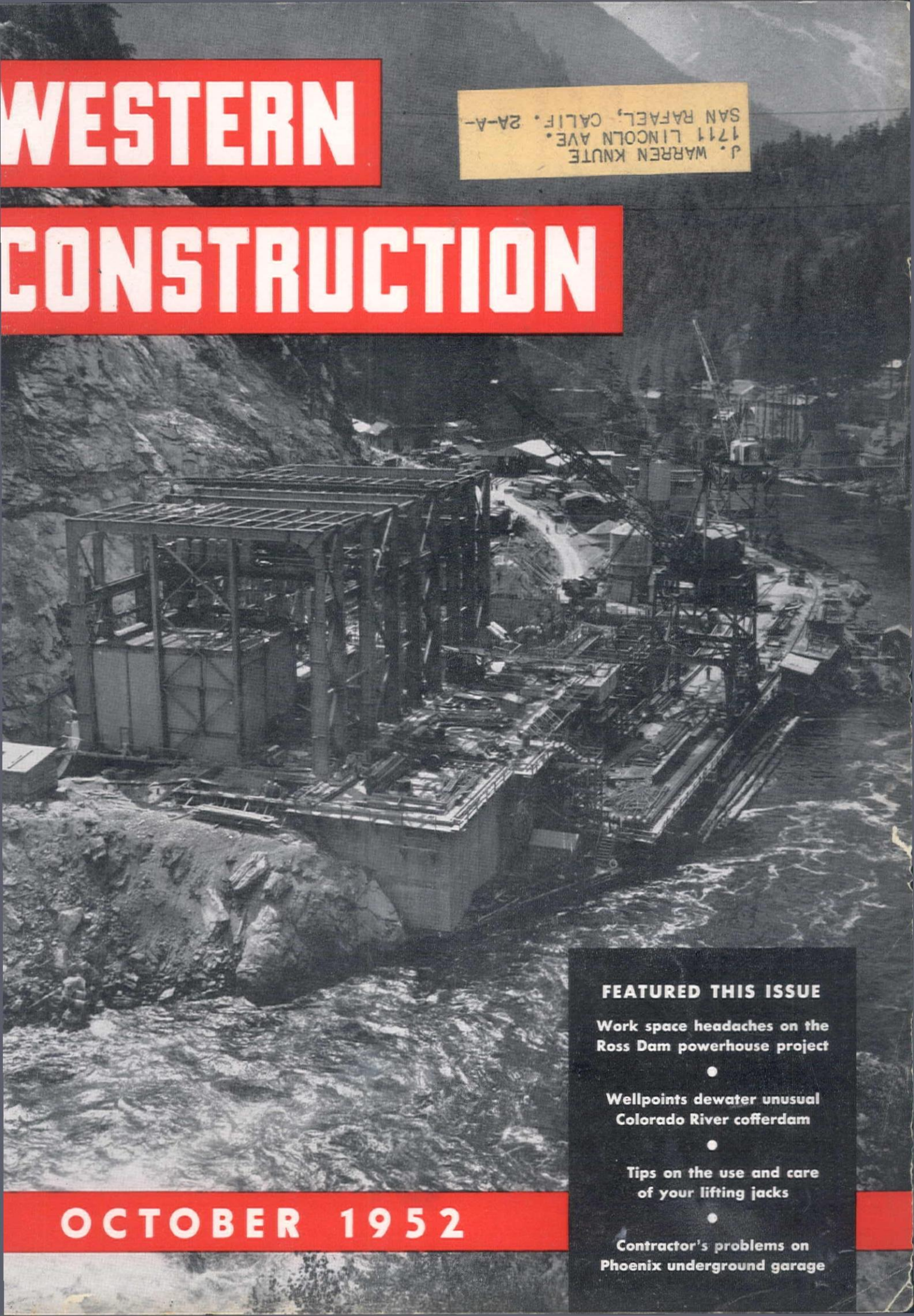
WESTERN CONSTRUCTION



FEATURED THIS ISSUE

Work space headaches on the Ross Dam powerhouse project

•

Wellpoints dewater unusual Colorado River cofferdam

•

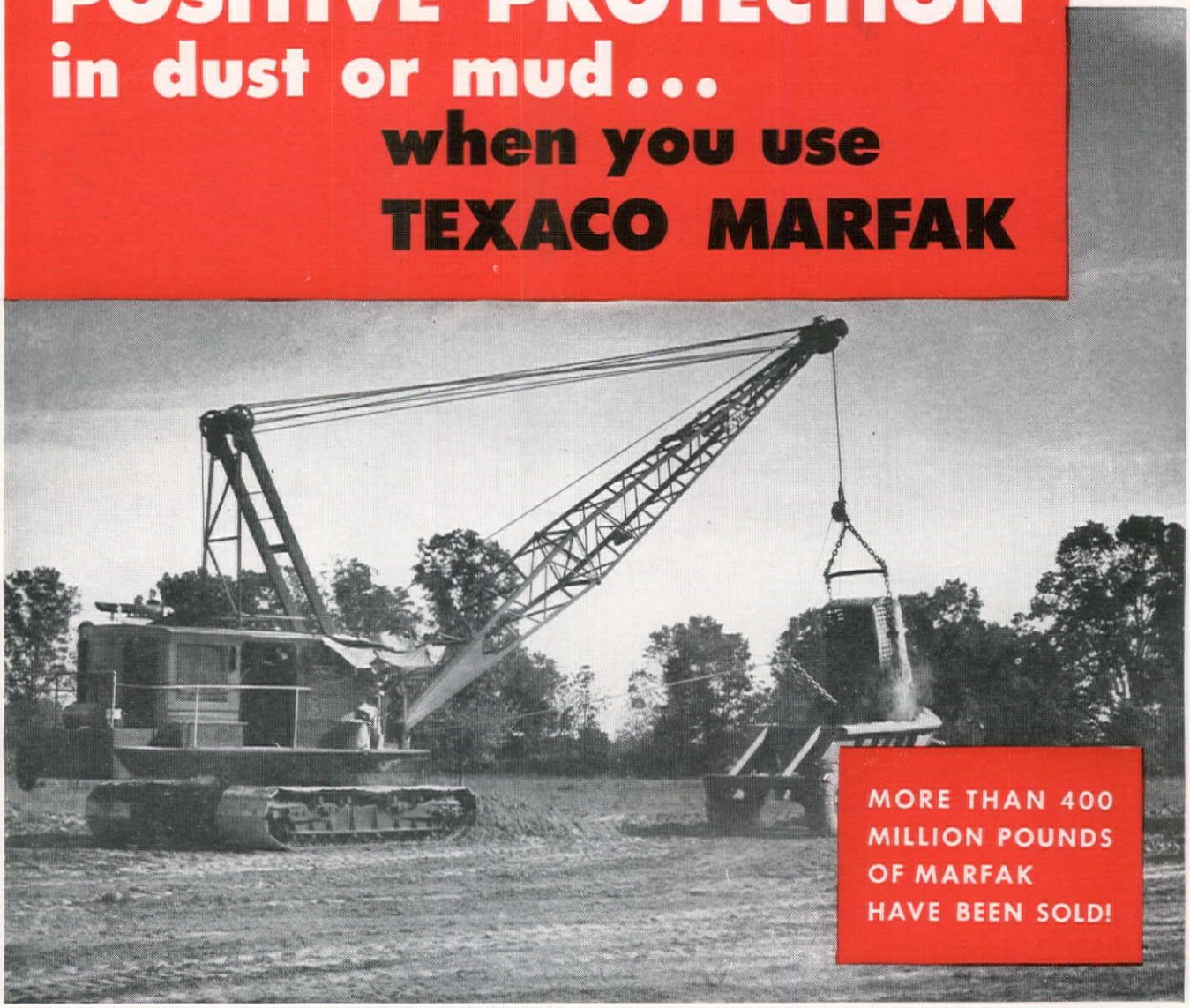
Tips on the use and care of your lifting jacks

•

Contractor's problems on Phoenix underground garage

OCTOBER 1952

POSITIVE PROTECTION
in dust or mud...
when you use
TEXACO MARFAK



Don't let dust, mud and moisture get in their "dirty work" on your equipment. Keep them *out* with *Texaco Marfak* – the tough, longer lasting chassis lubricant that *stays in* the bearings in spite of jolts, heavy loads and road splash. *Texaco Marfak* prevents rust, minimizes wear, prolongs the life of parts, reduces maintenance costs.

To assure the same fine protection for wheel bearings, use *Texaco Marfak Heavy Duty*. It seals itself in, seals out dirt and moisture. And there's added safety in the fact that it won't leak onto the brakes. No seasonal change is required.

Other Texaco Maintenance-Reducers

For engines, heavy-duty gasoline or Diesel, use *Texaco Ursa Oil X★★*. This fully detergent and dispersive oil cleans as it lubricates and has extra resistance to oxidation. Reduces fuel consumption and maintenance costs.

For crawler track mechanisms, use *Texaco Track Roll Lubricant*. It protects against dirt and moisture, guards against rust and wear, prolongs the life of parts.

Ask your Texaco Lubrication Engineer about the Texaco Simplified Lubrication Plan that lets you handle *all* your major lubrication with *only six* Texaco Lubricants. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

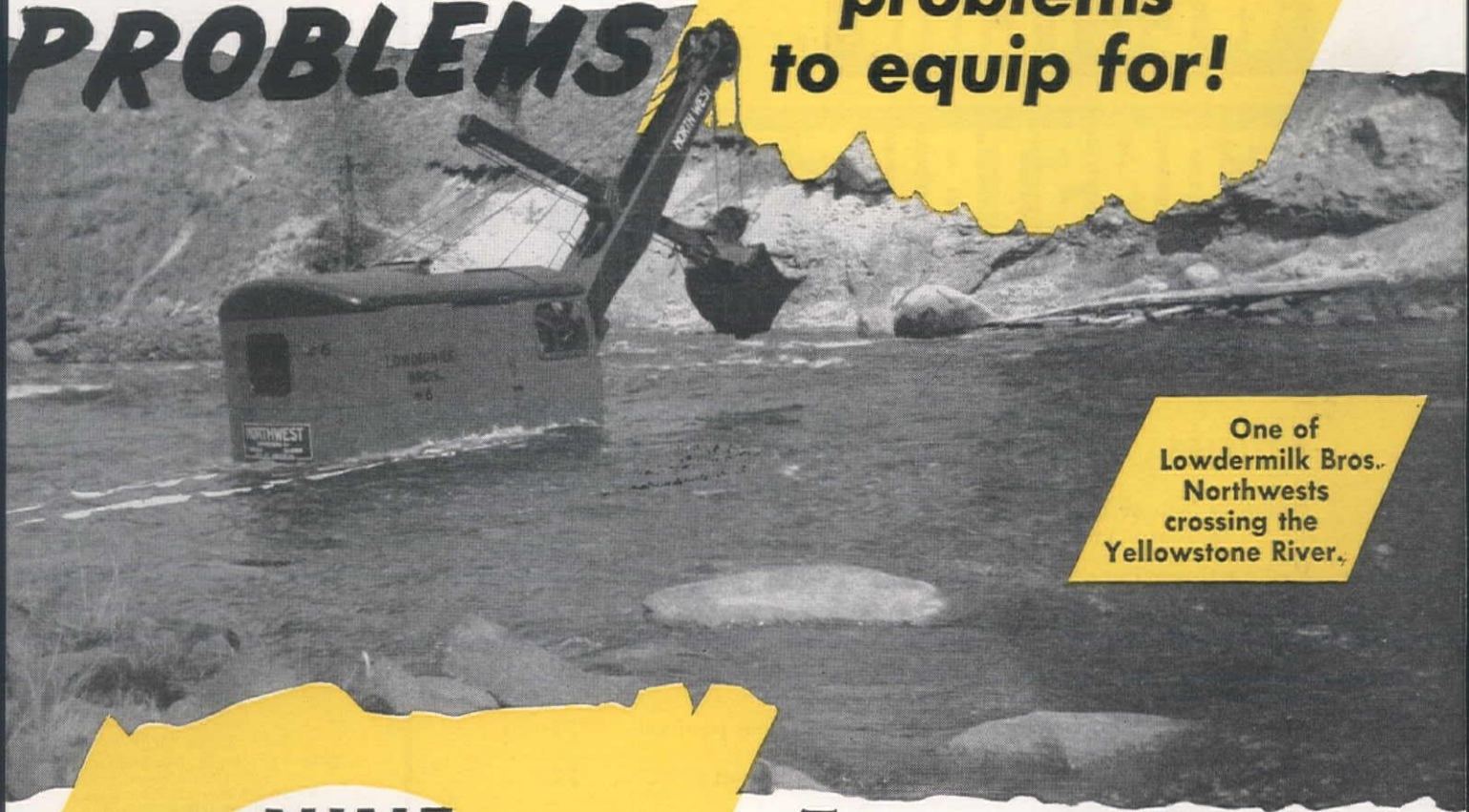
Faithfully yours

50 TEXACO 1902 1952

for Fifty Years

TUNE IN: Tuesday nights on television—the TEXACO STAR THEATER starring MILTON BERLE. See newspaper for time and station.

DIGGING PROBLEMS aren't the only problems to equip for!



One of Lowdermilk Bros.' Northwests crossing the Yellowstone River.

NINE NORTHWESTS for LOWDERMILK BROS. Denver, Colo.

THAT job you're on now—maybe it's pie—but what of tomorrow? That's the thing about Northwest equipment. It meets the daily, unexpected problems that every job presents.

It's a *real* Rock Shovel—you're set for the toughest digging—sure of higher output when the digging is easy. It is quickly converted and you have a recognized leader whether working as a Shovel, Crane, Dragline or Pullshovel.

Northwest crawlers have proved their worth many times over. Where there are grades to climb, streams to ford or rough going to negotiate, your Northwest gets you there—and back. These things mean money on the job. They're important on the profit side of the ledger.

These are just a few of the reasons why Lowdermilk Bros. of Denver, Colorado have bought nine Northwest machines.

You can plan to have Northwest advantages too. Why not talk it over with a Northwest man?

NORTHWEST ENGINEERING COMPANY
135 South La Salle Street, Chicago 3, Illinois

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Successful Contractors Stay Successful with Proved Equipment

WESTERN CONSTRUCTION

Volume 27 **OCTOBER 1952** Number 10

ARTICLES

DEPARTMENTS

FRONT COVER

HEMMED IN between the Skagit River and the steep walls of its gorge below Ross Dam, construction is constricted at Seattle City Light's $15,000,000 Ross powerhouse job. Supplied only by barges, but rushed by power needs of the Northwest, the project is an office engineer's nightmare but a tribute to construction industry ingenuity. Article on pages 72-76.

Photograph on August 20 by Robert Miller, Seattle City Light.

The Construction and Civil Engineering Publication of the West

★

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B.F.Goodrich

Tires in use twelve months —and never off the wheel!

● B. G. Young & Sons of Johnson City, Tenn., do general road contracting throughout Tennessee, North Carolina and Virginia. The company's 20 trucks, 6 tractors and 11 other off-the-road units roll daily over roads covered with sharp, blasted rock and gravel.

Take the unit pictured above, for example. Its tires have continuously carried 16 tons of equipment plus a payload of 20 tons of rock and dirt on just such roads for over a year. Yet not one of these B. F. Goodrich Universal tires has ever been removed from its wheel!

No wonder Mr. B. G. Young, partner of this company, says, "The service we obtain from B. F. Goodrich tires with the nylon shock shield is far and beyond anything we have experienced before."

Universal tires give such superior service even under the toughest operating conditions because the tread is made of specially-compounded, cut-resistant rubber. The tread wedges give positive 2-way traction. And Universal tires—like all tires of 8 or more plies in the complete B. F. Goodrich line—are built with the nylon shock shield, exclusive BFG development.

Layers of strong nylon cords, coated with rubber, lie between the tread and cord body. Under impact these cords stretch together to protect the tire body from shock. This shock shield increases tire mileage, boosts bruise resistance, means more tires can be recapped and reduces the danger of tread separation.

This is why Mr. Young adds: "We get more hours of service from BFG tires than from any other make we have ever used." — why his company uses B. F. Goodrich tires exclusively on its off-the-road equipment.

There's a B. F. Goodrich tire to meet your off-the-road requirements. Most of these off-the-road tires are also available in all-nylon construction. See your BFG dealer—he's listed under Tires in the Yellow Pages of your telephone book—or write: *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

Announcing the NEW Commander

ANOTHER Cedarapids PRODUCT

FOR HIGHER PERCENTAGES OF SECONDARY CRUSHING AND GREATER SCREENING CAPACITY

LARGER ROLL CRUSHER

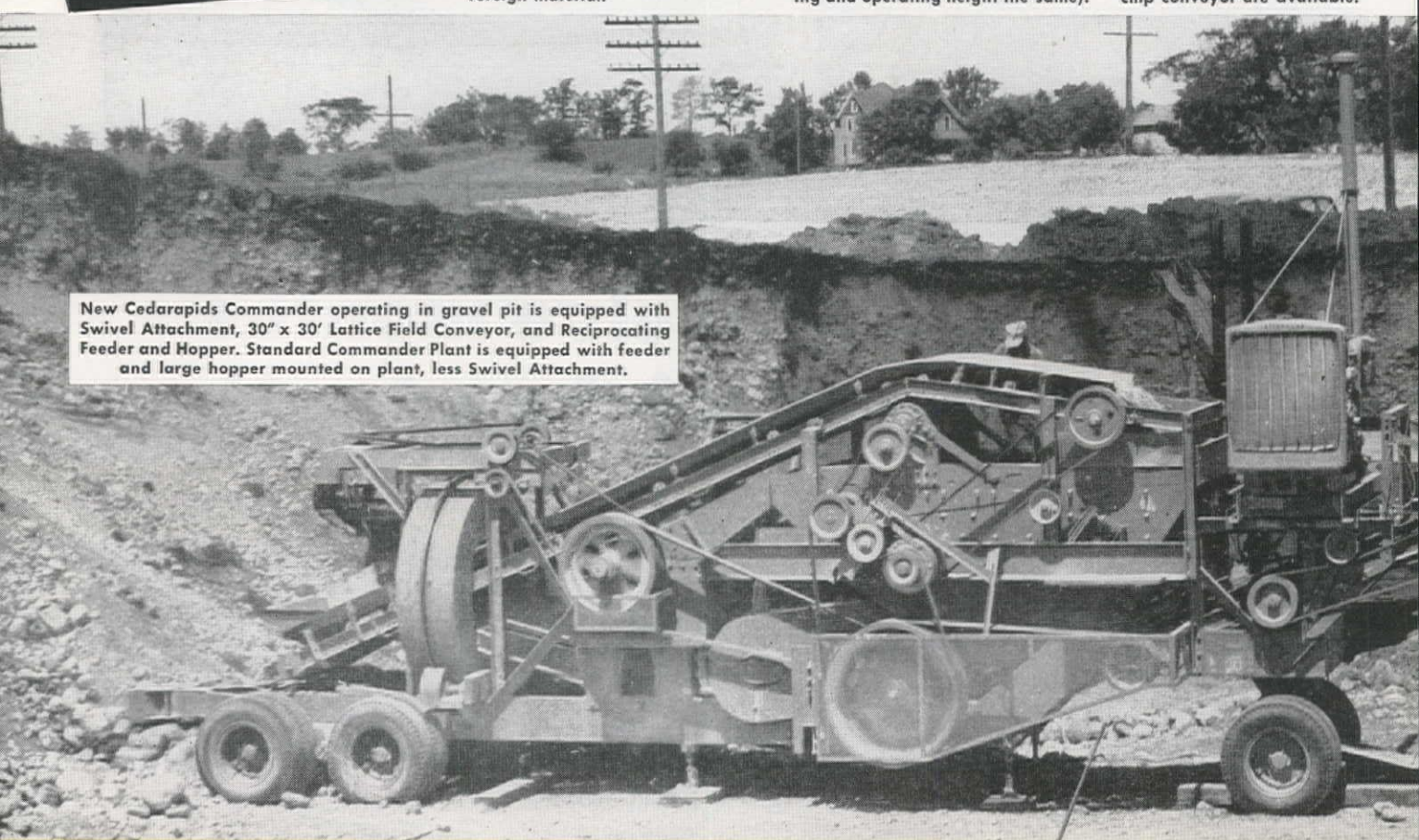
The 30"x22" Roll Crusher in the new Commander increases secondary crushing capacity by approximately 50% for the producer who needs greater output, or whose pit conditions put a bigger load on the secondary crusher. Heavy-duty construction features include: Smooth or corrugated manganese steel roll shells; Timken tapered roller bearings for maximum long wear and economical operation; Finger timing gears of chrome molybdenum and heavy chrome vanadium steel; Helical tension springs; Easy roll shell opening adjustment. Cedarapids patented safety shear plates prevent crusher damage from uncrushable foreign material.

LARGER SCREEN

The big 48" x 10' Screen on the Commander Plant gives you 30% more screening capacity! This, plus the more efficient screening action and the *extra* capacity of all Cedarapids Horizontal Vibrating Screens, assure big volume output of accurately graded aggregate. The top deck feeding principle used on Cedarapids Plants also increases capacity by eliminating any possible choke point. By making an immediate split of the pit material, the circulating load on crushers, belts and screens is reduced and the output of the plant is not limited by the capacity of the jaw crusher. Lower over-all head roomr equired (traveling and operating height the same).

LARGER CONVEYORS

The feed conveyor, delivery conveyors and under-crusher conveyor on the Cedarapids Commander have been widened to 30" to handle the increased capacity of this plant. The channel frame conveyors combine light weight with exceptional strength. Pulley shafts are fitted with sealed anti-friction bearings. The idler ball bearings are sealed for life. These belt conveyors are ideal for Commander Plants because they are built for continuous, efficient service under the toughest working conditions. As optional equipment, an 18" x 18' sand conveyor and an 18" x 27' chip conveyor are available.



New Cedarapids Commander operating in gravel pit is equipped with Swivel Attachment, 30" x 30' Lattice Field Conveyor, and Reciprocating Feeder and Hopper. Standard Commander Plant is equipped with feeder and large hopper mounted on plant, less Swivel Attachment.

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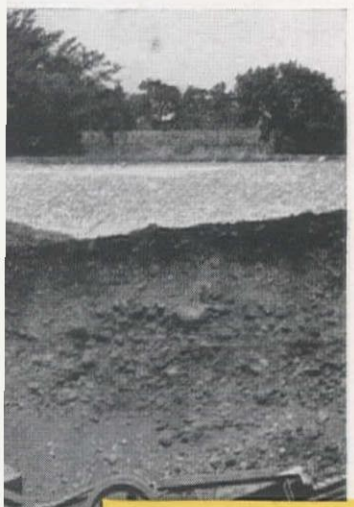
. . . PORTABLE CRUSHING AND SCREENING PLANT!

HERE'S a brand new gravel crushing and screening plant designed specifically to meet the demand for *much greater tonnages of fine-crushed products.* The Cedarapids Commander has approximately the same over-all dimensions as the popular Cedarapids Junior Tandem, but it contains a *bigger* Roll Crusher, a *larger* Horizontal Vibrating Screen and *wider* Conveyors to handle the increased capacity. More secondary crushing and greater screening capacity give you a big advantage in any pit, but are especially profitable where there is a high percentage of pit material to be crushed.

The Commander's big-volume output is combined with extreme portability and flexibility to handle a wide range of crushing and screening conditions . . . *and you get the same low maintenance and operating costs that are standard in the Junior Tandem!* It adds up to a pleasant profit picture in today's booming aggregate market. Find out about *all* the many new Commander features that help you command the market, the bidding, the pit conditions and the profit potential on every job. See your Cedarapids distributor today.



. . . and a host of other big-production features . . .

- **Swivel Feed Attachment (optional) to drive 30" x 30' lattice frame feed conveyor (as shown in picture).**
- **30" Reciprocating Feeder and Hopper, clutch controlled from operator's platform or ground, assure a steady, workable flow of material. A weight-loaded metering gate regulates the feeding for properly balanced plant operation.**
- **75" x 22" Elevating Wheel Return System makes the Commander shorter and narrower for easier transportation, and speeds handling of material from crushers to screen.**
- **Sand Ejector Screw, 12" diameter and 4' long, is used under the screen for discharging sand onto the sand conveyor. Optional equipment.**
- **The Commander is easily converted into a high capacity rock plant by using a Cedarapids 2236 AAA or 2540 AAAA Portable Primary ahead of it.**
- **Highly portable for easy moving from pit to pit. Fast set-up and take-down minimize lost time between jobs.**

It's another reason why so many contractors BUY CEDARAPIDS!

The development of new products to meet the constantly increasing demands for greater production of specification aggregate with no increase in operating and maintenance costs, is still another reason why more and more aggregate producers *Buy Cedarapids.*

Cedarapids equipment is produced in such a wide range of sizes and types, and designed for such a wide variety of work that selection of the proper machine for your specific job is no problem . . . and you are sure of getting equipment which is as modern and efficient as constant engineering research and precision methods of manufacture can make it. Iowa fully understands the needs of producers because Iowa Engineers keep in close contact with the problems of the field.

Cedarapids

Built by IOWA

IOWA MANUFACTURING COMPANY

CEDAR RAPIDS, IOWA, U.S.A.

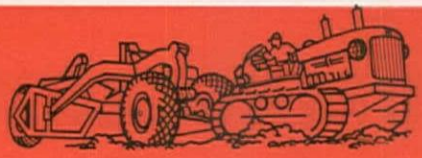
It's the Operators'

BEST BY A DAM SITE. Troy Hood and Jack Rank (shown here with Dirt Foreman Sam Crawford) operate TD-24s for Guy H. James, building the great Oahe Dam in South Dakota. Hood says: "I can keep right behind the scrapers—catch 'em sooner and push 'em out faster because TD-24 controls are easier." And Rank chimes in: "Much easier to handle than any other tractor."

"ALMOST THINKS FOR ITSELF!" That's what Jess Leatherwood says about the Big Red TD-24 he operates for Macon Construction Co., Franklin, N. C. "It pushes more, moves it faster and handles easier than any other crawler I've ever been on."

"WE RIP PLACES YOU'D USUALLY HAVE TO BLAST," says another Macon operator, Roy Cantrell. "We've been working in the Blue Ridge Mountains on rock you couldn't touch with a dozer till the TD-24 came along. Now we blade where we couldn't scratch before, and rip where we used to dynamite!"

"OUR TD-24s REQUIRE LESS SERVICE," says John Tickler, Service Superintendent for John E. Bloomer Construction Co. "These big red machines are very accessible, very easy to maintain. And when we do need help, the International Distributor is always on the job!"



Crawler!

Read what the operators and servicemen say about "Big Red", the International TD-24...

"HOW DO I LIKE 'BIG RED'?" asks George Miller. "Listen: This TD-24 is just the fastest and surest handling tractor there is, that's all! Nothing I've seen can touch it for moving dirt." George and his TD-24 move dirt in North Carolina for Kiker & Yount Construction Co.

"GREATEST THING I'VE SEEN," says Bruce Olson (right), TD-24 operator and Sec.-treas. of G. A. Olson Construction Co., Marshall, Minn. "The TD-24 is the easiest crawler of all to operate. The high-low shift is great for whipping around to the cut after dumping the load. It's the fastest equipment going for anything up to a 3,000-foot cycle!" Man in center is Glen Olson, Bruce's brother and company president. At left is Superintendent Donald Young.

Ask the men who know. Ask the operators. They know that *this* makes "Big Red" the Champ:

TD-24 POWER

148 maximum drawbar horsepower, more than any other crawler on the market.

TD-24 SPEED

Up to 7.8 m.p.h. with 8 forward speeds, 8 reverse. Moves loads faster, gets back quicker for more work-cycles per hour.

TD-24 STEERING

Fingertip control for pivot-turns, feathered-turns and *turns with power on both tracks.*

TD-24 STARTING

Exclusive International push-button starting for quick starts any time in any weather.

Want to know more reasons why the Big Red TD-24 is the work-champ of the world?

Ask your International Industrial Distributor. Ask TD-24 operators. Ask the men who know—and you'll be a TD-24 man yourself from then on in!

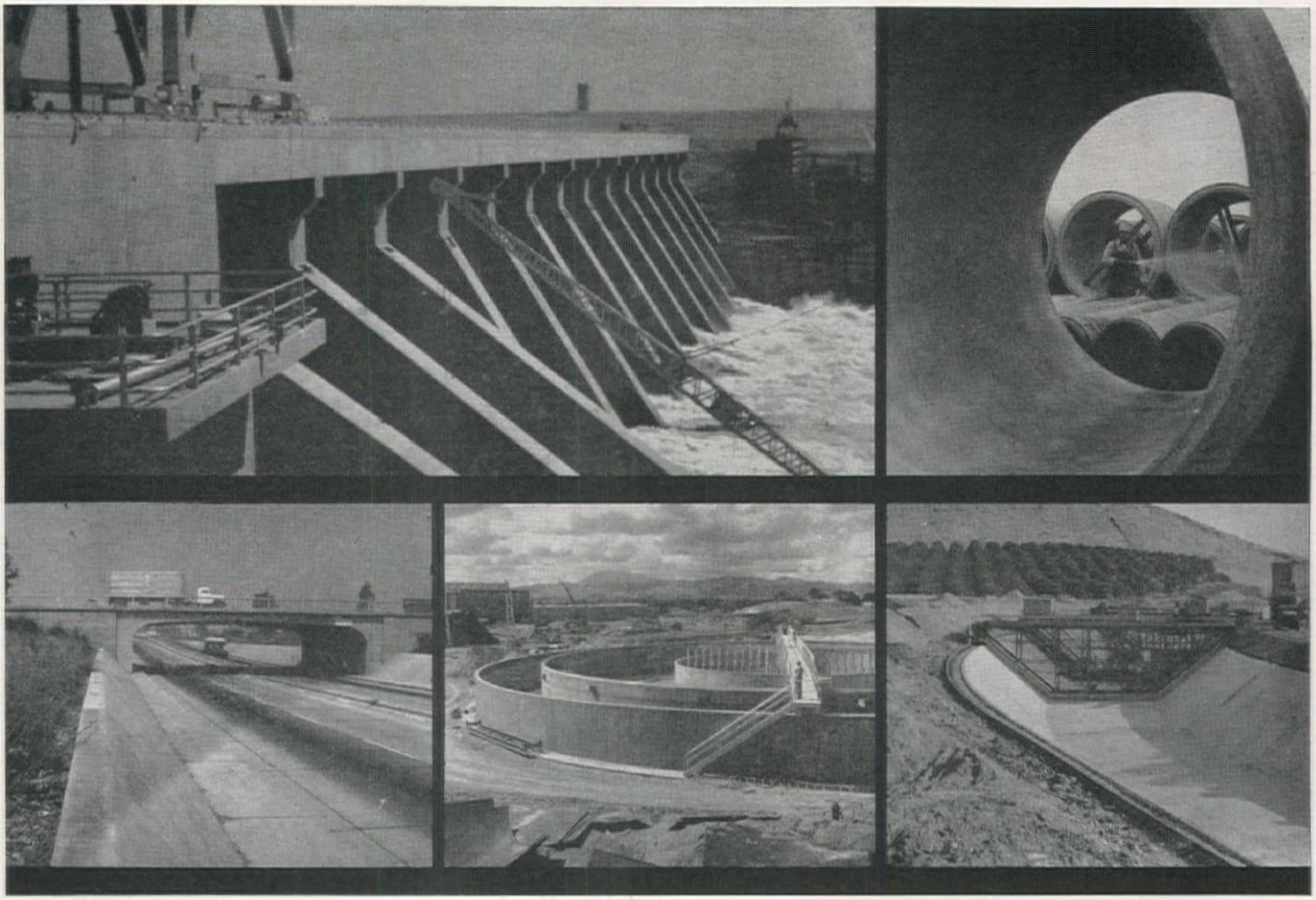
INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

SEE YOU AT THE POLLS!

INTERNATIONAL HARVESTER

INTERNATIONAL

POWER THAT PAYS



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Cement users in the West are faced with many problems in concrete construction not generally found in other parts of the nation. Weather conditions range from semi-tropical heat to sub-zero cold. Great areas of desert land are separated by only a few miles, from regions of torrential rain. These extremes in temperature and humidity can cause wide variations in setting time and ultimate strength of concrete.

Concrete research by such agencies as the Bureau of Reclamation and the California Highway Department indicated that no one type of cement would produce durable concrete under conditions which are encountered in the West. As a result of these surveys, PERMANENTE manufactures fifteen different types of standard and special purpose cements—cements specially designed to meet every construction problem that may confront Western builders.

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On the job - On time

PERMANENTE

CEMENT COMPANY

PERMANENTE, SANTA CLARA, YOSEMITE AND KAISER BRANDS OF PORTLAND CEMENT AND PERMANENTE LIME PRODUCTS

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P&H STABILITY

MEANS FASTER DIGGING!

Whatever the attachment . . . shovel, dragline, hoe, clamshell or pile driver . . . P&H gives you more production. Why? Because P&H's lower center of gravity and better weight distribution let you apply more power at the business end. You can put "more on the hook" — dig harder — work faster!

Modern design contributes still more speed with advantages like true tractor-type crawlers, easy hydraulic control, all-welded construction, live roller circle — and many others. See your P&H dealer today.

Remember: faster production means lower costs!

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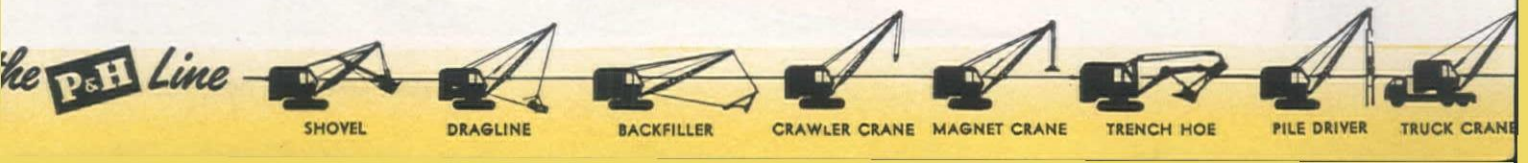
The P&H Line

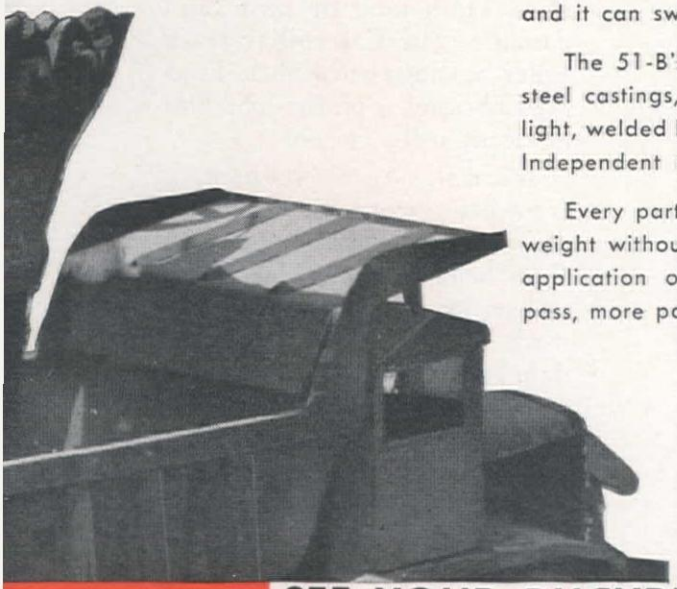


DEADWEIGHT . . .

counts more than ever

and it's yours with Bucyrus-Erie's 2-yd. 51-B

⅜ to 4-yd. Gasoline, Diesel, Electric Excavators



HERE'S an excavator that combines built-in durability with weight economy to give bigger output with less maintenance.

For instance, the 51-B's revolving frame is a single box-section casting of annealed steel . . . specially developed and cast by Bucyrus-Erie. This solid "backbone" provides real rigidity for machinery alignment — yet holds weight to a minimum. As a result, vibration is minimized in the 51-B . . . and it can swing fast, work at a profit-building pace.

The 51-B's truck frame and caterpillar side frames are single annealed steel castings, too — for strength with light weight. Boom and handle are light, welded box-sections that provide ample strength for all working stresses. Independent rope crowd eliminates the need for heavy boom machinery.

Every part of the 51-B reflects advanced engineering that cuts out dead weight without compromising strength. This means you get most economical application of power and lowest upkeep — with bigger payloads every pass, more passes every day.

67E52C

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

Most Compared Most Preferred

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SHOVELS • DRAGSHOVELS • DRAGLINES • CLAMSHELLS • CRANES

How to cut a time schedule 25%

The Skousen-Hise Contr. Co. of Albuquerque is cutting a new four-lane highway for U. S. 66 through New Mexico's Tijeras Canyon. So far they've also cut their time schedule for the job a full 25%.

One reason for this amazing record is the "Caterpillar" equipment on the job: a D13000 Diesel Engine in this Northwest Shovel, six D8 Tractors, a D7 and a D6 Tractor and two No. 12 Motor Graders.

The D13000 Diesel Engine in this shovel has been going almost constantly since 1938. On this highway job it's helping to move a million yards of granite rock—the kind of rough duty it was designed and built to handle. For this Diesel was built with care: its "wet" type cylinder liners, for instance, are Hi-Electro hardened, then chemically treated to assure smooth break-in with the rings. And like all 12 sizes of "Cat" Diesel Engines, it runs on low-cost, non-premium fuel without danger of fouling.

"Caterpillar" Engines are available in machines built by the leading equipment manufacturers. So take a tip from the experience of Skousen-Hise: cut your own work schedules by specifying "Caterpillar" power in the equipment you buy.

CATERPILLAR, SAN LEANDRO, CALIF.; PEORIA, ILL.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

You owe it to yourself to check...

"KOEHRING WORK CAPACITY"

WITH any crane or excavator, all mechanical features and operating advantages, speeds and capacities, contribute to one deciding factor . . . *cost per ton lifted or yard moved.* To make sure you get the biggest value in cranes and excavators, you owe it to yourself to measure by "KOEHRING WORK CAPACITY". For specific figures, see your Koehring distributor.

SEE YOUR KOEHRING DISTRIBUTOR FOR COMPLETE FACTS

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JOHNSON CONCRETE PLANTS

"Complete package" for transit-mix

. . . Specially developed for a western transit mix company this plant is typical of Johnson "complete package" engineering. Quickly erected, all-welded tandem bin has 110 cu. yd. total capacity, and consists of four 19-yd. aggregate compartments and a 250-bbl. central cement tank. 2-yd. Concentric Batcher assures accurate production at high speeds. Plant is also fully Johnson-equipped with truck-receiving hopper, screw conveyor, enclosed elevator and 520-bbl. aerated silo for cement . . . truck unloading hopper, open type inclined elevator for aggregates.

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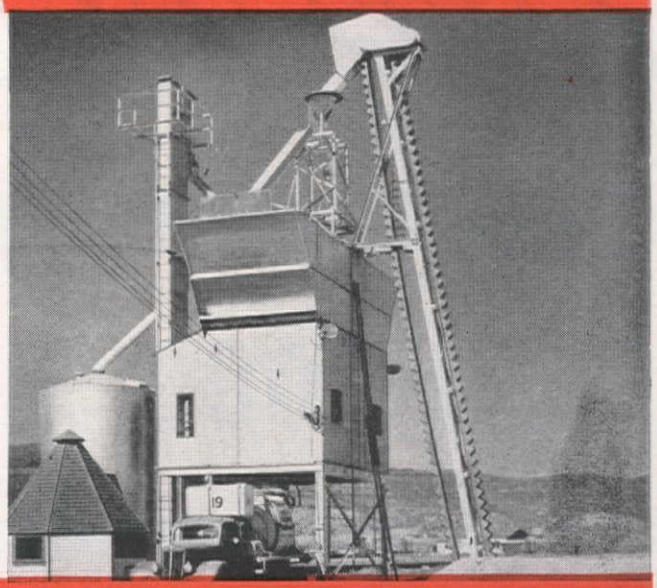
WESTERN MACHINERY CO.....Salt Lake City
NEIL B. McGINNIS CO.....Phoenix
THE HARRY CORNELIUS CO.....Albuquerque
SHAW SALES & SERVICE CO.....Los Angeles
COAST EQUIPMENT COMPANY.....San Francisco
KING AND EAST MACHINERY CORP.....Denver
ENGINEERING SALES SERVICE, INC.....Boise



PARSONS TRENCHLINERS®

202 digs 6.2 in. to 18.5 ft. per min.

. . . has 30 digging feeds . . . 9 trenching widths from 13 to 31 inches wide . . . depths to 6 feet. Digging wheel is friction-clutch controlled for extremely accurate grading on drainage, pipeline, irrigation and utility trenching jobs. Other 202 advantages: quick-change bucket fronts with cutting lips or digging teeth; easy-in, easy-out "Tap-In" teeth; 16 or 20-inch crawler treads; gas or diesel engine. Tile box and chute optional. Also check Parsons wheel-type 215 for special pipeline work; 3 ladder-types full crawler mounted; and utility-size rubber-tired Trenchliner.

AMERICAN MACHINE COMPANY.....Spokane
PACIFIC HOIST & DERRICK CO.....Seattle
COLUMBIA EQUIPMENT CO.....Boise, Portland
HARRON, RICKARD & McCONE CO. OF SO. CALIF.....Los Angeles
McKELVY MACHINERY CO.....Denver
KIMBALL EQUIPMENT CO.....Salt Lake City
NEIL B. McGINNIS CO.....Phoenix
THE HARRY CORNELIUS CO.....Albuquerque
SAN JOAQUIN TRACTOR CO.....Bakersfield
ENGINEERING SALES SERVICE, INC.....Boise
KOEHRING CO., WEST COAST SALES DIVISION.....Stockton

KWIK-MIX 11-S DANDIE® and MOTO-BUG®

7-second discharge on 11-S

. . . in only 2 revolutions of the drum, exclusive Flow-Line Discharge Chute pours a full 12.1-cu. ft. batch of concrete. Chute is tilted, reaches far into drum, intercepts each bucket load without changing natural flow line of mixed concrete. 11-S has side or end discharge, 2 or 4 wheels, tower attachment. Other Kwik-Mix units: 3½-S, 6-S, 16-S Dandies; bituminous; tilting and non-tilting plaster-mortar mixers. **MOTO-BUG,** Kwik-Mix power wheelbarrow shown here, hauls 10 cu. ft., is fully powered forward and reverse . . . has interchangeable flatbed, fork lift, also scraper blade.

AMERICAN MACHINE COMPANY.....Spokane
PACIFIC HOIST & DERRICK CO.....Seattle
COLUMBIA EQUIPMENT CO.....Boise, Portland
HARRON, RICKARD & McCONE CO. OF SO. CALIF.....Los Angeles
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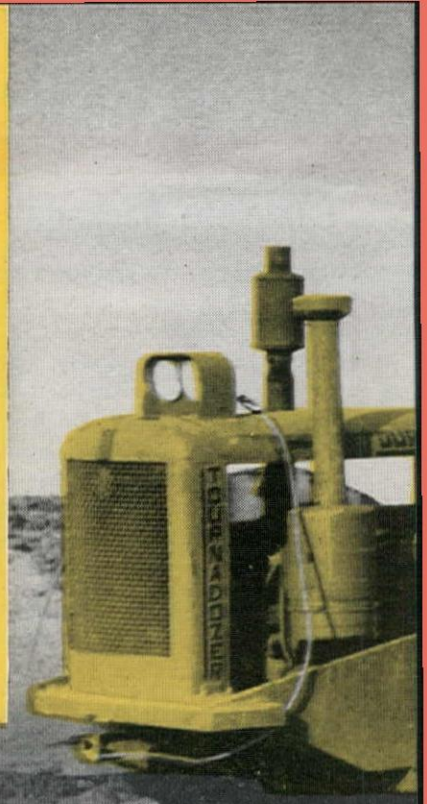
SAN JOAQUIN TRACTOR CO.....Bakersfield
ENGINEERING SALES SERVICE, INC.....Boise
KOEHRING CO., WEST COAST SALES DIVISION.....Stockton

MOVING lake-bottom gumbo over 1000′ hauls



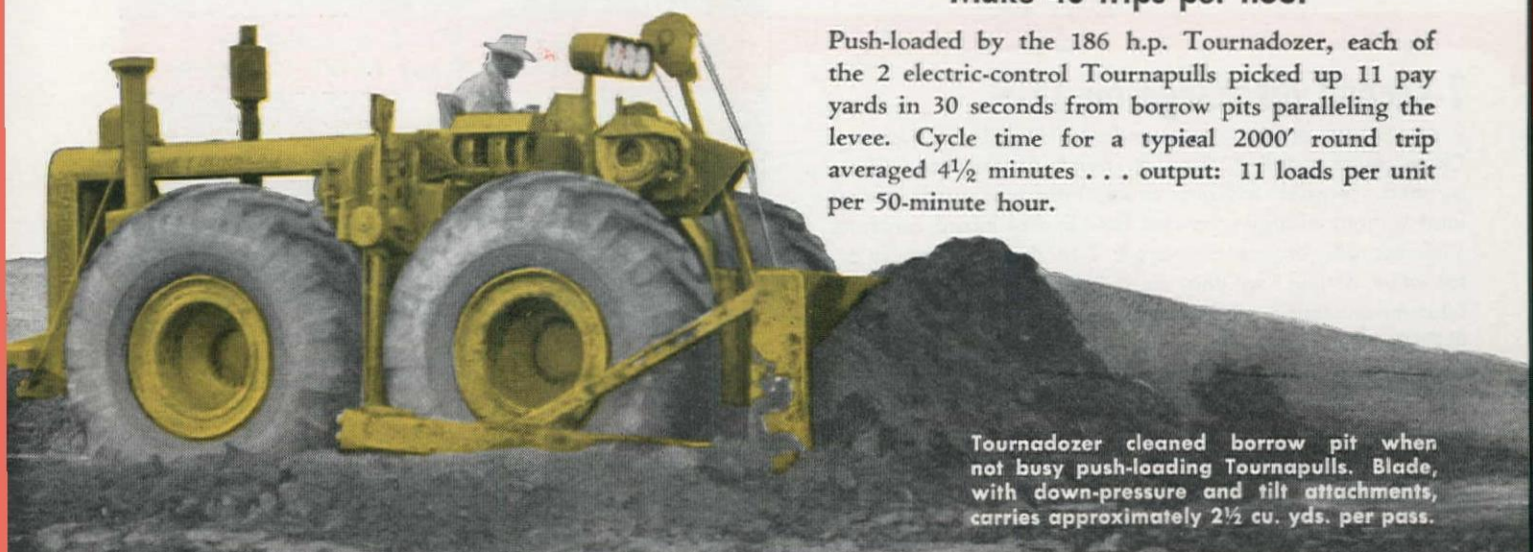
4 Tournapulls deliver 127,500 yds. in 280 hours

When Richter Bros. of Oroville, Calif., contracted to raise and widen Cousin Levee at Tulare Lake near Corcoran, they brought in their 2 electric-control C Tournapulls, 2 Super C Tournapulls, and a rubber-tired Tournadozer. The job was a tough one.

About 150,000 yards of lake-bottom gumbo had to be moved, much of it after heavy rains. Material was heavy, extremely sticky, and hard to handle. Haul distance included 40′ of 15% adverse grade up ramps onto top of levee.

Make 40 trips per hour

Push-loaded by the 186 h.p. Tournadozer, each of the 2 electric-control Tournapulls picked up 11 pay yards in 30 seconds from borrow pits paralleling the levee. Cycle time for a typical 2000′ round trip averaged 4½ minutes . . . output: 11 loads per unit per 50-minute hour.



Tournadozer cleaned borrow pit when not busy push-loading Tournapulls. Blade, with down-pressure and tilt attachments, carries approximately 2½ cu. yds. per pass.

Arizona — Phoenix
ARIZONA EQUIPMENT SALES, INC.

California — Los Angeles, Bakersfield
CROOK COMPANY

Idaho — Pocatello
ROCKY MT. MACHY. COMPANY

California — Oakland
BAY CITIES EQUIPMENT, INC.

Colorado — Denver
COLORADO BUILDERS' SUPPLY CO.

Montana — Helena, Billings
MONTANA POWDER & EQUIP. CO

Tournadozer, shown here loading an electric "C", serviced all 4 Tournapulls on hauls which averaged 1000 ft. The 4 'Pulls placed about 3550 pay yards of gumbo on the fill per 8-hour day . . . in the first 35 working days, moved 127,500 pay yards.

The 2 Super C's, also push-loaded by the Tournadozer, averaged 1 minute longer over same cycle . . . moved 9 loads per unit per 50-minute hour.

"Work where other rigs can't"

This difference in output is due mainly to the new "C's" speed and greater tractive ability. "Electric power steer and torque-proportioning differential are the best features of these new rigs," says Partner William Richter, LeTourneau owner since 1935. "The differential enables these machines to walk through tough going where competitive machines cannot go."

You, too, can make C Tournapull's speed, electric controls, and all-weather production ability pay off on your job. See your LeTourneau Distributor and get all the facts on Tournapulls and Tournadozers.

Tournapull, Tournadozer-Trademark Reg. U.S. Pat. Off. PD-189-A

TOURNAPULL TIME STUDY

Haul	1000′ one-way, including 40′ of 15% adverse grade
Material	Heavy, wet gumbo
Loads	10 to 11 pay yards (with Tournadozer pusher)
Trips	11 per unit (per 50-min. hr.)
Pay yds. per hr.	110 to 121 per unit

MECHANICAL EFFICIENCY
95% over 1090 working hours

METHOD OF TRAVEL TO JOB
Over main highways under own power

Distance	From Oroville to Corcoran, 300 miles
Travel time	14 hours (21.4 m.p.h.)

New C Tournapulls now have capacity of 16 yards heaped, 2 yards more than machines described here.

Nevada — Reno
SIERRA MACHINERY CO., INC.

Oregon — Portland, Eugene
LOGGERS & CONTRACTORS MACHY. COMPANY

Washington — Spokane, Seattle
MODERN MACHINERY CO., INC.

New Mexico — Albuquerque
CONTRACTORS EQUIP. & SUPPLY CO.

Utah — Salt Lake City
ROCKY MT. MACHY. COMPANY

Wyoming — Casper
COLORADO BUILDERS' SUPPLY CO

Two of the inspections for fuel pump gears, checks for thickness and parallelism of faces, determine whether machining tolerances to within five ten-thousandths of an inch were held on these parts.

CUMMINS® DIESEL PARTS
give more service!

When your Cummins Diesel requires scheduled overhaul or non-scheduled emergency service, install Genuine Cummins Parts. Because we take *twice* the care in manufacture, every Genuine Cummins Part *fits* exactly, has *longer* life, gives you *trouble-free* service. You'll get added years of dependable performance from your Cummins Diesels when you *insist* on Genuine Cummins Parts.

Only Cummins Dealers, located from coast to coast, sell Genuine Cummins Parts. Contact the dealer nearest you from the list below.

CUMMINS ENGINE COMPANY, INC. · COLUMBUS, INDIANA

Diesel power by CUMMINS

CUMMINS Dependable DIESEL

TRADEMARK REG. U. S. PAT. OFF.

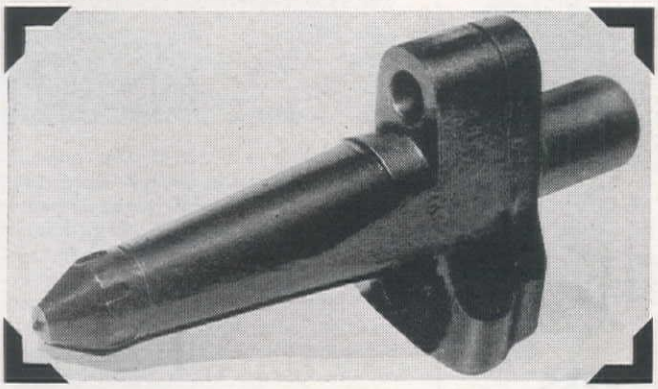
SEATTLE, Cummins Diesel Sales of Washington, Inc.: 2520 Airport Way, Seattle 4, Wash., Tel. Main 7160. *Authorized Sales & Service:* Kenny's Cummins Diesel Service, Aberdeen, Wash.; Yakima Commercial Co., Yakima, Wash. . . . **SPOKANE, Cummins Diesel Sales, Inc.:** S. 155 Sherman St., Box 2185, Spokane 5, Wash., Tel. Madison 0101 . . . **BOISE, Cummins Diesel Sales of Idaho, Inc.:** 1204 Front St., Boise, Idaho, Tel. 3783 . . . **PORTLAND, Cummins Diesel Sales of Oregon, Inc.:** 1225-1235 S. E. Grand Ave., Portland 14, Ore., Tel. East 7146. *Branch:* 731 Garfield St., P.O. Box 367, Eugene, Ore. *Authorized Sales & Service:* Diesel Sales & Service, Inc., Grants Pass, Ore. . . . **SAN FRANCISCO, Watson & Meehan:** 1960 Folsom St., San Francisco 3, Cal., Tel. Market 1-8930. *Branch:* 248 Palm Ave., Fresno 3, Cal. *Authorized Sales & Service:* Connell Motor Truck Co., Stockton, Cal.; Frank J. Coyle, Sacramento, Cal.; Connell Motor Truck Co. of Redding, Redding, Cal.; Fred E. Barnett Co., Eureka, Cal.; Nevada Transit Co., Reno, Nev. . . . **LOS ANGELES, Cummins Service & Sales:** 1661 McGarry St., Los Angeles 21, Cal., Tel. Prospect 1021. *Branch:* 401 Golden State Highway, Bakersfield, Cal. *Authorized Sales & Service:* Leo's Diesel Service, Blythe, Cal.; Smith's Diesel Sales, Colton, Cal.; Rhyne's Automotive Service, El Centro, Cal.; San Luis Truck Service, San Luis Obispo, Cal.; F. R. Laux Diesel Service, San Diego, Cal.; Hanson Equipment Co., Santa Maria, Cal.; Newton Automotive Service, Baker, Cal. . . . **PHOENIX, Cummins & Moran:** 1350 N. 22nd Ave., Phoenix, Ariz., Tel. 8-2668. *Branch:* 1921 N. Broadway, Albuquerque, N. M. *Authorized Sales & Service:* Cooper Tractor Service, Yuma, Ariz.; Stirling Diesel Service, Las Vegas, Nev.; Willis Diesel Engine Service, El Paso, Texas . . . **SALT LAKE CITY, Cummins Intermountain Diesel Sales Co.:** 1030 Gale St., Salt Lake City, Utah, Tel. 9-3768. *Authorized Sales & Service:* Wally's Chevron Truck Service, Cedar City, Utah; Automotive Body and Machine, Inc., Idaho Falls, Id.; Jim Macy's, Blue Bell Truckatorium, Rock Springs, Wyoming . . . **DENVER, Cummins Diesel Sales of Colorado, Inc.:** 2450 Curtis St., P.O. Box 507, Denver 5, Colorado, Tel. Acoma 5933. *Branch:* 119 N. Colorado Ave., Casper, Wy. *Authorized Sales & Service:* La Plata Repair Shop, Durango, Col.; Hallam & Boggs, Grand Junction, Col.; Cortez Diesel Sales, Cortez, Col.; Western Motor Truck, Inc., Scottsbluff, Neb.; Century White Truck Co., Casper, Wy. . . . **BILLINGS, Cummins Diesel Sales of Montana, Inc.:** 4322 State St., Billings, Mont., Tel. 8904 and 9-8800. *Branch:* Fifth and Omaha, Rapid City, S. D.

(1-11-52)

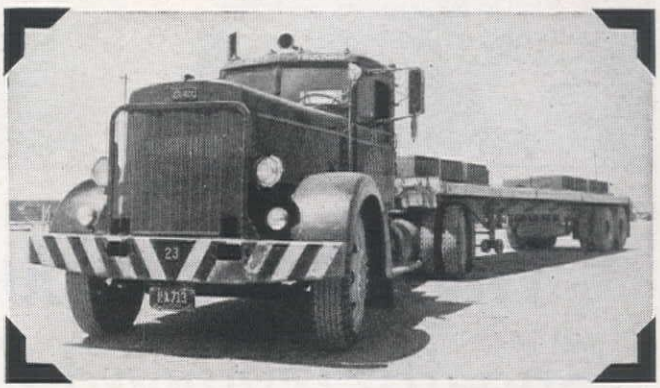
STANDARD ENGINEER'S REPORT

DATA	
PRODUCT	Standard Diesel Fuel
UNIT	50 Cummins diesels — 275, 200, 165 H.P.
CONDITIONS	Fast highway freight service
LOCATION	Pittsburg, Calif. to Los Angeles
FIRM	J. A. Nevis Trucking Pittsburg, Calif.

100,000-mile service period average for injectors!



THIS INJECTOR is exactly as it came out of an H165 Cummins truck engine for the first time, after 115,000 miles of operation on Standard Diesel Fuel. The engine was running good and all injectors functioning properly when the truck came in for general overhaul. Burning Standard Diesel Fuel, the more than



50 engines in the J. A. Nevis Trucking fleet go an average of 100,000 miles before injector cleaning is required. "With Standard Diesel Fuel, we've had as much as 6 years of good service from injectors", says Geo. Rabideau, Shop Foreman. "It gives us better all-around service than any other brand."

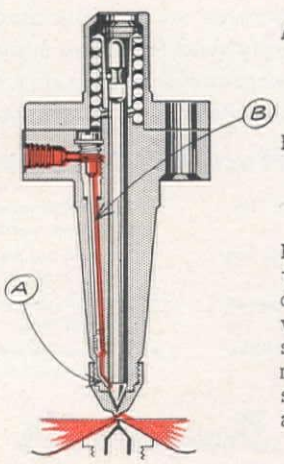
RPM DELO SPECIAL LUBRICATING OIL in crankcases of J. A. Nevis' diesels also gives outstanding service. This assembly was in one of the truck engines for 110,000 miles and was replaced only because of mechanical problems not connected with lubrication. Taper in the sleeve was only 0.003. Rings were all good and machined marks on the piston skirt still intact.

STANDARD DIESEL FUELS — RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

REMARKS: Standard Diesel Fuel and RPM DELO Oil work together to develop the highest efficiency in diesel engines. The fuel is made to exact specification; the oil contains compounds to keep engines clean and prevent wear.

How Standard Diesel Fuel cuts repairs and ups engine efficiency



A. Cleanliness, and viscosity within correct limits prevent wear of fuel parts.

B. Low pour-point assures free flow in all temperature conditions.

Proper ignition qualities and controlled distillation range provide even burning and sustained power with minimum combustion shock, quick starting and smooth idling.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

PANEL DISCUSSION

Plywood Forms Play Important Role in Parkmerced Project

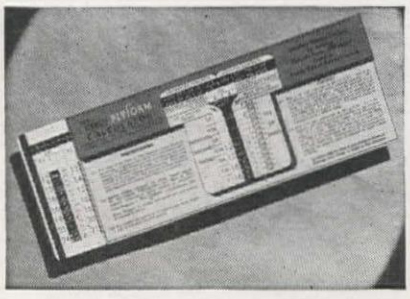
Three prime factors—re-use, speed and appearance—dictated specification and use of plywood forms for both interior and exterior concrete surfaces on the new Parkmerced apartment project, San Francisco.

According to W. A. Bender, superintendent for Starrett Bros. & Eken, Inc., contractors on the job, plywood panels gave up to 15-18 re-uses, helped speed formwork application time and construction costs by about 20 percent and produced uniformly smooth, fin-free concrete surfaces. In fact, Bender reports, plywood-formed ceiling slabs were smooth enough to be painted after a minimum of grinding and application of spackling material—permitting a savings by eliminating expensive plastering.

Large built-up form sections 11-feet high and ranging from 20 to 48-feet long, were used on the walls. Forms were built of ¾" Exterior plywood, nailed to 2x4 studs, 12", o.c., backed by 2x4 and 3x4 walers. After each pour, sections were stripped and raised to the next story. Forms were used 13 times on the eleven 13-story tower buildings, then in some cases re-used further on the two-story Colonial type apartment buildings which dot the 200-acre tract.

Parkmerced was planned and built by Metropolitan Life Insurance Co. General Contractor: Starrett Bros. & Eken, Inc. Dinwidde Construction Company was the subcontractor on concrete work. Leonard Shultze & Associates were the architects, with the firm of Thompson and Wilson serving as architectural consultants.

PlyForm Calculator Available



A handy slide rule calculator which gives plywood form construction data is available for $1.00 from Douglas Fir Plywood Assn., Tacoma, Wash. Included with the PlyForm calculator is a leaflet of design assumptions.

Plywood Helps Complete Rush Jobs on Schedule

A crew of 25 men completed construction of the new Lakewood (Wash.) Branch of the Puget Sound National Bank in 10 working days to hang up what might well be a record for buildings of its kind.

The final decision to rush construction of the 2,600 sq. ft. building was made by bank officials only 18 days before job completion. Architects Lea, Pearson and Richards went to work to meet the "impossible" schedule. To give the builder every opportunity to save time, they turned to virtually all-plywood construction. Drawings and specifications were completed within a week and work was begun under the direction of O. D. Parker, building superintendent for Ketner Bros., Inc., contractors.

According to both builder and architect, plywood made possible the speed of building. The big panels were used for combined siding-sheathing, gable ends, interior paneling, roof decking and underlay floors. The plywood board and batten siding is painted barn red to contrast with white flush-surfaced gabled ends. Interior paneling is painted light green.

Plywood Ideal Form Material Reports Highway Builder

A typical use of plywood forms in highway projects is the six-lane Stanley Drive highway underpass in Northern California—built jointly by M and K Corporation and Eaton and Smith. The builders used 5/8" Interior PlyForm for all exposed surfaces for this half million dollar project.

"We wouldn't use anything but plywood for a job like that", says M and K Corporation President B. F. Modglin. "As far as we are concerned it is the ideal form material. It forms clean, smooth concrete, saves time and labor, and re-use cuts costs considerably."

Forms 16-feet high, 2½-feet wide at the bottom and 4-feet, 7 inches wide at the top were used for the ends of the bridge piers. Plywood was nailed across 2x4 and 4x4 studs, 12" o.c., backed by double 2x4 and 4x4 walers. Panel's for road slab were placed across 2x12 joists.

There's no six-wheeler like it—*in the 28,000 GVW class!*

HERE'S the answer to the tough, closely scheduled jobs you're bidding on today: It's GMC's great new Model W450-30 six-wheeler chassis rated at 28,000 GVW for use with dump, concrete mixer or general purpose body.

GREAT because its new "302" engine is pound-for-pound the mightiest in truck history! Here's 145 H.P. to pull capacity loads through mud, sand and slick—with faster pickup and less gear-shifting than any other medium six-wheeler you've ever put on a job!

GREAT because its record-breaking 7.2 to 1 compression ratio turns out highest ton-mileage performance—and does it on *regular* gasoline!

GREAT because an extra differential acts between its dual-drive rear axles to put power where it's needed—to compensate for road irregularities. This eliminates power waste and tire spin. Inter-axle lockout optional.*

GREAT—you bet! But drop by your GMC dealer—get its price—and you'll get the greatest surprise of all. It costs far less than you'd expect!

GMC Truck & Coach Division of General Motors

GMC TRUCKS

GM GENERAL MOTORS

*Every GMC 450-30 has provision for an optional, inter-axle lock-out that lets you pour full, unrestricted traction to both driving axles when extreme conditions demand it. Operated from the dash.

GASOLINE 4,800 GVW TO 90,000 GCW
DIESEL 19,500 GVW TO 100,000 GCW

ROOTS & DOZES

IN THE SAME PASS...

ESCO introduces NEW BUCK FORTE ROOTER

Model view. Four adjustable rooting depths: 9", 15", 21" and 27".

REMEMBER the name—Buck Forte Rooter—especially designed to root and doze on the same pass. This dual feature of operation has enabled operators, working with a pair of Buck Forte Rooters, to up their dozer yardage over 50%. *That's a job-proven fact.*

It gives you these advantages:

LIGHT IN WEIGHT. Less than 1,000 lbs. No special handling equipment required. Can be transported on the tractor.

LOW COST. The Buck Forte Rooter costs 75% less than conventional rooters.

TOUGH AND DEPENDABLE. Equipped with *ESCO* alloy steel shank and renewable box type points, it has proved itself in concrete, rock and hardpan.

EASILY INSTALLED. One man can install or remove the rooter in minutes with no cutting or welding on dozer.

ADJUSTABLE. Four adjustable rooting depths—9", 15", 21" and 27".

FITS ALL LARGE, STRAIGHT DOZERS. Can be used in pairs or singly.

Get more information on the new Buck Forte Rooter—Just see your ESCO dealer or fill in and mail the coupon.

Rooter mounted on dozer blade. Second rooter is usually installed to double effectiveness.

Buck Forte Rooter on a straight dozer rooting unshot sedimentary ocean rock for aggregate plant.

ESCO DRAGLINE BUCKETS, DIPPERS AND HOE DIPPERS

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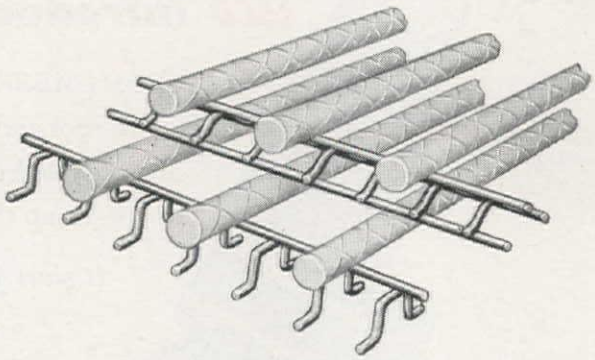
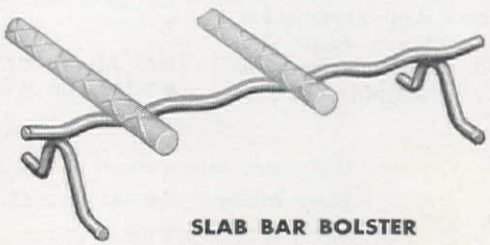
"TOPS" IN CONCRETE CONSTRUCTION

UNIVERSAL BAR SUPPORTS and SPACERS are made of highest quality materials . . . meet all Concrete Reinforcing Steel Institute or Government specifications . . . are rigidly inspected, carefully packed . . . delivered to you clearly marked.

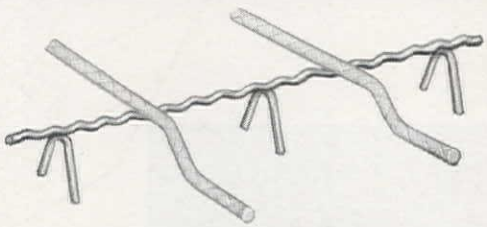
Standard accessories are available for quick shipment. Special supports, spacers and accessories can be designed and produced promptly to meet special job requirements.



BEAM BAR BOLSTER

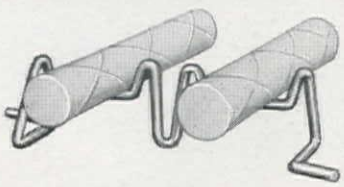


SLAB BAR BOLSTER

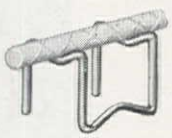


CONTINUOUS HIGH CHAIR

INDIVIDUAL HIGH CHAIR



JOIST BAR CHAIR



INDIVIDUAL BAR CHAIR

Write for the Universal Catalog 902 . . . which contains specifications for placing accessories.

Sent without obligation.

UNIVERSAL FORM CLAMP CO.

Concrete Form Specialists Since 1912

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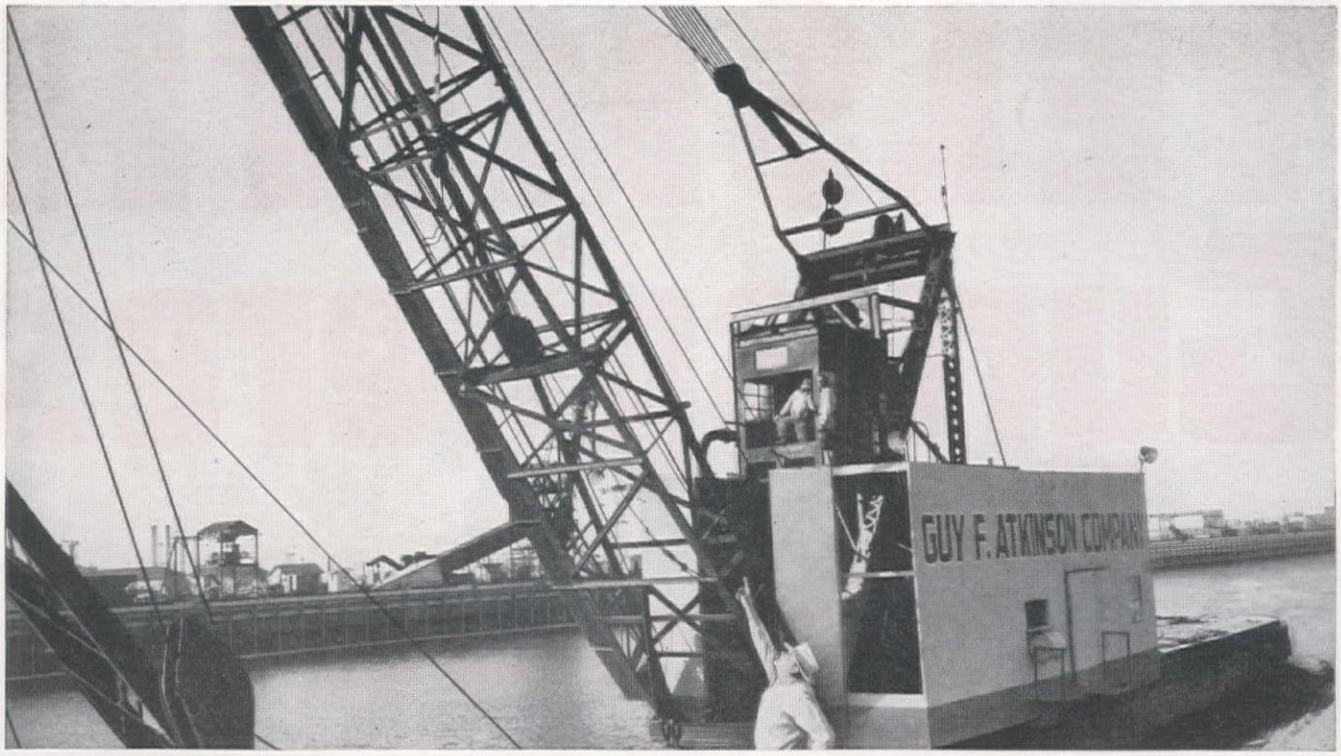
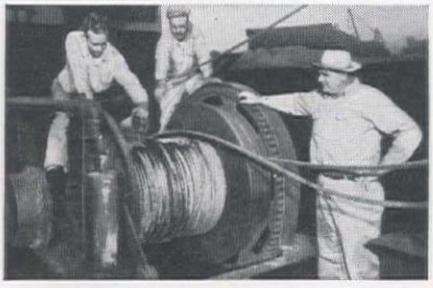
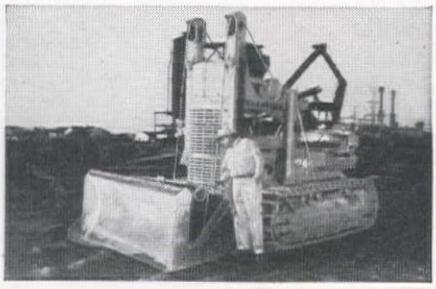


"**This boom-hoist line** is one of the jobs Tiger Brand does for us," says Dominick Billi, above, master mechanic of the Guy F. Atkinson Company's Long Beach district. "Despite loads up to 20 tons, it's still going strong after 8 months of steady service."

Construction firm gets long life from Tiger Brand Rope!



For longer rope life, Mr. Billi's advice is regular lubrication with a good grade of wire rope dressing. He says: "Pile-driving operations in the salt air here are plenty hard on lines, so that even rope as tough as Tiger Brand needs this extra care. We find that it definitely prolongs rope life."



"**Skiploaders,** power shovels, and heavy-duty tractors are some of the other places where we use Tiger Brand Wire Rope," says Mr. Billi. "And no matter how tough the work, it always gives us trouble-free service. We know we can count on Tiger Brand Rope for long life on any job it does."

For any construction job you handle, rely on tough American Tiger Brand, the wire rope that's rigidly controlled by United States Steel from raw ore to finished product. To get all the stamina engineered into it, you're welcome to the services of a Field Specialist. Contact your local distributor or write Columbia-Geneva Steel, Room 1422, Russ Building, San Francisco 6.

USS

U·S·S TIGER BRAND Wire Rope

Columbia-Geneva Steel Division, United States Steel Company, San Francisco

UNITED STATES STEEL

TELSMITH® Gyraspheres®

Style S standard

Outstanding—with its heavier design *and* many Telsmith-engineered improvements tested and proved by years of operation—the Style S Standard Gyrasphere has . . .

1. Longer Crushing Stroke . . . for greater capacity.

2. Larger Roller-Thrust Bearings . . . : both now located at top of eccentric . . . to transmit crushing pressures from *bottom* of head direct into main frame.

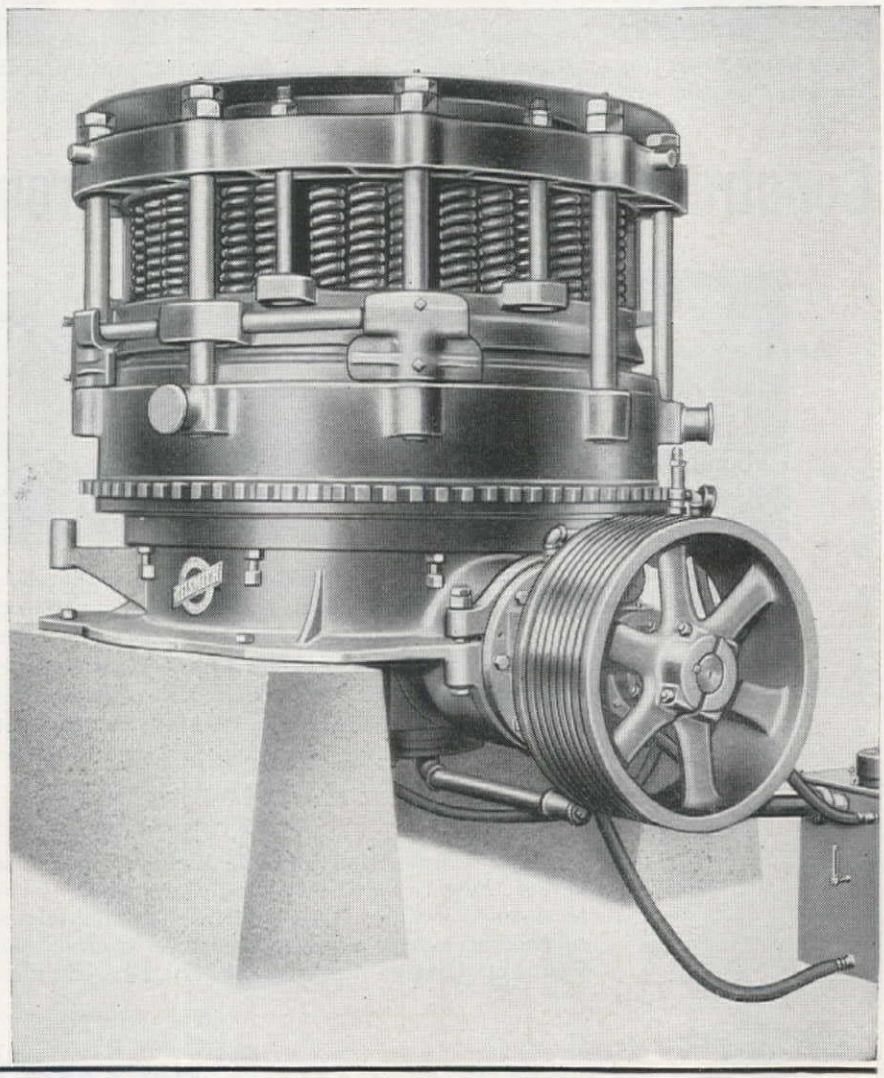
3. Eccentric Bearings have *more* bearing area in the upper zone of greatest crushing pressures.

4. Longer Springs . . . to pass larger pieces of tramp iron.

5. New Location of drive gears . . . for more economical operation.

6. Easier accessibility . . . makes maintenance quicker, simpler, and cheaper.

7. Available with either coarse or medium bowl.



Send for Bulletin No. 274

Y-11-R

MINES ENGINEERING & EQUIPMENT CO.

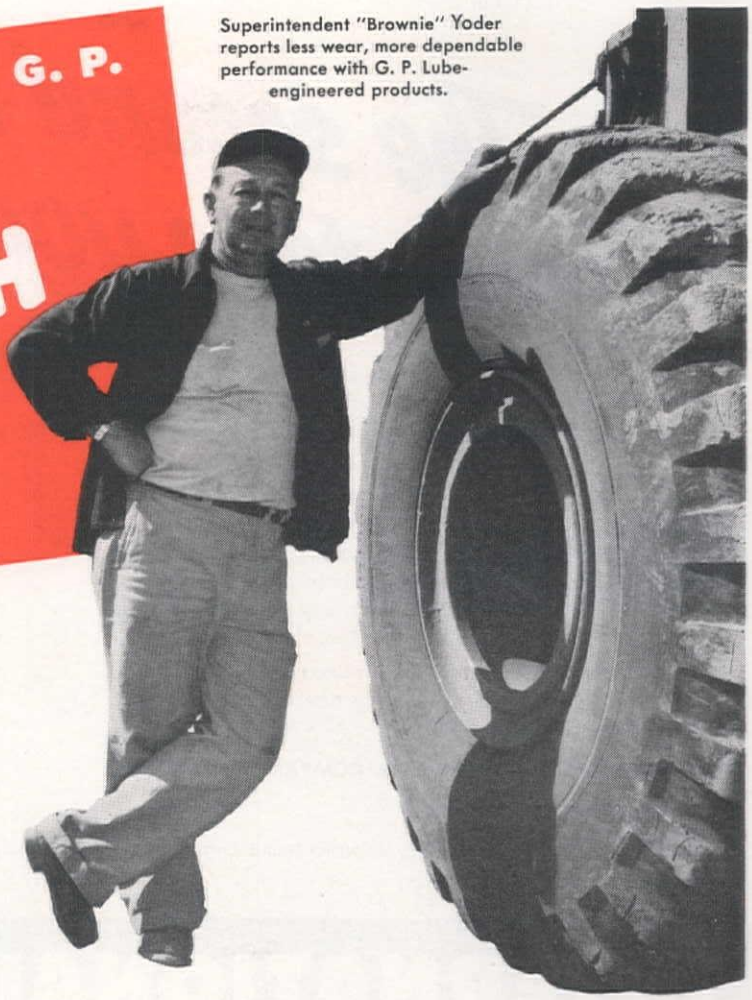
369 Pine Street • SUtter 1-7224

SAN FRANCISCO 4, CALIFORNIA

Manufactured by SMITH ENGINEERING WORKS, MILWAUKEE 12, WISCONSIN

E. C. HALL CO. LOOKS TO G. P.

WHEN THE CRUSH IS ON!

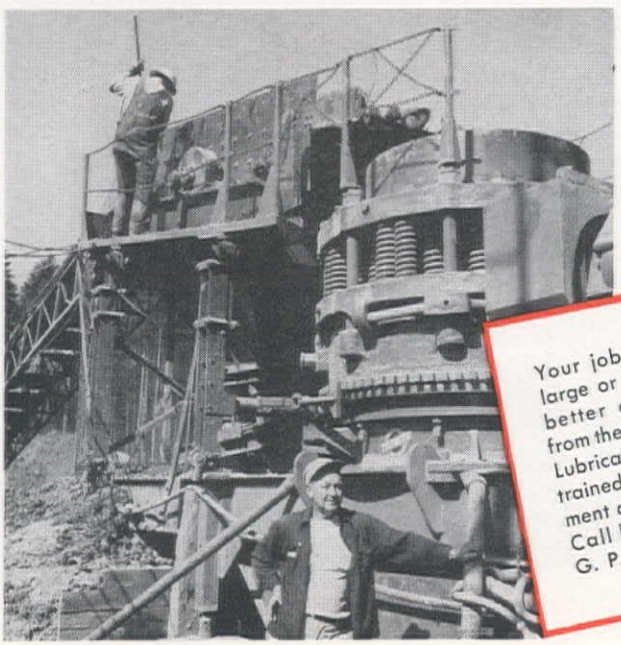


Superintendent "Brownie" Yoder reports less wear, more dependable performance with G. P. Lube-engineered products.

When it comes to making little ones out of big ones, the E. C. Hall Co. of Portland, Ore., has found that it's good business to rely on General Petroleum products and service for its rock-crushing equipment.

According to superintendent E. W. "Brownie" Yoder, "We've had cleaner motors, less bearing wear and no breakdowns since switching to General Petroleum more than five years ago . . . the help of the G. P. Lube Engineer has been of great value, too, in keeping our machinery running at peak efficiency on even the toughest jobs."

Now hard at work on the four-lane highway between Tigard, Ore., and the Tulatin River Bridge, the Hall Company's rock crushing equipment promises to finish the job well within established deadlines — without the lubrication problems which often spell the difference between profit and loss.



Your job, no matter how large or small, will receive better all-round service from the General Petroleum Lubrication Engineer who's trained to keep your equipment operating at a profit. Call him at your nearest G. P. office today!

GENERAL PETROLEUM CORPORATION

Converting Nature's Gift For Better Living

SOCONY-VACUUM

11-25

The second look tells you more!

One look tells you that an International six-wheeler is big and rugged.

A second look, a look at any owner's cost records, tells you far more. It shows you how amazingly low upkeep costs have helped keep International first in heavy-duty truck sales for 20 straight years.

There's a reason for this record. Long years of low operating costs are engineered into every International Truck. All this can be yours in an easy-riding truck that's easy to handle, too.

There's no need to settle for second best when you can have the leader. See your nearest International dealer or branch now.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

Check this list of International exclusives:

- Powerful, dependable, economical gasoline, LPG or diesel power plants for rough, tough going.
- The "roomiest, most comfortable cab on the road"—the Comfo-Vision Cab. One-piece Sweepsight windshield. New green-tinted, non-glare glass available.
- Super-steering system—more positive control. Wider front axles make possible full 37° turning angle for greater maneuverability.
- 115 basic models . . . everything from ½-ton pickups to 70,000 GVW ratings.
- Traditional truck toughness that has kept International first in heavy-duty truck sales for 20 straight years.
- America's largest exclusive truck service organization.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL TRUCKS

"Standard of the Highway"

International LF-190 Six Wheel series available in GVW ratings 22,000 to 45,000. Diesels up to 70,000 lb. GVW ratings.

"We're keeping on schedule!"

Just south of California's Half Moon Bay, Contractors Snodgroth, Archibald & Ebright of Redwood City tackled a tough highway realignment job. 165,000 cu. yds. of wet, sandy clay had to be moved to take four sharp turns out of the two-lane road. Five "Caterpillar" DW10 Tractors with No. 10 Scrapers took over. They got 3,200 yards out every 9-hr. day, moving that tough material 750 feet. D7 and D8 Tractors and No. 12 Motor Graders were also on the job.

Superintendent Don Westbrook reports: "We're keeping on schedule with our 'Caterpillar' equipment. The DW10s' speed sure helped on this job, with our 1,750,000 station yards of overhaul, 500 feet of free-haul. They fit the job very well."

The DW10 Tractor is all-"Caterpillar" built, with a smooth constant mesh transmission and heavy-duty clutch that's built to last. Its hydraulic power steering never loses the feel of the road. Turning radius is extremely short, only 37 feet nonstop. And synchronized braking holds the trail unit first, prevents jackknifing. The No. 10 Scraper's cable operation allows easy pumping of dead materials, positive ejection moves the stickiest load out in a hurry, and the big open bowl is an easy target for the shovel operators.

Your nearby "Caterpillar" Dealer can give you the whole story on this big, speedy yellow team.

CATERPILLAR, SAN LEANDRO, CALIF.; PEORIA, ILL.

CATERPILLAR

REG. U. S. PAT. OFF.

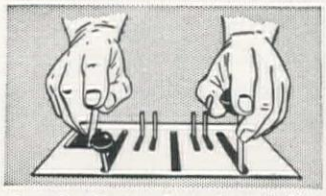
DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

"Extra safety factors"

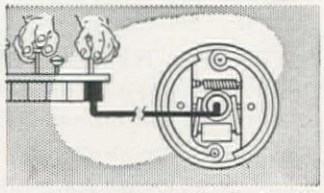
make K-375 with power hydraulic controls ideal rig for steel erection

LONE STAR STEEL COMPANY, Lone Star, Tex., is rushing a $82,000,000 plant expansion. On this job, they're handling and erecting structural steel with a Link-Belt Speeder K-375 crane with 90 ft. boom. Iron work foreman Ellis D. Martin says, "I like the extra safety factor of the K-375. It does a good job of handling any load in its rated capacity." Crane operator LaVon Swagger adds, "Speed-o-Matic power hydraulic controls are the best I've ever used."

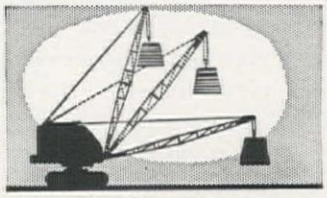
Here are Link-Belt Speeder PLUS FEATURES that speed work, cut costs



Speed-o-Matic Controls — fully hydraulic! You "feel" the load all the way. Simple, easy—fingers instead of muscles do work.



Speed-o-Matic Clutch, hydraulically actuated, simple, smoothly responsive. Runs cool. Eliminates need for frequent adjustments.



Independent Boom Hoist — controlled power down and up. Boom, hoist, swing simultaneously or independently. Optional.

Convertibility — designed for peak production as shovel, crane, dragline or trench hoe. Convert in field—quickly, easily.

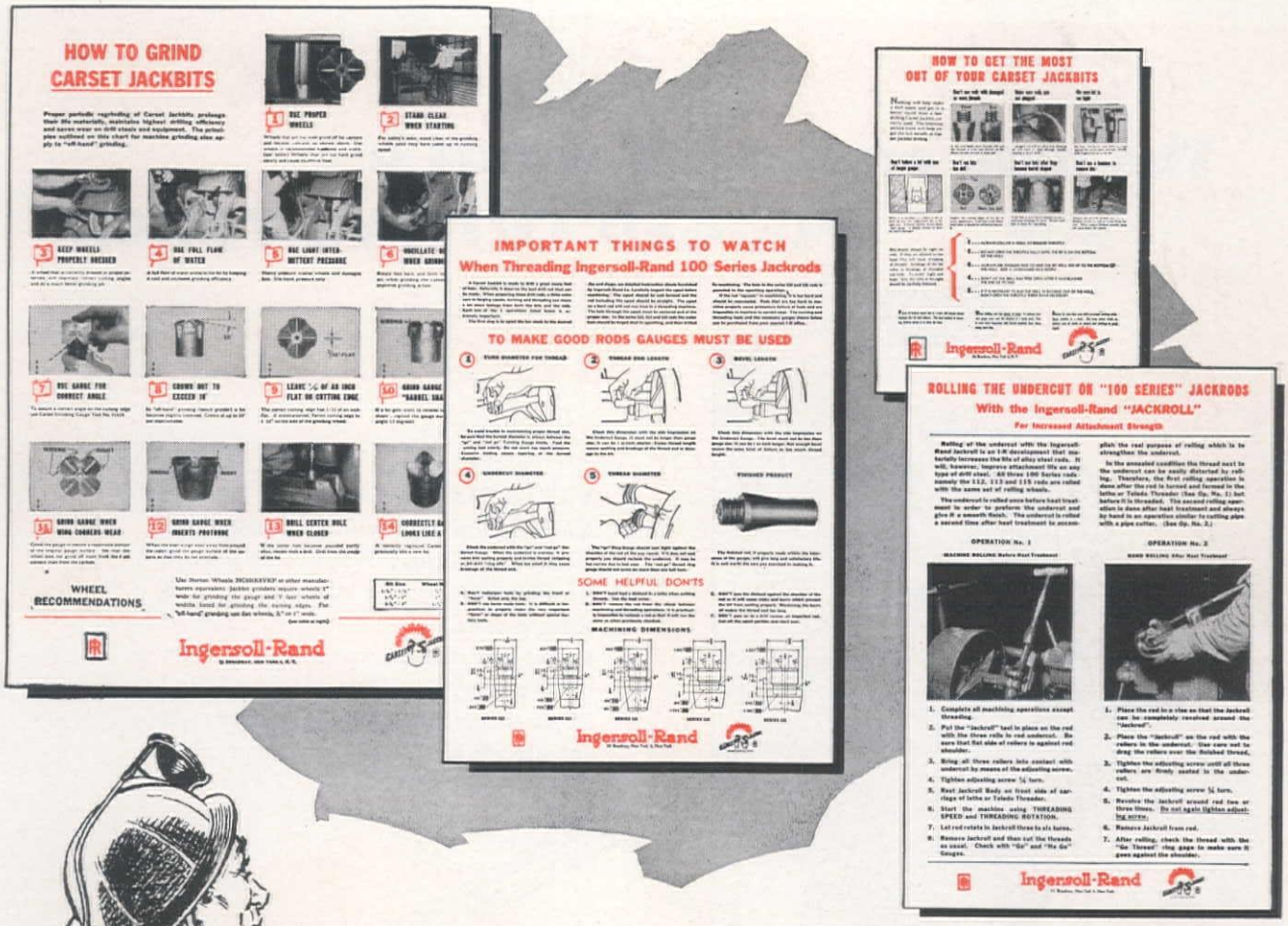
12,957-A

LINK-BELT SPEEDER

CORPORATION

Builders of the most complete line of shovels, cranes and draglines

CEDAR RAPIDS, IOWA



Get more* out of your CARSET JACKBITS by using these *free* WALL CHARTS

* *To get maximum drilling speed and longest bit life you should use Ingersoll-Rand Carset Jackbits as indicated on these charts.*

■ Nothing will make a shift easier or help you get in a better round quicker than fast-drilling Carset Jackbits. To help you make sure that your Carset Jackbits are used to best advantage, Ingersoll-Rand has prepared these four large, easily read charts for your bit-shop wall or bulletin board. They give simple illustrated directions for using and servicing Carset Jackbits and threading 100 Series Jackrods.

You'll find these charts a big help in showing your drilling crews and shop personnel how to get the most out of longer-lasting, faster-drilling Ingersoll-Rand Carset Jackbits. To get your free copies, call your nearest Carset Jackbit supplier or fill out and return the coupon.

Ingersoll-Rand 786-15
Rock Drill Dept., 11 Broadway, New York 4, N. Y.

Please send me, free of charge, the wall charts checked below:

- ☐ Grinding Carset Jackbits, Form 4121
- ☐ Using Carset Jackbits, Form 4122
- ☐ Threading Jackrods, Form 4112
- ☐ Rolling the Undercut, Form 4120

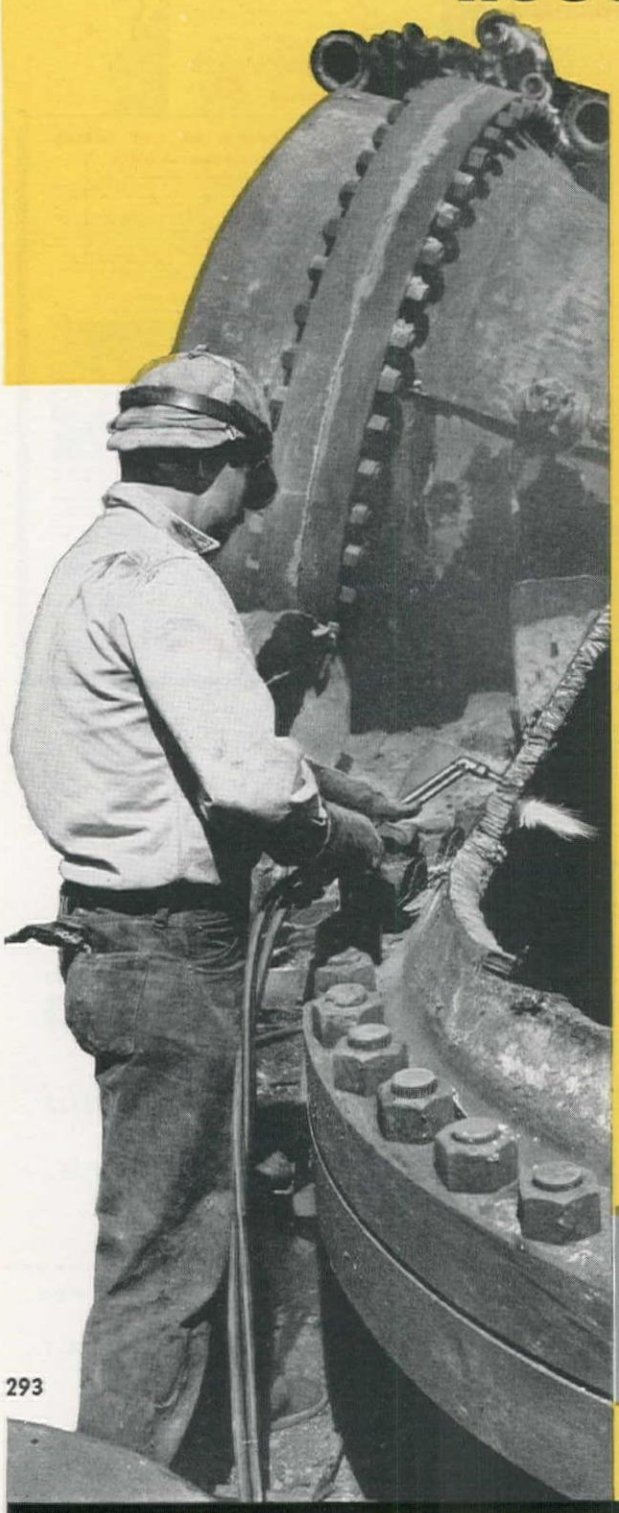
Name _____

Company _____

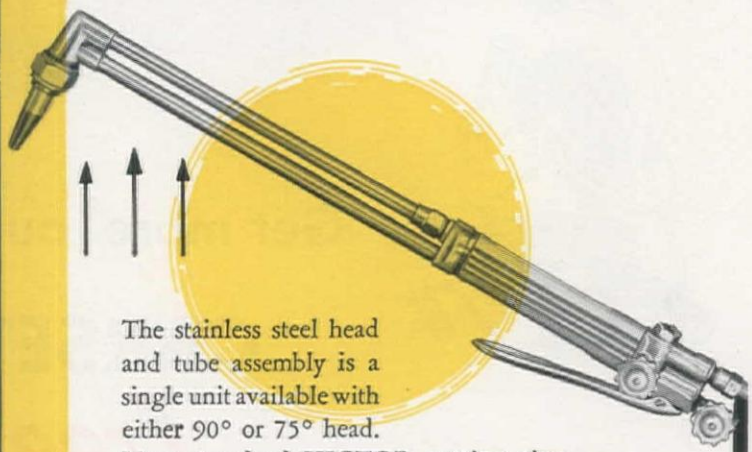
Address _____

City _____

The man on the job wants a *RUGGED CUTTING TORCH*



VICTOR Models CTS400 and 1400 with stainless steel head and tube assemblies meet the challenge. They cut longer and stand up better with a minimum of maintenance costs. Mixer and mixer tubes of special heat resistant copper alloys prevent overheating. VICTOR's famous Spiral Mixer thoroughly mixes the preheat gases for safe, efficient and economical operations.



The stainless steel head and tube assembly is a single unit available with either 90° or 75° head. Uses standard VICTOR cutting tips.

Try it on heavy scrap cutting as shown here. Ask your VICTOR dealer for a demonstration NOW.

VICTOR
Welding and Cutting Equipment
Since 1910

LOOK FOR THE VICTOR DEALER SIGN!

Ask him to show you why it costs less to own and operate VICTOR.

Dealer inquiries invited.

293

VICTOR EQUIPMENT COMPANY

3821 Santa Fe Ave.
LOS ANGELES 58

844 Folsom Street
SAN FRANCISCO 7

1312 W. Lake St.
CHICAGO 7

in WIRE ROPE, too, extra strength demands the RIGHT KIND of muscle

Towering as high as eight feet on his hind legs, the Kodiak or Alaskan Brown Bear ranks as the most powerful animal of North America. Rugged muscle development makes him the feared and deadly fighter that he is.

In wire rope, too, the right kind of muscle is essential to ward off the destructive effects of abrasion, corrosion, bending fatigue, load strain and shock stress.

That's why in Wickwire Rope we make sure—through complete quality control—that you always get the right construction and lay of the rope... the right grade of steel and size of wire for long-lasting resistance to the rigors of your particular service.

See your Wickwire Rope distributor or contact our nearest sales office.

1222

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

WICKWIRE ROPE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

Do you have a tunnel to Drive?

11x12 Keyhole

10x10 Baltimore

7x7 Olmstead

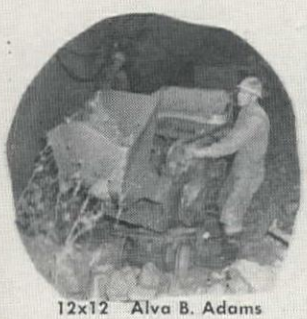
29x29 Lucky Peak

11x11 N. Y. Aqueduct

12x12 Horsetooth

5x5—Pawtucket

9x9 Treasury



12x12 Alva B. Adams

9x9 N. Poudre

12x12 Scottish Hydro

20x20 St. Mary's

9x9 Rainbow

Other people have successfully driven tunnels in the same kind of rock and under the same conditions you will find when you drive your next tunnel.

Most of the successful tunnel drivers (the ones that finished with their shirts on their backs) have claimed that good loading equipment meant the difference between success and failure. These are the men who hold world's tunneling records for distances, speed and safety — these are the tunnel drivers using Eimco Loading equipment exclusively.

Let us help you plan your tunneling jobs, Eimco Engineers are anxious to assist without obligation on your part.

EIMCO A396

THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines

EXECUTIVE OFFICES AND FACTORIES — SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

NEW YORK, 51-52 SOUTH STREET • CHICAGO, 3319 SOUTH WALLACE STREET
BIRMINGHAM, ALA., 3140 FAYETTE AVE. • DULUTH, MINN., 216 E. SUPERIOR ST.
EL PASO, TEXAS, MILLS BUILDING • BERKELEY, CALIF., 637 CEDAR STREET
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1, ENGLAND, 190 PICCADILLY

IN FRANCE: SOCIÈTE EIMCO, PARIS, FRANCE
IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
IN ITALY: EIMCO ITALIA, S.P.A., MILAN, ITALY

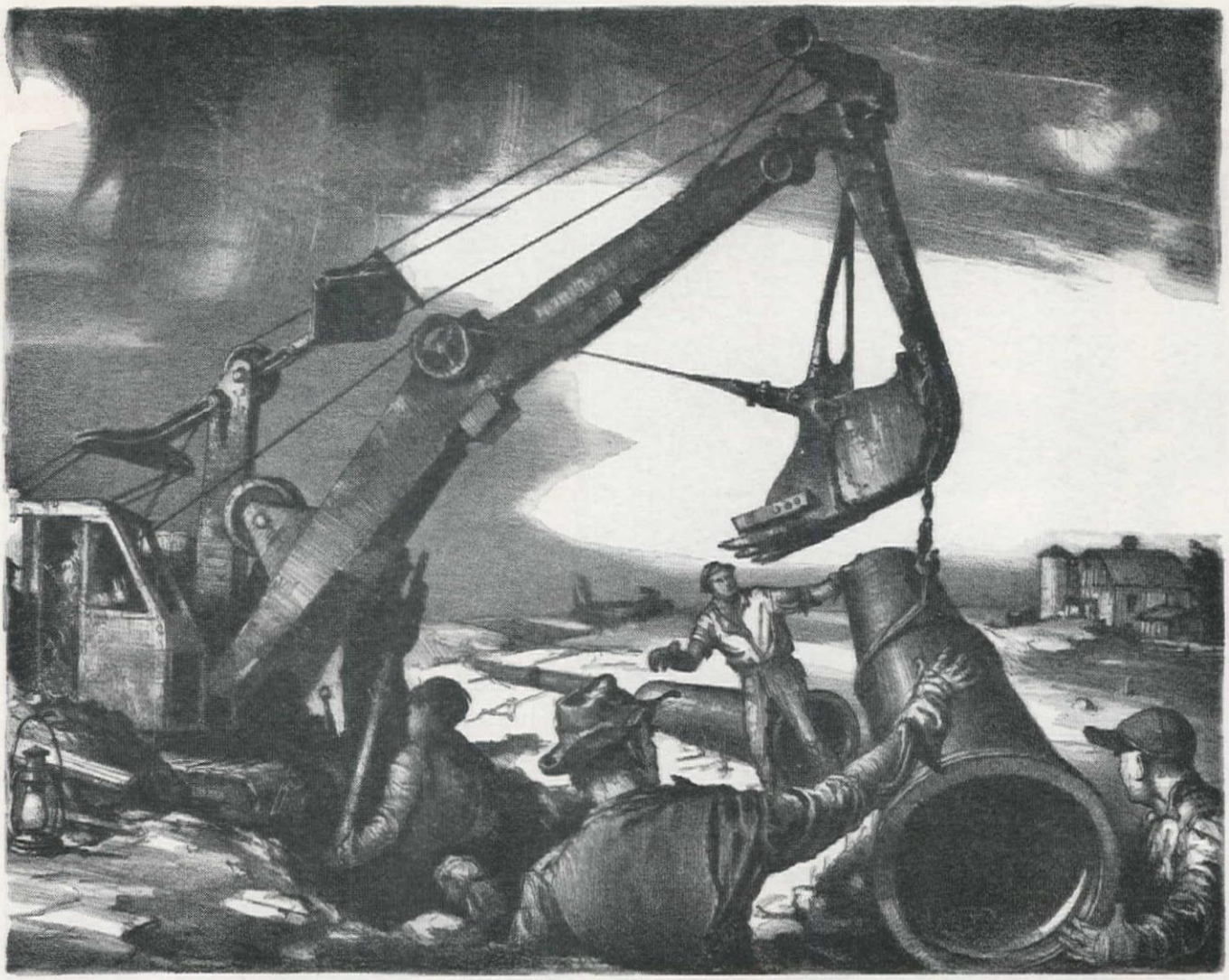
SMITH-FRANCIS TURBINES AT TOKETEE

ADDING to an ever-growing list of users, the Toketee Development of the California-Oregon Power Company has installed three vertical Smith - Francis units of 17,600 H.P. capacity each, under 394 feet head, operating at 400 r.p.m. The turbine runners are stainless steel. The pressure regulators are of a new horizontal discharge design of the Howell-Bunger Valve type.

Put your hydraulic problems up to us!

S. MORGAN SMITH Co.

YORK, PENNA. U.S.A.



Lithographed on stone for U. S. Pipe and Foundry Co. by John A. Noble, A.N.A.

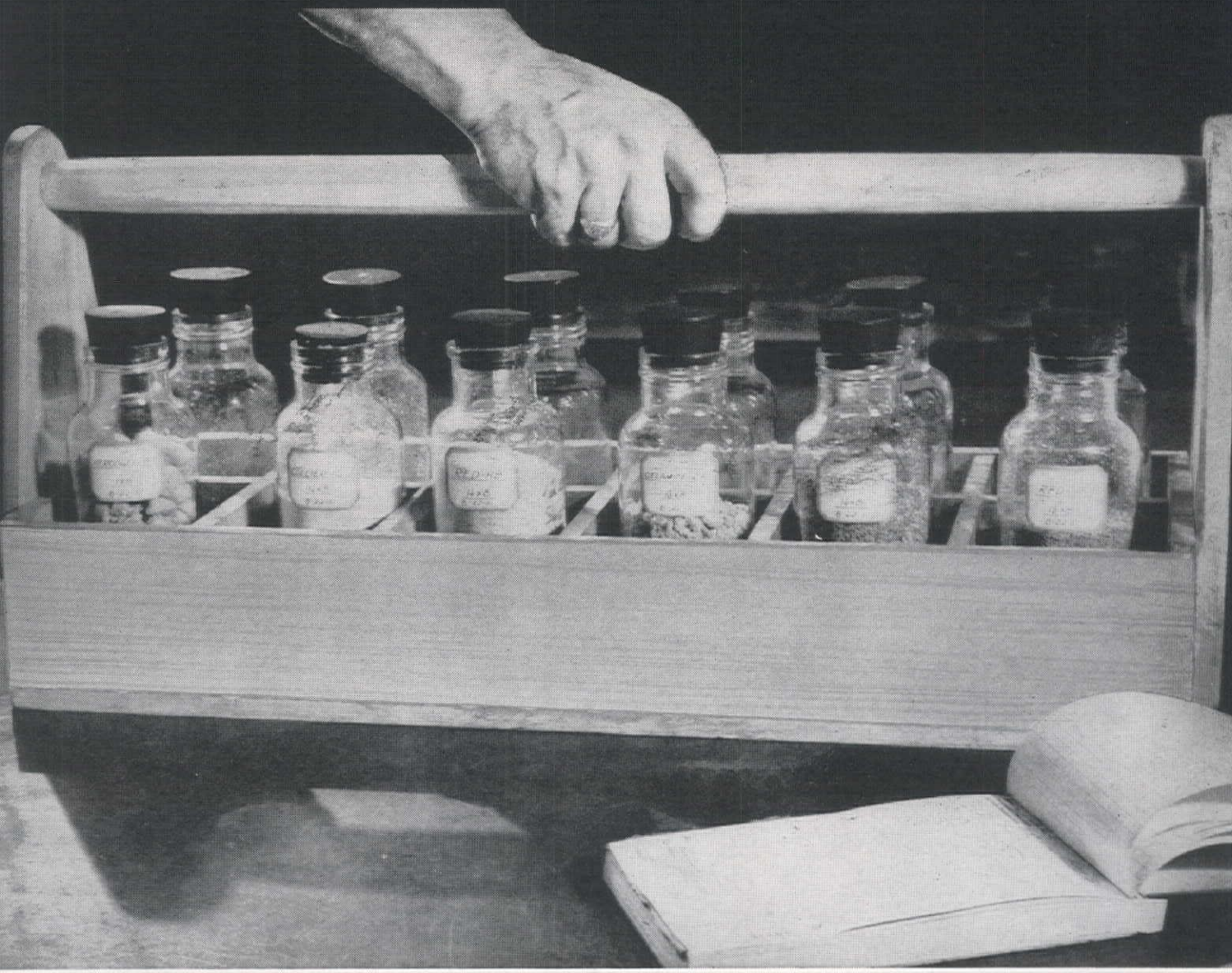
THIS RURAL SCENE is not an unusual background for cast iron pipe. The installation might be a water supply line for a city nearby. It could be a sewer force main leading to a treatment plant. Also it might be a gas transmission line for a city, in which case it would unquestionably be of the mechanical joint type.

U. S. cast iron pipe in sizes 2-inch through 24-inch are cast centrifugally in metal molds with bell-and-spigot; mechanical joints and plain ends. All sizes of flexible joint and integral flange pipe and all pipe 30-inch and larger are cast by the pit cast process. By whichever process the pipe is made, high quality is assured with the modern control methods employed during its manufacture.

United States Pipe and Foundry Co.,
General Offices, Burlington, N. J.
Plants and Sales Offices Throughout the U. S. A.

U.S.
cast iron
PIPE
FOR WATER, GAS, SEWERAGE AND INDUSTRIAL SERVICE

PROGRESS IN EXPLOSIVES . . .



EVERY LOT TESTED

Here are some of the samples of explosives taken daily at one Hercules plant. Every day, at every plant, samples of each lot are analyzed and tested for conformity with Hercules' strict chemical and physical standards.

Sensitivity, consistency, water resistance, moisture content, density, percentages of various ingredients . . . these are some of the exacting laboratory inspection standards that must be met.

From raw materials to packaged products, Hercules' progress in explosives assures better blasting performance and helps to lower blasting costs.

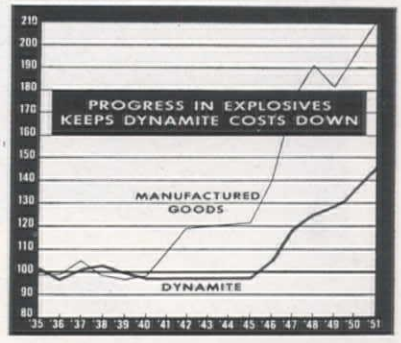


Chart shows relative stability of dynamite prices since 1935, as compared with prices of other manufactured goods. 1935-39 values=100.

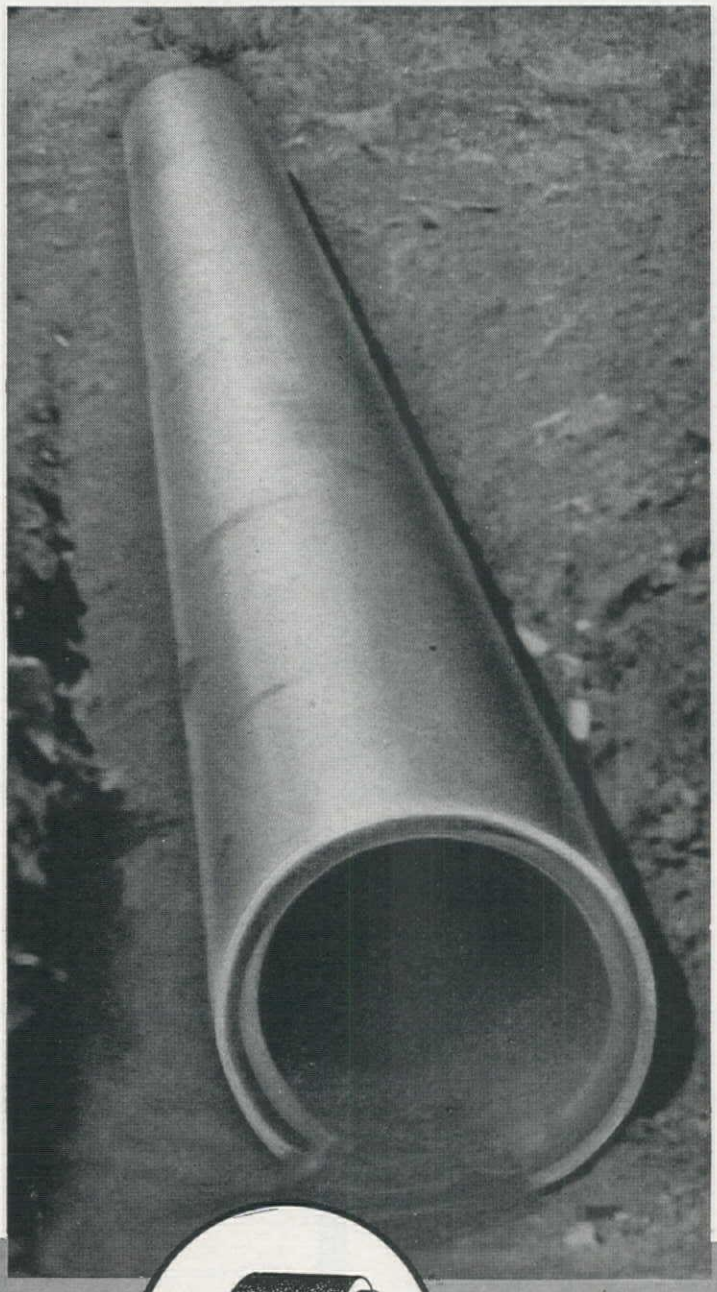
HERCULES POWDER COMPANY

INCORPORATED

Explosives Department, 973 Market St., Wilmington 99, Del.

XR52-6

for longer culvert life... concrete reinforced with

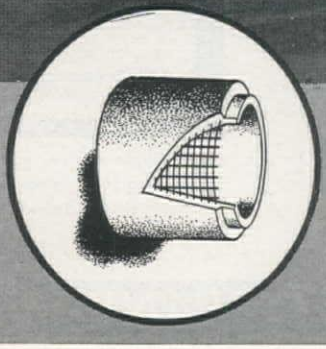


CLINTON WELDED WIRE FABRIC

Follow this specification for long-lived culverts . . . concrete reinforced with Clinton Welded Wire Fabric. This type of culvert pipe will give you years of dependable service, strength and ability to stand up under heavy loads. Write Clinton Welded Wire Fabric into your next specification.

THE CALIFORNIA WIRE CLOTH CORPORATION, OAKLAND
THE COLORADO FUEL AND IRON CORPORATION, DENVER
WICKWIRE SPENCER STEEL DIVISION, NEW YORK

1061



CLINTON
WELDED WIRE FABRIC
THE COLORADO FUEL AND IRON CORPORATION CFI

Let these plain hard facts show you how you'll save with CHEVROLET Advance-Design TRUCKS

CHEVROLET first in demand in value in sales

Fact No. 1

THEY LIST FOR LESS

Yes, Chevrolet trucks *list for less* than *any other* comparable truck capable of handling the same payloads. And yet, in a Chevrolet you'll find a combination of great truck features you can get in no other truck.

Fact No. 2

EVERY MILE AN ECONOMICAL MILE

For low fuel, oil and upkeep costs you can't beat Chevrolet's time-proved Valve-in-Head engines. Thriftmaster or Loadmaster, these engines give you top economy and long life to match the ruggedness of frame, axles and other units.

Fact No. 3

THERE'S ONE TO FIT YOUR JOB

Right down to wheels and tires, every Chevrolet truck is fitted to the job it has to do—*factory-matched* to operating conditions and payload. You don't have to waste money on "too much truck" or sacrifice efficiency with "too little truck" for your needs.

Fact No. 4

VALUE STAYS HIGHER LONGER

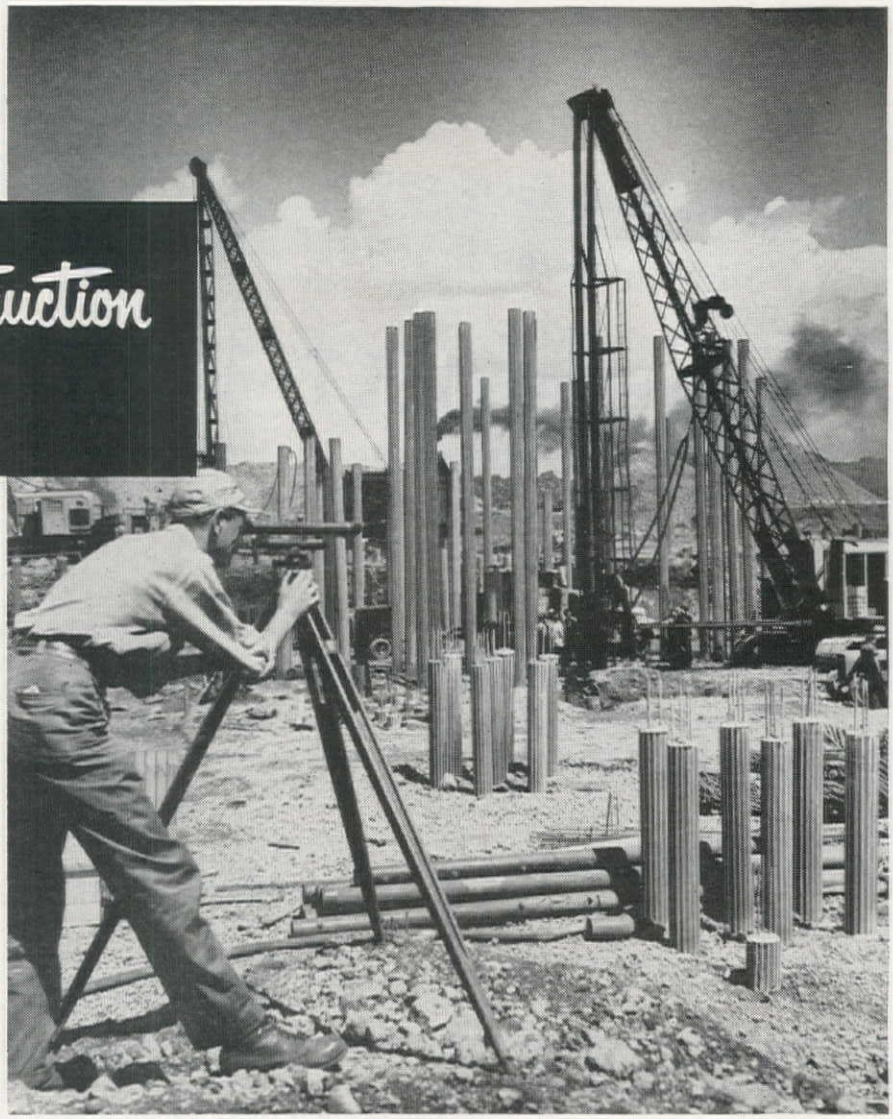
Chevrolet trucks traditionally bring more dollars at resale or trade-in than other makes costing about the same when new. You get more value with Chevrolet trucks from first to last. See your Chevrolet dealer.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

Simplified construction in sight



...with MONOTUBE cold-rolled steel piles!

THE advantages afforded by Monotube piles in this major Canadian industrial project are well worth considering . . .

Although driving conditions were extremely tough—10 to 15 feet of heavy slag fill—over 3,000 Monotubes up to 80 feet long were driven with only light, mobile equipment!

Secondly, the job involves high loading . . . safely accomplished using fluted, cold-rolled Monotubes with 12″ butts and standard 8″ tips.

Finally, Monotubes as usual afforded the extra advantage of easy, on-the-job cutoff and extendibility. Cutoffs were readily re-used as extensions.

Monotubes come in types and sizes for sound, economical support in any kind of soil under *all* kinds of structures. For details write to The Union Metal Manufacturing Co., Canton 5, O.

UNION METAL

Monotube Foundation Piles

GENERALS combine Safety and Strength

Extra Traction and Speed . . . to do More Jobs Anywhere

Faster! Easier! At Lower Cost!

GENERAL D. T. L. For off-the-road jobs where maximum traction is required. Broad, deep, sharp, self-cleaning tread lugs dig deep for positive grip on soft surfaces. No slipping, sliding.

GENERAL H. C. T. For some work off-the-road, most work on. Deep, saw-tooth safety tread and sturdy shoulder cleats develop extra traction. Rolls smoothly, safely, stops fast.

THE GENERAL D.T.L.

THE GENERAL H.C.T.

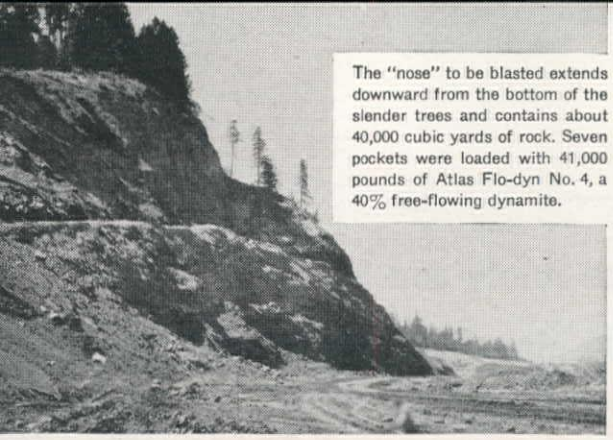
Make Every Worn Tire Work Longer for More Profit!

Your GENERAL TIRE DEALER will KRAFT SYSTEM RECAP Worn Tires with the New GENERAL Truck Tire Tread of Your Choice

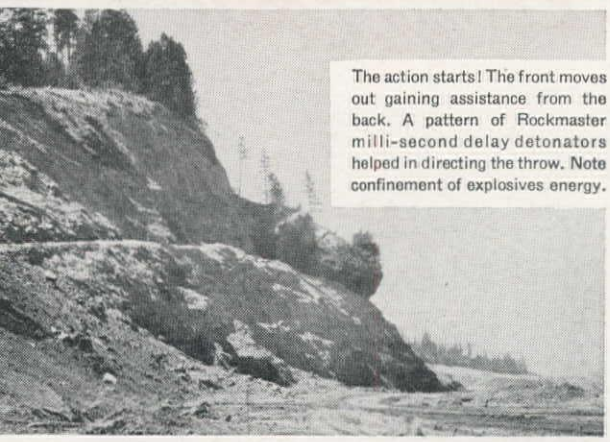
KRAFT SYSTEM RECAPPING
A GENERAL TIRE SERVICE

You're throwing away money when you throw away worn tires or accept an ordinary "adjustment" for them. Let your General Tire Dealer—a tire expert—restore worn tires with famous factory controlled Kraft System Recapping. You choose from the complete line of on and off-the-road new General Tire treads and he'll put that tread on your worn tire. He can do sectional repairs too. Get Kraft System Recapping—get more profit from every tire.

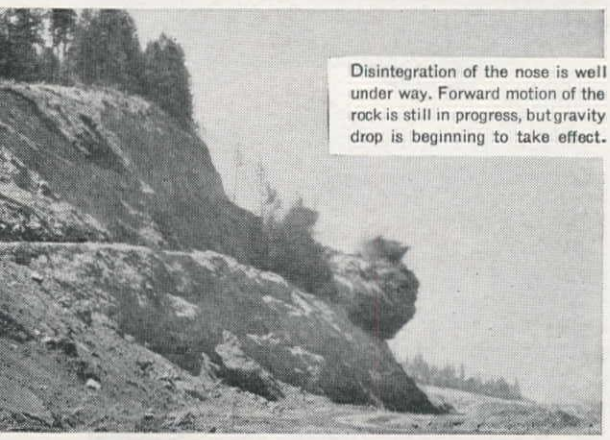
SPECIFY GENERAL TIRES ON YOUR NEW EQUIPMENT



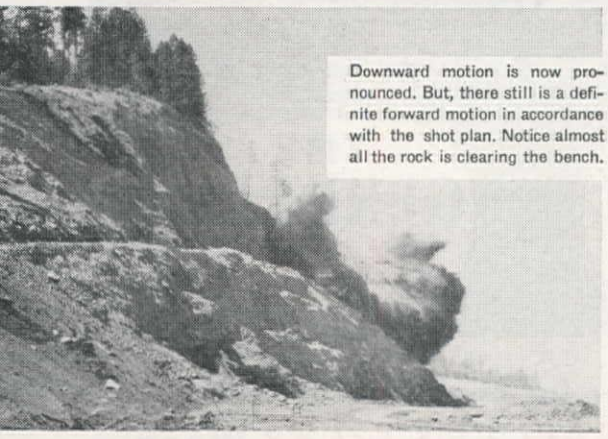
The "nose" to be blasted extends downward from the bottom of the slender trees and contains about 40,000 cubic yards of rock. Seven pockets were loaded with 41,000 pounds of Atlas Flo-dyn No. 4, a 40% free-flowing dynamite.



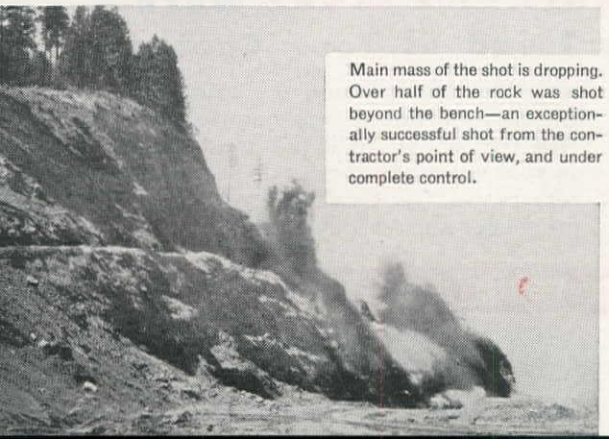
The action starts! The front moves out gaining assistance from the back. A pattern of Rockmaster milli-second delay detonators helped in directing the throw. Note confinement of explosives energy.



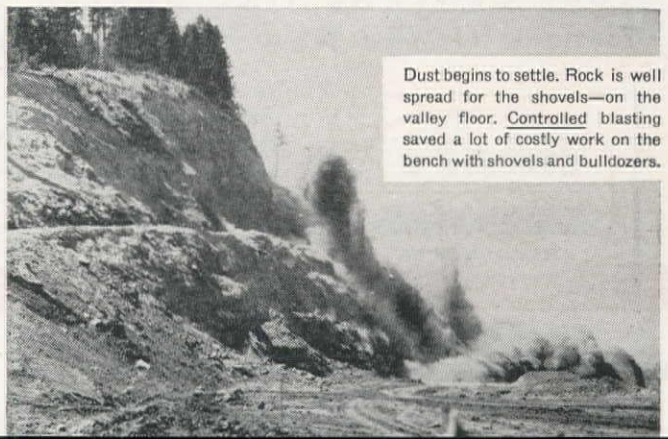
Disintegration of the nose is well under way. Forward motion of the rock is still in progress, but gravity drop is beginning to take effect.



Downward motion is now pronounced. But, there still is a definite forward motion in accordance with the shot plan. Notice almost all the rock is clearing the bench.



Main mass of the shot is dropping. Over half of the rock was shot beyond the bench—an exceptionally successful shot from the contractor's point of view, and under complete control.



Dust begins to settle. Rock is well spread for the shovels—on the valley floor. Controlled blasting saved a lot of costly work on the bench with shovels and bulldozers.

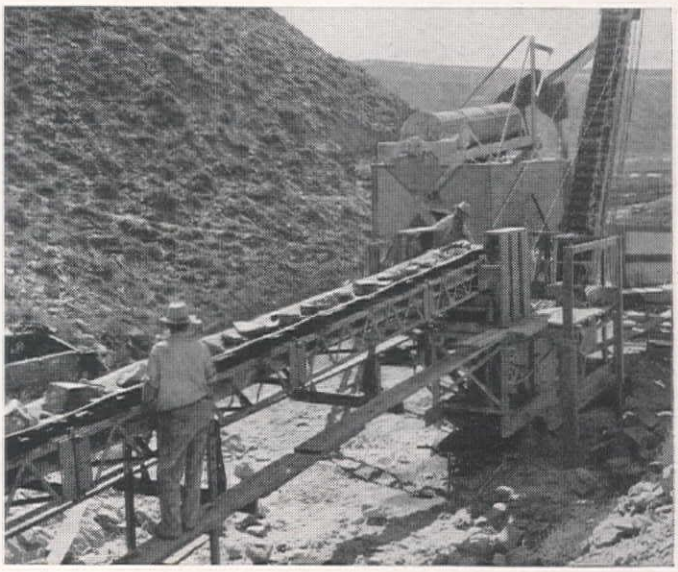
Nothing too rough or tough for Thermoid Conveyor Belting

Thermoid's long experience and continuing research *in the field*, pays off with real economy, maximum efficiency and greater tonnage for your belting dollar. Regardless of the size or kind of material—light or heavy, soft or abrasive, hot or cold, wet or dry—whatever the job, it's a good bet that Thermoid has solved the same or a similar problem with a belt that will do the job better.

In most cases, your Thermoid distributor can select the belt that will serve your needs most economically. Where unusual conditions exist, he will call in an experienced Thermoid Sales Engineer.

Get in touch with your Thermoid distributor or write direct for a copy of the Thermoid Conveyor Belting Catalog No. 3679.

It will pay you to specify Thermoid



Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N.J. Nephi, Utah

Why build temporary shacks for . . . . .

- SUPERINTENDENTS
- FIELD ENGINEERS
- TIME KEEPERS
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- FIRST AID STATIONS
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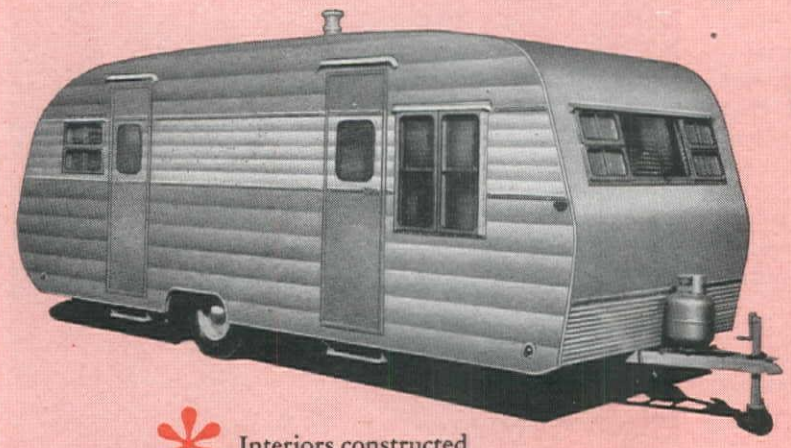
When You Can Use . . .

COLUMBIA

CUSTOM-BILT*



* Interiors constructed to your specifications.

MOBILE OFFICES

The perfect replacement for any temporary field office. Columbia Mobile Offices are ruggedly constructed to withstand years of hard service and severe weather conditions. Floor areas range from 7½ x 16 feet to 7½ x 31 feet. Partitions, counters, shelving and closets constructed according to your specifications.

WRITE FOR NAME OF YOUR NEAREST FIELD OFFICE

COLUMBIA TRAILER COMPANY

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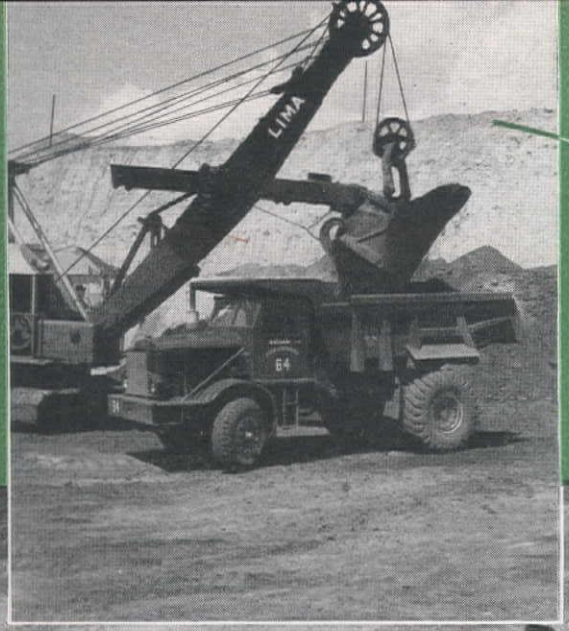


"Eucs"

Deliver More Payloads at Less Cost

EUCLIDS have what it takes to deliver more loads per hour at the lowest cost per ton or yard moved . . . large capacity, plenty of power and speed, and long service life on the toughest jobs.

"Eucs" are unmatched for job availability — they've established records for high production on a wide range of construction, open pit mining, quarry operations and industrial jobs. This dependable performance is backed by Euclid distributors and factory branches with facilities to provide genuine parts and prompt service to owners everywhere.

Less down time and maintenance costs assure more profitable hauling. Have your Euclid Distributor show you how "Eucs" can deliver more payloads on your off-the-highway work.

Bottom-Dump Euclids—13 to 25 cu. yds. . . . 190 to 300 h.p. . . . top speeds loaded to 34.4 m.p.h.

Rear-Dump "Eucs"—10 to 34 tons . . . 125 to 400 h.p. . . . spring mounted or semi-rigid drive axles . . . top speeds loaded to 36.3 m.p.h.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

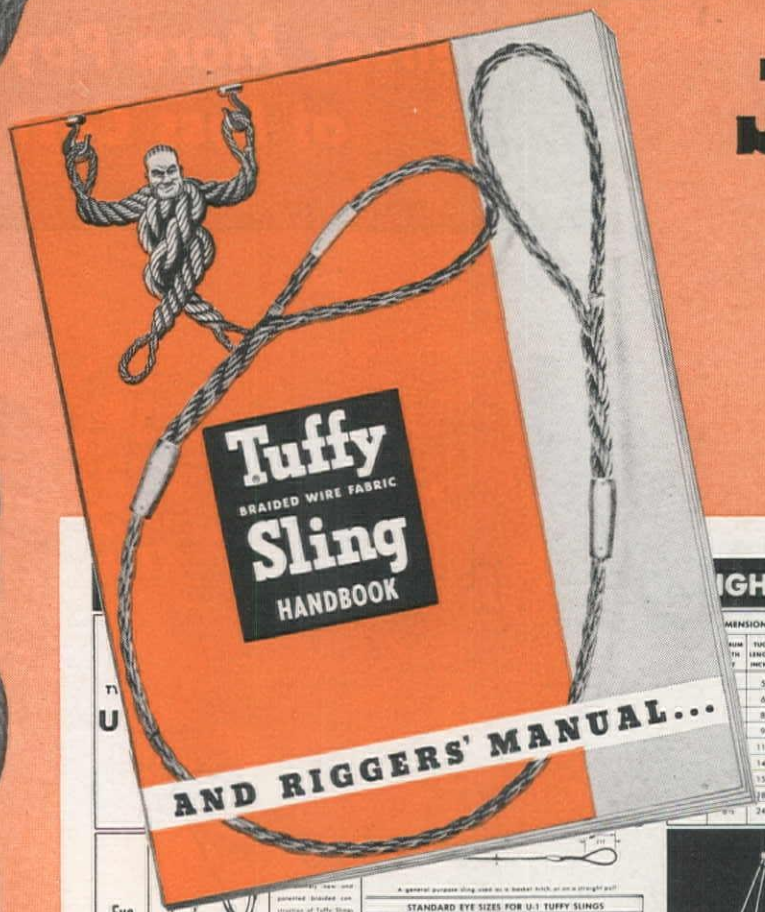
CABLE ADDRESS: YUKLID CODE: BENTLEY

EUCLID THE PIONEER

EUCLIDS *Move the Earth*

Just Off to Help

Free!



union Wire Rope

the Press and Ready You Cut Sling Costs!

Only Handbook of its Kind in the Sling Field. You just can't measure Tuffy Slings by the old sling standards. Because of the new characteristics and efficiencies developed in Tuffy's 9 part, machine braided wire fabric construction, all users of slings need this Sling Handbook to know the facts about lower sling costs through longer sling service. You can have it FREE for the asking. It gives you—

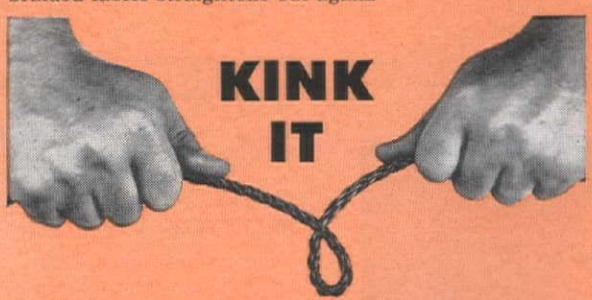
Factual Data On 12 Sling Types and On Various Types of Sling Fittings. That's right, all the working data—dimensions, weights, safe loads, standard eye sizes, tuck lengths, sizes and data on standard and special fittings, straight pull, basket, choker and angle hitches, simplified ordering procedure, etc., on 12 factory fitted and factory packaged sling types. Also there is valuable information on sling care and on braided wire fabric for rigging your own slings.

30 Illustrations of Sling Uses—help you determine the types to fit your sling jobs. Should none of the 12 factory fitted types exactly fit, then the handbook tells how our engineers develop special types for special uses.

Step by Step, Illustrated Instructions On Splicing Both Tuffy Slings and Wire Rope. Splicing the braided wire fabric of Tuffy Slings is made easy with visual instructions. And, to make the sling handbook doubly useful, it contains 24 pages of visual instructions on making 7 kinds of wire rope splices, attaching sockets, ferrules and thimble clamp. Efficiencies of wire rope attachments, as established by actual strength tests, are tabulated.

You'll find this Sling Handbook and Riggers Manual easy to use and highly useful. A copy is yours with our compliments. Simply fill out and send the coupon.

Tie a knot in a Tuffy Sling. Note its flexibility. Pull the knot tight—then untie it. See how readily the patented braided fabric straightens out again.



It's hard to do by hand without the aid of a vise. If you are able to kink a Tuffy, then see how easily the patented braided wire fabric straightens out without material damage.

Get FREE Sling Sample—See For Yourself All The Advantages of Tuffy Slings

To see how entirely different they are you just have to handle and try out a Tuffy Sling. That's why we have made up a supply of 3 ft. samples. Get yours and prove for yourself Tuffy Sling superiority. Fill out the coupon—It's FREE.

UNION WIRE ROPE CORPORATION

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Please send FREE of Cost—

☐ Tuffy Sling Handbook

☐ 3 ft. Sample of Tuffy Sling

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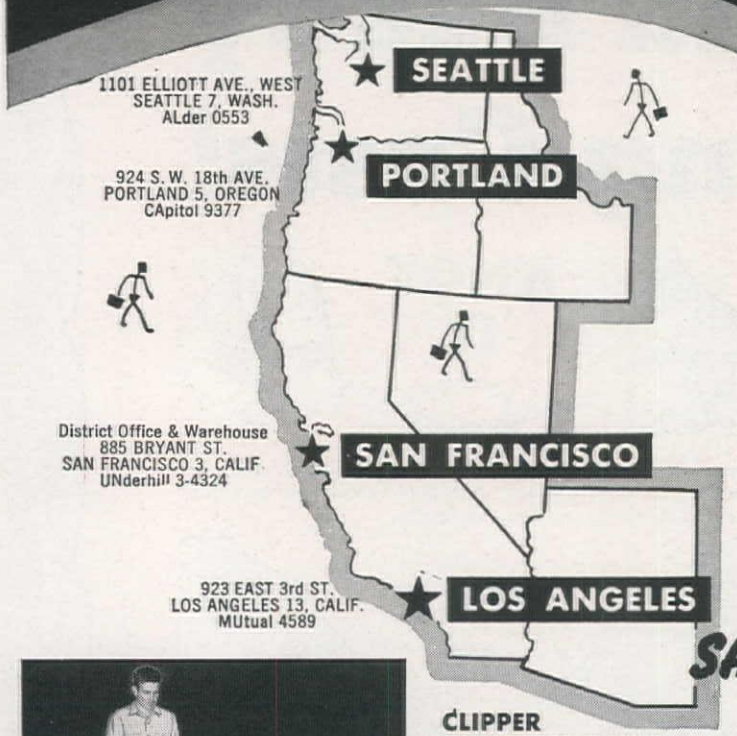
*Title*_____ *Company*_____

*Address*_____

*City*_____ *State*_____

NOW STOCKED IN 4 WEST COAST CITIES



Clipper "SAILS RIGHT THRU"

CONCRETE SAWS

• MASONRY SAWS
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• WET & DRY ABRASIVE BLADES

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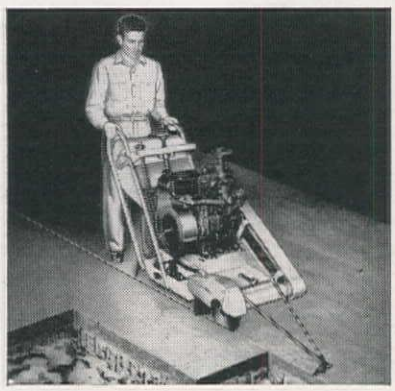


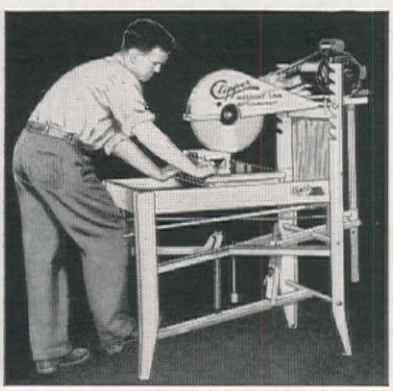
CLIPPER CONCRETE SAWS

Now you can saw Streets, Sidewalks, Building Floors, Airport Runways. Clippers are the fastest, most economical Concrete Saws ever designed. SAW CONTRACTION JOINTS, Saw PATCHES, TRENCHES with straight, smooth edges 1/4 the depth. Five models . . . gasoline or electric powered.

Direct from Factory to User

Immediate "Same-Day" shipment is not the only advantage you have when you contact a Clipper Direct Factory Office . . . you have the important added advantage of *dealing DIRECT with the MANUFACTURER!*

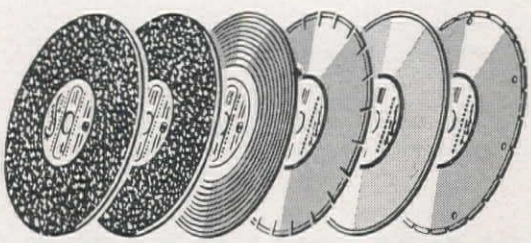
Every Clipper Factory Representative is a specialist whose *sole business* is *masonry and concrete cutting.*



. . . the Originators of Masonry Cutting

CLIPPER MASONRY SAWS

Regardless of material hardness — a Clipper Masonry Saw (9 models) will cut any shape in record time and with simplicity that will amaze you. REMEMBER TOO —the Model HD is "4 Saws in 1" — No. 1 a Dustless and No. 2 a Dry Masonry Saw and No. 3 by placing cutting head on "CONVERTIBLE" CART becomes a Concrete Saw plus No. 4 a Track Saw by placing Cart on tracks.



GENUINE CLIPPER BLADES

ABRASIVE
Your material . . . regardless of density . . . can be cut ECONOMICALLY with one of the "37" Wet or Dry Clipper Abrasive Blades.

"B-R"
(Break-Resistant)
Bending, Dropping or Twisting does not affect the "B-R" Blade. Especially adapted to Hand-Power Saws.

DIAMOND
The fastest known method of masonry and concrete cutting. Sizes and specifications for any saw . . . any material.

Clipper "SAILS RIGHT THRU"

WRITE OR PHONE FOR IMMEDIATE "FREE TRIAL" SHIPMENT

No. 88 0

GENERAL OFFICE & FACTORY
MANUFACTURING CO. • 2800 WARWICK • KANSAS CITY 8, MO.

CLEVELAND DETROIT HOUSTON ST. LOUIS **SAN FRANCISCO** WASHINGTON, D. C. ST. PAUL
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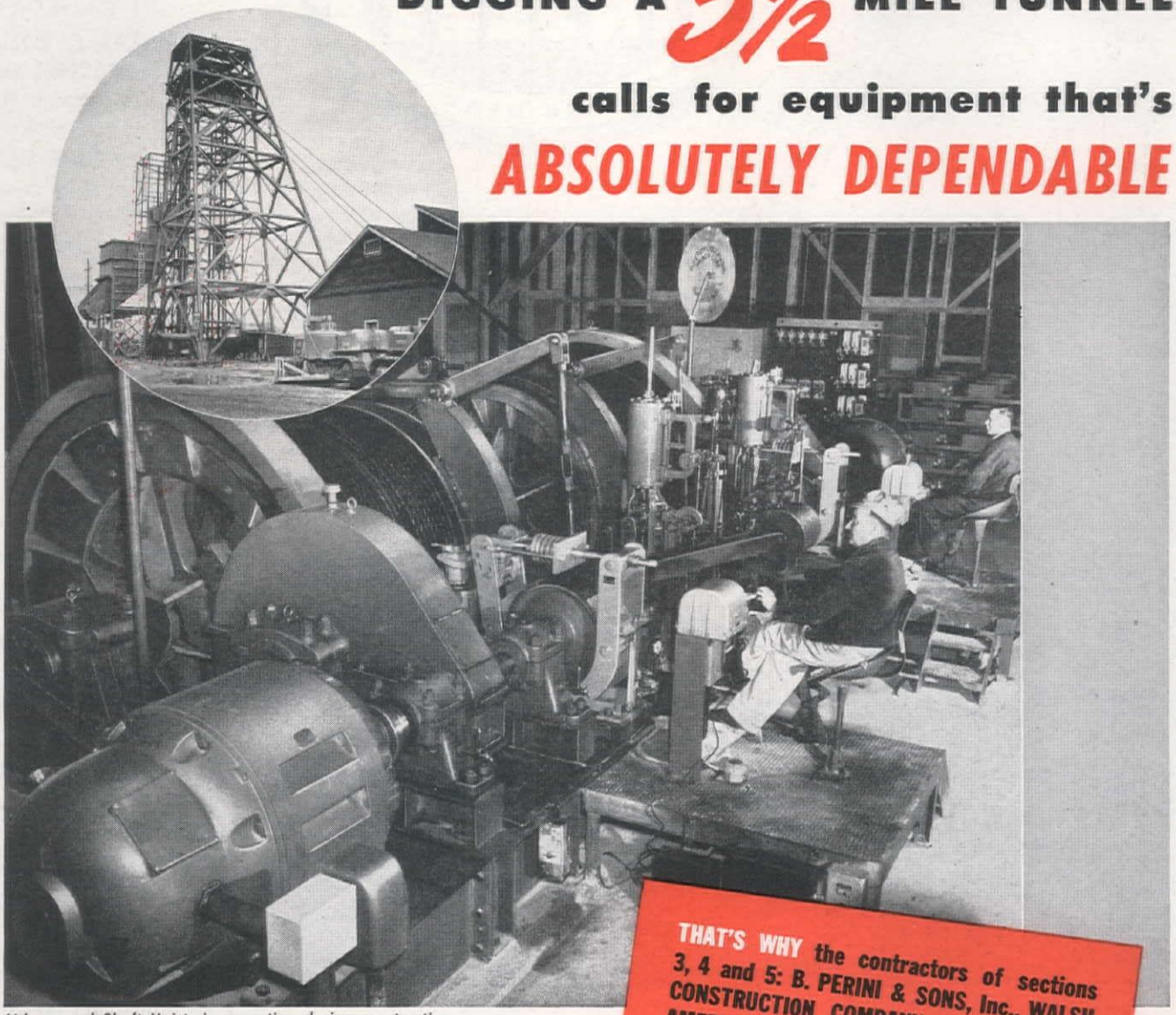
DIGGING A 5½ MILE TUNNEL

calls for equipment that's ABSOLUTELY DEPENDABLE



Lidgerwood Shaft Hoists in operation during construction of the hydraulic pressure tunnel for Ontario Hydro's Sir Adam Beck-Niagara Generating Station No. 2.

Because the job calls for absolute dependability, the contractors are relying on six LIDGERWOOD SHAFT HOISTS to raise an estimated 1,200,000 cubic yards of muck from 16,130 lineal feet of the 45' diameter tunnel. These hoists will raise and lower men, equipment, steel and other supplies, so they *must* deliver top performance. LIDGERWOOD SHAFT HOISTS are a product of the 200 years of combined experience of the SUPERIOR-LIDGERWOOD-MUNDY CORPORATION.

THAT'S WHY the contractors of sections 3, 4 and 5: B. PERINI & SONS, Inc., WALSH CONSTRUCTION COMPANY and CANADIAN-AMERICAN CONTRACTORS chose

6 LIDGERWOOD SHAFT HOISTS

to handle cages and dumping skips for Shafts 3, 4 and 5 of the Niagara hydraulic pressure tunnel being built for the Hydro-Electric Power Commission of Ontario, (Canada).

For descriptive literature write to:

OVER 200 YEARS OF ACCUMULATED EXPERIENCE — 1869 MUNDY — 1873 LIDGERWOOD — 1895 SUPERIOR

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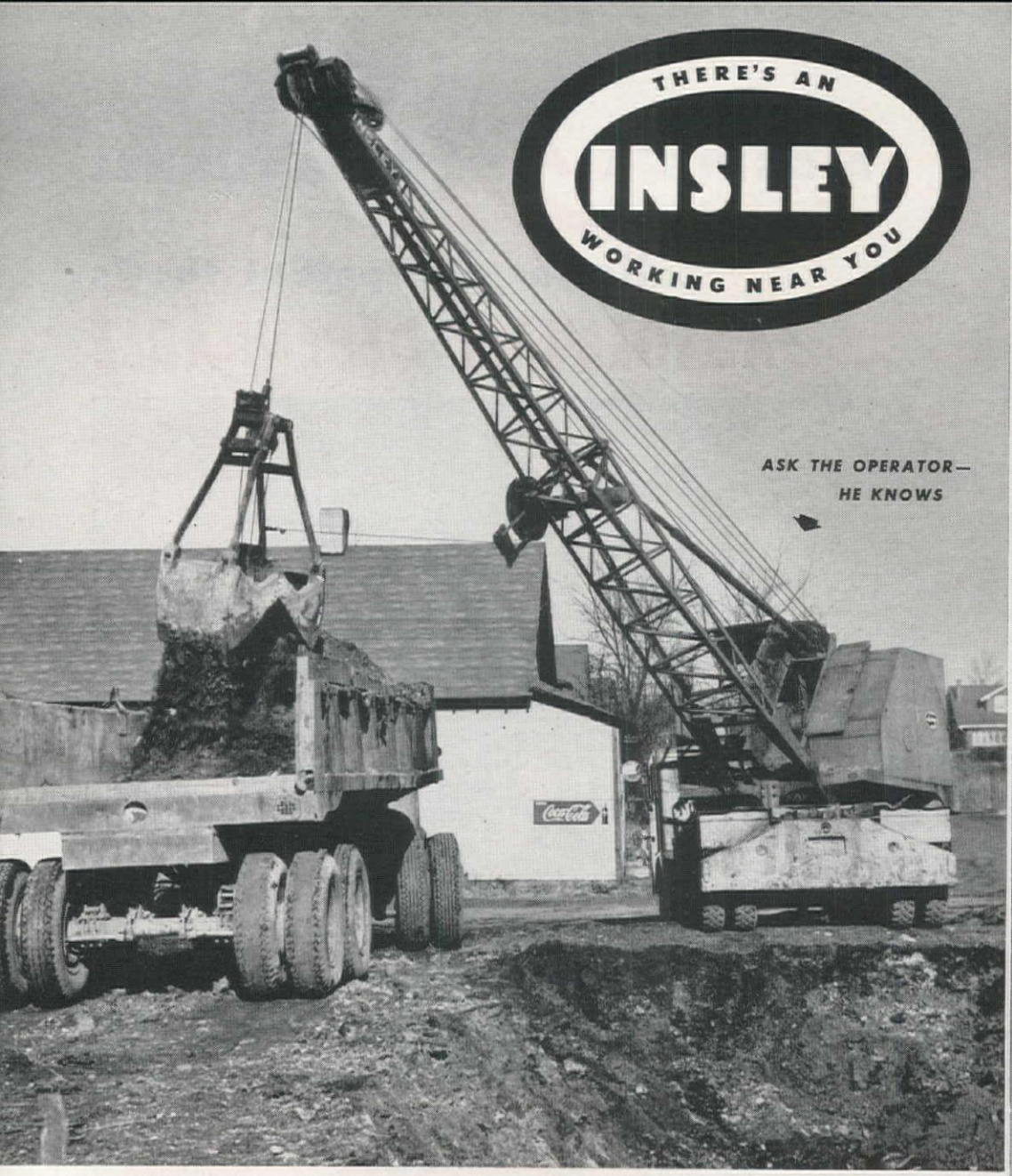
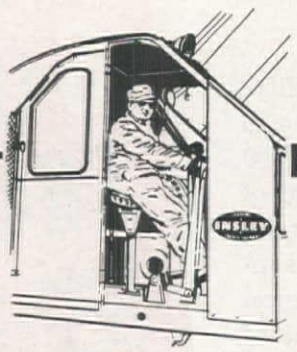


The INSLEY operator knows..



PROJECT RATED
INSLEY
BY THE USER—FOR THE USER

that Insley equipment can be rated-for-the-project... he knows that specification alternates make it possible to buy the exact equipment to do his job best.

INSLEY MANUFACTURING CORPORATION • INDIANAPOLIS 6, INDIANA

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But Not the Mower with an OLIVER Hydro-Cut!

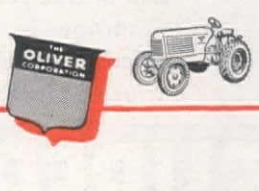
Yes, here's the mower that not only cuts anything from thick matted grass to heavy brush but also cuts maintenance costs to the bone . . . *50% and even more according to cost records of users!*

When an Oliver Hydro-Cut hits a bottle . . . a piece of wire or other roadside debris, you don't lay up the mower for expensive repairs. With the ordinary mower, this impact breaks or damages knife sections, guards, knife heads and even pitman drives.

The Oliver Hydro-Cut is hydraulically operated; there is far less impact when the cutter bar strikes debris. The "metal in motion" behind the knife in an Oliver is approximately 22 pounds as compared to over 100 pounds for a mechanical mower. It is the vastly increased impact load in the ordinary mower that causes the excessive damage and maintenance costs. And, for extra safety, Oliver has a hydraulic blow-off valve which instantly unloads the force behind the knife when the mower strikes an obstruction.

If you're interested in saving hundreds of dollars in maintenance costs per year, see or call your Oliver Industrial Distributor.

THE OLIVER CORPORATION



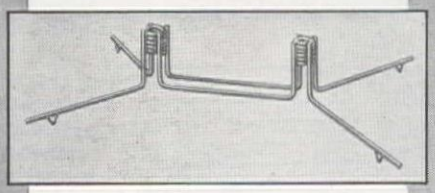
A complete line of industrial wheel and crawler tractors

State of Arizona: Guerin Implement Co., Phoenix, 1401 S. Central St. *State of California:* Gustafson Tractor Co., Eureka; Mechanical Farm Equipment Dist., Inc., San Jose; Ashton Implement Co., Salinas; Comber & Mindach, Modesto; Cal-Butte Tractor Company, 820 Broadway, Chico; Tractor & Equipment Co., San Leandro; Flood Equipment Co., Sacramento; W. J. Yandle Co., Santa Rosa; Jim Ingle Co., Fresno, Hanford, and Tulare; Oliver Implement Co., Bakersfield and Shafter; Turner & Chapin, Whittier and Covina; Condosta Tractor Company, Colton; Polzine Farm Equipment, Merced; H and M Tractor Company, Stockton; Banzhaf Farm Machinery Co., Ukiah. *State of Washington:* Inland Diesel & Machinery Company, Spokane; Pacific Hoist & Derrick Co., Seattle and Puyallup; Melcher-Ray Machinery Co., 202 East Alder St., Walla Walla; Central Tractor and Equipment Co., Wenatchee. *State of Oregon:* Loggers & Contractors Machinery Co., Portland and Eugene. *State of Idaho:* Idaho Cletrac Sales Co., Lewiston and Cottonwood; Engineering Sales Service, Inc., Boise. *State of Montana:* Western Construction Equipment Co., Billings and Missoula. *State of Nevada:* B & M Tractor & Equipment Corp., 1420 S. Virginia St., Reno. *State of Utah:* Arnold Machinery Co., Inc., 433 W. Second South St., Salt Lake City 1. *British Columbia:* Pacific Tractor & Equipment, Ltd., 505 Railway St., Vancouver, Victoria, Chilliwack. *Alaska:* Herning Equipment Co., Box 1792, Fairbanks.

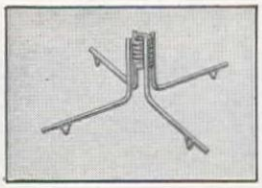
3 NEW SUPERIOR ACCESSORIES

for more efficient handling of...

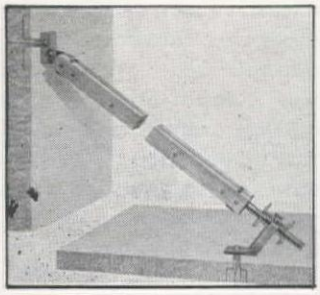
"TILT-UP" SLABS



"PICK-UP" INSERT with two 1" coil bolts, will safely lift a load of 11,000 lbs. when embedded in 3,000 lb. concrete slabs.



"ANCHOR" INSERT in both the "Tilt-Up" slab and the floor slab provides anchorage for slab brace bolts.



SLAB BRACE for temporary anchorage is quickly installed and adjusted. Has exclusive pivoting action.

Are you bidding on a "Tilt-Up Slab" job? Are you starting a "Tilt-Up Slab" Job? Then you will be interested in Superior's three new accessories, designed for faster and more efficient handling of precast panels.

The Superior *"Pick-Up" Insert* provides dependable anchorage for bolts to which slings are attached when the panel is raised. *"Anchor" Inserts* in both the "Tilt-Up" slab and the floor slab secure the temporary bolts to which the braces are attached. With Superior's adjustable and pivoting *Brace* you have an efficient as well as inexpensive answer to both ordinary and unusual bracing problems . . . you merely assemble with 2 x 4's of lengths to fit individual jobs.

Leading contractors on the Pacific Coast and in the Midwest already are users of these new specially designed inserts and braces.

For details write today for Superior's Bulletin "T U-1".

SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

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1775 Broadway, New York 19, N. Y.

Pacific Coast Plant
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WHY NOT LOAD THE CHEAPEST WAY?

BARBER-GREENE

MODEL

82-A

CRAWLER-MOUNTED BUCKET LOADER

FIGURE your present loading cost . . .

CONSIDER wasted truck time . . . wasted man-hours . . . special operator . . .

COMPARE the constant 3 cu. yd. per min. loading of the B-G 82-A . . .

AND SEE the savings in man-hours and money possible on your loading jobs with a B-G 82-A Bucket Loader.

A B-G 82-A Bucket Loader is by all odds the cheapest and fastest method of loading free-flowing materials into trucks. Exhaustive cost analyses made throughout Barber-Greene's over 30 years' experience (during which B-G Loaders handled over a billion yards of material) have consistently proved this.

Simple controls mean that each driver can load his own truck . . . no need for an expensive operator. Each truck can be loaded to full capacity without spillage . . . without truck damage or undue truck wear.

Crawler-mounted, the 82-A provides positive traction in all kinds of going—on soft or muddy bases—on spots where pneumatic-tired rigs can't operate.

B-G Redi-Fab Series Sectional Truss Belt Conveyors

IN STOCK — IMMEDIATE DELIVERY

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See your Local Distributor: BROWN-BEVIS-INDUSTRIAL EQUIPMENT CO., Los Angeles 58, California; COLUMBIA EQUIPMENT CO., Spokane, Washington, Seattle, Washington, Boise, Idaho, Portland 14, Oregon; WILSON EQUIPMENT & SUPPLY CO., Cheyenne, Wyoming, Casper, Wyoming; CONTRACTORS EQUIPMENT & SUPPLY CO., Albuquerque, New Mexico; RAY CORSON MACHINERY CO., Denver 9, Colorado; JENISON MACHINERY CO., San Francisco 7, California; WESTERN CONSTRUCTION EQUIPMENT CO., Billings, Montana, Missoula, Montana; KIMBALL EQUIPMENT COMPANY, Salt Lake City 10, Utah; STATE TRACTOR & EQUIPMENT CO., Phoenix and Tucson, Arizona.

NOW is the time . . .

Choose Equipment for Snow Removal

that works the year 'round

When you select Allis-Chalmers Tractors and Motor Graders, you have units that do more than snow removal work. They are busy throughout the year on all types of excavating, grading, maintaining and material handling — one investment provides an economical all 'round, year 'round machine.

There's a unit in the Allis-Chalmers line to fit every need . . .

A Great New Snow Fighter —the AD-40 Motor Grader

Features that make the AD-40 the outstanding motor grader also make it outstanding as a snow fighter.

New Type, Built-In Hydraulic Power Steering is another Allis-Chalmers first in the motor grader field. Adds the ease and smoothness of hydraulic power to the wheel-feel accuracy of mechanical control and eliminates most of the steering effort normally required. Makes snow plowing easier for the operator and assures greatest accuracy—a big help in handling the added front-end weight of snowplows.

New Operator Convenience — unmatched visibility, with single-member tubular frame from platform to front axle—true comfort, sitting or standing, with roomy operator platform, adjustable seat and steering wheel, easily reached controls—simple operation, with hydraulic steering, hydraulic brakes.

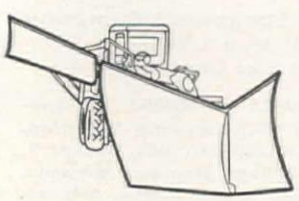
New Service Simplicity not found in any other grader. Universal drive shaft between clutch and transmission permits pulling engine without disturbing transmission. Transmission removable without disturbing engine or floor plates. Power take-off and hydraulic steering pump readily accessible. Adjustments easy to get at, easy to make.

New Performance — with traction assured by tandem drive, big tires and 23,000-lb. weight (24,800 lb. with optional calcium chloride in tires)—plenty of power provided by 104 brake hp., 2-cycle diesel engine, which can be throttled down to half speed without loss of rim pull on grader—plus other proven Allis-Chalmers features such as exclusive Tubular Frame and exclusive ROLL-AWAY Moldboard.

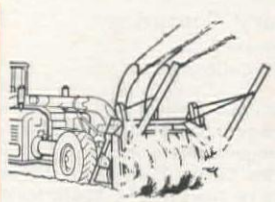
ROLL-AWAY is an Allis-Chalmers Trademark.

Its performance, service and operator advantages make the AD-40 the finest heavy-duty grader on the market.

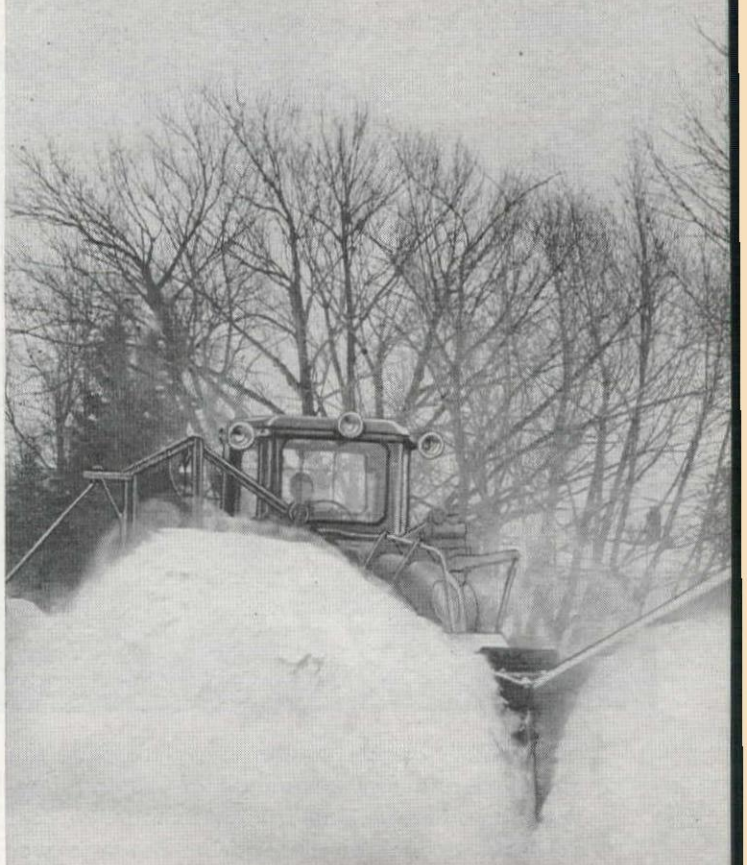
Allis-Chalmers diesel Motor Graders are versatile snow fighters . . .



They mount V-type plow with wings . . .

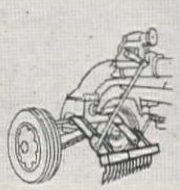


or rotary type snowplow . . .

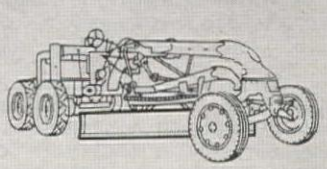


FOUR DIESEL GRADERS

17,772 to 23,000 lb. —
50.5 to 104 brake hp.
Speeds to 20.4 mph.



scarifier for breaking up ice or packed snow . . .



or regular grader blade for windrowing snow.

For Economical All 'round Snow Removal . . . it's the low-cost Allis-Chalmers Model D grader. Windrows snow on streets with grader blade, then loads into trucks with rear-end loader. Scarifier breaks up stubborn ice and snow along gutters. V-type snowplow is used to open outlying roads. The Model D offers the working advantages only a tandem drive grader can give—yet three Model D's can be bought for the price of one large grader.

LOW-COST GRADER

Model D
8,500 lb. (bare),
34.7 brake hp.
four forward speeds
to 25.6 mph.

For Clearing Away Heavy Snows . . . it's any of the four modern Allis-Chalmers pace-setting crawler tractors with regular dozer blades. These world's finest tractors have the power and the traction to fight snows anywhere—opening mountain passes, pushing biggest drifts off highways, helping clear city streets in a hurry.

FOUR CRAWLER TRACTORS

HD-5
40 drawbar hp.,
10,500 lb.
HD-9
72 drawbar hp.,
18,800 lb.
HD-15
109 drawbar hp.,
27,850 lb.
HD-20
175 net engine hp.,
41,000 lb.

For Big-Capacity Loading in City or Country . . . it's Allis-Chalmers tractors with Tracto-Shovels. Snow is loaded into trucks or carried away fast by big light-materials buckets—sand efficiently loaded to trucks from stockpiles. Ice and packed snow is broken up by bucket teeth or by rippers mounted on rear of tractor.

FOUR TRACTOR-SHOVELS

2 to 7-yd. buckets
for light materials,
1 to 4-yd. standard
and rock buckets,
other attachments,
9 to 13-ft. dumping
height

For Clearing Walks, Parking Areas, etc. . . . it's the Allis-Chalmers Model IB wheel tractor with broom or snowplow—either "V" or blade type. Has mounting frame for quickly attaching or removing auxiliary equipment.

WHEEL TRACTOR

Model IB
2,365 lb.,
18 drawbar hp.
three forward speeds
to 8.5 mph.

For Complete Information on any of these Versatile Snow Fighters . . .

see your ALLIS-CHALMERS dealer

ARIZONA
Neil B. McGinnis Equipment Company—Phoenix

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Moore Equipment Co., Inc.—
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MONTANA
Mountain Tractor Company—Missoula
Richland Machinery Company—Sidney
Seitz Machinery Company, Inc.—Billings

NEVADA
A-D Machinery Company—Elko
Moore Equipment Company, Inc.—Reno

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Farm and Industrial Equipment Company—
Eugene, Roseburg and North Bend

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Dielschneider Equipment Oreg. Ltd.—The Dalles
Tractor Sales and Service, Inc.—Medford
West Hitchcock Corp.—Klamath Falls
Wood Tractor Company—Portland

UTAH
Cate Equipment Company, Inc.—Salt Lake City

WASHINGTON
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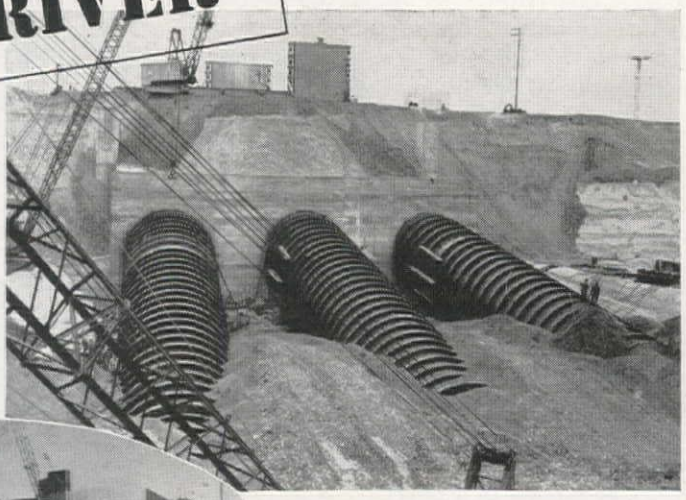
Seattle, Tacoma and Wenatchee
American Machine Company—Spokane

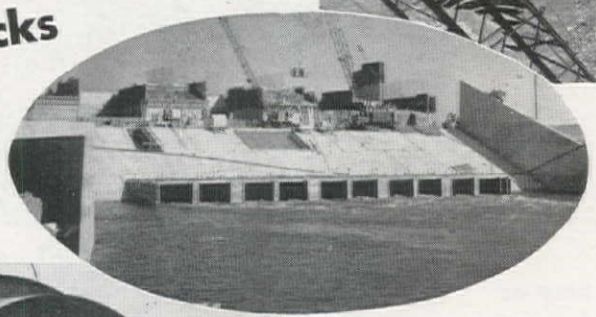
WYOMING
Studer Tractor & Equipment Company—Casper

NEW DEVELOPMENT ON THE SNAKE RIVER

Idaho Hydro-Electric Plant Built to Serve Pacific Northwest

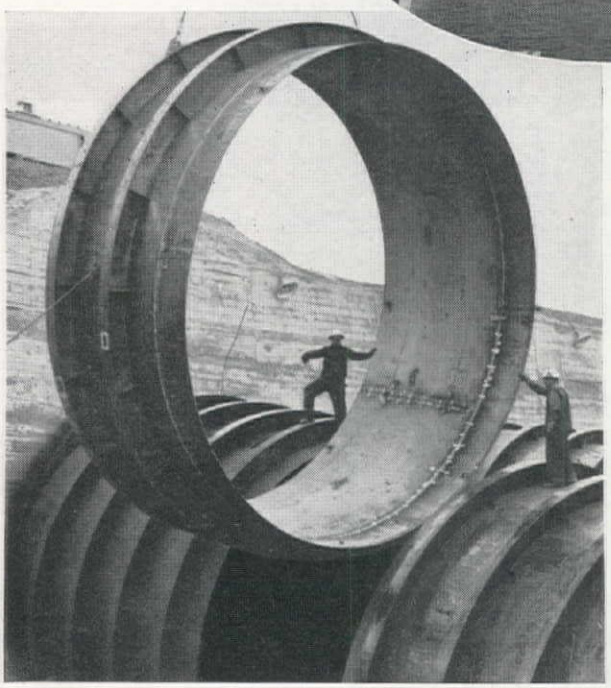
Three 22-Foot Diameter Horton Penstocks Installed





Above: Three 22-ft. diam. Horton steel penstocks at the C. J. Strike Hydro-Electric Development.

Left: View showing ten openings in bottom of spillway during construction of the dam.



Above: Closing section of Horton steel penstock being lowered in position at the Snake River dam site.

The C. J. Strike Hydro-Electric Development—located on the Snake River 60 miles southeast of Boise—is the sixth plant in the Idaho Power Company's postwar expansion program designed to meet ever increasing power demands in the area it serves. This new $20,000,000 project consists of a 3,220-ft. earth fill dam with a concrete spillway, and a powerhouse with three 30,000-kva. generating units.

Essential to the operation of the powerhouse turbines at the C. J. Strike Development are three 22-ft. diam. Horton welded steel penstocks. These structures were fabricated and erected by the Chicago Bridge & Iron Company illustrating, once again, our versatility in meeting the steel plate requirements of industry and power throughout the world. Other recently built Horton penstocks are in service at the Buggs Island Dam, Roanoke, Virginia—the Clark Hill Dam, Augusta, Georgia—and the Bartletts Ferry Dam, Bartletts Ferry, Georgia.

For special steel plate work or storage tanks to fit your specific requirements, write our nearest office. There is no obligation on your part.

HORTON

WELDED STEEL

STORAGE TANKS

CHICAGO BRIDGE & IRON COMPANY

Plants in Birmingham, Chicago, Salt Lake City, and Greenville, Pa.

Atlanta 3	2183 Healey Building
Birmingham 1	1598 North Fiftieth Street
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Chicago 4	McCormick Building
Cleveland 15	Guildhall Building
Detroit 26	Lafayette Building
Houston 2	C & I Life Building
Los Angeles 17	1544 General Petroleum Building
New York 6	165 Broadway Building
Philadelphia 3	1700 Walnut Street Building
San Francisco 4	1569—200 Bush Street
Seattle 1	1355 Henry Building
Tulsa 3	Hunt Building
Washington 6, D. C.	1103 Cafritz Building

WESTERN CONSTRUCTION

October 1952 Vol. 27, No. 10

The public votes on engineering problems

The level of civil engineering recognition reaches a further low in public acceptance whenever voters are called upon to make engineering decisions. On the November ballot the citizens of San Francisco are being asked to decide whether municipal funds should be provided to help finance the building of a large-scale hydraulic model of San Francisco Bay. Of course, the city officials take the position they are merely asking the public to vote on the spending of its own money. In reality they are saying to the average voter, "Do you think a model is necessary in the solution of the present engineering problem?" . . . if so, you will obviously be in favor of providing funds and vote yes. The question of voting funds is therefore secondary to having the citizen answer the engineering question as to whether the model is required, or not. Imagine voters being asked for a corresponding decision on a purely legal or medical question. It is not too pleasant a commentary on the position of civil engineering when elected officials consider such a matter as not worthy of their time for proper study and decision, passing it along to the public. As a result the average citizen considers himself quite an authority on civil engineering and has the idea that the profession does not deserve more than a modest compensation for such work. This leads, logically, to a further observation.

Pride is a strong attribute of the true engineer. The thrill of accomplishment provides a major element in the compensation for designing and building permanent structures. Possibly this applies more to the field of civil than any other branch of the science since the production of a mechanical or electrical gadget, superseded next year by a new model, does not permit more than passing gratification. Civil engineers ordinarily are salaried employees dealing with projects involving important expenditures. Much personal satisfaction comes from studying the available solutions to the assigned problem, applying individual ingenuity, and arriving at an answer which can pridefully be designated as "least-cost." Thus their professional accomplishment produces immediate and tangible money savings to the owner—either the general public, or private industry. But the average civil engineer, being a salaried employee on a staff, is not in a position where compensation is commensurate with such accomplishments. There is no element of "per cent of cost," which characterizes the work of a professional consultant, or the savings in cost which can be turned into profit by the contractor. Today, the salaried civil engineer has arrived at a time for serious self-analysis.

Rubber roads in the West

For the first time a section of asphalt pavement with a natural rubber additive has been laid in the West. This experimental section of street resurfacing was put down in Los Angeles a few weeks ago. It will offer the first opportunity for direct observation of the use of natural rubber with asphalt under Western conditions. The process already has a relatively long foreign history and many test sections have been laid on city streets and state highways in the East. Western engineers will now want to study the balance between advantages and added costs, as is their custom and responsibility. At present the cost appears to be a considerable item, although like any other new development this factor could be expected to decrease as volume increases and the process is better understood. However, any added cost, no matter how small, must not overbalance the improvments that result. Several are claimed, and have been confirmed by extensive laboratory tests, and the observed results of foreign experience. Among these are longer life of the pavement, its reduced susceptibility to temperature variations, combined with added elasticity and reduced brittleness at low temperatures. A higher resistance to skidding is also claimed.

In general, the West is a region of bituminous roads, but it is also a region where engineers are forced to get the most out of the highway dollar, because of long distances and many areas of scant population. Thus, their interest should be doubly keen in following the results of this first field test. Further, more experimental sections should be placed under widely differing conditions (the West has more than its share). The determination of the possible advantages should be explored by such multiple testing, so that no time will be lost in finding sound answers to the questions that exist today. The West has an unusual stake in the exploration of this development.

Gravel goes out; comes back concrete

Normally, the material excavated for a building foundation is wasted, and other materials are secured and processed for the foundation concrete. An exception is the recent underground garage project in Phoenix, described on pp. 61-64 of this issue, where the excavated gravel was trucked to a commercial concrete plant for processing, and much of it returned to the same site in the form of concrete that went into the building. The idea represents no important construction innovation and possibly should be classed as more of a novelty. Never-the-less it deserves recognition as the work of an alert contractor in doing the unusual and not overlooking any ideas for saving in construction costs. These are the small, but important angles which add up to keep the construction industry of the West in its position of leadership.

"... the 99-H is the most versatile grader I have ever seen, as well as the most maneuverable."

Howard Price, President
Howard Price and Company
Huntington, W. Va.

"This grader is on U.S. Route 35, where we are engaged in a project involving 2.05 miles of grading, draining and ditching, as well as paving the highway in North Charleston between Two Mile Creek and Tyler Creek.

"This is the first Austin-Western grader to be used in this family of contractors, and I have no hesitancy in saying that the 99-H is the most versatile grader I have ever seen, as well as the most maneuverable. It will do jobs that other graders will not do, and, when the going is really tough, it will operate under conditions that other graders would not attempt. Just recently, after several days of heavy rain, the 99-H was doing its chores on schedule. Two other graders of well-known makes were compelled to stand by until the terrain was favorable to the extent that they could be put to work. This adds up to more hours operation every week for the 99-H.

"Aside from the standpoint of the 99-H's ability to take tough going in stride, it is also the easiest grader to operate that I have ever owned. The operators like it, which means we get more efficiency from them."

HOWARD PRICE AND COMPANY
Howard Price
President

Thank you, Mr. Price, for putting into words—what so many other contractors have learned—that Austin-Western's *exclusive* combination of ALL-WHEEL DRIVE and ALL-WHEEL STEER means top grade performance by America's top grader.

AUSTIN-WESTERN COMPANY · *Subsidiary of Baldwin-Lima-Hamilton Corporation* · **AURORA, ILLINOIS, U.S.A.**

ARIZONA—SHRIVER MACHINERY COMPANY.....*Phoenix*
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MONTANA—WESTERN CONSTRUCTION EQUIPMENT CO.....*Missoula*
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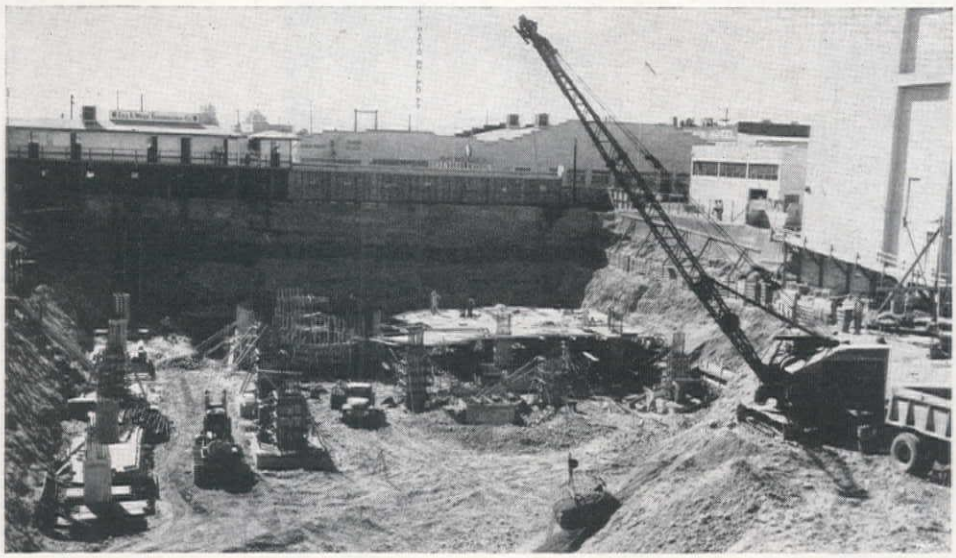
WESTERN CONSTRUCTION

OCTOBER 1952

Supporting the sides of 3-floor excavation highlights—

PHOENIX UNDERGROUND GARAGE



Area 150 x 300 ft. under new J. C. Penney store held open by railroad rails driven through loose material and braced against completed central section—Spoil sent to commercial rock plant for processing and return in concrete mix—Chemical solidification used during underpinning of adjacent building

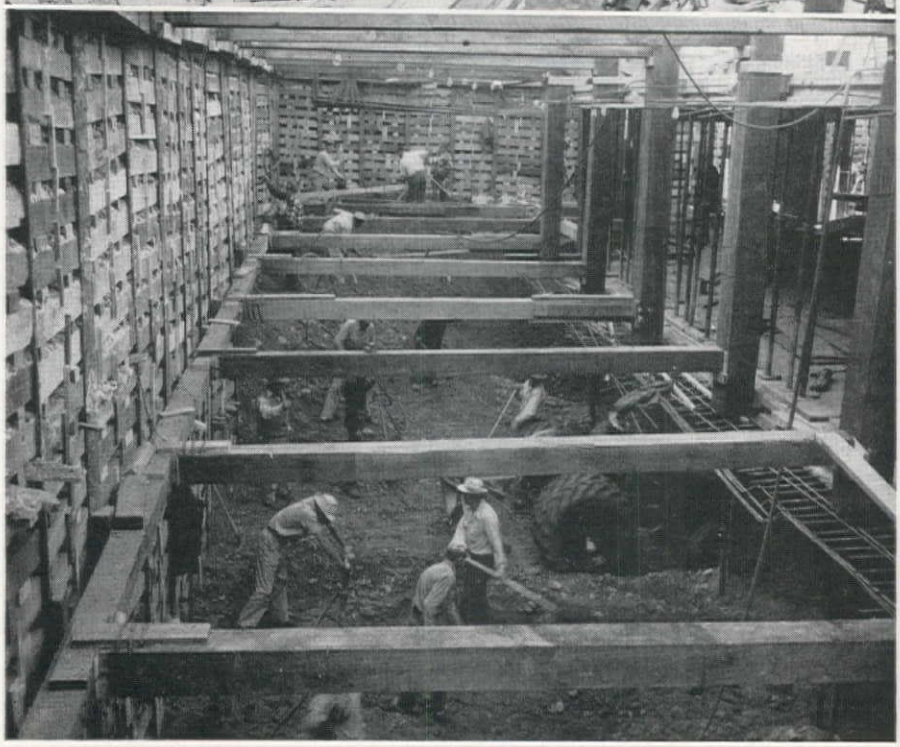
By

JOHN H. EVANS

Job Engineer
Del E. Webb
Construction Co.
Phoenix, Ariz.

A THREE-FLOOR underground garage for the J. C. Penney store in Phoenix, Arizona, provided several interesting construction angles. There was the problem of supporting the excavation walls through sand and gravel, the use of chemical solidification to aid the underpinning of the adjacent building and the fact that much of the excavated material was trucked to a commercial plant where it was processed and returned as ready-mix concrete.

Metropolitan Phoenix, serving as a trading center for some 400,000 residents of farming and resort communities of the Salt River Valley, is faced with an increasingly critical problem in traffic engineering. As in many other cities of comparable recent growth, existing inadequacies of off-street parking facilities present a major problem to municipal planners and mid-town merchants who note with anxiety the mushrooming of suburban shopping and the accompanying decline of business center property values. The Landrum and Mills Realty Co., now completing the largest of southwest stores for the J. C. Penney Co., has sought to provide customer parking facilities, yet retain valuable merchandising street frontages. In attempting to balance the physical and financial dictates of the situation, the modernistic J. C. Penney store and garage building covers a full half city block, will boast three basements of auto parking and a complete auto repair and



SUPPORT for the sides of the excavation was secured by driving 90-lb. rails at 4-ft. spacing (top) and wedging 3 x 6 lagging between the webs.

CENTRAL STRUCTURE was then built and excavation support transferred to it (center). Note gunite used to hold the top 12 ft. of excavation.

EXCAVATION was then carried down to final grade (bottom) in preparation for forming footings and exterior walls.

service facility, in addition to a three-level sales area.

Architectural and structural design by Milton L. Anderson, architect of Los Angeles, provides for approximately 115,000 sq. ft. of merchandising floor space for the occupancy of the J. C. Penney Co., with an additional 125,000 sq. ft. of garage and parking facilities for System Auto Parks, Inc., readily accessible to merchandising areas and street levels.

General design

The general contract awarded to the Del E. Webb Construction Co. of Phoenix and Los Angeles specifies a six-story reinforced concrete structure 300 by 150 ft., requiring some 14,000 cu. yd. of concrete and 1,300 tons of reinforcing steel. Design features include concrete columns supporting a splayed cap slab ranging in thickness from 10 to 24 in. Focal point of ground floor and basement elevations is an interior ramp 26 ft. wide providing access to sub-grade parking levels. Warped slab areas adjacent to the spiral ramp permit an easy transition into each of three parking levels. Concrete columns form a grid 33 ft., 4 in. by 28 ft., 6 in. on centers yielding a maximum of lateral freeway for both store and garage areas.

Floor to overhead clearances in the parking garage are a minimum of 7 ft., 6 in., while in the store occupancy 18-ft. ceilings are suspended from a 22-ft. overhead deck. Two minute air change ventilation by forced air is employed in basement areas of the garage; a 350-ton refrigeration unit serves all merchandising sections. Ready access to all areas of both store and garage has been provided by four elevators and eight escalators.

Construction begun

Construction activity started June 21, 1951, with the work of excavating 67,000 cu. yd. of material. In operations employing both a Lorain 1½-yd. shovel and a Northwest ¾-yd. utility rig, Webb Company personnel operating at peak efficiency moved in excess of 1,900 cu. yd. of material in a single operational day. Haulage distance of about 2 mi. with city traffic driving presented a problem for the fleet of Ford 6-yd. dump trucks. Practically all of the excavated material was hauled to the plant of the Acme Materials Company.

Incidentally, much of this excavated material returned to the job in the form of concrete. As the sand and gravel was

A SINGLE POUR on the floor slab exceeded 635 cu. yd. of concrete, placed in a 12-hr. period. This is believed to have been the largest single pour ever executed in Arizona building construction.

excavated from the site, the contractor's staff selected the loads which were not suited for processing and they were disposed of as fill for nearby building sites. The material going to the Acme plant received the usual screening and washing, and then went to the batch plant from where much of it ultimately moved back to its original location in the form of transit-mix concrete. Finally, tally showed that 35,000 cu. yd. were hauled to the concrete plant and 20,000 cu. yd. were used for fill.

Nature of sub-surface soils indicated the jobsite to have been at one time in the bed of the nearby Salt River. Below a 12-ft. strata of clay overburden, river-run sand and gravel was encountered to the deepest area of excavation at 51 ft. below ground floor datum. Such materials, although to the advantage of the contractor in excavation operations, proved a definite hazard in the support of excavation embankments. Initially, the stabilizing of the sides was secured by guniting fresh cut sections. The method employed a 2-in. cover of gunite with 6 - 6 : 10 - 10-mesh reinforcement which served as a drainage seal in preventing erosion of the 12-ft. clay overburden. However, when attempt was made to face those river run banks below the —12-ft. elevation, forces controlling the ultimate angle of repose of the material refuted such attempts at lateral support and led to an alternate method of bank stabilization.

Pile driving

Final approval was given to a plan employing an exterior piling shield of 90-lb. rail piling driven 3½ ft. outside building line at the toe of the 12-ft. gunited berm. Standard 33-ft. rails were driven on 4-ft. centers to a depth required by adjacent building footings. Along this piling line 3 x 6 rough fir lagging was wedged between rail webbs. By a process to be described later, loose sand and gravel soils outside the lagging piling line were solidified to minimize the sloughing off of sand from behind the lagging.

Driving was carried out with the crawler crane, rigged with 45-ft. leads, a McKiernan-Terry No. 6 hammer and a Gardner-Denver 600-cfm. compressor. Supervised by R. G. Fleming, superintendent in charge of excavation and preliminary site preparation, completed piling operations saw the driving and eventual extraction of 180 units of relay rail.

Underpinning

Coinciding with the excavation and pile driving was the underpinning of the Fox Theatre Building, a structure immediately adjacent to the proposed Penney Store. Again in underpinning operations, the sand and gravel nature of sub-surface soils caused trouble in sinking shafts for Fox Theatre underpinning work. With existing footings of the Fox Building at an elevation of —12 ft., reinforced concrete underpinning columns and footings had to be designed to reach to an elevation of —40 ft., corresponding with the bottom of the Penney Building footings. Placement of these underpinning units necessitated the sinking of 12 working shafts through some 28 ft. of sand and gravel, again providing the problem of lateral support when working in loose material. In these operations the abilities of experienced mining men were coupled with the application of chemical solidification. This relatively new process in the construction industry, involving the injection of sodium silicate, was presented by the Philadelphia Quartz Co. In a pilot shaft sunk to develop operational procedures, much was learned of the reaction of the chemicals used, to the soils to be worked. It was early discovered that the accuracy in the batching of the injection solutions could in a large measure account for the success or failure of this particular application. The sodium bicarbonate catalyst when properly combined in controlled volumes with the sodium silicate base, could advance or retard the solidification of the processed materials. By rigid control of batching, set-up time for treated areas could be varied from a few minutes to a full day.

Extreme care was exercised to avoid premature setting-up of solution in the pumps, discharge hose, or injection needles. Through preliminary tests it was found that injection following a definite pattern to a predetermined depth was most desirable. Complete saturation of the sand and gravel to be worked was a necessity since any untreated soils in the working area would act as a plane of weakness through the material, encouraging sloughing-off of neighboring solidified masses.

Hand excavation of the stabilized soils was found to be comparable to the working of loosely cemented conglomerate materials. The use of air tools in the vicinity of the working shafts was prohibited because it was believed that the accompanying vibrations might start dangerous sand drifts. The complete operational cycle covered a 14-hr. period with injection of silicate solutions scheduled in the late evening. Off-shift hours immediately following the injection allowed set-up time for treated areas.

The cycle of operations

Neither the application of the chemical process nor the experience of the mining men alone could have achieved the final goal; each aided the other. Preliminary to the excavation for the 9 x 12-ft. working shafts, the sand and gravel soils in the immediate area of operations were chemically treated as described. Following solidification of the shaft area, excavation and subsequent timbering operations were carried on. As shaft sinking progressed beyond the depth affected by previous silicate injections, the entire operational cycle was repeated. Forming, steel placement, and concrete work for underpinning units were completed by those trades having jurisdiction at underground premium scale. Backfilling of shafts employed lean mix concrete to provide for any settlement of underpinning before final wedging and dry packing. Timber sets were pulled for re-use as backfilling progressed. In all, twelve underpinning units were completed, requiring the placement of some 8 tons of

UNDERPINNING the existing footings of an adjacent building moved them down about 28 ft. through sand and gravel. Chemical solidification of this loose material made the work possible.

reinforcing steel and 120 cu. yd. of concrete.

Silicate injection equipment included Fairbanks Morse steam pumps capable of discharge at pressure up to 400 psi., various length injection needles, miscellaneous intake and discharge hose, etc. Hoisting for shaft work was provided by Chicago Pneumatic 105-psi. air tuggers. Job-built head frame of timber construction was moved from shaft to shaft as work progressed. Timber sets for shaft work were pre-cut of 3 x 6 mining grade fir. Intermediate support was provided by both 6 x 6 stulls and 4-in. extra heavy pipe. In all underground operations the factor of personal safety to shaft crews was stressed and underpinning operations were completed without a lost time accident.

Working from inside out

Varying considerably from normal practice, operations on the reinforced concrete structure were started from the interior of the three sub-basements to provide a rigid intermediate support for the previously placed rail piling. Footings, columns, and overhead slabs were formed and poured to produce an interior core of the building about 11 ft. inside the exterior wall line on all sides. With this rigid core completed to the ground floor level timber struts and walers at elevations —13.00 and —23.00 braced the rigid interior structure against the exterior piling shield. Following this intermediate support of the rail piling, final excavation proceeded for the removal of the berm retained at the toe of the piling. Subsequent removal of the interior berm permitted excavation and concrete work for exterior wall footings and placement of the structural wall to ground floor elevation.

Above the ground floor elevation form work and concrete placement operations reverted to standard practice. Commercial plywood form material was used exclusively in facing both flat and curved surfaces. Resultant exposed concrete required only pointing of tie holes and patching of irregularities. Throughout sub-surface operations every advantage was taken of gravity flow in concrete placement. Supplementing the system of chutes and tremies were six Whiteman concrete buggies of ⅓ cu. yd. capacity. Slab pours exceeding 635 cu. yd. were made in a 12-hr. period, believed to be the largest single concrete pour in building construction in Arizona.

Crane spots materials

Operations above ground were serviced by a Bay City 20-ton truck crane. With access to a 700-ft. frontage of the 900-ft. job perimeter, this rig, with effective boom lengths up to 105 ft., was used for diversified operations including hoisting of concrete and reinforcing steel, handling of form materials, and setting of penthouse mechanical equipment. In readily accessible areas concrete was poured directly from the 1-yd. bucket, realizing a considerable savings in placement costs. Pouring interior sections the power buggies worked under double hoppers fed by the one truck crane.

Topping out of the main penthouse roof was scheduled for mid-September and will mark the 12-month concreting operations, concluded some 110 ft. above the grade of the initial interior footing pours. In accord with the original contract, beneficial occupancy is scheduled for mid-December.

Personnel

For the Del E. Webb Construction Co. excavation and preliminary supervision was by R. G. Fleming, sub-surface formwork was designed and supervised by E. A. Leedham. L. D. Sanders was in charge of engineering detail, C. M. Smith was general carpentry foreman, R. H. Koehle and C. A. Cameron were labor foremen. Office manager was T. P. Kohl and the author was job engineer.

General supervision for the Webb Company project was provided by E. G. McIntosh and F. L. McDowell as job superintendents; H. E. Boice and C. V. Bernard representing the firm's operations department. Throughout the job, architectural design and inspection has been directed by Frank G. Rempel, resident architectural superintendent.

ASCE told construction passes agriculture as the country's largest single industry

BY HAPPY COINCIDENCE, America's construction industry became its largest single industry in 1951, giving added significance to the Centennial of Engineering held last month in Chicago on the occasion of the 100th anniversary of the American Society of Civil Engineers. Speaking on September 3 at one of the Centennial programs, H. E. Foreman, managing director of the Associated General Contractors of America, tabulated the basic items that went into the 1951 construction total:

"The volume of new construction put in place was more than $31,000,000,000, according to the revised estimates of the Departments of Commerce and Labor. In addition, approximately $9,000,000,000 worth of maintenance and repair operations was performed to bring the total volume of construction activity to $40,000,000,000.

"This exceeded the total value of agricultural production, which normally has been the greatest industry in the nation. Nearly one dollar in every eight created in end products and services in the United States was a construction dollar in 1951.

"Throughout the year an average of 2,250,000 men were employed each month by general contractors and subcontractors on the site of construction projects. For each man working at the site, from two to four other jobs were created elsewhere in the production or transportation of materials and in the performance of services for the industry.

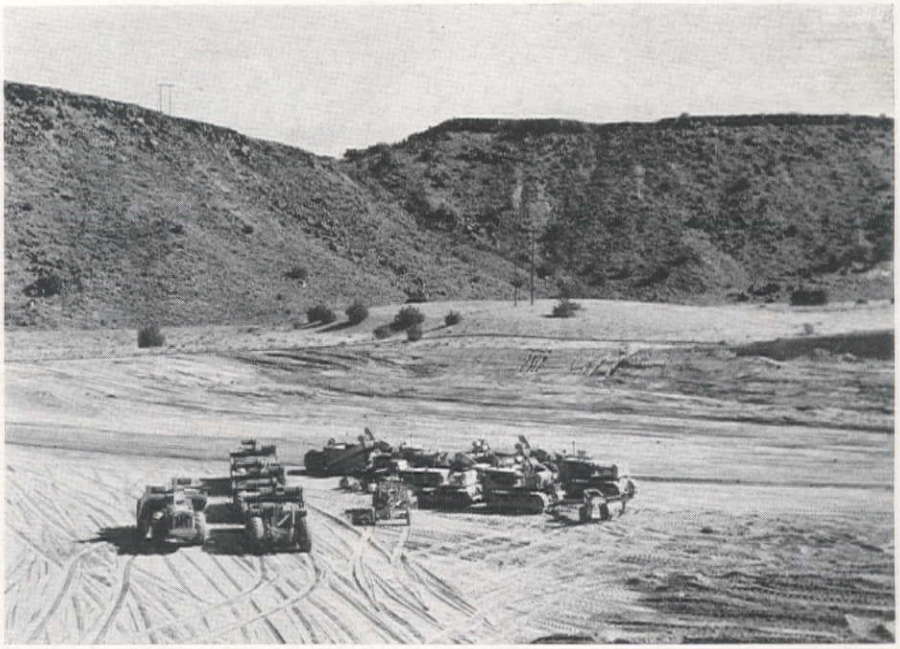
"Of this construction, more than $21,000,000,000 was privately financed, and more than $9,000,000,000 was invested in public funds. Of the private funds invested, almost $11,000,000,000 went into residential construction; more than $5,000,000,000 was invested in nonresidential building for industrial, commercial, religious, educational, health and other institutional purposes; and more than $3,000,000,000 was for public utilities.

"Of the public funds, more than $3,000,000,000 was invested for educational and other public institutions; approximately $2,500,000,000 for highways; almost $1,000,000,000 for conservation and development of resources; and more than $1,000,000,000 for military construction.

"During the first six months of 1952 another record of nearly $15,000,000,000 in new construction was established. There is the possibility that if materials are available during the balance of the year another annual record of more than $40,000,000,000 in construction will be established.

"These figures on construction activity . . . clearly indicate that the construction industry is performing a tremendous amount of work for the nation and all of its communities."

New Mexico's big Rio Grande silt control program starts with Jemez Dam — Zero pit moisture is problem, but contractor moves dirt fast by sticking to . . .



SOME FULL, some empty, rigs are bunched for service at noon hour, can resume work at top speed.

Earthwork schedules at Jemez

REPRESENTING the first major unit in the silt control program along the Middle Rio Grande, construction operations are moving fast on the Jemez Dam, with the earthfill structure scheduled for completion by July 1953. Contract is being carried out by Hinman Bros. Construction Co. of Denver for the Corps of Engineers. A comprehensive review of this Rio Grande control program, which is so essential to the accelerating development of New Mexico, was published in *Western Construction*, August 1950, including a large map showing the location of major units in the plan.

Jemez Dam is being built across the creek by the same name that drains about 1,000 sq. mi. of area lying northwest of Albuquerque. The creek joins the Rio Grande about 15 mi. above the city and since it produces about 10% of the silt carried by the main river, the retention of this load is an important feature of the control program.

The final-stage contract, amounting to $1,490,585, has started off at peak speed by the contractor with work under way on the main dam and spillway, along with a permanent service road. Previous contracts include one of $118,609 by H. C. Jones of Albuquerque for a 6-mi. access road, and one of $1,113,214 for outlet works awarded in June 1950 to Morrison-Knudsen Co., Inc.

Other project works

The resulting reservoir with its 120,000-ac. ft. capacity will prevent stream bed aggradation on the main Rio Grande. In fact, the release of clear water, when the dam starts to function, will tend to scour the river bed and lower the water table in the valley. Other tie-in structures proposed for future construction in the Rio Grande project include dams at Bluewater, Chamita, Espanola Valley, Middle Valley and Hot Springs.

From a contractor's point of view, Jemez Dam is a desirable job and the contract price was well below the engineer's $1,630,000 estimate, as were three other bids submitted to the U. S. Engineers Albuquerque office. Possibly a factor to influence that condition was the method by which the Corps of Engineers had set the project up. For example, the usually troublesome problem of stream diversion was practically nonexistent, because of the earlier contract of Morrison-Knudsen for the permanent 13-ft. circular concrete outlet conduit and gate structure. Further, all the earth necessary to build the 3-zone dam was available in the spillway excavation. Derrick stone and riprap was available largely in a pay area cut on the service road construction.

Good job situation

The terrain was so favorable that a main haul road could be built to within 5 ft. of the dam's crest, without major excavation or fill. Favorable, too, was the foundation situation, for the 780-ft. length of earth embankment, 135 ft. high and 800 ft. wide at the base, can be set on native stream bed overburden and keyed at the abutments to the tight, impervious Santa Fe formation which underlies the talus slopes above the stream. There is no core wall to build.

But there is at least one major construction problem. The embankment material lies in place in the spillway cut at close to zero moisture content. It is powder-dry and resists water penetration. The blending of moisture, along with flying dust, wind, and a requirement that the embankment must be brought up within a 10-ft. over-all range are other factors which introduce construction difficulties.

Hinman's crews moved in June 23 with all but two principal units of their equipment, and started practically from the first day to operate at the scheduled 560 cu. yd. of dirt an hour. This was possible because the work has been scheduled around the following five principal phases, all related and tied in with each other.

1. Dragline excavation in the permanent outlet channels above and below the outlet works will be done simultaneously with the construction of main haul roads, establishment of an office and shop area, and spillway excavation which can be wasted safely. This phase is active now.

2. Abutment stripping will begin and an earth cofferdam that will be a permanent part of the toe of the dam will be constructed to divert the creek through the permanent outlet works. This phase is also active.

3. The stream will be diverted into the conduit, and the foundation will be stripped to acceptable overburden foundation.

4. The main earth fill will be constructed with excavated material from the spillway. This work will commence in time to keep the excavation equipment from wasting any time by being idle.

5. The concrete weir and spillway containing 3,700 cu. yd. will be built, probably by subcontract.

The 1,500,000-yd. excavation and fill job includes three principal types of material: random, pervious, and impervious, and calls for hauling these materials a distance of about 2,000 ft.

Because the fill material to be ex-

SPILLWAY EXCAVATION furnishes all embankment for dam. Material for 2,000-ft. haul is moistened before being moved out.

cavated from the spillway has a moisture content of about zero, the contractor set up equipment and a procedure for prewetting, to reduce the amount of time and equipment required on the dam to secure the moisture required for proper compacting.

Pit sprinkling

A major pump installation lifts water 173 ft. from sumps in the river bed to the spillway area. A 6-in. water main delivers to the 3-in. rainmaker lines spaced at 75-ft. intervals, and terminating in sprinkler heads. Pre-sprinkling is being done on all material which will be placed in the dam, or in the earthen dike which will protect a nearby Indian pueblo from inundation by the reservoir.

This sprinkling of the pit is paying off, too, because despite the resistance of the material to the penetration of moisture, some is soaking in, and preliminary passes by the ripper help. Considerable processing equipment would undoubtedly be necessary on the fill if this prewatering was not done. Where the sprinkled borrow area has been dug, the material has been in good condition, with moisture evenly blended through the mass.

Good speed on hauling

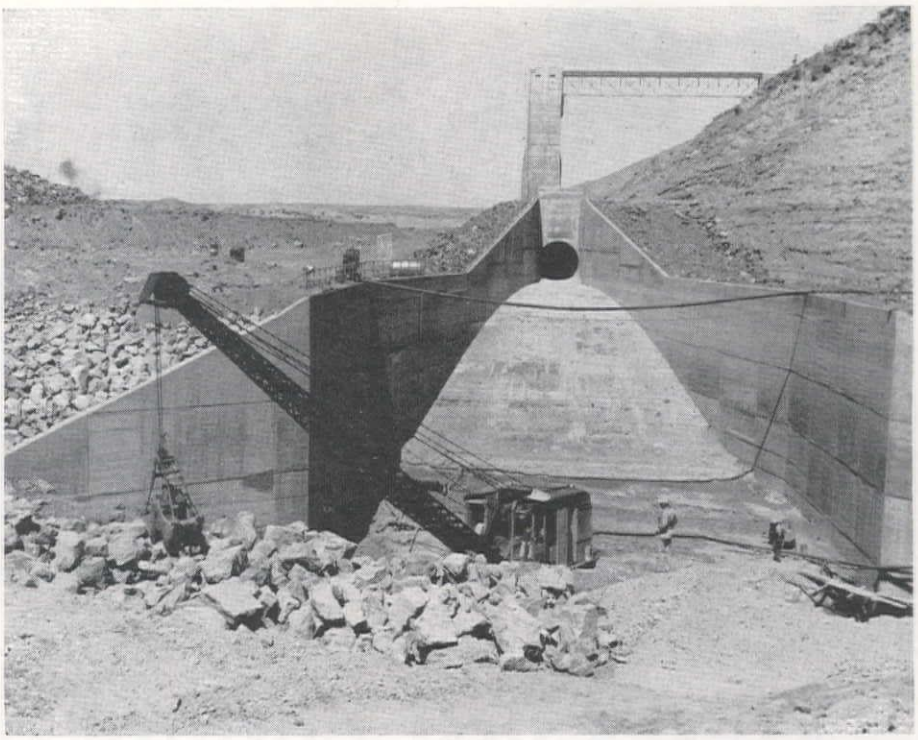
Some of the earliest excavation in the spillway area was in dry ground, but even there, where digging conditions were none too good, the seven hauling units were getting 1,000 loads in two 8-hr. shifts, for a production figure of 14,000 cu. yd. a day on a 2,000-ft. haul.

Placement of this material in the dam proper is a fast, well-timed operation. Specifications call for 12-in. lifts in the impervious zone, and 18-in. lifts on random and pervious zones. One 100-ton rubber-tired roller is expected to handle the entire compaction job, delivering densities around 90-92%.

Hand work at abutments

Placing the main embankment is carried out from abutment to abutment in a single stage. The only hand tamping will be around the inaccessible parts of the abutment, and around the concrete outlet structure.

NEWLY ARRIVED ROLLER, which the contractor elected to use instead of sheepsfoot, is inspected by R. J. Allred, project engineer, and Chris Eastin, project manager.



OUTLET WORKS were completed under a previous contract. Hinman Bros. is placing rock obtained from access road cut excavation.

Both abutments are on steep talus slopes underlying a high escarpment overlooking the stream valley, and have to be stripped of this loose material down to acceptable Santa Fe impervious formation. The left abutment is accessible by pioneer roads from three levels, and so far, the material is loading without anything more than light shooting of oversize rock. This material is being dumped in waste and riprap areas as abutment stripping progresses.

The right abutment is a dozer job, worked down from the top. The shovel will also load this material out, when the pile of waste material justifies taking it across the river. There is to be no final cleanup of abutments beyond stripping to the solid Santa Fe formation.

Riprap production

Production of many thousands of cubic yards of riprap for protection around the spillway and outlet works would normally be quite a problem, because acceptable rock is generally mixed up with dirt and finer material. To solve this problem the contractor is using a tractor-mounted front loader with a slotted bucket, to allow dirt to sift through. This machine is expected to salvage riprap at a good rate of speed, loading it to trucks which will haul it to the dam site.

Equipment maintenance

An excellent equipment service and preventive maintenance program has been set up on the job. Since the selection of equipment was well standardized so far as manufacturers were concerned, this has not been too difficult, and a program aimed at following through on the several manufacturers' recommendations has been established. The center of this maintenance-repair setup is a Butler 50 x 125-ft. building, erected in the center of a big yard in the administration area. Once every shift a mobile service unit visits each piece of equipment, delivering fuel and lubrication as each manufacturer recommends. Each operator is charged with responsibility for reporting anything which might lead to mechanical trouble. These reports are gathered together near the end of the second shift, and a mechanic and several helpers work the graveyard shift, when the equipment is idle, making the necessary operating repairs.

Road maintenance

Special emphasis is being given to the sprinkling and frequent blading of the haul roads. Every hour spent on the haul roads pays off in lowered tire maintenance. There is a growing tendency among Western contractors to try to get 1,500-1,900 hr. service, along with about three retreads, from the high-priced tires on this modern equipment. Hinman Brothers is no exception to this rule. Carelessness of operation is simply not tolerated, so far as tire maintenance is concerned.

JOB TALK occupies Clayton Hoon, assistant superintendent, and Don Wilson, resident engineer for the Corps of Engineers, Albuquerque District.

Personnel

Joe F. Rausch is master mechanic in charge of equipment maintenance. Chris Eastin is project manager, John Gardner is construction superintendent, Clayton Hoon is assistant superintendent, and R. J. Allred is project engineer. The office force consists of R. E. Petersen, office engineer, and George W. Taylor, office manager. Don Wilson heads the Corps of Engineers field force as resident engineer.

Major units of equipment at Jemez Dam

7 LeTourneau C-Roadsters with
7 LeTourneau P-19 Carryalls, built up to carry 14-yd. struck measure
7 Euclids, end-dump, 27FD
4 Caterpillar D8, with dozers
2 Allis-Chalmers HD-20
1 Allis-Chalmers HD-19, with ripper
1 White mounted water tank, 2,500 gal. cap.
1 International mounted water tank of 3,200 gal. cap.
2 Peerless pumps (Ford powered)
1 Caterpillar motor grader
1 Bros 100-ton rubber-tired roller
1 RPB pneumatic tamper
1 Northwest shovel, 80-D (Esco 2½-yd. dipper)
1 Traxcavator, 2½-yd.
1 Lorain clamshell
1 Jaeger compressor, 350-ft.

Los Angeles is site of experiment, laying the—

West's first natural rubber road

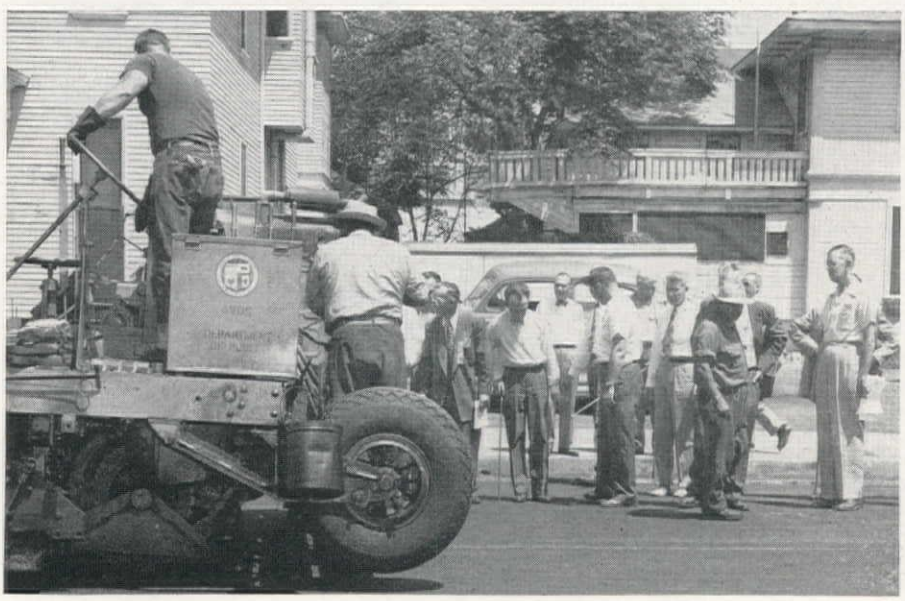
Section of busy street resurfaced with 2½-in. asphaltic mix containing granular natural rubber—Test section follows similar experiments undertaken by Eastern cities and highway departments during the last three years

FIRST NATURAL-RUBBER asphalt pavement to be laid in the West was placed on a short section of street in Los Angeles on August 27. The experimental section, about two blocks long, was put down by the City Bureau of Street Maintenance, under the direction of L. Miller, general superintendent, and was inspected by city and highway officials who were attending the Annual Public Works Congress held in Los Angeles that week. As a basis for comparison, control sections, without rubber added, will be put down on both sides of the experimental strip.

The work was carried out under the supervision of Harry K. Fisher, consulting engineer of the Natural Rubber Bureau, Washington, D. C.

Location of the test section is near the intersection of Figueroa and Venice Blvd., and the work was a resurfacing job laid in a single course 2½ in. thick. The natural-rubber asphalt section was laid for a length of about 400 ft. at a 52-ft. width. Cost, in place, ran almost 50% more than normal costs for similar work on Los Angeles city streets. The extent of this increase results from the relatively lower cost of paving materials in the area, and the Natural Rubber Bureau states that the corresponding increase in cost is only about 25% on a national average. Further, the added cost would tend to drop as the volume of this type of pavement expanded.

NO SPECIAL EQUIPMENT is necessary for asphalt resurfacing with natural rubber. Recent project was observed by engineers attending the Annual Public Works Congress.

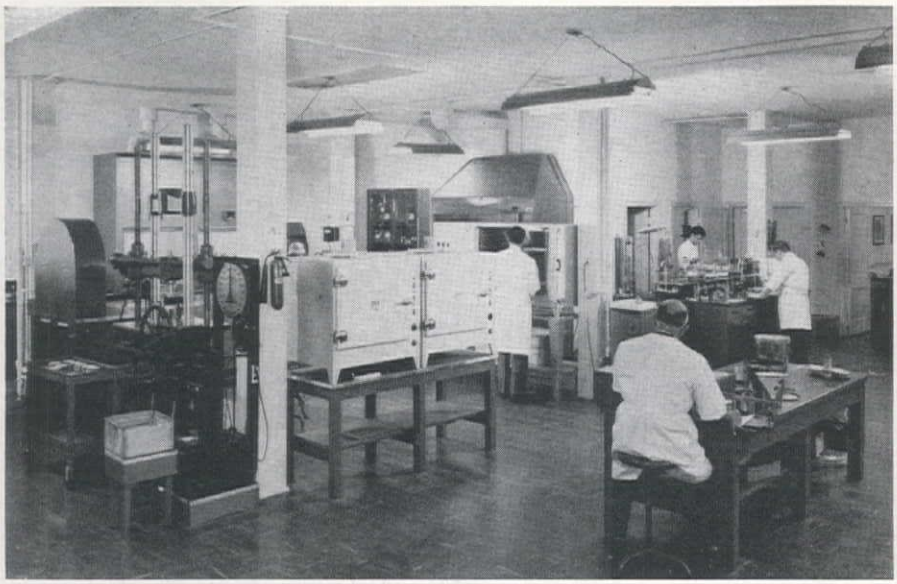


The mixing and laying of the experimental section followed normal procedure, with the work on the street indicated in the accompanying pictures. Rubber was introduced in granular form at the mixing plant. The street was opened to traffic 15 min. after the pavement had been completed.

Incidentally, the California Division of Highways laid a test section of highway surfacing in 1950, but the rubber was a reclaimed product and the Natural Rubber Bureau claims that the improvements in the final paving material are not as effective as with natural rubber.

Precedent for test section

During the last three years several states and cities in the East have laid experimental sections of natural-rubber-asphalt pavements. Using standard hot-plant mixing and machine laying methods these tests have included the addition of natural rubber powder (about 5% of the weight of asphalt) for both seal treatment and bituminous pavements. Laboratory tests and older experimental roads in foreign countries indicate that the resulting advantages include: (1) a longer life for the pavement, (2) added elasticity, (3) a reduction in susceptibility to temperature variations, (4) reduced brittleness at lower temperature,



GENERAL VIEW in the new research laboratory of the Natural Rubber Bureau, devoted to all phases of rubber road research.

(5) less effect from shock and vibration, and (6) a higher coefficient of skid friction.

A word of history

More than 20 years ago experiments with rubber-asphalt mixes for road surfacing were conducted in Singapore and Ceylon. Between 1930 and 1940 several sections were laid in England and The Netherlands.

In 1938 a process was developed for a powdered form of new rubber, made from latex, and the present interest in using rubber combined with asphalt developed momentum from that time. The use of unprocessed, natural rubber particles gave indications that real worthwhile improvements could be produced in bituminous pavements.

The Natural Rubber Bureau, with headquarters in Washington, D. C., is the recognized source of authoritative information on this development, and provides technical assistance for street and highway engineers interested in studying the subject and conducting any actual pavement tests. This technical service is under the direction of Harry K. Fisher. A fully equipped research laboratory has been built and operated by the Bureau to study all phases of rubber-asphalt mixtures and their application to highway work.

What it does in an asphalt mix

All the answers are not known as to the effect of combining natural rubber with bitumens. But more and more information is available from the work of the Bureau laboratory and the continuing observations on the test sections already laid.

When rubber powder (natural latex from rubber trees), with grain sizes similar to salt or sand, is added to hot bitumen the particles swell to double size, absorbing some of the lighter hydrocarbons. As a result, there are observable changes in the character of the asphalt mix after the addition of rubber. Different types of rubber—latex, synthetic or reclaimed—affect the mixes differently. Also the different grades of crude oil and methods of refining the asphalt provide other variations.

Mixing in the field can be done either by combining the rubber and asphalt before adding it to the aggregate, or mixing granular rubber to the aggregate before it goes into the mixer. The Natural Rubber Bureau uses the latter sequence on most of its experiments. In general, the amount of rubber, or the rubber-asphalt ratio is determined by the size and gradation of the aggregate.

Laying procedure is no different from normal, and the usual spreading, paving and rolling equipment is used.

Results and advantages

The Natural Rubber Bureau makes the following statement:

"The early work of the paving engineers in The Netherlands has fairly well proved the value of rubber in bituminous mixes, especially where used as a seal coat or as a thin wearing coat. Their data, based on fourteen years of study, definitely show that where rubber was present in the asphaltic paving material there was an increase in the life of the pavement and, after use, a much higher coefficient of friction of the surface area was maintained than on the surface of the straight bituminous pavement sections."

American highway engineers have an experience record of only three years on which to base conclusions as to the effectiveness and ultimate value of the use of rubber. Careful study is going forward on all the test sections now in place. The answer will be the comparison of the added cost with prolonged life of the pavement and reduced maintenance.

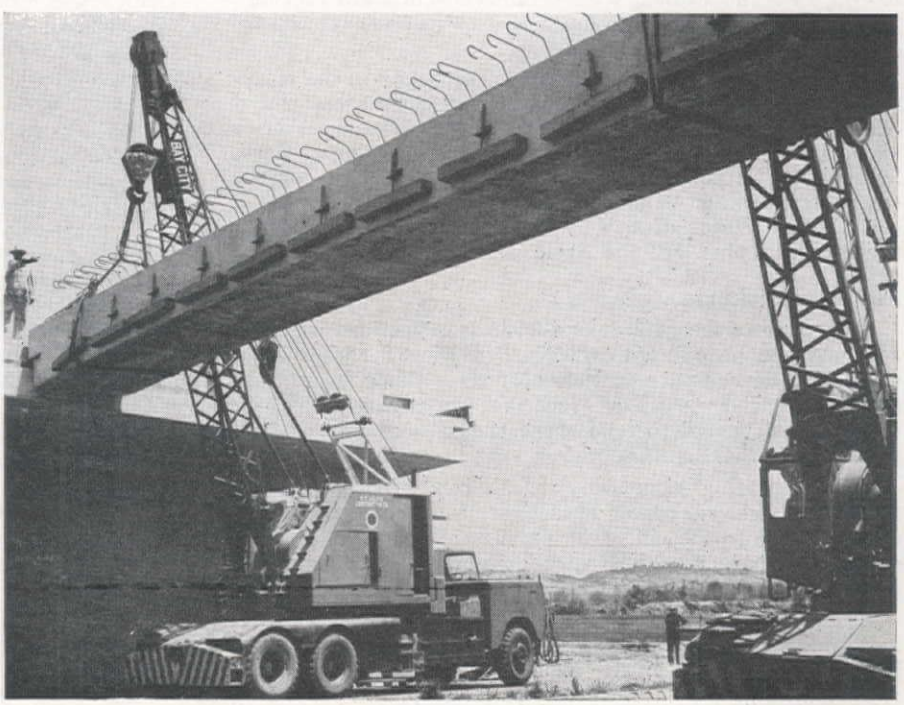
Precast girders span between cantilever abutments

SAN DIEGO'S Camino del Rio overpass features a precast design adopted to minimize traffic interruption. Pictured is the first of 14 concrete box girders placed by the contractor, M. H. Golden Construction Co.

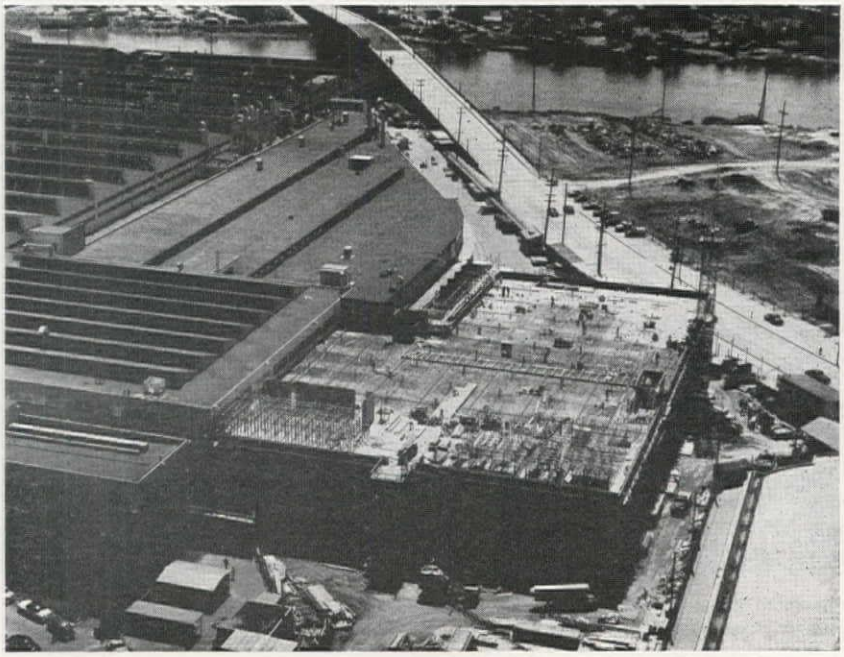
Overpass abutments cantilever 13 ft. from either side, thus shortening the clear span units. This permitted use of shallower girders which give required clearance over road but hold down the vertical distance between roadway grades.

Each girder is 56 ft. long, 6 ft. wide, and weighs 38 tons. They complete an overpass span totaling 93½ ft. in length, with a width of 85½ ft.

Precast design was adopted by the San Diego city engineering staff in order to minimize traffic interruption.



A five-story addition to the Boeing Airplane Co. plant at Seattle will provide another 240,000 sq. ft. of floor area for the technical forces of the organization — The reinforced concrete structure of flat-slab type was designed for a .04W seismic factor and includes the largest single suspended installation of acoustical ceiling in the Northwest



New building for Boeing engineers

ENGINEERING DEPARTMENTS in the aircraft industry are big, and at the Boeing Airplane Company plant in Seattle a five-story building, 186 by 302 ft. in plan, is under construction as an addition to the space now occupied by the technical force of the company. When completed about the end of the year, the building will provide 240,000 sq. ft. of floor area, with drafting and conference rooms, an auditorium, projection room, medical section and blueprint department. Traffic between floors will be handled by escalators for personnel, and elevators for freight. General contract is held by Strand and Sons of Seattle at a bid price of $3,215,364.

Materials and design

The structure rests on untreated fir piling designed for a 25-ton load and capped with reinforced concrete footings. Basement level of the building is below water level and required extensive waterproofing.

About 14,000 cu. yd. of concrete is contained in the structure, ranging from 3,500-lb. concrete with a 6.5-sack cement content to 2,500-lb. with 5.5 sacks for slabs and exterior walls. Loads used for design were generally 75 lb. per sq. ft. liveload, 25 lb. per sq. ft. for partitions and 10 lb. for the suspended ceiling. Wind load was taken at 15 lb., and a seismic load factor of .04W was used when W is equal to the deadload plus half the liveload.

Floors and columns

Floors are of flat slab design with drop sections over the columns, but no column capitals. Provision for high shear values in the concrete at the columns is made by prefabricated circular "spiders" (see accompanying drawing) which are designed to take these shear forces. The result of this design is a considerable saving in ceiling height.

Column spacing is generally 25 ft. in both directions. Slabs are 9 in. thick, except at special sections, and thicken at drop sections to 13½ in. Drop panels are 9 ft. square. Slabs are all finished by machine troweling, and cured under waterproof paper.

Rustication markings along the walls are of small size, and some include weakened plane joints for control of cracking. The strips used on the inside of the forms to produce these markings are ¾ in. wide by ⅜ in. deep, and protecting them from damage during form handling and setting provided a distinct construction problem.

A plastic paint is used on the inside of the forms, which are of ⅝-in. plywood with a minimum stud spacing of 12 in. Snap ties are normally spaced at 2 ft. Shores are 4 x 4's at 5-ft. centers, with additional shores installed under the drop sections. A contractor's field problem resulted from the small amount of space available at the site for form fabrication and storage. For example, exterior wall forms were prefabricated at a site 3 mi. distant and trucked to the job. This lack of space emphasized the need for job planning with regard to the scheduling of material deliveries.

Concrete handling

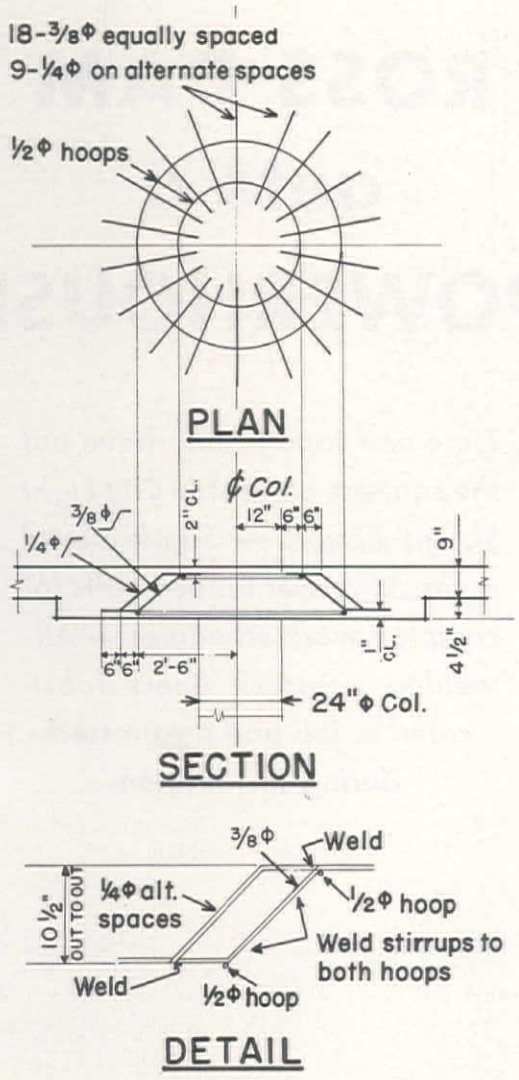
Concrete was handled by P&H crane having a 40-ft. boom, which was gradually increased to 100 ft. with a 20-ft. jib. Buckets of 1-yd. capacity were handled to hoppers at the pouring level, where Gar-Bro motorized buggies distributed the concrete. Maximum volume placed in 8 hr. was 450 cu. yd.

Ceilings in the building represent the largest single suspended installation in the Northwest. It provides acoustical absorption, sound isolation and light reflection. Quick accessibility provided at any point to the space above is a structural feature important to modern plant design, permitting future changes in office partitions and lighting fixtures. The installation has involved 70,000 lin. ft. of Acousti-Line metal suspension panels and 140,000 sq. ft. of perforated mineral fibre tile. The ceiling work was carried out by Noise Control Companies, under the direction of Robert Reynolds, superintendent.

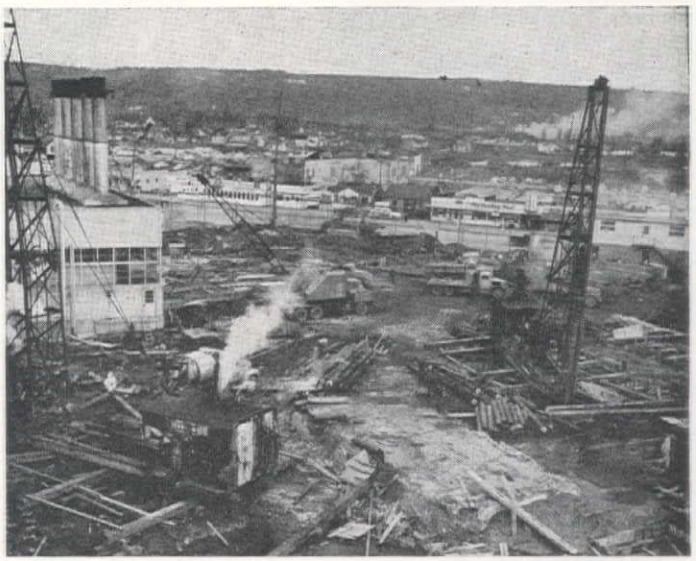
Personnel

For Boeing Airplane Co., the chief of contract construction is Robert E. Braley, with Harold L. Becker, major project engineer. Operations of Strand and Sons are under the direction of J. H. Wallstrom, and the project engineer is Glenn Uhlig. The architect for the project was John W. Maloney, and the structural engineering was done by W. H. Witt Company, both of Seattle.

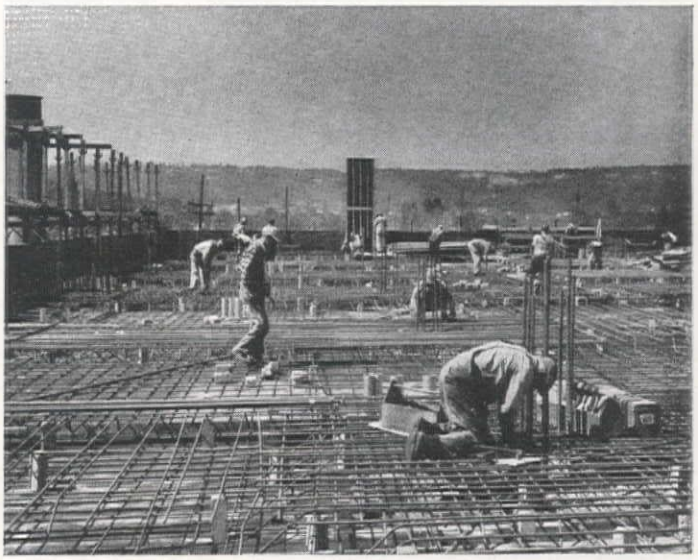
Principal subcontracts include University Heating and Plumbing Co., O. H. Carlson Electric Co. of Seattle, and Grinnell Company of the Pacific.



PREFABRICATED "SPIDERS" of reinforcing steel provided to handle the high shearing stresses at the columns, which have a drop section but no capital. The design results in a considerable saving in ceiling height.



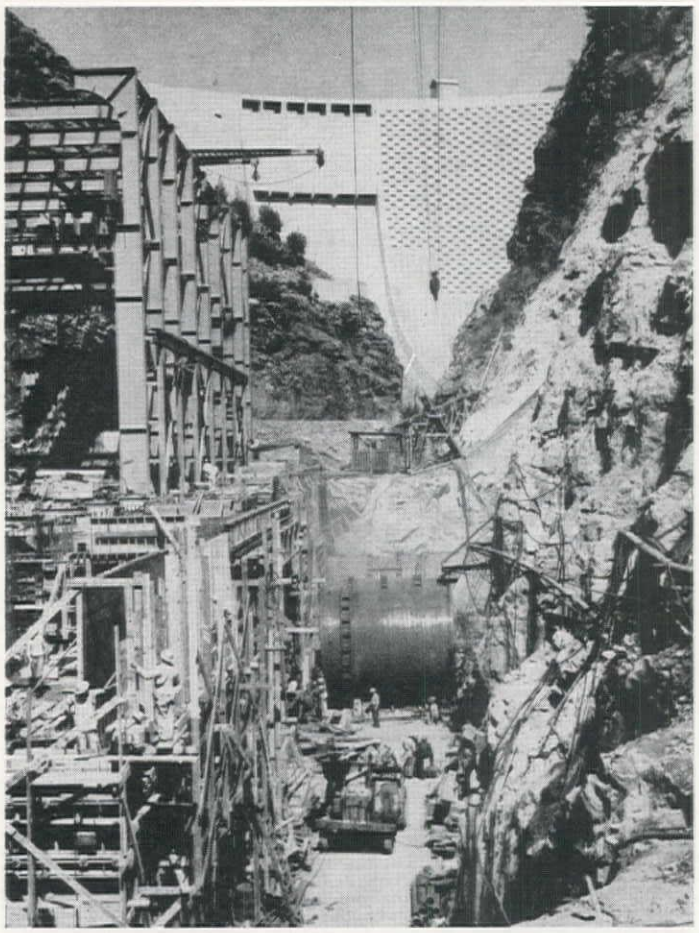
FOUNDATION consists of untreated fir piling designed for a 25-ton load and capped with reinforced concrete footings.



COLUMN SPACING is 25 ft. in both directions and slab thickness is 9 in., with drop panels 9 ft. square and 13½ in. thick.

CONCRETE was lifted in one-cu. yd. buckets to floor level by crane and handled by motor buggies.

MAXIMUM VOLUME of concrete placed was 450 yd. in one 8-hr. shift, and slabs were cured under water-proof paper.



ROSS DAM gets a POWERHOUSE

Time and topography have put the squeeze on Seattle City Light Skagit Project — Single-portal access to power tunnels calls for complex work schedules — All-welded penstock liners fabricated at job and prestressed during installation

WHEN A CONTRACTOR'S camp includes temporary barracks five stories high, you know that work space is limited. When individual rail cars of materials must be transported on a private railway, lifted singly 300 ft. up a sidehill incline, and barged 4 mi. to the construction site, you know that access is difficult. The resulting headaches make for a 24-hr. schedule among office engineers, and this is true of Seattle City Light's Skagit Project, where Ross Powerhouse Contractors, a four-firm joint venture, is currently pressing work on a $15,000,000 contract. The office engineers have company on their round-the-clock work though. The power needs of the Pacific Northwest call for a three-shift basis in building what will eventually be a 4-unit, 360,000-kw. powerhouse below recently raised Ross Dam (*Western Construction*—February 1949, pp. 59-62).

Tunnel alignment

Most spectacular feature of the present work is the pair of power tunnels, each 27½ ft. in diameter, blasted out of the hardest rock in a complex alignment that combines horizontal curvature with vertical slopes to as much as 30 deg. The tunnels pass through the left abutment of Ross Dam, cutting the corner where the river bends just downstream. The upstream portion of their length, commencing at an invert elevation of 1,423 ft., slopes at 5% (Tunnel 1) and 6.276% (Tunnel 2). These gentle gradients carry the tunnels around an initial horizontal curve and along on a tangent for over 1,000 ft. The tunnels are uniformly 150 ft. apart, center to center.

The greater portion of tunnel fall is achieved in the latter reaches, with Tunnel 1 slanting downward on a 36.4% slope and Tunnel 2 practically dropping off at 57.73%. The bifurcation of each includes the transition both to final alignment and final grade. Tailrace elevation is 1,205 ft. The total indicated drop is about 218 ft. There is additional head on the powerhouse, however, imposed by the present reservoir surface at el. 1,600. After the dam is raised once more, the powerhouse will operate with the reservoir at el. 1,725. This means an ultimate head of 525 ft.

Tunnel excavation

A portion of the power tunnel excavation was done in the 40's by General-Shea-Morrison as that firm raised Ross Dam from a height of 305 ft. to its present 540 ft. The early tunnelling, done to avoid blasting near the dam abutments later on, carried Tunnel 1 about 400 ft. into the mountain, and Tunnel 2 about 250 ft. The intake structure was built at that time also, but fitted with only temporary gates. During a more recent contract held by Peter Kiewit Sons' Co., first stage powerhouse excavation was done and, with it, further driving of the power tunnels. This time portals were opened at the downstream end adjacent to the powerhouse site. The upstream end, gated off, had been submerged by reservoir storage. Kiewit work added about 650 ft. to each of the tunnels, but it remained for Ross Powerhouse Contractors to hole through and complete the tunnels to full section. This work involved 872 ft. of excavation in Tunnel 1 and 657 ft. in Tunnel 2, bringing the tunnels to their respective lengths of 1,928 and 1,593. Tunnel 2 was holed through in May 1951, and Tunnel 1 in June.

The work was rough for various reasons. Where the tunnels are steepest, the material couldn't be stoped down—not enough slope. On the other hand, the situation was too steep for operation of the contractor's electrified Caterpillars. The answer was a slusher, a poor man's dragline that mucked material down to the bottom where it could be loaded out by shovel.

Once outside, the muck still meant a problem. Short working space certainly didn't permit disposal of spoil just anywhere. It all had to be dumped on barges, towed out and jettisoned in the dead storage of Diablo reservoir, which backs up to the toe of Ross Dam.

Tunnel traffic

With tunnel driving completed, work could proceed on the complex job of lining. The two tunnels split apart near the downstream end, leading to a total of 4 penstocks. And here arose another traffic problem. The bifurcations require most intricate forms. Elsewhere, on the steep rise of the tunnels an ingenious jumbo is needed to make possible the setting of reinforcing steel. Further up, collapsible forms that will negotiate double curvature are to be installed. All these structures must be built to pass men, materials and equipment. Exten-

sive ventilation equipment is about the only thing not needed at this stage. Due to the large tunnel section and the presence of the vertical shaft of the intake gate structure, there is a good draft at all times.

Penstock progress

At present, Tunnel 2 is being rushed ahead of Tunnel 1 as it leads to penstocks designated 43 and 44. The latter unit is expected to be in operation by the end of this year, and unit 43 within two months thereafter. As a result, steel penstock liners are in place for 44 and are rapidly being installed and connected for 43. An access tunnel connecting the two main bores just above their bifurcations permits transport operations to by-pass the penstocks completely.

Right now, reinforcing steel is the main item being carried in through this cross connection, and it is being placed in an intricate maze at the bifurcation site. A heavy timber framework provides a work platform for the steel crews. Later it will be replaced by the bifurcation form, built in entirety outside the tunnel, sawn apart, brought in and re-assembled. This is one reason that bifurcation concrete costs $170 per cu. yd.

Steel in this area consists generally of two mats, each of 1¼-in. square bars at 6-in. centers. In places there is additionally a double row of such bars at 5-in. centers. Longitudinal steel, largely for tying the mats together, is of ¾-in. bars at about 1-ft. centers around the tunnel circumference.

It is for steel placement immediately above the bifurcation that a special jumbo has been built for Ross Powerhouse Contractors by Isaacson Iron Works of Seattle. The jumbo is 25 ft. long, riding on 6-in. pipe runners in the rough tunnel invert. It is held in position on the steep incline by wire cables led to an air-operated winch that is used to move it as necessary.

Tunnel lining

In the upper portions of Tunnel 2, lining has already been placed, about two-thirds of that required for completion. This lining is a minimum of 1½ ft. thick, giving a tunnel diameter of 24½ ft. inside the neat line. Steel in this portion consists mostly of 1¼-in. square bars at 12-in. centers. Longitudinal reinforcing is ¾-in. at 12-in. centers. This pattern was doubled for a distance of about 200 ft. where the tunnel passes beneath a creek on the mountainside above. Though the section so heavily reinforced caused no trouble during tunnelling, it did present a potential hazard and for that reason was supported by steel sets during the driving. Only one other portion of the work required similar treat-

The Skagit: Seattle City Light has a hard-working river

SOME 900 MEN are working around the clock at Seattle City Light's Skagit Project to complete a 5-yr., $75,000,000 construction program that will increase generating capacity by 318,000 kw. and provide the major transmission facilities to handle it. Hydroelectric construction along the Skagit River is the major item in a $111,000,000 system-wide expansion begun in anticipation of taking over the competing private company's properties in the Seattle area.

Ross Dam

Principal job under way is erection of Ross powerhouse by Ross Powerhouse Contractors, a joint venture of the Guy F. Atkinson Co. and Charles L. Harney, Inc., of San Francisco; Bressi & Bevanda Constructors, Inc., of Los Angeles; and A. Teichert & Son, Inc., of Sacramento. The contract, awarded in March 1951, includes completion of excavation of the powerhouse site and tunnels, concrete lining of tunnels, installation of steel penstock liners, installation of spillway and power tunnel intake gates, and erection of the powerhouse. It is the largest construction contract ever let by Seattle City Light on a single award. The bid was $15,128,670.

Last June the same contracting firm was awarded a $714,171 contract for installation of mechanical and service facilities in the powerhouse. The contract includes piping and equipment for water, oil, air, and fire-fighting systems. At the present time, erection of the rigid-frame steel powerhouse superstructure is under way preparatory to placement of concrete curtain walls. Tunnel lining is in full swing, along with installation of penstock liners. First power generation, by a single 90,000-kw. unit, is expected in December of this year.

More contractors are on other Skagit jobs preparing for completion of Ross powerhouse and the additional electrical energy to become available. Donald W. Close Co. of Seattle is working on a $222,000 contract to enlarge the Diablo switching station to handle the augmented load.

M. A. Pithoud of Vancouver is erecting a 230,000-volt double-circuit steel tower transmission line extending over 19½ mi. of mountainous country from Ross powerhouse to Bacon Creek at a cost of $1,745,000. The line from Bacon Creek to City Light's new Bothell substation and to Seattle has already been completed.

The Skagit River development consists of a chain of three dams and their power plants. Ross is the farthest upstream, its toe at the waters edge of Diablo reservoir. Both Ross and Diablo are concrete arch structures and have their powerhouses located immediately below. Gorge is a low diversion dam supplying a long power tunnel that terminates in a power plant at Newhalem, the City Light community for operation of the project. The power plants are about 7 mi. apart, with Gorge Dam lying midway between Newhalem and Diablo.

Diablo Dam

The Diablo and Gorge plants have not been without change in the past few years. In August 1951, Morrison-Knudsen Co., Inc., completed a $3,500,000 imrovement job on Diablo Dam. The work included grouting joints and foundation, extending spillways and erecting additional training walls. Part of the work was done in the summer of 1950 and the balance beginning in the spring of 1951 when the dam temperature was at a minimum and it was practicable to lower the reservoir level 90 ft. This allowed contraction joints to open for a better job of grouting.

At Gorge power plant, 1951 saw the completion of an $11,522,000 improvement job begun in the spring of 1949, increasing plant output from 60,000 to 108,000 kw. Principal contractors were the Guy F. Atkinson Co., which built the powerhouse extension and did appurtenant tunnel and penstock work, and the Cascade-Phillips Contractors (Cascade Construction Co. and Alton Phillips Co. of Seattle), which built the new Gorge diversion dam.

Future work

Completion of Ross powerhouse will not end construction activity for very long. On May 26 the Seattle city council approved City Light Superintendent E. R. Hoffman's request for $250,000 to re-examine the feasibility of proceeding with a high dam at Gorge. The appropriation will also cover preliminary investigation of other power sites on the upper Skagit River and its tributaries. The new Gorge Dam as now contemplated would rise about 100 ft. higher than the present structure, raising the maximum water elevation from 787 ft. to 880 ft. The increased head would increase the output of the Gorge generators from 108,000 kw. to about 150,000 kw. This construction would entail not only erection of the new dam and intake works, but construction also of a highway above the proposed reservoir to replace the inundated Skagit Railway.

Construction of Ross Dam itself, keystone of the Skagit Project, has proceeded in stages. The first was begun in 1937. The second and third, combined, were added between 1943 and 1949 on a stretched-out wartime schedule. The dam now rises to el. 540 ft. and presents a waffled downstream face to provide bond for additional concrete when the fourth and final stage to an elevation of 665 ft. is undertaken.

ment: near the bifurcation of Tunnel 2 there is a series of three steel sets presently in position, with some lagging and blocking.

Articulated forms

Lining operations in the tunnel have required the use of special forms. The work to date in the gentle tunnel gradient has been done with the aid of a collapsible form built by Chicago Bridge & Iron Co. In order to negotiate curves it could not be a conventional slipform. Rather, its top drops from the arch upon completion of a 32-ft. tunnel section, and its sides are pulled laterally toward the center, freeing the assembly for movement to a new set-up. The tunnel invert was poured prior to the employment of this form, which then shaped the lining for the remaining 270 deg. of circumference.

For the more sharply curved and steeply inclined alignment yet to be poured a specially built Blaw-Knox form will be used. Its length is only 18 ft., and its panels have had to be built as a series of gores, with wooden spacers of variable shape and area whereby the form can be fitted to the peculiarities of each section poured.

A slickline has been shaped in the crown of each tunnel section to accommodate a Pumpcrete pipe, for this is the method of introducing concrete to the lining operation. For past work, concrete has been batched at the contractor's plant outside the tunnel and discharged into a Pumpcrete machine there, which sent the mix into the bifurcation of Tunnel 2. Dumped into conventional buckets at that point, it was hoisted up the tunnel incline by winch and moved on additional track "upstream" in the gently inclined portion of the tunnel. A second Pumpcrete then received the mix at the form and conveyed the concrete to its final position.

For subsequent concreting now being planned, the first Pumpcrete machine, at the batcher, will send the concrete into the bifurcation of Tunnel 1. A second Pumpcrete, now set up at that point, will move the concrete through the cross tunnel to Tunnel 2 and into position in the forms.

The concrete is batched at a 150-ton plant and mixed in a pair of 2-yd. tilting mixers. Concrete is a 6-sack mix with 1½-in. maximum aggregates. Its 28-day strength will exceed 4,000 psi. Tunnel concrete has a 4-in. slump; that used in the powerhouse structure is restricted to 3 in. An air entraining agent is used.

Illustrative of the congestion at the site is the sequence in handling concrete aggregates. They arrive by barge and are handled ashore into limited stockpiles by one of two 45-ton revolving gantry cranes that travel alongside the powerhouse. One of these same cranes is used to charge the batcher, a piddling chore for such a crane but a useful one to avoid the necessity for other space-using measures such as a smaller crane or a conveyor system.

The only other crane on the work, other than A-frames on truck beds, is a small crawler handling materials for bifurcation form construction. There are three highlines on the project, however, two of which are directly concerned with powerhouse and tunnel work. Rigged between the cliffs on either side of the Skagit, one is used for handling powerhouse machinery components between barge and final position. The other has been used similarly for landing penstock liner sections at the tunnel portals. This latter line has been tested to 58 tons; the heaviest penstock liner lifted was 50 tons. The third highline spans the canyon in the vicinity of Ross Dam. Barges proceed directly to the dam toe and mooring there can have their loads removed and placed on or about the dam 540 ft. above. This line has been used by the present contractor for materials used in spillway tainter gate and intake gate construction.

Penstock liner fabrication

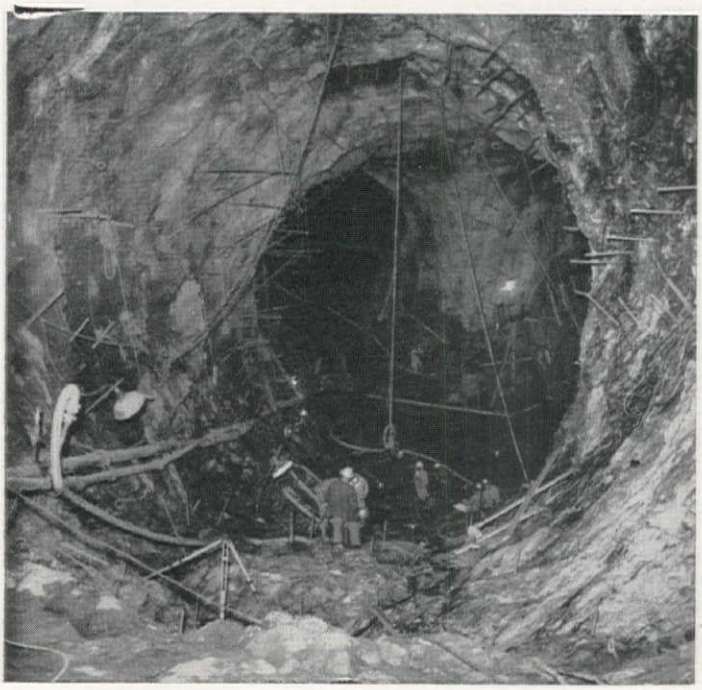
The penstock sections were made up to their 50-ton weight near the project site. Furnished and fabricated by Consolidated Western Steel Corp., they arrived at the fabrication area in half-circular segments of 10-ft. length. The assembly plant was built on the Skagit River bank below Diablo Dam, 6 mi. below Ross.

Varying in thickness from 1¼ to 2⅝ in., the steel was joined into full sections 10 ft. long and these joined in pairs to form the final assembly unit. There are variations in make-up sections, test sections, anchor sections, etc., but the basic unit is 16 ft. in diameter and 20 ft. long. Following fabrication using the machine-controlled Union Melt method, the units were placed in specially built "ovens" for stress relief. A temperature of 1,100 deg. F. was maintained during treatment.

Barged to the powerhouse site, the penstocks are handled by highline into position outside the tunnels (see pictures). From their initial landing place they may be slid laterally to position outside a selected tunnel and mounted there on a rail dolly for transport into place. Twelve liner sections are required for each of the four penstocks. These twelve sections aggregate 225 ft., 5¼ in.

The only field weld necessary in the liner installation is a girth weld joining the adjacent sections. This weld is performed primarily from inside in 16 passes, with one pass outside the liner. These 16 passes require the full time of two welders for 8 shifts—128 man-hours! The circumference involved is about 50 ft. In order to insure uniform success, an automatic machine was developed by MISCO, the subcontractor on this work, to carry and synchronize the torches both inside and out. Girth seams are x-rayed and low-temperature stress-

SURVEYING is uphill work above the bifurcation of Tunnel 2. This reach has required a special jumbo for setting reinforcing steel.



COLLAPSIBLE form shaped 25 ft. of lining in a single pour in upper part of Tunnel 2. Concrete was boosted through two Pumpcretes to reach work.

THE WHOLE PROJECT is parked on a narrow bench in the Skagit River gorge. Two gantry cranes ride ways in foreground to service powerhouse construction and handle concrete batching. Bifurcation forms are being built against cliff at right center. Barges can proceed to toe of dam for highline handling of material needed there.

relieved, a new process used here for the first time on all-welded pressure penstocks.

The penstock tunnels are 54 ft. apart, center to center, with liners presently being installed in Nos. 43 and 44. Supplied with water through Tunnel 2, these will be the first in operation. Liner installation for unit 42 will follow a schedule calling for power generation through its appurtenant works early in 1953. Penstock 41 will be completed by the contractor immediately after 42, but will be bulkheaded off to permit admission of water to 42 only. Power units for No. 41 have not yet been ordered and may not follow until City Light needs call for them, perhaps in 1956.

Penstock prestress

A description of the prestressing and anchoring of the penstocks provides an interesting sidelight to the project story. The penstock sections are numbered 1 through 12, leading from the powerhouse (butterfly valve) to the bifurcation of the power tunnel. Section 1 is an anchor section, fitted with circumferential ribs to engage backfill concrete. Section 7 is similarly fitted. The distance between these anchorages is about 70 ft. The sections are placed successively from the bifurcation outward with Section 2, the make-up section, being placed last. Test heads are then installed in Sections 1 and 7, and hydraulic pressure is introduced to 450 psi. This pressure is maintained merely for an appropriate observation and inspection period and is then backed off to 300 psi. This corresponds to the eventual head to be experienced with Ross Dam raised again and the reservoir pool at el. 1,725.

The length of penstock between anchorage sections is wrapped in roofing paper and backfill concrete is poured to a formed thickness of 3 ft. around the penstock. The roofing paper effectively destroys concrete bond in this length of penstock. Thus is the penstock prestressed. Relaxation of the hydraulic pressure after the concrete has set causes a tendency to shrinkage during the remainder of construction. By means of this construction measure, however, introduction of operating heads in the immediate future (395 ft.) and in the ultimate future (520 ft.) will cause no expansion of the penstock and resultant stress or binding strain on the butterfly valve housing.

Completion of penstock encasement includes placement of compacted earth backfill atop the already placed concrete, addition thereon of a protective concrete slab 18 in. thick, and then more or less random backfill with sand and gravel. The reason for this total protection of 10 ft. is that the penstocks are otherwise unprotected between the portal and powerhouse, yet lie at the foot of a precipitous mountainside subject to occasional falls of material.

FORMING for intermediate structure of powerhouse has progressed "downstream," is now over 80% complete. Problem has been to find iron workers since settlement of steel strike.

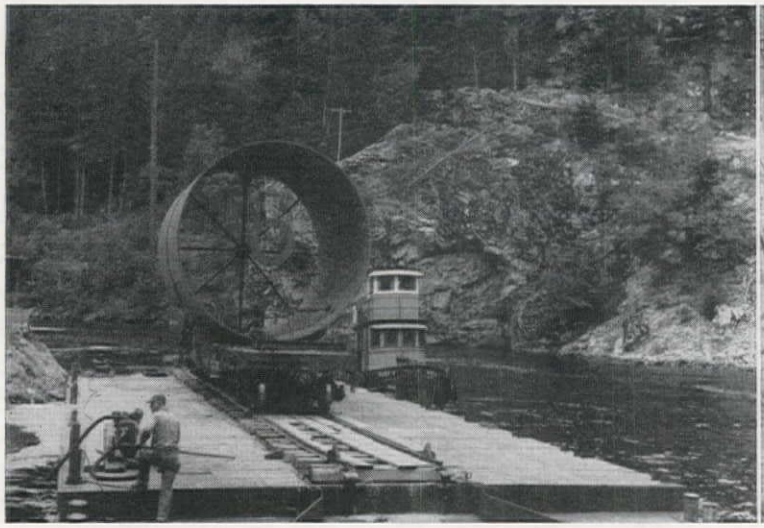
Powerhouse construction being conducted by Ross Powerhouse Contractors required completion of excavation initiated by Peter Kiewit Sons' Co. under the prior contract. In performing the later work, the present contractor had to build a cofferdam. In this construction he was assisted by the presence of control equipment of Ross Dam. Closure of valves restricted or stopped releases of water as necessary, permitting cofferdam construction in the dry. During these periods, Diablo reservoir storage downstream sufficed to operate generating facilities of that reservoir and those of Gorge powerhouse at a lower elevation.

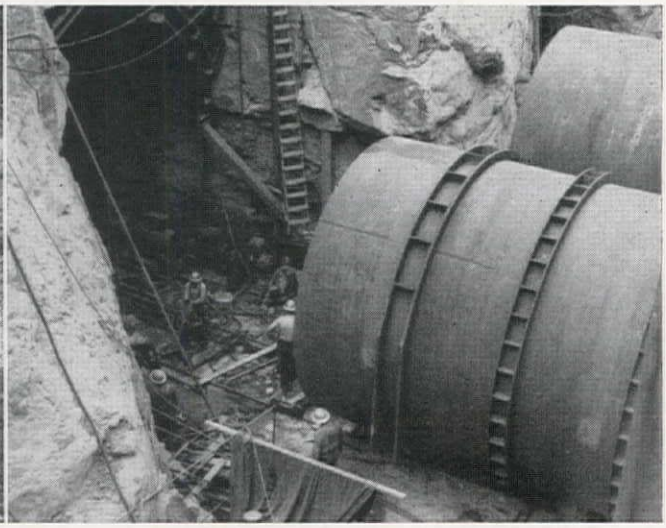
Powerhouse cofferdam

The cofferdam is a timber crib loaded with rock for weight and stability. Sheeting of 3-in. T&G forms the impervious seal over most of the cofferdam, with concrete sealing the lower ends and abutments. Completed in 1951, the cofferdam permitted work to proceed on powerhouse excavation and construction. Founded at el. 1,170, the powerhouse is considered generally to consist of three structural portions, substructure, intermediate structure, and superstructure. The former two are of reinforced concrete, the substructure extending to el. 1,201.5 (turbine floor), and the intermediate structure to el. 1,236.5 (generator floor). These two zones are, respectively, 100% and 80% complete as far as concrete construction is concerned.

The superstructure, housing the generators, operating controls, etc., is of structural steel construction, with reinforced concrete curtain walls. Steel in this portion is now 40% finished, and concrete curtain wall forming has only just begun, with very little poured. Curtain walls are 10 in. thick.

Concrete has been poured in 6-ft. lifts.





PENSTOCK LINERS travel by inclined tram and barge to powerhouse. Highline places them behind powerhouse, where they can be slid to proper portal and moved in on rail dollies.

All construction joints are thoroughly cleaned before adjacent pours are made. All contraction joints below water level or where seepage is apt to occur are cast with stainless steel intercepting membranes.

Total concrete in place in the powerhouse comes to about 42,000 of an ultimate total of 48,000 cu. yd. The tunnels account for 19,000 cu. yd., giving the project a total of 67,000 cu. yd.

Subcontracts and suppliers

A significant portion of the current work has been subcontracted by Ross Powerhouse Contractors, and in addition their work includes installation of machinery furnished to the project by many suppliers under separate contracts with Seattle City Light. One of the principal subcontractors is MISCO—Marine Industrial Supply Co. of Seattle, installing penstock liners and turbines.

The three 140,000-hp. turbines themselves were furnished by Baldwin-Lima-Hamilton Corp. Butterfly valves are coming from Newport News Shipbuilding & Drydock Co. The draft tube liner for unit 44 is also coming from Baldwin-Lima-Hamilton, while the remaining two were furnished by Todd Shipbuilding Corp. of Seattle. Generators for the powerhouse, three 90,000-kw., 100,000-kva. units, are being supplied and installed by Westinghouse Electric Corp.

Also contributing to the powerhouse equipment above the generator deck level are two overhead rail cranes, one 340-ton and one 170-ton, both supplied by Star Iron & Steel Co., Tacoma. Structural steel in the superstructure itself has been furnished by Isaacson Iron Works of Seattle. Judson Pacific-Murphy Corp. of Emeryville, Calif., has a contract for one 60-ton gantry crane to handle butterfly valves. Six 70,000-kva. transformers for the powerhouse switching facilities will be supplied by General Electric Co. These will be installed on a concrete deck over the tailrace.

In and around Ross Dam itself, 12 spillway tainter gates are being supplied by California Steel Products Co. of Oakland, while slide gates and frames for the power tunnel intake are coming from Todd Shipbuilding Corp.

The original schedule called for this plant to be in operation by late 1955. However, in April 1951 the Defense Electric Power Administration, as a result of a survey of critical power needs in the Northwest, requested that the work be speeded up. It offered to give all assistance in getting priorities on scarce materials if Seattle City Light agreed to advance construction schedules. The move was recommended after making a study comparing the cost of such speedup with the cost of purchased power from outside sources for the longer period (and considering the possibility of additional delay for lack of adequate priorities). The Seattle city council then authorized the emergency schedule and appropriated the necessary $1,750,000 to meet increased costs.

Delivery dates for materials were moved up and arrangements made for construction to continue around the clock through the winter season. The new program has been maintained. But it is one of the tightest powerhouse schedules ever, according to Bill Wolff, contractor's project engineer. The presence of only one accessible portal per tunnel has made combination of final mucking, reinforcing, lining, and penstock operations a very delicate chore. Access not only to the tunnels, but to the job itself, has called for virtually split-second timing of material and equipment arrivals. This latter problem is complicated by a lack of storage space at the project. Parts and supplies are stacked between gantry crane ways, reinforcing steel is stockpiled with its ends washed by river waters. Steel must be moved into the tunnel as it is convenient to other work. As a result, stacks of it clutter the steeply inclined tunnel invert.

Personnel has been a problem, particularly in view of the speedup. Turnover is expected to be above average on any isolated job. Here it becomes more significant that enough men be on hand at all times to prosecute the work. The surge of employment for iron workers that followed settlement of the steel strike cleaned out the market. This happened just when Ross powerhouse construction needed them badly, with tunnel reinforcing, penstock installation, and superstructure erection all ready to go.

Personnel

E. R. Hoffman is superintendent of Seattle City Light, and C. W. Cutler is chief engineer of the Skagit development. Resident engineer at Ross powerhouse is Charles E. Shevling; his assistant is Robert E. Brown. Office engineer is Ray Halvorson. Four senior inspectors for City Light are Marvin Schultz, tunnels; Art Ferris, swing; Herbert Wolf, graveyard, and H. K. Anderson, materials and equipment.

Erection of transmission lines in connection with Ross powerhouse is under the direction of the department's transmission engineering division, headed by project engineer Herb V. Strandberg.

Engineering work for the project as a whole has been done by City Light engineers, with Dr. J. L. Savage of Denver, Colorado, and the architectural firm of Robert L. Durham & Associates of Seattle acting as consultants on various phases.

For Ross Powerhouse Contractors, G. W. Wintz is project manager, and Forrest Jones is general superintendent. Tunnel superintendent is L. L. Sheddy, powerhouse superintendent is Bill Roark, and intake superintendent is Joe Davis. The contractor's business manager is Tom Foran. W. H. Wolff is project engineer, with field engineers Dave Belcher (powerhouse) and A. P. Ketchen (tunnels). Master mechanic is Harold Lundberg. Ernie Bernhagen is electrical superintendent, Art Cody is rigger superintendent, and Otto Hansen is carpenter superintendent.

Principal personnel for MISCO include A. N. MacKinnon, general manager; J .B. Sprague, superintendent; and J. H. Boney, assistant superintendent.

Manufacturers' engineers on the job include Jack Berry for Westinghouse, assisting on generator installation, and William Sayles for Baldwin-Lima-Hamilton on turbines. Morgan Electric Co. of Seattle has commenced wiring and installation of control panels for the three units under the supervision of P. D. Teed.

Nevada starts a four-lane program in Truckee Canyon

Improvement of U. S. 40 will accommodate heavy traffic increase estimated at 76% in next decade — First section of 3.14 mi. being carried out by Isbell Construction Co. — Spring flood interrupts field operations

NEVADA HAS BEGUN a program which will eventually provide for four-laning U. S. 40 a total distance of about 30 mi. through the narrow and picturesque Truckee River Canyon. The first contract for the improvement of 3.14 mi. east of Sparks is being carried out by Isbell Construction Co. on a low bid of $530,136. Work involving about 375,000 cu. yd. of excavation, 50,000 tons of gravel base and 18,300 tons of asphaltic (plantmix) surfacing was seriously delayed during the spring and early summer by a severe flood on the Truckee River.

Provision for this first unit was included in the Nevada highway budget for the fiscal year starting July 1, 1951 with the work to start at the city limits of Sparks and extend 3.14 mi. east. The limited sight distance, and heavy increase in vehicular travel over this route during the past decade were prime factors in the decision to make this section of U. S. 40 a four-lane divided highway. The 1951 July traffic survey indicated the present road carried an average of 3,413 vehicles daily; of this number 488 were commercial vehicles, including trucks of all descriptions. It is estimated that during the next decade this count will increase by about 76%. The project, when completed, will tend to expedite travel and also reduce the traffic bottlenecks that now exist at various places along the present location.

Typical section

A typical section of the new improvement shows a center ditch section 31 ft. wide separating two 36-ft. roadways. The slopes of the ditch section vary from 6:1 to a 12:1 for 12 ft., thence a level section for 7 ft. Each roadway is decked with 12 in. of base and surfacing, the top 2½ in. being a plantmix (Class F2) bituminous surface the full width of the roadway. The two 24-ft. travel lanes receive a class A1 surface treatment which consists of an application of emulsified asphalt and crushed rock screenings.

Each roadway consists of two 12-ft. travel lanes, with an 8-ft. shoulder for parking on the right or outside and a 4-ft. shoulder on the left or inside, next to the ditch section. The surfacing is crowned on a 50:1 slope for 12 ft. each side of center line. The shoulder sections are constructed on a 25:1 slope providing a steeper slope to obtain a better runoff of surface drainage. Fill slopes on 4:1 were provided on each side to cover the borrow ditches that had been used to obtain material for the original embankment, and also minimize the hazard of a steeper slope.

For almost 2 mi. the highway crosses a swamp area which, at times of the year, is completely inundated by flood waters of the Truckee River. One of the main problems confronting the design department was to provide a drainage system to eliminate the present water condition that existed in the old borrow pits covering about ⅔ of the length of the entire job. After much discussion and several surveys it was agreed by all parties concerned to construct a new channel immediately south and parallel to the Southern Pacific railroad right-of-way, placing the new channel and the proposed highway on opposite sides of the railroad. Thus it became necessary to install one additional culvert under the railroad as well as to deepen another that was already in use. For the new structure it was decided to jack a 36-in. corrugated metal pipe 100 ft. long through the railroad embankment, and the capacity of the existing structure would be increased by adding a deeper concrete lined ditch.

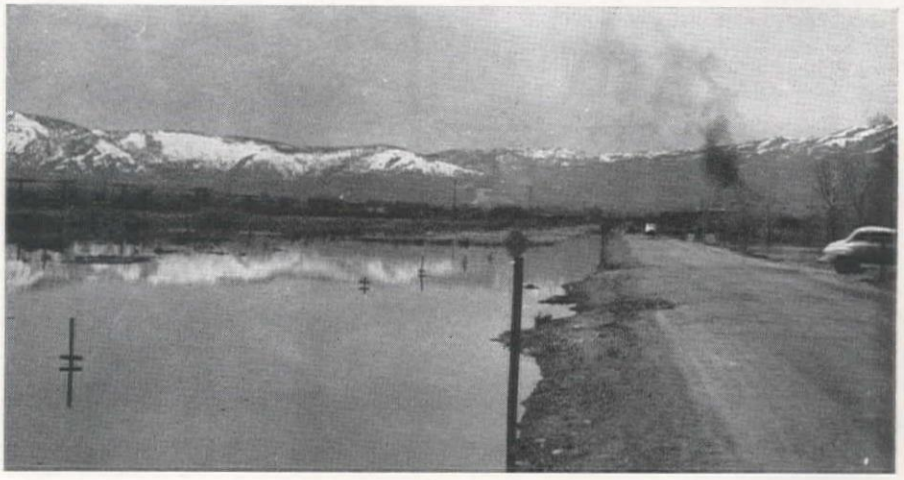
Scheduled winter stop

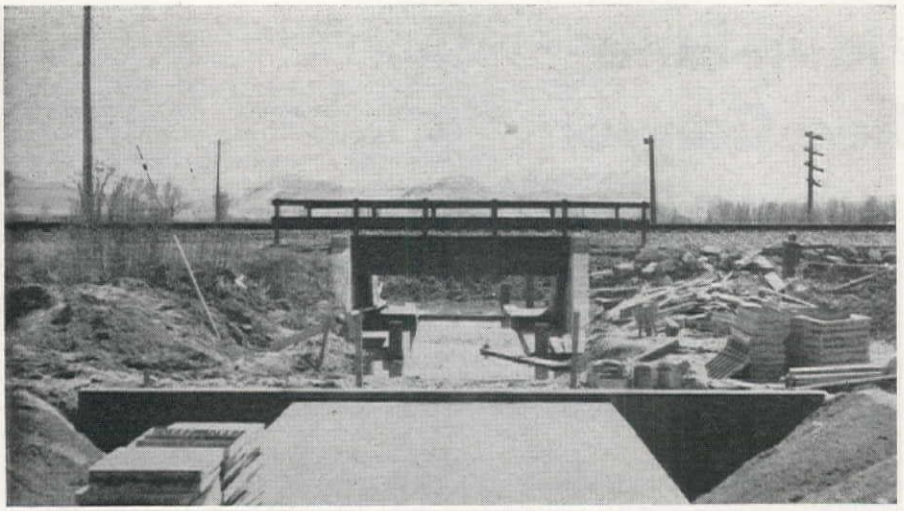
Work got under way on a limited scale during the early part of October 1951, and continued until cold weather compelled the contractor to suspend operations the first part of January 1952. Provisions had been included in the contract permitting a work stoppage during the winter of 1951-1952. This conforms to Nevada's policy of stopping work in the northern section of the state during the winter months, precautions thereby being taken to see that no frozen material be placed in an embankment that will thaw at a later time causing settlement.

During this period the operations were mostly preparatory to the major work items that would be completed under the contract. This included the removing and constructing of fences, and clearing trees and shrubbery from construction area. The major portion of work carried

THIS TRAFFIC PROBLEM through much of Truckee River Canyon prompted the program of the Nevada State Highway Department to four-lane a 30-mi. section, starting with the present job at Sparks.

FLOOD WATERS of the Truckee River, caused by the heaviest snow for decades in the Sierra Nevada, stopped work during spring and early summer. Grade stakes show subgrade elevation, and the fill for the new east-bound two lanes appears on the left of the present highway.





A COMPLICATION was to get the drainage through an existing railroad structure (shown in background). It was deepened 5 ft. by building a concrete-lined ditch in the bottom. End of box culvert under new section of highway appears in the foreground.

out during this period was the construction of the new channel south of the railroad right-of-way, and the jacking of the 36-in. corrugated metal pipe through the railroad fill. It was necessary to complete these items before the water could be disposed of and work started on the embankments.

A 1½-yd. dragline was used for the 11,200 ft. of channel work, the first 2,100 ft. being a 6-ft. flat bottom ditch with 1:1 back slopes, the remaining 9,100 ft. a 12-ft. flat bottom ditch with 1:1 back slopes. The average depth of channel was 7 ft. About 38,000 cu. yd. were moved in 20 working days, or a daily average of 1,900 cu. yd.

Jacking procedure

For the jacking operations a pit was dug on the upstream or north side of the work, with the forward end of the pit bulkheaded against the railroad fill. A timber guide with steel rails was built so that the pipe could be kept on line and grade. A pushing frame was used against the end of the pipe to distribute the jacking pressure and also protect the end from damage. Two 50-ton hydraulic jacks with supporting backstop were placed in the pit and work started on a three shift basis, with a crew consisting of a foreman and five laborers on each shift.

For opening up ahead of the pipe two laborers worked at 30-min. intervals, while the others removed the material and handled the jacks. The material was removed from the forward end of the pipe by a small slip scraper operated from a double drum air-controlled slusher hoist. Material was dumped on a small platform and from there disposed of by hand. As work progressed in cold and stormy weather a tent was thrown over the open pit and warmed, allowing work to continue without interference. A 60-ft. length of pipe was jacked into place in 6 days (18 shifts). The remaining 40 ft. was laid directly into open trench on each end.

Upon completion of the jacking operations and the channel excavation, work continued on the removing and constructing of fences, clearing and removing brush and sod until the first part of January 1952, when the contractor was forced to suspend operations due to the extreme cold and wintry weather.

Following one of the most severe winters in recent times, work was again resumed the early part of March. Work was started on a full scale and continued until the latter part of April, when the contractor was again forced to suspend operations due to the heavy spring runoff. Melting snows in the Sierra Nevada high above Reno caused the Truckee to rise rapidly and overflow its banks. At that time about ⅔ of the job was completely covered with water.

During the period that the contractor has been able to work, the grading operations were performed in three 7½-hr. shifts. The half hour between shifts was used for greasing and making minor repairs to equipment for the next shift. No work was done on Saturdays or Sundays other than that necessary for the protection of the work or traffic. This time was utilized in making major repairs and getting equipment in shape for the following week.

Traffic control

About 220,000 cu. yd. of excavation was hauled to the embankment in the eastbound lane during this period. Initial completion of the eastbound two lanes was set up in the contract as a means of controlling traffic. This lane is parallel to and immediately south of the present highway. Traffic will use the present highway until the eastbound route is completed to the stage of the primed Type 2 gravel base. It will then be directed over this section while the westbound two lanes, which cover the present roadway, are being completed.

Material for the embankments will be obtained by uniformly widening a cut section at the east end of the swamp area. A 2½-cu. yd. shovel was used in excavating the material from the cut section, loading into 6- and 10-yd. trucks. As the fill progressed away from its source additional trucks of 18- to 20-yd. size were used. Compaction was obtained by an 8-ft. and a 10-ft. section of double-drum sheepsfoot rollers. The smaller unit was pulled by a rubber tired tractor, and the 10-ft. section by a crawler type.

A rocky formation was encountered in the east end of the cut and although it was possible to dig the material with the shovel, better production could be obtained by blasting. A 6-in. churn drill was used with the spacing of the holes 20 ft. on centers both ways. They were charged with 40% bag type powder. In spite of the small amount of explosive used and the large spacing between holes, very good results were obtained and no further blasting was necessary.

Drainage problem

Probably the most unusual feature of the job, and undoubtedly the biggest headache, was the deepening of the drainage structure under the railroad. The existing structure consisted of two concrete abutments 20 ft. apart, supporting a deck of 16-in. steel I-beams. Clearance from the bottom of I-beams, to the top of abutment, which was also the flow line of the structure, was a little less than 5 ft. Under the new drainage setup it became necessary to lower this flow line approximately 5½ ft. by constructing a 10 by 80-ft. concrete lined ditch 5 ft. deep between the existing structure footings. Provisions were made in the specifications to protect the existing structure by placing copper arsenite treated timber sheeting and bracing progressively as material was excavated. The timber sheeting consisted of 6 x 12-in. Douglas fir, cut in 10-ft. sections. The bracing was placed at 10-ft. centers and consisted of 8 x 8-in. timbers. The walls and floor were then poured in 7½-ft. sections. When these sections had cured the bracing was removed and the remaining 2½-ft. sections poured.

Excavating was done with a slip scraper operated from the power unit of a tractor. The drawback line was fastened to a deadman at the opposite end of the excavation. Material was a wet sticky clay that would stick to the scraper, requiring cleaning nearly every trip. Five laborers (miners from near Virginia City) worked in the excavation digging material and placing it so the scraper could pick it up. They also placed the sheeting and bracing as each section was ready. Twenty-five working days were taken to complete this phase of the work.

While this work was in progress, a

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Major units of equipment

2 Northwest shovels, Model 6
1 Northwest shovel, Model 80 D
7 Mack Trucks 6 and 10-yd.
3 Euclids—18 and 20-yd.
1 International rubber tired tractor
1 Caterpillar—D7
1 Bucyrus-Erie Churn Drill—29T
Bodison gravel plant
Simons Cone Crusher
Atlas powder
Ford trucks in gravel pit

Cleaning 11-mi. of old pipe before cement-mortar lining

Each of three runs of the cleaning machine through the line requires about 6 hr., with control by valves and two-way radio — A flow of 15 mgd. during the run necessary for power and flushing

TO CLEAN 11 MI. of large diameter steel pipe on San Francisco's Hetch Hetchy aqueduct required only 9 working days recently when the job was done as a preliminary to placing a cement-mortar lining in the pipe. About 15 mg. of water per day was required for the combined action of hydraulic power for the cleaner and removal of the loosened material.

Briefly, the procedure involved opening up a section of the line, inserting the cleaning tool, rewelding the pipe, applying water behind the cleaner with sufficient pressure to start it moving and then regulating this flow to keep the cleaner moving slowly through the pipe. Enough water is supplied at all times to pass the tool and carry away the old coating and incrustations which are being scraped loose.

The pipe cleaned under a recent contract for relining crosses that part of the San Joaquin Valley from the San Joaquin River (15 mi. west of Modesto) westerly to the Tesla Portal of the Coast Range Tunnel, located some 7 mi. south of Tracy.

What was needed

There are several important requisites to a successful hydraulic cleaning shot. First, it is necessary to have a cleaning tool of proper design and manufacture to stand up under the considerable water pressures and thoroughly clean the pipe interior of loose or deteriorated remains of the old coating. Second, is an adequate supply of water. Third, is a safe place to dispose of the cleaning water. In cleaning the section of Hetch Hetchy pipe, the direction of cleaning was determined by the location of an adequate place to dispose of cleaning water which was found near the edge of the San Joaquin River.

The 15 mg. per day flow of cleaning water required during the actual cleaning time was delivered through the recently installed No. 2 Pipe Line and diverted to the No. 1 Pipe Line at the Tesla Portal. Control of this water was regulated first at the Oakdale Portal, 45 mi. easterly, and then adjusted by butterfly valve located at the Tesla Portal.

How it was done

After removing the top one-half of a 7-ft. section of pipe at Tesla Portal, the hydraulic cleaner (see illustration) was jacked into the end of the 66-in. old riveted line, followed by welding back the previously removed pipe section. At the same time, about 4 mi. back up the line, a second top-half section, 7 ft. long, was removed and a dished head and control valves were installed to insure control of the speed of the cleaning machine. Then, after setting up radio control between (1) the water supply at Oakdale Portal, (2) the original location of the cleaning tool at Tesla Portal, and (3) the control valves at the end of the proposed cleaning run, the pipe was filled with water and preparations were complete.

By opening the 16-in. valves at the location of the end of the run, the cleaning tool was started. A watcher at this point could clearly hear it start and could easily follow its progress through the pipe, particularly as it passed the riveted joints. The cleaning tool makes considerable noise as it proceeds on its way. The best speed is between 100 and 200 ft. per minute, equal to a slow walk, so by radio control the valves were regulated to insure this speed.

All cleaning water, with literally tons of deteriorated lining suspended in the water, was allowed to continue through the adjacent 62-in. and 58-in. pipe, to be finally released into the San Joaquin River. Over the years it has been found that release of cleaning water has no ill-effects on streams unless released immediately above a domestic water intake.

During the travel time of the cleaning tool on its run, which took about 6 hr., the pipe line was kept full of water, both ahead and back of the cleaner. As the cleaner approached the end of the run, the valve control was operated to bring the tool to a quiet stop shortly before it reached the bulkhead. This resulted in cleaning 23,000 ft. of pipe in about 6 hr. actual time.

The final step of cleaning this run was to dewater the pipe line sufficiently to allow removal of the dished head and

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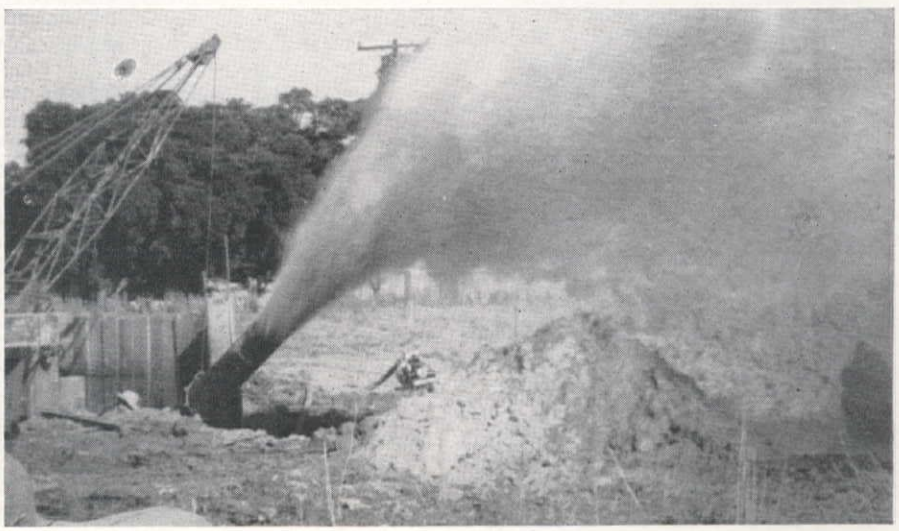
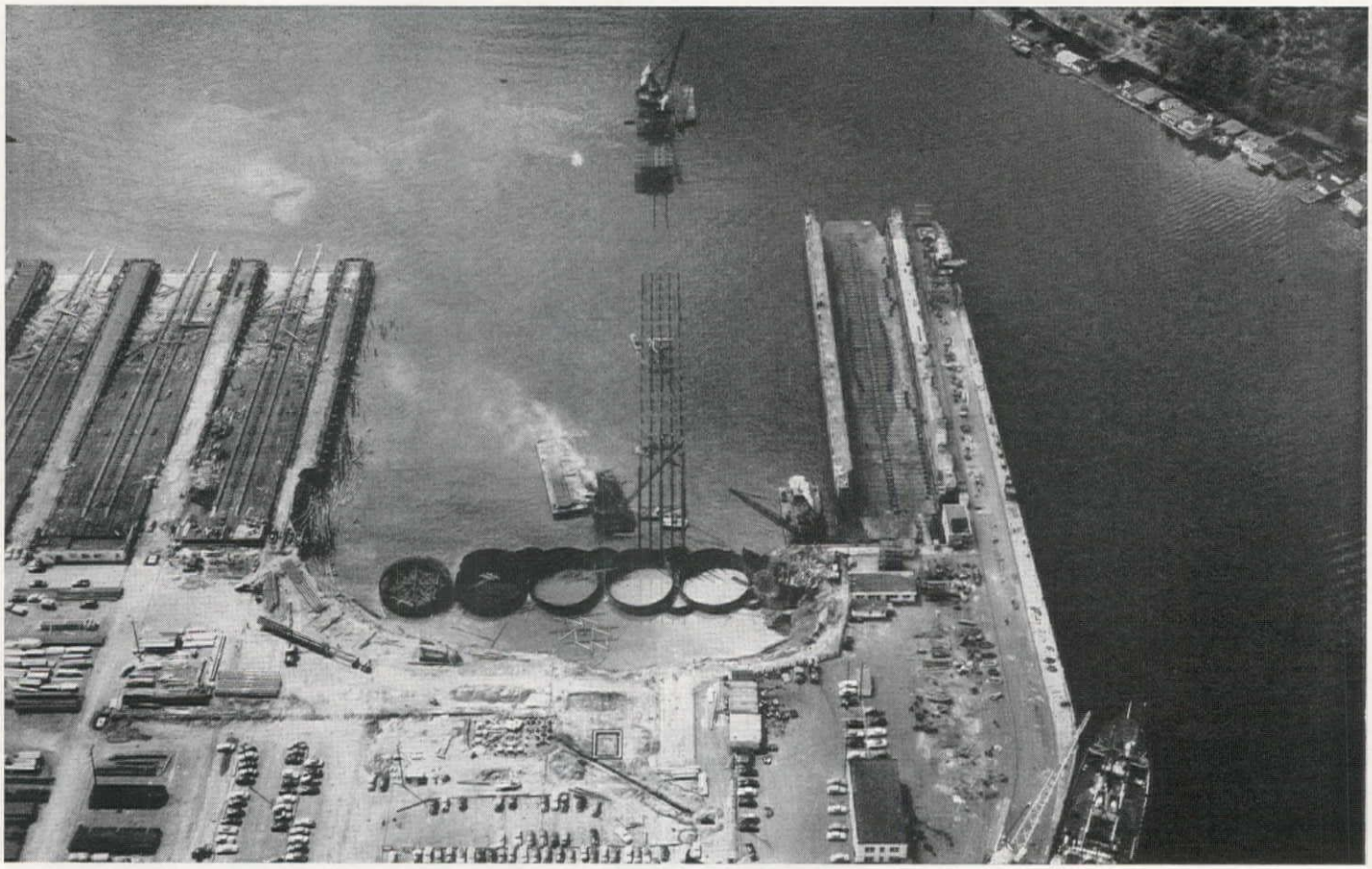
CLEANING TOOL being inserted into the 66-in. diameter steel pipe through a hole produced by cutting out a 7-ft. top section.

DISCHARGE OF WATER which is flowing through the cleaner under control to provide power for its progress in the pipe and to flush out the pieces of old lining and incrustations as they are scraped loose.





Shipbuilding site gives way to repair center as—

Port of Portland builds for future

Accommodations for two floating drydocks include cellular bulkhead and 1,100-ft. finger pier founded on 250 pipe piles — Pier height calls for 200-ft. pipe lengths, H-section batter piles for stability — Contract includes yard and shop facilities

ON THE WILLAMETTE River at Portland, Oregon, a $1,957,000 contract being performed by Guy F. Atkinson Co. will result by the end of 1952 in completely modern drydocking and outfitting facilities for the Port of Portland at the north end of Swan Island. The present work is only a portion of the ultimate multi-million dollar development planned for the waterfront property that was famed during the recent war years as the site of a Kaiser shipyard engaged in production of Liberty ships.

Aside from shoreside structures, the main items of work are construction of a bulkhead formed of steel sheet pile cells, and the building of a 1,080-ft. finger pier alongside which will be moored two floating drydocks. Additional length of pier beyond that needed for the drydocks will be used for outfitting of ships, with a rail-mounted gantry crane to be installed for this purpose.

Port facilities centralized

Need for the new construction has been known for some time, as the maritime tradition of Portland boomed during the war years. The port's existing drydocks are now moored at separate locations, one adjacent to the new site and the other downstream at St. John's. The Swan Island dock is not easily accessible to shipping, being off to one side of the channel and moored at an inconvenient angle for approaching ships. The new finger pier will be situated to make for easier landings by the largest ships using the port facilities, and progress from initial tie-up to the drydock itself will be handled by winching rather than tug or ship's power.

An irregular shoreline of fairly natural slope and contour faced the contractor after removal by the Port of shipbuilding ways on the site. Now it was desired to establish a bulkhead line with deep water (50 ft. depth) on one side and the natural island ground surface (el. 32 ft.) on the other. The great bulkhead height is needed because the Willamette in this reach is occasionally subject to high water under certain combinations of tide and stream flow. This level approaches 30 ft. The resulting 80-ft. differential called for the use of sheet pile lengths of 105 ft. (maximum), including penetration length.

The bulkhead is 700 ft. long, composed of six cells, each 68.4 ft. in diameter, using MP 101 pile sections. The remaining length of bulkhead beyond the cells is composed of an existing pier frontage. In order to establish the necessary depth of water at the bulkhead line, and to permit cell construction, prior excavation was necessary in the cell area. This work carried back some 80 ft. from the eventual bulkhead line. As a result, for all but the end cells, a floating rig could be maneuvered into position for pile driving.

Cell construction

The contractor attempted handling and driving the sheet piling in one piece, but after a couple of discouraging tries, the remaining 105-ft. lengths, which he had welded together at the job, were cut apart and a more conventional mode of progress adopted. The bulkhead cells are connected by arc walls to create a reasonably straight bulkhead line. The cells were patterned by template and the piling driven in two lifts, upper and lower

rings each composed of 50- and 55-ft. lengths of piling. These were alternated, side by side, in the driving. Thus, with their bottom edges at a given depth, the exposed ends of the lower ring presented a notched profile for keying in the upper ring piling.

Piling in the front of the cells only is composed of this longest stock and stands exposed at el. 32. The remainder of each cell rises only to el. 19. Thus, the free standing portion of the bulkhead retains a depth of backfill of only 13 ft.

Backfill material is largely sand, dumped in from trucks, sprayed with a hose to get proper moisture (16%), and spread and compacted by crawler tractors to about 95%.

Finger pier construction

The finger pier construction has represented an interesting series of problems, mostly traceable to the use of pipe piles 200 ft. long. They are 18- and 24-in. diameter, with ⅜-in. walls. Such piling could not be handled in one piece, but any choice of combinations based on 40-ft. increments was available. As it has turned out, a 120-ft. length has been put down first, and an 80-ft. section held in position above by floating crane while connecting welds are made. Incidentally, this splicing is done on a mass basis, many second sections being added after a large group of lower piling sections have been driven. Welders do not complete their work on each splice in turn. Four tack welds around the girth joint are sufficient to hold the 80-ft. "wands" in place while temporary joining is completed on other piles in the group. Welders then move back into the forest and complete the welds.

The piles are driven open-ended and are subsequently bailed out to receive concrete. Though there was some concern over this method, judging from experience elsewhere, the bailing did not create a hydraulic head differential big enough to cause river bottom material to "blow" up through the pile. Bailing did, however, extend in many cases to a depth somewhat below river bottom elevation outside the piles. Gravel was then introduced into the bailed piles to stand higher than any remaining water, thus assuring that there would be no dilution of concrete.

Tremie concrete was not specified, but the contractor tried it. Here, however, as with the attempt at driving sheet piling in one piece, more trouble was involved than could be justified. Also, it was the resident engineer's feeling, in view of other jobs within his experience, that segregation would not be pronounced in concrete falling free within the narrow confines represented by the 18- and 24-in. pipe piles. No reinforcing is present to obstruct the concrete.

Pile driving

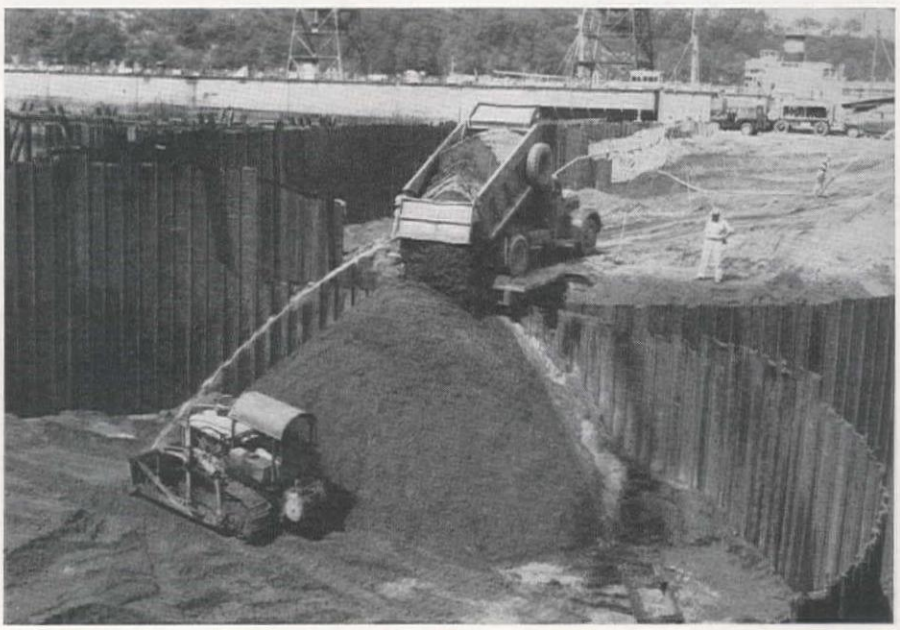
The finger pier being built totals 1,087 ft. in length. For a distance of 580 ft. it is 50 ft. wide, accommodating gantry crane ways. Beyond this point, the pier narrows to 32 ft. Standard gauge railroad tracks, however, do extend to the pier end, 507 ft. further out. Supporting this pier plan are 30 bents of 5 piles each, followed by a 4-pile bent at the transition. The next 20 bents contain 4 piles, and the last four bents are composed of 3 piles each. The total is 246 piles. Beyond the transition they are 18-in. diameter.

Site investigations before construction proved very reliable in indicating the penetration that would be needed and achieved. It is estimated that no pile has been more than 5 ft. above or below its intended level when driving ceased. Piles were considered to have met satisfactory resistance if 800-900 blows were needed to penetrate the final 5 ft. This comes to between 30 and 50 blows per in., and was based on the use of a 24,000-ft. lb. hammer. The hammers employed were a Vulcan 80-C and a Vulcan OR. Specifications and tests qualify each pile for support of a 225-ton load.

Lateral support

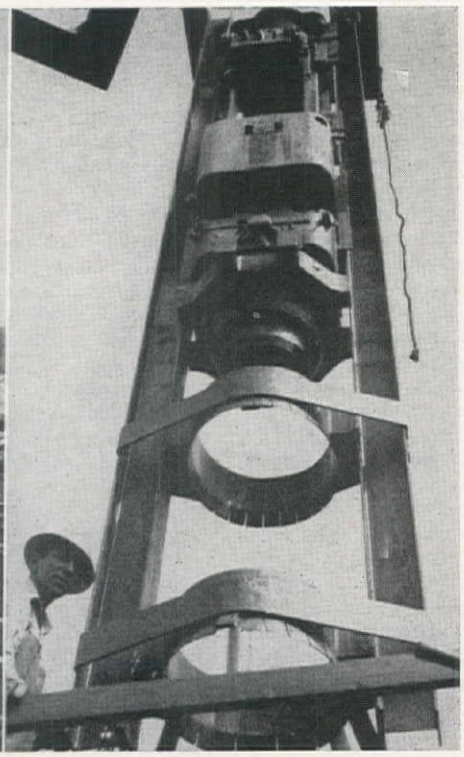
The pier is not intended to be rigid under the impact of an incoming ship, even when the seamanship is good and the landing well made. However, some lateral support is necessary in consideration of the 80 ft. of pile exposed above river bottom and supported laterally only by the surrounding water. As a

BATTER PILES (above) are 14-in. H-sections 128 ft. long. All piling on job had to be spliced for needed length. Life preserver on third bent is good safety note.



BULKHEAD CELLS (right) are backfilled with imported material that is spread and compacted by small tractor. Prior excavation permitted most sheet piling to be driven from floating rig.

CONCRETE CAPS are formed close behind driving operation. Cluster of tall piles offshore is scene of production welding as many second sections are added to first 120-ft. length.



PILE FOREMAN Harvey Swanson indicates scale of Vulcan hammer fitted for driving pipe piles.

result, 14-in., 89-lb. H-pile were driven on a 1:2¼ batter to provide support (see pictures). These were driven in pairs, flanking alternate vertical bents. These piles also required splicing, two 74-ft. lengths used to get a total of 128 ft.

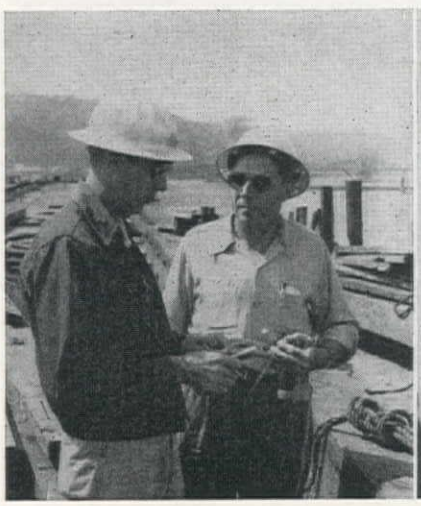
Within the range of river rise and fall, all bulkhead and pier piling have been treated to resist deterioration. Bitumastic 50, a Koppers product, has been used on the top 50 ft. of pier piling and on the upper 30 ft. of the bulkhead.

Deck construction

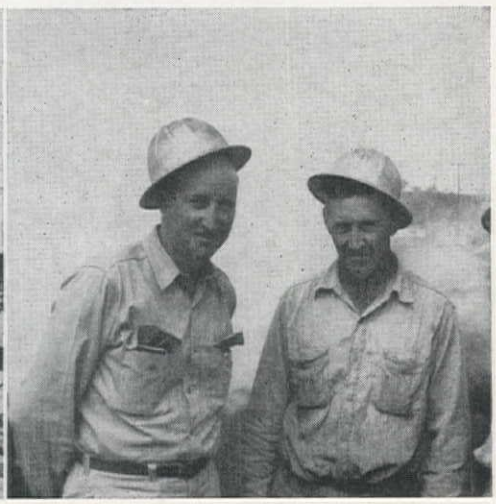
When the project was visited in August by *Western Construction*, pile driving was still under way for the main pier, while at the same time concrete cap forms were being built across the inshore bents. These caps are 3 x 5½ ft. in section, containing two rows of reinforcing at both top and bottom. The top reinforcing totals 12 1-in. square bars, the bottom, 12 1¼-in. square bars. In addition, there are three ¾-in. round bars placed longitudinally in the sides of the cap, spaced uniformly between top and bottom. Stirrups are ⅝-in. Six 1-in. dowels are set in each pile and bent into the cap.

Running the pier length between caps are beams of varying depths, depending on whether or not they are directly below crane ways or railroad tracks. The different depths are achieved by letting the beams into the caps they cross. The minimum distance from cap top to deck soffit is 2 ft., 2 in.

CHECKING QUANTITIES at Swan Island are Joe McNabb (left), contractor's engineer, and Hal Hunt, resident engineer.



POSING FOR PICTURE are Lee Cox (left), Atkinson superintendent, and Les Caldwell, pile foreman.



Reinforced concrete paving will form the deck, an 8-in. thickness being specified, reinforced transversely by pairs of ⅝-in. bars at 9-in. centers. Longitudinal reinforcing consists of ½-in. bars, in pairs, at 12-in. centers.

Shoreside facilities

In addition to the bulkhead and piers, there are numerous other structural components of the work. Other marine items include a narrow access pier east of the main pier, forming the other side of a slip to receive one of the drydocks. This pier will be 520 ft. long, built on 2-pile bents of 24-in. pipe piles. Also, to maintain the depth of water to the west of the main pier and to minimize inflow of river silt, a submerged sheet pile wall will be driven on a line parallel to the main pier and 150 ft. to the west. Driven 10 ft. into the river bottom (el. —50), this piling will be cut off at el. —35. Dredging will not be performed to the west of this point, but only in the 150-ft. width of channel between this wall and the pier when the wall is overtopped by silt. A number of timber pile clusters known as dolphins, for mooring, will be driven at specified points in the channel to either side of the main pier.

Ashore, the crane way leading from the main pier will be continued inland some 500 ft. to connect with existing crane ways. Generally, a shop area along the full 700-ft. bulkhead frontage and extending 250 ft. back of the bulkhead will be paved with bituminous surfacing over an 8-in. rolled base course. Structures to be built in this area include a contractor's building, a shop building, a boiler house, a power substation and transformer yard, and utilities ducts.

Subcontractors

Pile drivers on the job are floating rigs from Willamette Tug & Barge Co. and from Portland Tug & Barge Co. They each mount a revolving crane and a standard assembly of leads. The pipe piles are being driven from a crane-handled hammer, while a moonbeam arrangement on the leads was used to drive batter piles.

Subcontractors include Soulé Steel Co., furnishing and installing reinforcing steel, and Gunderson Engineering Co., performing structural fabrication for buildings to be erected by Oregon Erecting Co. Concrete construction ashore is being handled by Star Concrete Co. Ready-mix concrete for their operation as well as for the prime contractor on the pier caps and superstructure is furnished by Ross Island Sand & Gravel Co. of Portland.

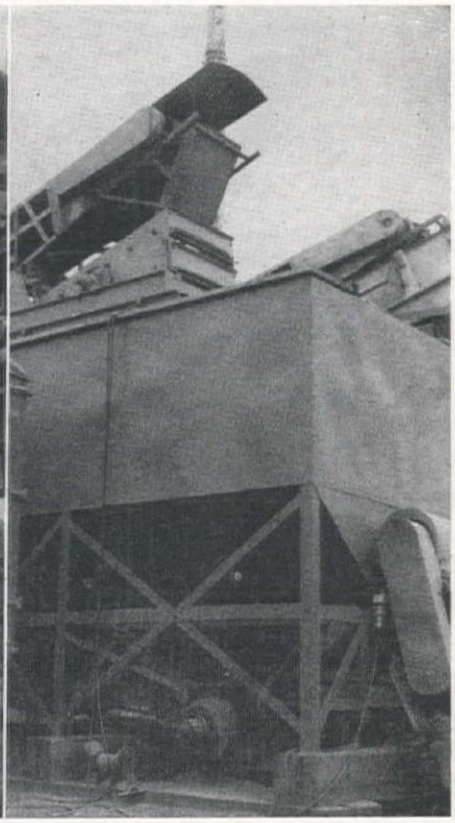
Personnel

For the Port of Portland, Frederic R. Harris, Inc., is the engineering firm in charge of the work. Resident engineer is Hal W. Hunt, assisted by W. N. Olsen, M. F. Habush, Frank Freidle, and Floyd Martin. Guy F. Atkinson Co., the prime contractor, has Lee Cox on the job as superintendent, assisted by Joe Lawrence. Joe McNabb is project engineer, and William Haenager is field engineer. Les Caldwell and Harvey Swanson are pile foremen.

This rock plant can go places

Ease of maintenance and flexibility of operation mark this plant — All units built as trailers, can move at 45 mph. — Only stock items are crushers and screens

CONVEYORS were designed to give full belt protection, are built for interchangeable use anywhere in plant.



BINS are divided into three compartments fed by vibrating screens. Screens must be removed for transport, are carried in towing truck.

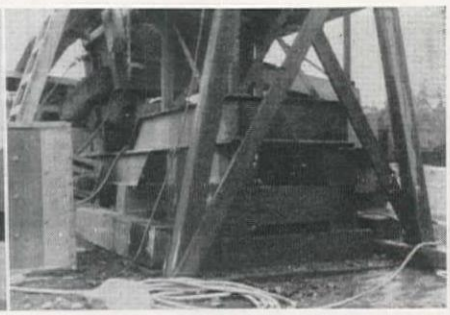
SOMETHING NEW in portable rock plants has been devised by Carl R. Staats of River Bend Sand & Gravel Co. at Salem, Oregon. The company's operational radius has been increased in the last two years by a plant of Staats' design, a flexible, high-production system that has worked most recently on a contract basis producing aggregates for concrete in construction of the Alcoa aluminum plant at Wenatchee, Washington. The plant's principal advantages are a production of 1,500-1,600 tons per day, an adaptability to crush and screen to any given combination of sizes, and a mechanical accessibility that makes for easy maintenance. Experience has shown that the plant can be moved 350 mi. and set up for production within 10 days.

This plant doesn't boast the compact quality of most commercially built plants; the units currently in use for commercial rock production at a Salem pit would total up to 9 wheel-mounted hauling units plus 3 truckloads of accessories. All of these can travel easily—35 to 45 mph.—behind conventional dump trucks, and with no worry over Oregon's legal load limit of 16,000 lb. per axle. Only one accessory truckload needs a special permit for being over the 50-ft. length limit with its 60-ft. conveyor assemblies.

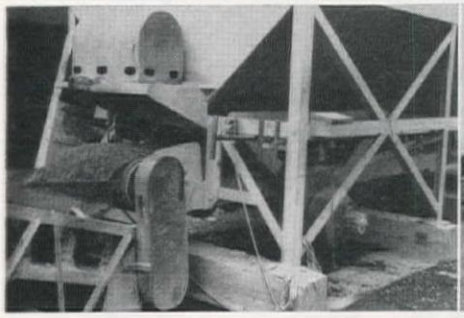
Pit run and crusher run

The usual arrangement of crushing, conveyor, screening and storage units of this plant makes possible dual production of both pit run concrete aggregates and crusher run stone for asphalt paving (see flow diagram). The essence of this plant's adaptability and flexibility lies in the designer's determination of where to "break" the plant into separate pieces. The crushing and screening units are commercial ones, but the remainder is strictly Staats—and successful.

TELSMITH crusher is mounted on frame of 12-in. I-beams, is fitted with dual axle for hauling as a semi-trailer.



TRAYLOR primary crusher is blocked up for stability at plant site. Timber framing supports pit feed conveyor.



THREE divisions of bin are tapped by conveyor belt. Power switch and three gate controls are grouped where operator can easily see truck being loaded.

SAND WASHER agitates fines washed from pit feed, skims off mason sand to conveyor at right. Plant currently produces 5 aggregate sizes.

Each crusher—two Telsmiths and a Traylor—is mounted on a frame of 12-in. I-beams that is equipped with dual axles. The effect is a low-bed trailer. The bins, three compartments to each, are likewise supported in heavy frames having axles. There are three such bins, two presently involved in the storage of graded aggregates at Salem. The bins are small and act only as surge storage, with trucks in continuous operation to move their contents to large stockpiles elsewhere on the property. The final unit that rides on its own special frame is the sand washer.

Conveyor design

Conveyors were built by Staats, rather than bought, because his design alone has the strength and the full protection for the belts that he sought. Also, he designed them on what might be called a modular basis for greater adaptability: each section will fit any place in the system. These conveyors do not ride on rubber themselves; but the whole collection—10 presently set up at Salem—comprises two truckloads.

The switchhouse for the plant was built into a trailer body, and the operators' tool house was converted from an old school bus. Front wheels of this bus were removed and the bus rebuilt as a semi-trailer.

Added to the two truckloads of conveyors should be a truck carrying the small sand bin. Total, 9 special hauling units and 3 trucks. The firm has its own ¾-yd. Northwest, with a 35-ft. boom and 10-ft. jib, to strike and set up the plant, but any local crane could be used.

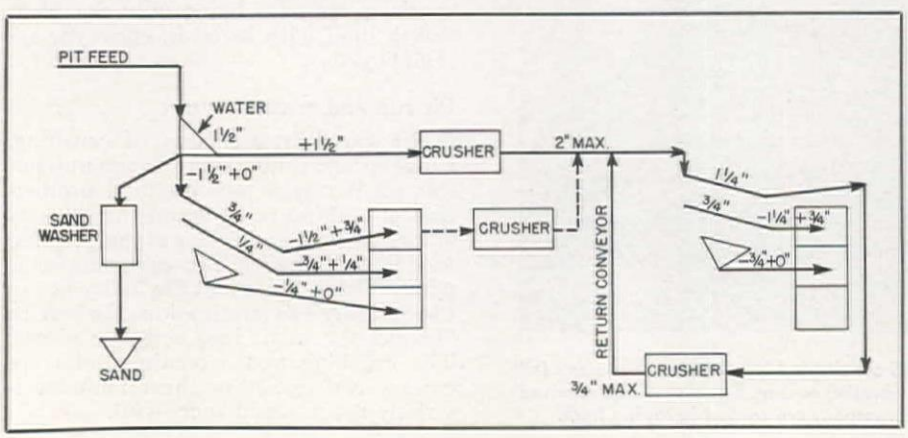
The only disassembly necessary within a given unit, to meet height, length, or load restrictions, is removal of the vibrating screens normally mounted atop the bins. These screens are transported in the bodies of dump trucks hauling the bins.

River Bend Sand & Gravel Co. being a local concern, a second firm has been set up to "handle the affairs" of the rock plant. This is known as the M-P-M Corp., the Marion-Polk-Materials Corp., named for the two counties that lie along the Willamette River at Salem and divide the town into two parts. In his capacity as president of M-P-M Corp., Staats is now busy hatching a plan for a "really portable" ready-mix concrete plant, but no part of the scheme is yet a reality. It will be interesting to see what does come of Staats' new notion, however, for the rock plant has already made a powerful impression among field engineers. Personnel of Morrison-Knudsen, also performing work at Wenatchee, photographed the plant extensively, took its measurements and noted its details for their own possible reproduction later on. And the Navy was very much interested in the plant for use overseas.

Personnel

The plant was conceived by Carl Staats, and build largely under the direction of W. L. "Swede" Nelson, the plant superintendent at River Bend Sand & Gravel. For ease of hooking up to any type of available electric power source while on contract work, Staats engaged James L. Hunt of Portland General Electric Co. as consultant in the design of switchhouse facilities. The resulting plant even has what are virtually "plug-in" connections in case it is necessary to generate power with a diesel generator set. Gilbert Moss is plant foreman.

FLOW DIAGRAM shows set-up for commercial rock production at Salem. Dotted lines indicate augmented flow to crusher-run supply when pit feed is low on large sizes (+1½). Idle third bin shown in picture on preceding page is not included here.



Water main ruptures; floods stores and houses

DAMAGES estimated at $350,000 resulted from the bursting of a water main in Edgewater, suburb of Denver, Colo. The 63-in. main, which carries a large part of Denver's water supply, burst at the scene of some recent conduit construction.

Approximately 1,000,000 gal. of water is carried hourly by the main from the Moffat filter plant, and basements, stores and residences felt the impact of the 3,000,000 gal. of water which emptied into the streets, before the flood could be halted. Residents of West Denver suburbs were without water for many hours, and other areas felt somewhat of a decline in pressure.

The break occurred where a newly installed concrete conduit on Twenty-ninth Ave. comes down a small hill. The conduit makes a right-angle turn into Newland St. Earl Mosley, manager of the Denver water department, estimated that a bulkhead at the turn had collapsed under severe water pressure and the flood was on.

A few hours after the break, the waters of the flood ran off, and harried citizens began clearing silt, mud and uprooted pieces of pavement from their homes and streets.

TIPS on the use and care of your lifting jacks

Five basic types of jacks are available to contractors — Select the proper kind and size for the job to be done — There are rules for the safe and effective use of jacks

By FRANK H. SCHWERIN
Manager of Engineering
The Duff-Norton Manufacturing Company

THE CONSTRUCTION industry will find there are lifting jacks which are correct for practically all needs of lifting and lowering, as well as many pushing and pulling operations. The problem is to match the right jack to the job. For a long time, it has been the custom in construction operations for workmen to make use of the jack which happens to be handiest, regardless of whether or not it was built for the task. Often this practice results in inefficiency, damaged equipment, broken jacks and serious accidents, all of which might have been avoided if a little thought had been given to the problem of selecting the proper jack for the particular job.

Basically, there are five types of jacks: (1) ratchet, (2) screw, (3) hydraulic, (4) air motor power, and (5) miscellaneous jacking mechanisms. A short discussion of each of these basic types of jacks will help contractors and their superintendents in extending jack service life, reducing accidents, and saving time and money through increased production efficiency.

Ratchet jacks

The simplest jack used in the construction field is the ratchet jack. In this type, the familiar lever-and-fulcrum principle is used to lift and lower the load. In the operation of single acting jacks, the downward stroke of the lever raises the rack one notch. A holding pawl, fulcrumed in the base, then slips into place to hold the load, while the lever is raised to take another "bite."

DON'T FORGET your jack. It thrives on regular cleaning and oiling. It will give longer and better service when you give it care.

Some models, designated double acting jacks, are built to allow the load to be lifted on both the downward and upward strokes of the lever. This jack, it should be noted, has both pawls mounted on the socket—one on each side of the socket fulcrum center. However, its capacity is somewhat limited compared to the single acting types because a relatively large amount of manual effort is required to lift a given load with balanced action, due to the location of the pawl fulcrums. Jacks of this type have one principal advantage; namely, faster operation on lighter loads.

In ratchet jacks, two types of lowering mechanisms are available: (1) automatic or ratchet lowering and (2) trip lowering. The automatic or ratchet lowering allows the load to be lowered a notch at a time, thereby minimizing the danger of damaging the load. In jacks with a tripping mechanism, the jack rack is dropped instantly. This type of jack is used for track work only and should not be used for lifting machinery.

BASICALLY, there are five types of jacks. Be careful in your selection. Choose the proper type and capacity for your load.

Practically all ratchet jacks provide the versatility of both head and foot lifts. Caution should be exercised in using the foot lift, for usually it is rated at only one-half the capacity of the jack. This reduction in rated capacity with the foot lift results from the fact that loads are carried eccentrically rather than centered, as is the case with the head lift.

Ratchet jack maintenance

The ratchet jack has many applications in the construction field. A few of these uses are lifting equipment into place, moving and setting heavy machinery, repairing construction equipment, breaking seals on manholes, lifting and holding light structures, and an unlimited amount of others. They are built in 5, 10, 15, and 20-ton sizes of various heights for the different industries.

Proper maintenance of ratchet jacks is very important in order to avoid accidents and possible injury to personnel and damage to equipment. These jacks should be checked periodically to detect wear of parts such as the pawls, the rack teeth, and fulcrum points, as these are the vital parts that support the load. The failure of these parts to function properly will result in accidents. Always keep jacks clean and well lubricated; see that pawls engage the rack fully at the end of the socket stroke; and see that the rack and teeth are in good condition in order that they will support the load without slippage due to worn teeth.

Screw jacks

For lifting heavier loads than is possible with ratchet jacks, screw jacks are most commonly used. In these jacks, the screw-and-nut principle is employed in two basic designs; namely, regular and inverted. In the regular type, the screw raises the jack housing to lift the load. In the inverted type, the screw itself remains fixed, riding on ball bearings at

BLOCK UP the jack if it's resting on a soft or uneven surface. Then it will hold a load for you firmly.

the base of the jack housing. When the screw is turned, a ram having a nut fixed in the lower end rises out of the housing to lift the load. For lighter loads, a lever bar will apply enough power to turn the screw of the simple type of screw jack, but as the loads increase, various gears and ratchet devices are used in jacks to multiply the operator's strength.

Geared screw type jacks are available for lifting loads ranging from 5 through 100 tons, and are produced in both manual and self-lowering models. In the latter types, the weight of the load causes the jack to lower automatically under full control of the operator. Governor-controlled, self-lowering mechanisms are also available for some of the larger models. These control speed of descent and can be gradually slowed down or stopped instantly by the operator at any point without shock to the mechanism. Geared screw-type jacks also include foot lifts in their design and can be used on loads as low in height as those for which ratchet jacks are employed. Some screw jacks can be inserted under loads as low as 7 in. in height. Heavy loads can be lifted and held for indefinite periods of time and will not creep or sink under a load if jacks are maintained in good repair.

Geared screw jack uses

Geared screw-type jacks, because of their superior load handling potentials, also have many applications in the construction field. Within the limitations of their capacities, they can be used for rigging and general heavy lifting, for bridge

and structural steel erection, for setting beams and stringers in place on bridge and other steel erection jobs. The journal types of screw jacks are particularly useful for bridge work, concrete form work, and in other places where low height is required. The screw type of jack is somewhat more costly than the rack jacks, but it has a lower maintenance cost, and due to the ease of operating is just as fast as the rack jacks of the same capacities and is a great deal safer to operate.

Air motor power jacks

Air motor power jacks are geared screw jacks and are relatively recent in development, but are finding many appli-

KEEP YOUR JACK in good working condition. Don't overload it; don't permit it to lie around in the dirt or in water.

cations in the construction field. With these rugged jacks, loads up to 100 tons are lifted absolutely without effort by means of a self-contained air motor. On typical applications, it was found that the ratio of air motor power versus hand jacking was 1 to 9 in favor of air power, with the total elimination of the operator fatigue factor.

Although these jacks spare the energy of the workman for other uses, caution should be taken to avoid using an oversized jack. A 100-ton capacity jack should not be used to lift a 20-ton load. Jack capacities should be selected to match the load to be lifted in order to obtain the most satisfactory and economical results, as a 100-ton capacity jack naturally is slower than a 20-ton jack.

Air motor jacks work in pairs

While air motor power jacks are relatively heavy, they feature integrally mounted wheels for ease in transporting and spotting. When in use, the jack is not supported on its wheels but on a sturdy, broad base; the wheels are mounted on the side and completely clear of the ground. Through the use of a connecting air hose, two air motor power jacks of the same capacity can be used simultaneously by one man. When this connection is made, two ends of heavy structures can be lifted or lowered smoothly, evenly, and with complete safety. These jacks have been used with great success on raising bridges, pushing heavy pipe, and are also used in all the leading railroad locomotive repair shops.

Geared screw jacks are a precision tool, the vital parts of which are machined, heat treated, and ground to close tolerances. All parts are operated in a good grade of grease within a closed jack housing. This type of jack will give good service, but should be inspected periodically to insure proper lubrication and renewal of worn parts to keep them in good working condition. It is also important to keep the outside exposed parts of these jacks clean and lubricated.

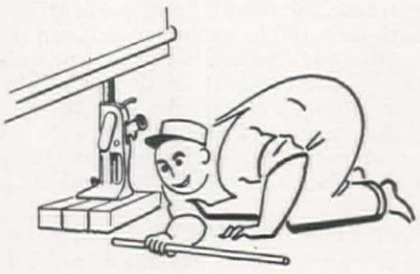
In placing a jack under a load, the operator should always be certain that the jack is placed as directly under the load as possible on a good foundation, with a wood cushion on the top to insure central loading to avoid slipping or damaging of the load and possible injury to the operator.

Hydraulic jacks

In hydraulic jacks, the tremendous power of hydraulics is employed to lift heavy loads with very little effort. Although not as fast in operation as ratchet jacks, they are extremely versatile in service. Many light capacity models have extensions of screws which can be run up quickly by hand to load height, with the actual lift starting with the first stroke of the lever bar. These jacks range in capacities from 3 to 12 tons.

On all hydraulic jacks, the oil is sealed in a reservoir which is generally a part of the jack itself—the oil drains down into the pump passage from where it is pumped under the ram to raise the load. When the load is to be lowered, the operator opens the bleeder valve, allowing the oil to return to the reservoir, as the weight of the load forces the ram down.

With the ordinary hydraulic jack it is most important, when placing a jack in a position for moving a load, that it be placed so that the oil can drain to the pump by gravity. Otherwise the pump will be starved for oil and will pump air into the jack to create an air lock. This is not a problem when the jack is setting upright on its base, but must be closely observed when it is used horizontally. The pump should always be the lowest point when the jack is operated.



TAKE OUT THE HANDLE when the lift has been made. Then you won't stumble over it and jar the load.

The 20- to 100-ton jacks do not have the extension screw, but some models have two pumps—one for speed and the other for high pressure to permit the ram to be speeded up to contact the load, after which the high pressure pump takes over.

The so-called independent pump hydraulic jacks, in which the pump with the reservoir is a separate unit from the ram, have the oil pumped to the ram through a high pressure hose. This type of ram can be placed in any position, even upside down, for operation without any ill effects and the control is from a remote point; namely, the position where the pump is placed.

Special jacks

TRENCH BRACES — Under this heading are a variety of jacks which have specialized uses in the construction field. Among them is the familiar trench brace, which is used for safe, economical bracing on many trench and excavation jobs. They have been proved essential to the safety of workmen on excavating jobs. Essentially, the trench brace is a screw-type jack mounted on either end of a piece of pipe or timber. A ball and socket joint at both ends of the brace permits rapid adjustment to any angle. Lugs on each face firmly grip the planking.

These jacks are adaptable to any width of trench simply by using longer or shorter lengths of timber or standard black pipe. Either complete units or the fittings are available, allowing the contractor to cut timber or pipe to his own requirements. Complete units are available in closed lengths from 16 to 60 in. Lengths of screws range from 10 to 18 in., and can be extended from 6 to 10 in. with safety. In using trench braces for excavations and concrete forms, care should be taken to use enough jacks to eliminate danger of the wall collapsing around jacks which remain firmly in place.

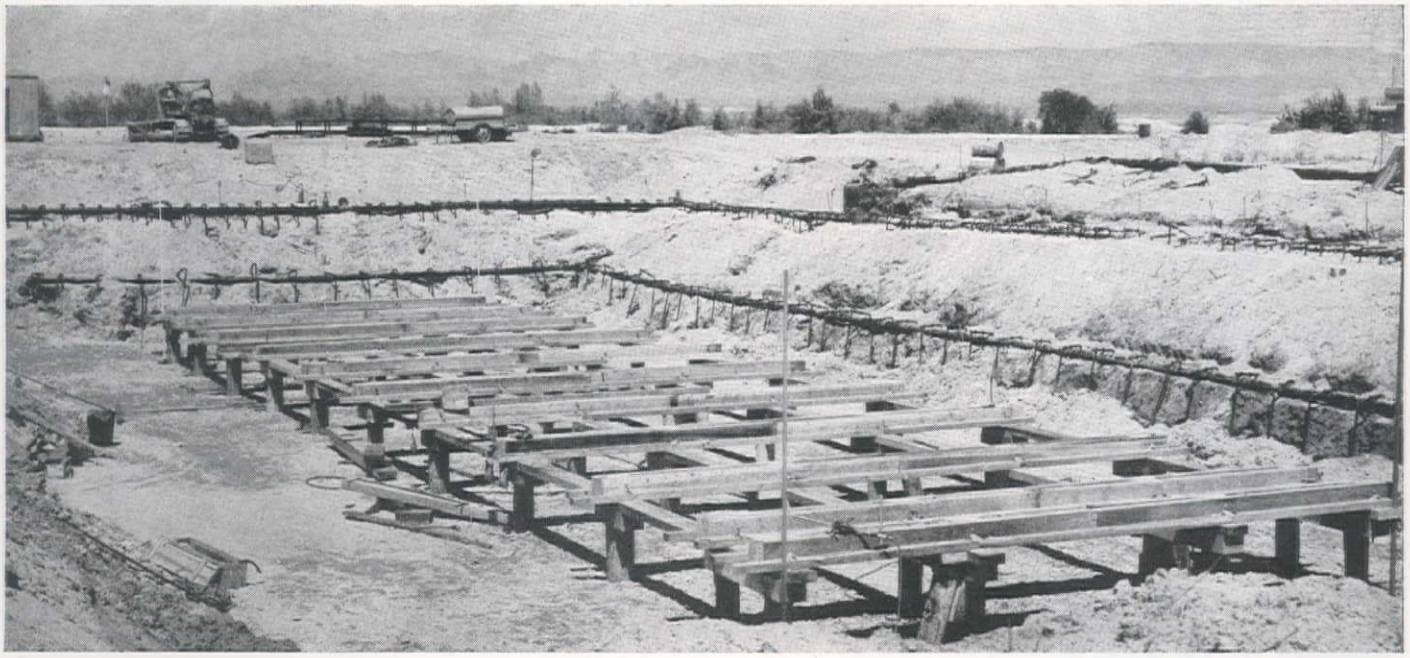
PUSH AND PULL JACKS—Supplied with rated capacities up to 15 tons, push and pull jacks are also widely used in many phases of construction work. With their powerful pushing and pulling action, these jacks are composed basically of three elements: (1) a long threaded screw, (2) a ratchet mechanism mounted in middle and (3) two steel nut-like devices, which move in and out along the screw and serve as hooks for pulling operations and heads for pushing operations.

These jacks are used for pulling together or pushing apart steel plates, beams, sheets and components of heavy equipment. When used with chains, hooks, or pipe sleeves, the range of application for these jacks is substantially extended. Other applications are for concrete form and steel erection jobs requiring false-work, framing or aligning, tying piling and bents together on cofferdams, bridge and dock construction, straightening shovel dippers, truck frames and other damaged structures, erecting bridges, trestles, and related construction projects.

Maintenance and safety tips

Often referred to as the forgotten tool of the construction industry because of the abuse it receives, being habitually left out in the snow and rain, invariably half starved for oil, or constantly overloaded or otherwise misused, the jack, fortunately, is built to withstand ex-

Continued on page 138



Excavated by dredge, this hole was dammed off and unwatered for construction of the keel blocks shown here. Flooded once again, its cofferdam was removed to clear a path for the incoming vessel. This rare operation along the Colorado River is one where . . .

A dredge digs its own drydock

By
C. P. VETTER
Chief,
Office of River Control
Bureau of Reclamation
Boulder City,
Nevada

DIGGING ITS OWN drydock in the bank of the river to provide for repainting after three years of channel work was the self-service operation recently performed by the dredge "The Colorado" operated by the Bureau of Reclamation. The procedure, including unwatering of the unlined excavation by means of wellpoints, proved an economical plan to allow necessary maintenance after it finished dredging the section south of Needles, Calif. This article describes the preparation of the drydock area, and the sequence used in its operation.

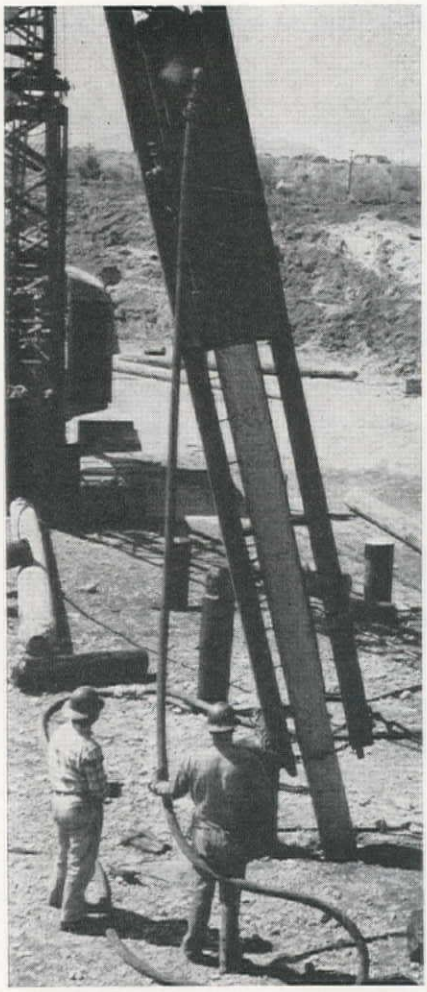
Work of the dredge

"The Colorado" was placed in operation on the Colorado River at Needles, Calif., on Feb. 1, 1949. Its first task was to excavate a new channel in the 11-mi. stretch of river between Needles and Topock, Ariz. Here, the river had deteriorated because of changed conditions introduced by the construction of dams.

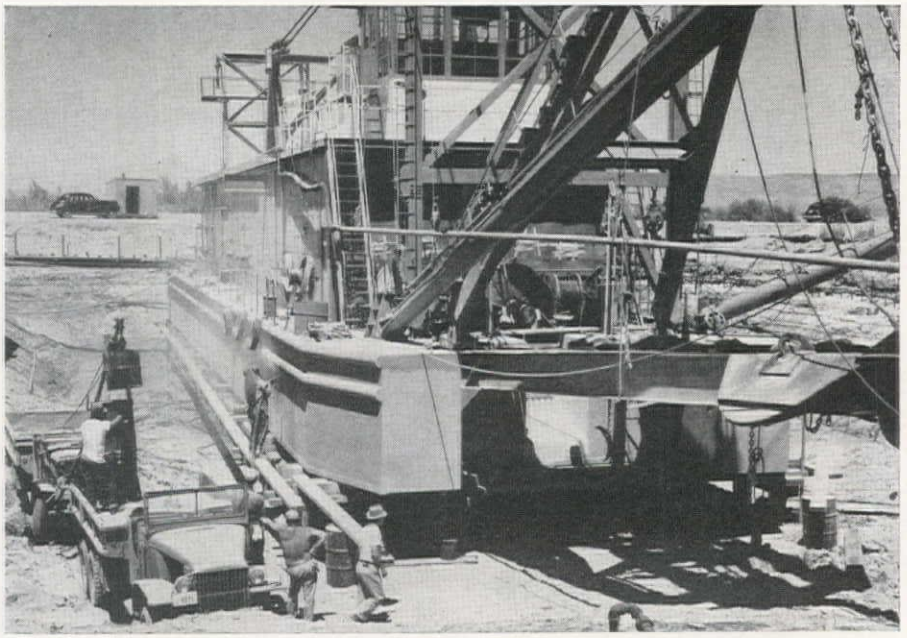
The dredge turned out to be a most useful tool for this work. It had its shortcomings, however, and because of those and a combination of circumstances which rarely occur together, the dredge sank in the Colorado River, November 1949. It was promptly raised, reconditioned, and placed back in operation. It completed that assignment in June 1951. A new channel free of vegetation and obstructions, some 200 ft. wide and 17 ft. deep, had been excavated from Needles to Topock. On June 25 the plug in the new channel, which protected it from inflow of silt from the river, was blasted and the river took over.

For a while the flow in the new channel was very rapid, making operations hazardous, and dredging was discontinued until July 18, when the dredge was placed back in operation to continue the work upstream from Needles. It had originally been intended that, upon completion of the Needles to Topock stretch, the dredge would be dismantled and taken overland to a point near Blythe, Calif. There it would be reassembled and placed in operation to open another

DRAGLINE opened the door of drydock after shutdown of wellpoint pumps had let water level rise. Slender poles marked corners of ways for spotting dredge.



STABILITY of the ways against wind load was assured in drydock construction by driving two rows of batter piles.



SANDBLASTING was the first major work in cleaning the dredge. A second flooding was necessary in order to shift the dredge and expose portions of the hull originally resting on the ways. Headroom of 5 ft. below ways made work easier.

river stretch which had deteriorated during the last few years. The dredge had been designed to allow dismantling and reassembling without too great difficulty. All underwater portions of the dredge hull were to be sandblasted and painted as part of the move.

Because of unforeseen circumstances, the program of dredging on the river was changed and the dredge, instead of being dismantled and moved to the Blythe area, was kept at Needles. It started dredging upstream from Needles toward Davis Dam after completion of the Needles to Topock stretch. This change eliminated the possibility of giving the underwater portions of the dredge hull a thorough inspection and new paint. It was determined in February 1952, after the dredge had been in the water for three years, that the time had come to place it in drydock for inspection and repainting.

No shipyards on the river

One difficulty had to be overcome, however. There is no drydock or floating deck of any kind in existence on the Colorado River. So, to drydock the dredge, it was necessary first to create an adequate drydock. Drydocks as usually constructed are expensive projects involving great quantities of concrete and steel. Obviously a drydock of that type would be out of the question.

Therefore, it was decided to have the dredge excavate its own drydock in the soft silty river-bed material; to close off the excavated chamber by means of an earth dike; and to unwater it by means of wellpoints. The actual rough excavation of the dock chamber was accomplished by the dredge in less than three days. The dredge was then backed out, a closing levee separating the dock chamber from the river channel was pushed in with dozers, and wellpoints were installed around the rim of the enclosed bay.

Pile driving

After the dock chamber had been unwatered by means of the wellpoints, ways were constructed by driving piles in the soft river-bed material and mounting walers on top of the piles to form the ways upon which the dredge would rest. Head room of 5 ft. was provided between the bottom of the dock and the bottom of the dredge to permit sandblasting and painting without undue difficulties. To prevent any side-sway of the ways due to wind and other causes, batter piles were driven for side stiffness. The bottom of the dock chamber, after unwatering, appeared too soft to support trucks and other equipment. It was over-excavated, therefore, and 12 in. of rock spalls and coarse sand placed as a surfacing material. General features of the drydock and the method of using it are shown in the accompanying illustrations.

After the ways had been completed, pumping was stopped and the water quickly rose to the same level as in the river channel outside. A gap was then excavated in the closing dike with a dragline, and the dredge brought into the chamber where stakes had been placed to permit exact centering of the dredge over the ways. After the closing dike had been re-established and the chamber unwatered, the underwater portions of the dredge hull were sandblasted and painted with six coats of Vinyl Resin, lacquer type paint, applied by spray guns. All openings to the engine room were closed to prevent sand and dust from entering the inside of the dredge.

Dredger crew in charge

After the bottom of the dredge had been painted between the walers, there remained the portions of the bottom surface on which the dredge rested. Water was therefore again permitted to rise to float the dredge and permit shifting it sufficiently in the lengthwise direction to expose the surface which had been in contact with the walers. The water was again removed and the remaining portion of the dredge bottom sandblasted and painted.

All work of excavating the dock basin, installing wellpoints, driving piles for ways, sandblasting, and painting was done by the regular crew associated with dredging operations, using Government equipment. The wellpoints themselves were rented from the John W. Stang Corp., who also furnished, as part of its contract, a superintendent to oversee the operation of the wellpoint system.

The construction of the dredge was described in the article "Colorado Silt to Meet Its Master," *Western Construction News*, April 15, 1949, p. 81. The raising and rehabilitating of the dredge after its sinking was described in article "Raising the Colorado River Dredge," *Western Construction*, June 15, 1950, p. 96. The dredging in the Colorado River is carried out by the Office of River Control, with headquarters in Boulder City, Nevada. The Office of River Control is part of Region 3 of the Bureau of Reclamation, also located in Boulder City. Regional Directors of the Bureau of Reclamation are directly responsible to U. S. Commissioner of Reclamation, with headquarters in Washington, D. C.

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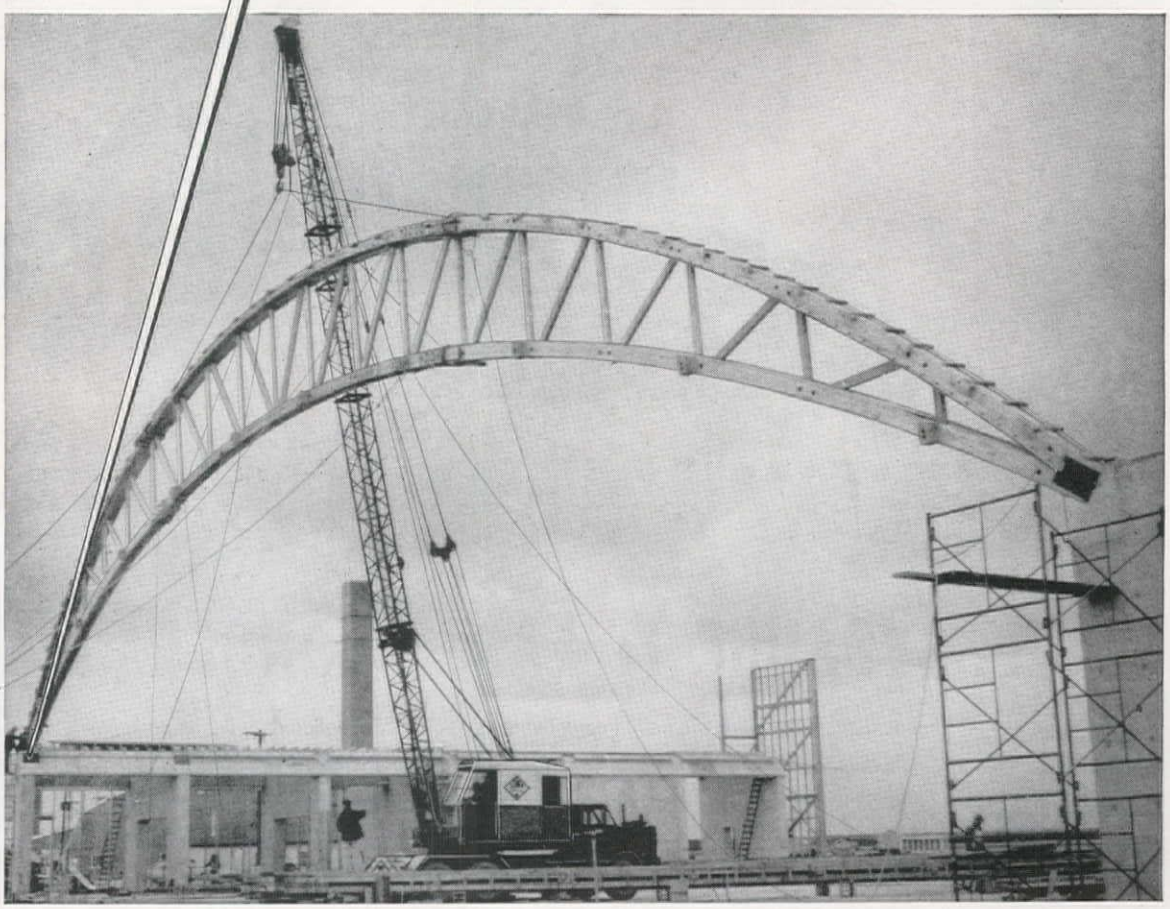

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This Case Model "SI" Tractor helps bus drivers in Spring Valley, N. Y., to operate on schedule. Besides removing snow from bus stops, the Model "SI" is shown loading sand into trucks equipped with sand spreader.

Scooping and loading snow from curbs in Cincinnati, Ohio, is this Case Model "DI" Tractor with snow-size bucket on shoveloader.

In Green Bay, Wis., this Case Model "VAI" tractor with reversible blade plow puts snow into windrows, ready for pick-up by traveling loader.

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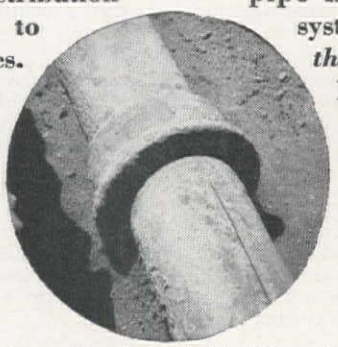

This cast iron water main installed in Richmond, Virginia, 120 years ago, is still in service. Over 35 other cities have century-old cast iron mains in service.

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HOW IT WAS DONE...

Tramway spans Wyoming river, hauls 60 tons of ore per hour

By CHARLES F. DWYER
Staff Engineer
Heron Engineering Co.

WHAT WOULD you do about transportation if you found a rich ore field on one side of a river, but the only suitable plant site on the other side?

That's the problem that faced the Magnet Cove Barium Corp. They knew that extensive bentonite desposits were available in the area east of Greybull, Wyoming, and that large scale surface operations could be developed. Because of lack of utilities, railroad siding and roads, however, the plant had to be erected north of Greybull. Between the deposits and the plant site runs the Big Horn River.

Building a bridge was economically prohibitive because Corps of Engineers restrictions demanded high, clear spans over the river at this point. The use of existing bridges added a 6-mi. haul to the plant site, partially over near-impassable roads. This interesting problem was solved by the erection of an aerial tramway. The tramway offered physical, cost, and timesaving advantages.

The Heron Engineering Co. of Denver was called upon to provide the tramway engineering service, handle material procurement, and furnish construction supervision. A tramway approximately 1,600 ft. long and having a capacity of 60 tons per hr. was needed. Various types of tramways were considered; but the nature of the terrain, the distance to be traversed, the capacity desired and other factors led to the selection of the time proven two-bucket jigback, or reversible, tramway. In this type of system large wire ropes form a suspended track over which two carriers travel in a reciprocating manner from loading terminal to discharge point. A single continuous haul, or traction, rope operating through the reversible drive machinery moves the carriers. With the elimination of intermediate supports this system permits the handling of material at an extremely high speed and capacity.

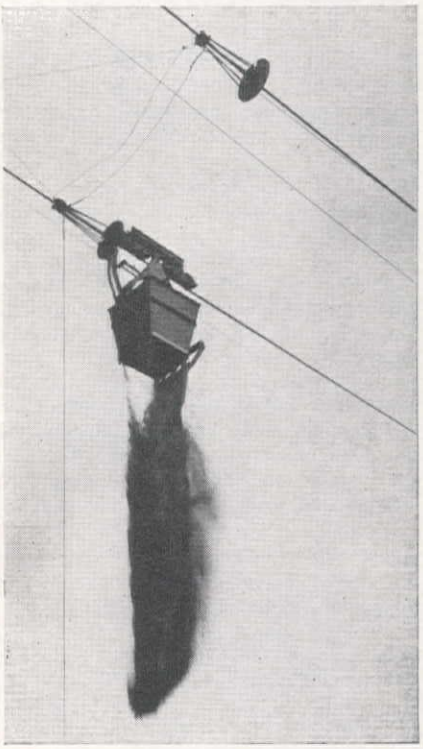
Leschen "Hercules" flattened strand wire rope 2 in. in diameter was selected as track cable. The flattened strand was used for this purpose because it provides a large proportion of metal wire to the total cross-sectional area, the strands are fitted together in a manner which offers maximum resistance to crushing, and a relatively smooth outside wearing surface is available. A ⅝-in. mild plow steel wire rope was chosen for the traction cable. Since this rope was to pass over sheaves and through the drive machinery, flexibility was necessary in addition to strength and resistance to wear.

The loading terminal for the tramway included the design of two 25-ton hoppers into which the ore trucks dumped. Structural steel hopper bottoms mounted the segmental gates. All gates were to be controlled from the operating platform with air valves and large air cylinders.

At the discharge point movable trippers were designed to mount on the track cables, providing automatic dumping for the carriers. The movable feature would permit dumping at any point along the line and make possible a stockpile capacity of over 100,000 tons. This large stockpile at the plant site permits continual plant operation even during winter periods.

With the completion of all concrete work the tramway erection was begun under the supervision of the writer. Erection of the steel tower was accomplished in good time with the aid of a large crane and experienced steel erection crews. The steel loading hoppers were positioned in the terminal and field welded to insure sturdy, dust-tight bins.

DEEP CUT for passage of buckets leads to loading terminal, set below ground surface for gravity charging of hoppers.



MOVABLE TRIPPER frames actuate bottom-dump buckets at desired point over long 100,000-ton bentonite stockpile.

In the drive terminal the mounting of machinery was relatively simple. All machinery was held in place by anchor bolts cast in the concrete supports. Terminal sheaves directing the traction cable into the drive sheave were mounted on structural steel members fitted between the walls of the terminal structure.

Placing of the large track cables was the most spectacular part of the erection and drew a great deal of local interest. The 2-in. track cables arrived in single lengths with sockets on either end. Over 1,700 ft. long, the cable on each reel weighed well over 6 tons. Two large tractors were employed to string the cable along the line, and to accomplish the precarious river crossing. A lead line of ½-in. Leschen wire rope was first pulled across the river by lighter lines and this in turn used to pull the large track rope across. The crane used in the tower erection was again employed to lift the track cable into position.

The ⅝-in. traction rope was pulled into place in much the same manner as described above for the 2-in. cables. With tension in the track cables provided through the hoist and anchorage reeving, the carriers were placed on the line and attached to the traction cables by wire rope clips. After proper alignment of drive machinery and sheaves, the tramway was ready for operation.

A few rigging tricks help handle heavy loads in close quarters

By H. B. McDERMID
Retired Construction Engineer

IT OFTEN HAPPENS in construction work that heavy loads must be hoisted to position close up against a solid ceiling, where there isn't head room to use a hitch of the usual sort. If the load is heavy enough to require multiple parts of hand-operated rigging, then getting a set of chain falls, or even a heavy set of rope blocks, located high enough to do the job is a man-killer. Usually the location is such that only one man can get at the job; and to succeed he just has to be stout, having the ability to punish himself unmercifully to get the hitch placed so that it will do any good. Even such a man will often wonder whether the figures cast on the side of a set of chain falls refer to its lifting capacity or to its dead weight!

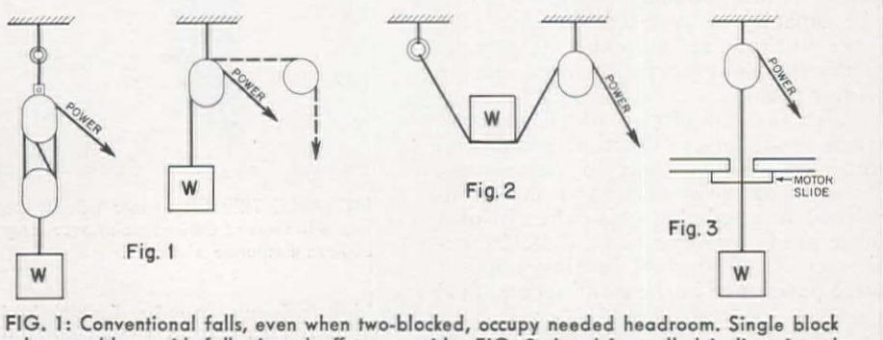


FIG. 1: Conventional falls, even when two-blocked, occupy needed headroom. Single block solves problem, with falls rigged off to one side. FIG. 2: Load is cradled in line rigged between points on either side, can be placed solidly against ceiling. FIG 3: Sometimes hoist can best be rigged through ceiling to floor above.

An easy way to solve lifting problems of this type came to notice on a powerhouse job. Some auxiliary steel had to be placed close up to a ceiling. It was just too heavy to place without rigging, but even with every possible inch of head room saved in placing the tackle, the steel couldn't be hoisted to within a foot of its designated place. The crew was nearly helpless. They tried hoisting the load as far as it would go with the blocks and then, from ladders, tried to muscle it up that last foot. It was no go—they managed to get a few pieces placed at the price of exhaustion, but the day's work was a sorry spectacle when judged by the pitiless standards of the usual steel worker.

Next day a new foreman had the job. He hunted up a single rope block, as small as he could get; its light weight made it easy to hang close up to the ceiling. Then he rove a single line through it, attached his load to one end and his double rope falls to the other. Anchoring the free end of his falls far enough away to get plenty of "drift," he hoisted away. The load—an I-beam—went clear up to its location without hesitation, and one after another followed smoothly until the job was done in a few hours. And nobody worked more than was normal.

The writer filed that trick away in his memory and has often used it since. It's a life saver in many instances. In case of a bulky load, it is both wise and necessary to run the single line through a second single block, thus leading the line over to one side out of the path of the load before hitching up to the rope falls or other power source. The accompanying sketch (Figure 1) shows the set-up and how it saves head room when used in place of double falls directly above the load.

Sometimes a job comes up which requires that a steel member or heavy length of pipe be placed solid against the ceiling. With this problem a different set-up is indicated. If the rigger can secure two hitches against the ceiling, one on each side of the final location (and as close to it as possible), the job can easily be handled. He simply fastens one end of his line to one hitch, passes his line under the load, and reeves it through a single block secured to the other hitch. Power applied to the free end of the line will pull the load up tight against the ceiling, depending on the relative depths of the load and the single sheave of the block.

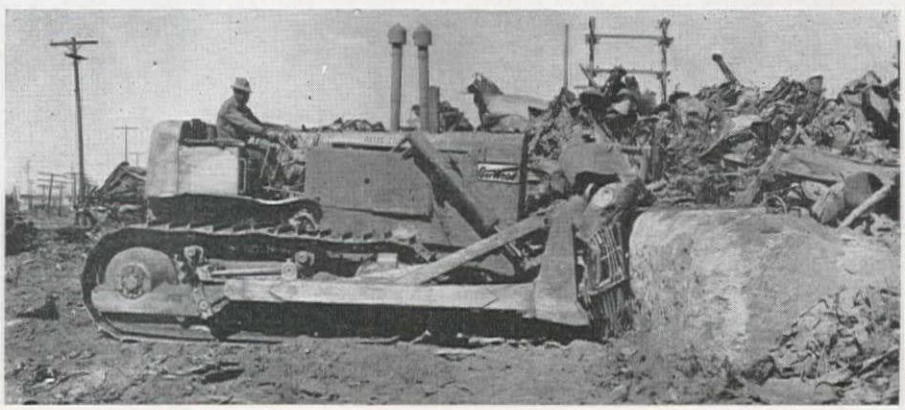
In the case of a pipe or structural steel member, it will be handy to have one such hitch at each end of the load to keep it in control. Also, as the load cradled in the two rigs will roll over as it goes up, it will be necessary to stop hoisting near the top and straighten the load so that it will arrive in its place right side up, or "workways" as the rigger calls it. But the load can be pulled tight against the ceiling by this method, which is a handy trick to know when one has need for it (Figure 2).

A third method comes to mind. A really heavy piece has to go high against the ceiling, and there is no feasible place to get a hitch below the ceiling. Then, if the floor above is unoccupied, it is a good stunt to drill a hole through the ceiling and place the rigging in the space above, passing a steel cable down to the load. If the set-up is correctly made, so as to obtain plenty of hoisting room or "drift," then a heavy slow-speed motor, for instance, can be pulled up solidly against its rails or slides.

With this sort of set-up, a disabled motor can readily be replaced by a spare, with a minimum of down time. It is necessary that the motor be closer to its seat than the blocks of the rigging above are to each other. Thus there is no doubt that when the hoisting is commenced, it can go on until the motor is "landed."

Bulldozer produces "crusher run automobiles"

JUNKED AUTOMOBILES are crushed in one operation at the Compressed Steel Co. yard in Denver. Use of an Allis-Chalmers tractor fitted with a Gar Wood dozer blade makes it unnecessary to separate auto bodies from their frames. With a concrete bunker as a backstop, the earthmover crushes cars in one pass and then shoves them to a crane for loading into a scrap baler.



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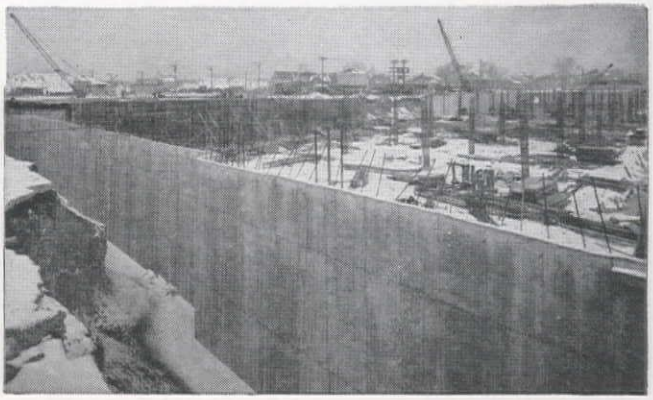
Mass Production Made Easy with Symons System

Robert E. Judge, Concrete Contractor, Bellwood, Illinois

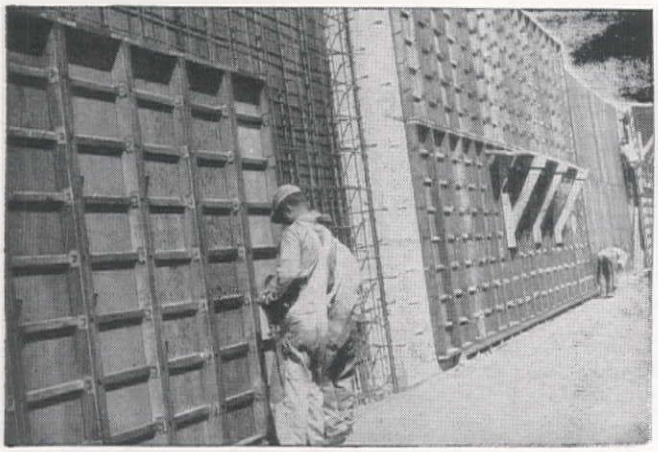
400 concrete foundations were expertly framed in record time with Symons Forms. "Weather and material permitting, these 25′ x 32′ foundations were set up in four hours by three men," stated the contractor. This rapid, economical means of form erection can be accomplished because panels are standarized and the erection hardware, which consists of three basic pieces, is easily secured.



Reinforced Forms for High Walls, Fast Pours

James Stewart, General Contractor, Chicago, Illinois

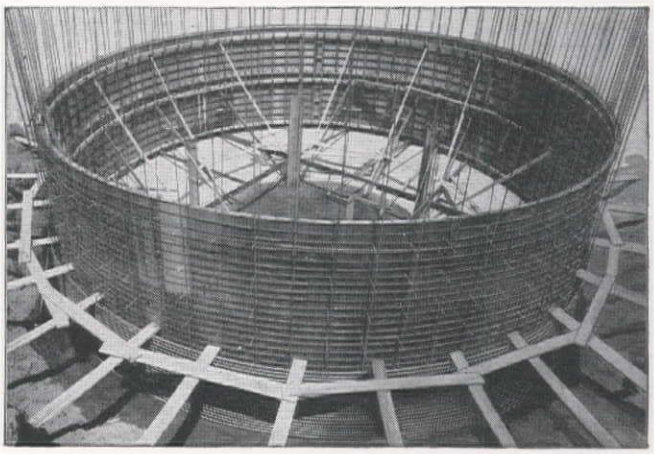
Pouring of these high walls with pressures from 650 to 1500 pounds per square foot required Symons ¾" Plywood Forms with steel ribs every 12". These heavy duty forms allowed the use of additional ties where the pressure was the greatest. Setting up and stripping was executed at the lowest possible cost due to the Symons System of securing forms and ties in one operation.



Setting Up Forms on a 16′ Battered Wall

James Leck, General Contractor, Minneapolis, Minnesota

Ties were placed in position when outside forms were erected. After erecting steel, inside forms were set in place and secured to the ties. Battered walls are handled similar to vertical walls, the only difference being the variance in the length of ties. Symons provides any special length ties promptly at little or no extra charge. Scaffolding was secured with standard hardware.



Setting Up Forms for Sewage Disposal Tank

G. L. Tarlton, General Contractor, St. Louis, Missouri

Steel rib panels with V shaped fillers at each joint were employed. The connecting bolts used in joining two panels and for anchoring ties pass through these fillers. Reinforcing is placed prior to locking of outside forms to panel ties. Symons Forming System is a simple method of forming that is adaptable to straight walls, battered walls, curved walls and slabs.

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Foam rubber aids safe handling of explosives

A SAFE METHOD for the handling of explosives on construction projects has been developed by Harvey Roach of the Lane County, Oregon, Electric Co-op.

Roach was seeking "something compact, sturdy, and resistant to shock" to hold explosives. He found his answer in an army surplus store by applying a little imagination to an army ammunition box. These heavy metal containers, costing only $1.25 most places, looked to Roach like the ideal base for his idea. He lined the box with 1 in. of foam rubber to make the box shock absorbent.

Of course, the caps could not go in with the explosives, so Roach branched out further with this foam rubber insulation. He lined a baking powder can which would hold 5-20 caps and placed this in a foam rubber-lined 2-lb. coffee can. This combination could then be placed in a lined ammunition box.

Additional care with explosives is, of course, necessary. Only experienced powder handlers should deal with the transportation of powder. The method of packaging, however, provides excellent protection against accidents.

Canal excavation makes good use of elevating graders

A "BALANCING" ACT is being performed by Madonna Construction Co. on a lateral job to carry water west from the Friant-Kern Canal, near Porterville, to the Tule Lake area in California.

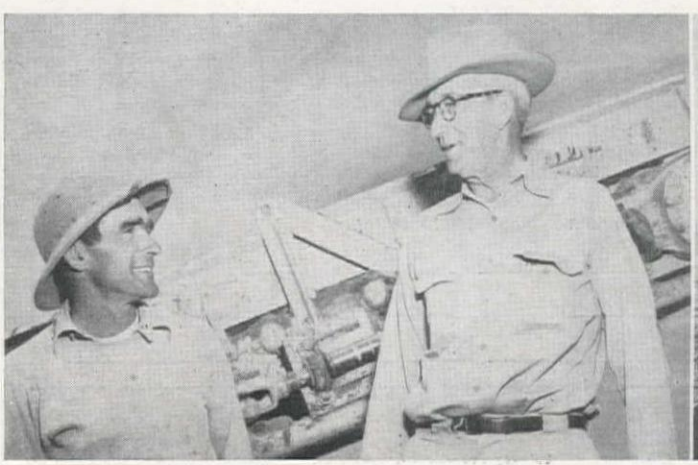
About 125,000 cu. yd. of sandy loam excavation are required on the 27½-mi. project, which calls for replacing obsolete and clogged irrigation ditches, some of which are 50 years old.

The contractor has two Caterpillar Diesel No. 12 motor graders with DoMor attachments "starring" on the project by building the entire ditch right down to the final grade and averaging ¾ mi. of canal per day under normal conditions.

According to A. H. Rahn, superintendent, the important thing about the lateral job is balancing the dirt ahead of the DoMor-equipped grader by the use of a No. 12 motor grader. Other equipment on the job is used to level, excavate for check sites, compact the levees, etc.

Since the new lateral cuts across several of the old irrigation ditches the DoMors have faced and cut through stumps up to 6-in. diameter. Hardpan struck at various levels from 2 ft. to 6 ft. deep also has been taken in stride by the DoMors.

DIGGING irrigation laterals with a motor grader must be pleasant work, judging by the expressions of John F. Silveira, grader operator, and A. H. Rahn, superintendent for Madonna Construction Co.



PRECISE PATH for operation of this grader has been prepared by a second machine working ahead. Procedure speeds actual ditch digging, as grader operator doesn't have to reset blade at high and low spots.

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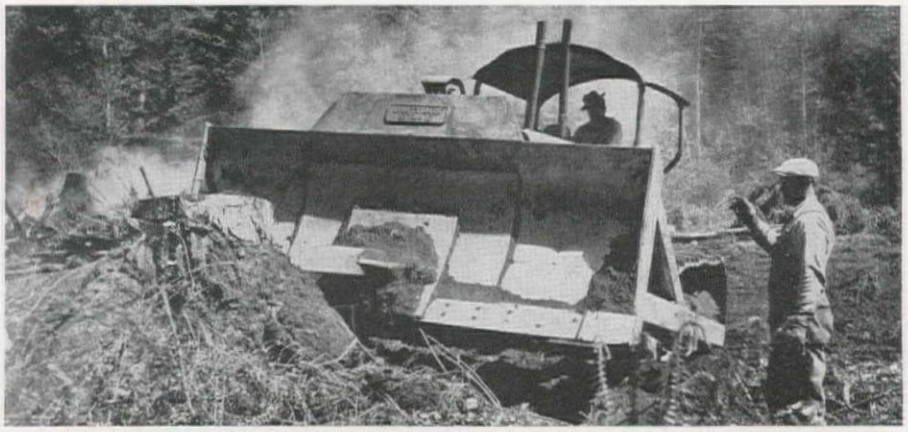
There's a point to this bulldozer!

THE UBIQUITOUS bulldozer has added a new trick to its repertoire of land clearing techniques. From the V-shaped saw blade mounted on a bulldozer to fell 24-in. trees at Boysen reservoir in Wyoming (*Western Construction*—July 1951, p. 80), contractor ingenuity has moved on to the "stump splitter."

Thomas Scalzo Co. of Seattle has devised a 4-ft. spike of armor plate steel for attachment to a bulldozer blade and has used the device to break and uproot stumps up to 8 ft. in diameter that remained in a new highway right-of-way on Washington's Olympic peninsula.



ABOVE: The skinner gets an assist in lining up his quarry as the Scalzo stump splitter takes on a reluctant stump. LEFT: Bob Scalzo appraises the device that substituted for 5,000 lb. of blasting powder on one of his company's jobs.

The armor plate spike was fashioned from a 4 x 6-in. bar, one end sharpened to a wicked point and the other welded to a ½-in. steel plate that was curved to match the contour of a Bucyrus-Erie bulldozer blade. Eight ½-in. bolts placed along the cutting edge of the dozer blade and one more at the top of the plate for stability provide a sturdy connection. Gusset plates 1 in. thick welded on either side of the spike provide lateral stability and enhance the wedge action of the stump splitter.

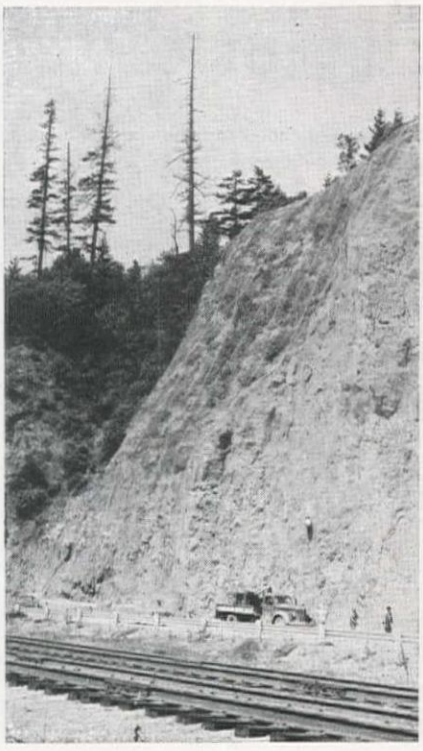
In operation, the splitter and bulldozer blade are mounted on one of Scalzo's International TD-24 tractors, which then splits the stump with a single pass. Using the splitter further as a wedge, the operator rocks his machine from side to side until the two stump halves are uprooted entirely. According to the owner, the biggest stumps require less than 20 min. from their first pinning to their final burning on the rubbish heap.

Roadside cliff in Washington gets a corset

THE SECOND installation of its kind in the state of Washington, a woven wire mat ½ mi. long and as much as 180 ft. high, is now in place alongside U. S. Highway 99 near Carrolls Point, completely covering a roadside cliff and preventing the fall of rocks on the pavement. Unlike its predecessor up on the Olympic peninsula, this matting is in full view of a large percentage of Washington's motorists, attracting a lot of what might be termed "passing interest."

For many years U. S. 99 at this location was a two-lane highway with a wide shoulder and ditch lying between the paved lanes and the toe of the bluff. However, recent four-laning involved the addition of the new pavement in the former broad ditch area. The result was insufficient remaining area to catch and retain material that occasionally dislodges from the steep bluff. The hazard to motorists was considerable, but appropriate construction economy would not permit berming the slope.

A total of 636 rolls of mesh were purchased for the work. This included 43 rolls of 2-in. mesh on hand in the department, and 593 rolls of 4-in. mesh. Each roll was 12 ft. wide and 50 ft. long. Altogether, the resulting 381,600 sq. ft. of mat cost $28,707.13.



Installation contract for the mat was awarded to Erland & Blickle at $28,890, bids for this unusual type of work having ranged as high as $84,000. The mesh is anchored every 25 ft. at the cliff top, several different types of anchorage being specified, depending on ground conditions and weight of supported mesh at a given anchorage. Two rolls were connected by hog rings into one 24-ft. width of mat for handling and placing in the field. Final connection to the anchorages was made with 26,400 ft. of ¾-in. galvanized wire cable, threaded continuously among successive anchorages and points of connection on the mats. Some of this supporting cable also ran vertically, at 25-ft. intervals.

In position, the protective matting hangs with its bottom edge uniformly 20 ft. above the roadway, the top edge height varying up to an elevation 180 ft. above. Its weight actually prevents much material from ever being dislodged from the cliff, but the mat's true function is really to restrain that which does fall from bounding freely onto the roadway. Its action has been successful, as small piles of material against the bluff toe already attest.

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Seattle telephone cables must "talk under water"

TELEPHONIC CONNECTION among all the subscribers of the Pacific Telephone & Telegraph Co. system around Seattle, Washington, has given the company somewhat of an operational record among Bell system companies. With Puget Sound and Lake Washington bordering the city on west and east, the telephone company has laid more underwater cable within its service area than has any other company having a comparable area.

Most recently the company spanned Lake Washington with 9,000 ft. of cable that increases by 150% the number of talking circuits available between Seattle proper and the largely residential community of Bellevue that has expanded on the lake's eastern shore. As with previous projects of this type, the cable was laid from a barge specially equipped to handle the big cable reel and its operating machinery.

Aptly named "Telephone II," the barge was built for Pacific Telephone & Telegraph Co. by Seattle Shipbuilding & Drydocking Corp. It is 125 ft. long, with a beam of 38 ft. and a draft of 7 ft. Tonnage is 413, gross. The barge has no motive power of its own, but is maneuvered during cable-laying operations by a pair of tugs. Those used in the described work are owned by Puget Sound Tug & Barge Co.

Originally the barge's cable reel was steam driven, but a recent rehabilitation of equipment saw installation of a 275-hp. General Motors 6-110 diesel power set-up. The drive system includes a torque converter and a series of gears having a speed reduction of 64 to 1. The side gears at each end of the cable reel itself are 14 ft. in diameter.

The new cable across Lake Washington weighed nearly 20 lb. per lin. ft., or about 90 tons altogether. Paid off the reel under close control of the GM diesel, the cable passed over a big fairlead at the stern of the barge and settled to position on the lake bottom.

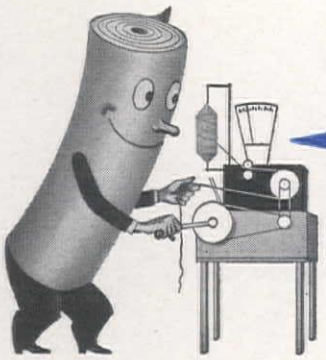
The laying operation could not be continuous, due to the length of cable. It was necessary to "splice in" a loading coil for amplification. The delay for this purpose took 50 hr., during which time 1,832 individual splices were completed. Actual cable laying time was about three days.

W. G. McKinney, district construction superintendent for the telephone company, directed the operation.

Electronic flood control in California

AUTOMATIC rain gauge transmitters are now being installed in the northern Sacramento Valley as an aid in the operation of Shasta reservoir. Contract for construction of the six stations, located on Clear, Cottonwood, Elder, Cow, Battle, and Deer creeks, is held by M. C. Baldwin and A. E. Mangs of Watsonville, Calif. They bid $12,900.

The new devices were developed by the Bureau of Reclamation in its Denver laboratories and were described in *Western Construction* for May 1952, p. 80. They are the latest step in the progress toward "push button flood control" by Western hydraulic engineers. The transmitting gauges will give at least an index of coming runoff several hours ahead of the actual stream flow peaks recorded and transmitted by existing automatic devices in California.



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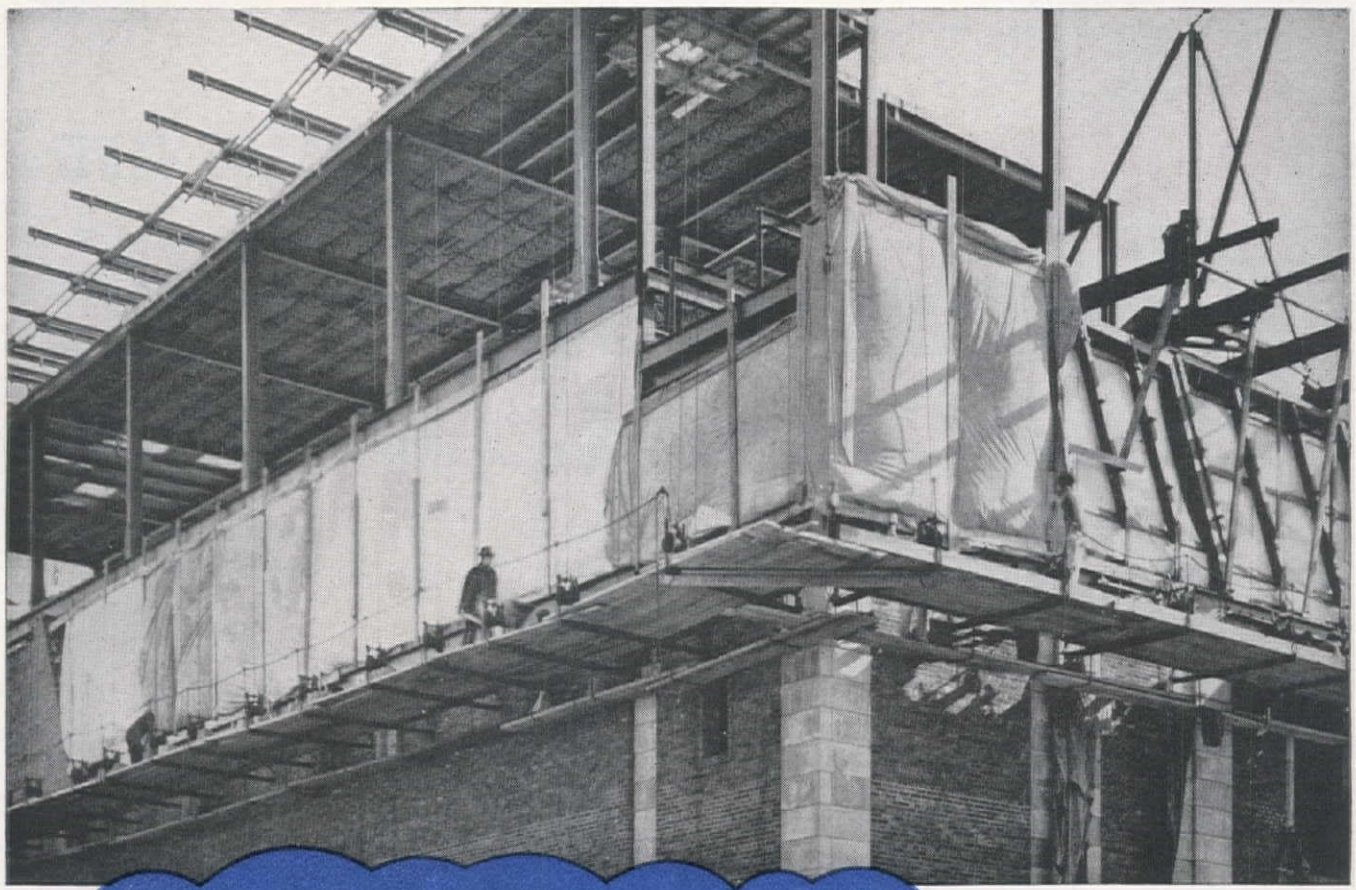

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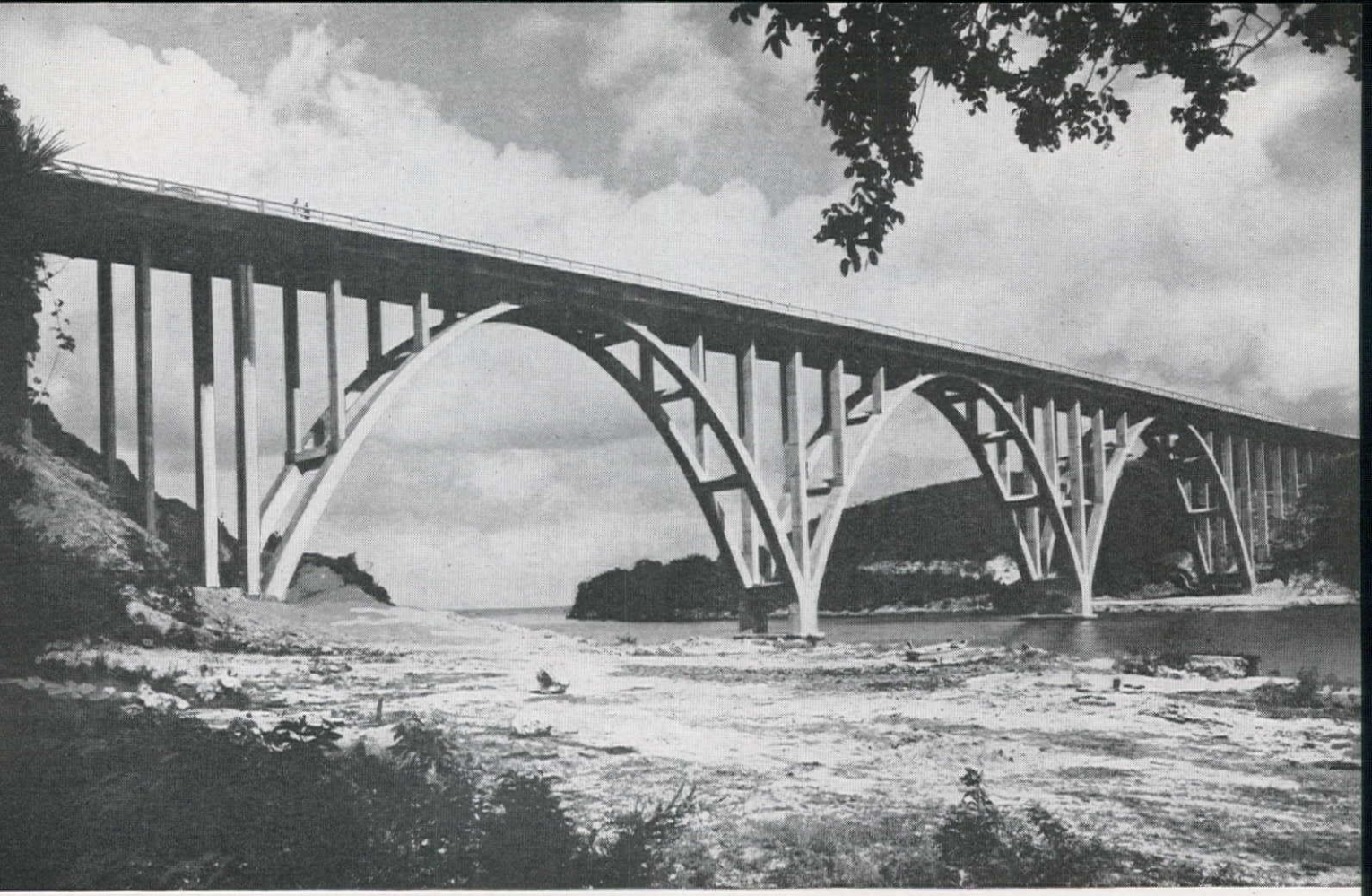

Structure designed under direction of Ing. Jose Menendez of Comision de Fomento Nacional; Manuel Ray, Resident Engineer.

Raymond FORGES AN IMPORTANT LINK IN HAVANA-VARADERO HIGHWAY

This graceful reinforced concrete bridge spanning the Canimar River in Cuba was completed by Raymond ahead of schedule. Hailed as one of the most functionally beautiful structures in the Caribbean, the three-span bridge is 115 feet high and has an overall length of 973 feet—a fitting symbol of the wide variety of Raymond activities.

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NEWS OF WESTERN CONSTRUCTION

OCTOBER 1952

Franklin Thomas, former national ASCE president, is dead

FRANKLIN THOMAS, Dean of Students and professor of Civil Engineering at the California Institute of Technology, and former National President of the American Society of Civil Engineers, died August 27. He had been ill for several weeks.

Franklin Thomas, long admired and beloved by his associates, joined the Caltech faculty 39 years ago. He came to the Institute in 1913 as Associate Professor of Civil Engineering to develop that department. Two years later he received full professorship, and in 1917 and 1920 he acted as chairman of the administrative committee of the faculty during the absence of the President. For twenty years he served as Chairman of the Division of Civil and Mechanical Engineering, Aeronautics and Meteorology, following his appointment in 1924, and since 1944 was Dean of Students at the Institute.

Professor Thomas was honored as a national civil engineering figure when the American Society of Civil Engineers elected him President in 1949. He joined the Society in 1912 as a junior member, and became successively associate and full member. He served the Society as Director from District II and Vice President from Zone IV. President of the Los Angeles Section of the group, he also acted as chairman of the Committee on Accredited Schools and a member of the special Committee on Irrigation Hydraulics.

His interests outside academic circles were many and varied. Probably no other single person was as responsible as he for obtaining Colorado River water for Southern California. He was named by Governor Earl Warren in 1947 a member of the Colorado River Board of California, and a year later was appointed Chairman of the Board.

An authority on water supply, irrigation hydraulics and silt deposits, Professor Thomas was a member of the Board of Directors of the Metropolitan Water District of Southern California since its organization in 1928. He was vice-chairman of the Board from 1929-47, and also served as consultant on flood control and sanitation projects for the City of Los Angeles and the counties of Los Angeles and Orange.

A great civic leader for many years, he received the Arthur Noble Medal for distinguished service to the City of Pasadena in 1939. He served that city as

Franklin Thomas

member and vice-chairman of the Board of Directors, and President of the Chamber of Commerce and Community Chest.

Franklin Thomas was born on May 19, 1885 near Red Oak, Iowa, and obtained the major portion of his schooling in that state. The University of Iowa awarded him the Bachelor of Engineering degree in 1908, and the following year he went to McGill University for graduate work. He received his C.E. degree from the University of Iowa in 1913.

Between 1909 and 1913 he was successively, construction foreman for the Mines Power Company, Cobalt, Ontario, Canada; instructor in the Department of Engineering at the University of Michigan, and designer for the Alabama Power Company.

Member and former Vice President of the American Society for Engineering Education, he also held membership in the American Water Works Association, California Sewage Works Association, Sigma Xi, Sigma Tau and Tau Beta Pi.

$45,000,000 hydro project on the Stanislaus River

A POWER CONTRACT recently signed by the Pacific Gas & Electric Co. and the San Joaquin and Oakdale Irrigation Districts will result in a $45,000,000 construction program on the Stanislaus River in California. The final program will include three large dams, one 7½-mi. tunnel and three hydroelectric plants. Engineering work is being carried out by the International Engineering Co., San Francisco.

Power to be developed will be sold by the Districts to the Pacific Gas & Electric Co. and revenue bond financing will be used, secured by the power income. The two Districts will own and operate the projects jointly with the Pacific Gas & Electric Co., who will receive benefits from the storage provided and the regulation of the Stanislaus River.

Briefly, the construction program will include the Donnells Dam, 7½-mi. tunnel and power plant. This will be a concrete arch structure and the plant will have a capacity of 54,000 kw. The Beardsley Dam will be a rock-fill type with clay core and will provide a reservoir of 97,500-ac. ft. capacity. A 10,000-kw. power plant will be located at this dam. The Tulloch Dam will be of concrete gravity type, 190 ft. high, storing 68,000 ac. ft. and have a 17,000-kw. power plant.

A more extensive review of this program will appear in the next issue of *Western Construction.*

Mountain barriers versus highways in Colorado

THE QUESTION in Colorado these days is whether to go over or to go through the mountain barriers that separate the state's East Slope and West Slope areas. And the question continued to be hotly discussed by proponents of both methods, just as it has been for many years. Two proposals under discussion recently are (1) use of the Moffat railroad tunnel for vehicular traffic, and (2) a toll tunnel to replace the Loveland Pass highway.

A 10-man engineering committee presented a report on the Moffat Tunnel proposal which strongly concluded that there is no possibility of a joint operation by motor vehicles and rail traffic. The report, by the Moffat Tunnel Committee of Professional Engineers of Colorado, pointed out that a new two-lane tunnel built parallel to the present bore would cost an estimated $41,000,000 and that annual average daily traffic over Berthoud Pass would hardly justify this expenditure.

The survey, made at the request of the Colorado Department of Highways, considered various methods for joint operation of the tunnel. These were: possibility of constructing a removable wooden floor on each side and between rails over which vehicles would travel under their own power; enlargement of the present tunnel to provide one lane for

vehicles; a new tunnel providing for two-lane traffic; ferrying of motor vehicles through the tunnel on flat cars. Each idea was discarded by the engineers for reasons of economic feasibility, interference with railroad operations, ventilation problems, excessive tolls that would have to be charged, fire risk and inadequate traffic density.

Meanwhile, proponents of the Loveland Pass tunnel objected strongly to a statement by Mark Watrous, Colorado highway engineer, that such a tunnel would not be economically sound. Disagreement on this proposed all-weather tunnel centered on the plan for tolls, differing estimates on cost ($7,200,000 estimated by Watrous, $2,700,000 estimated by West Slope spokesman), maintenance costs on tunnel approach roads, and snowslide possibilities.

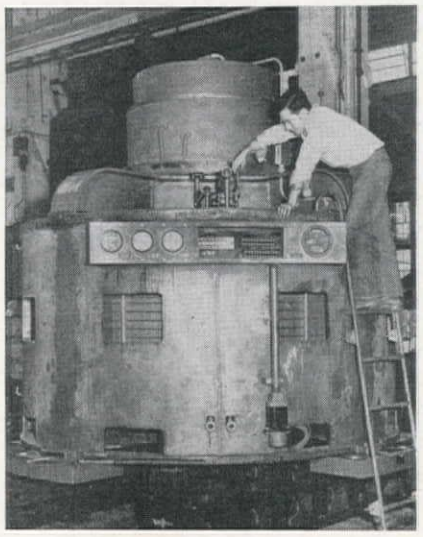
Wyoming AGC sponsors eleven scholarships

THE WYOMING CHAPTER of the Associated General Contractors has set up eleven $250 scholarships at the University of Wyoming. Eleven students will each receive $100 from the chapter when they register this fall for the fall quarter, $75 when they register for the winter quarter, and $75 at the beginning of the spring quarter.

Wyoming high school graduates named to be first to receive the scholarships are Lawrence Bishop, Charles Blackman, James Felt, James Fenton, John Fossey, Tel Hillstead, Charles Lawson, Jerry Maki, Ted Nast, John Noble and Stanley Partridge.

HERE'S THE FIRST WATERWHEEL BUILT IN THE WEST

First water wheel generator built in the West (and for the West) has been shipped from the Sunnyvale, Calif., plant of Westinghouse Electric Corp. The machine is first of twelve 1200-kw. vertical induction generators ordered from Westinghouse by Portland General Electric Co. for its historic Oregon City, Ore., hydroelectric generating station on the Willamette River. In operation since 1893, the plant is now being rebuilt.



This contractor is not bi-partisan

SIGNS OF THE TIMES crept into Pasadena, Calif., street repair recently when Fancher Corp., a street-car rail pulling firm, decided to do a little politicking along with its pavement breaking.

The firm is de-tracking Colorado Street, Pasadena's main thoroughfare, but its caution-to-motorists signs were not exactly bi-partisan.

The first round began when the contractor installed "I Like Ike" signs along the route. Pasadena police showed a rare subtlety by covering the "Ike" part of the signs with "No Parking" notices.

This move forced the contractor into a creative mood. His new signs appeared with the statement: "Neighbor, please be careful the next mile so that you may live to vote for who you like." The only difficulty was that the "like" in the sign had a small, light-colored "l" with a booming, colorful "IKE."

The Democrats in Pasadena filed protests with the City Manager, while Republicans silently applauded Fancher Corp.'s "street campaigning" ingenuity.

The signs had to come down, however, when the "no advertising in a public thoroughfare" law was called into effect by city officials.

$16,000,000 for sewage disposal at San Diego

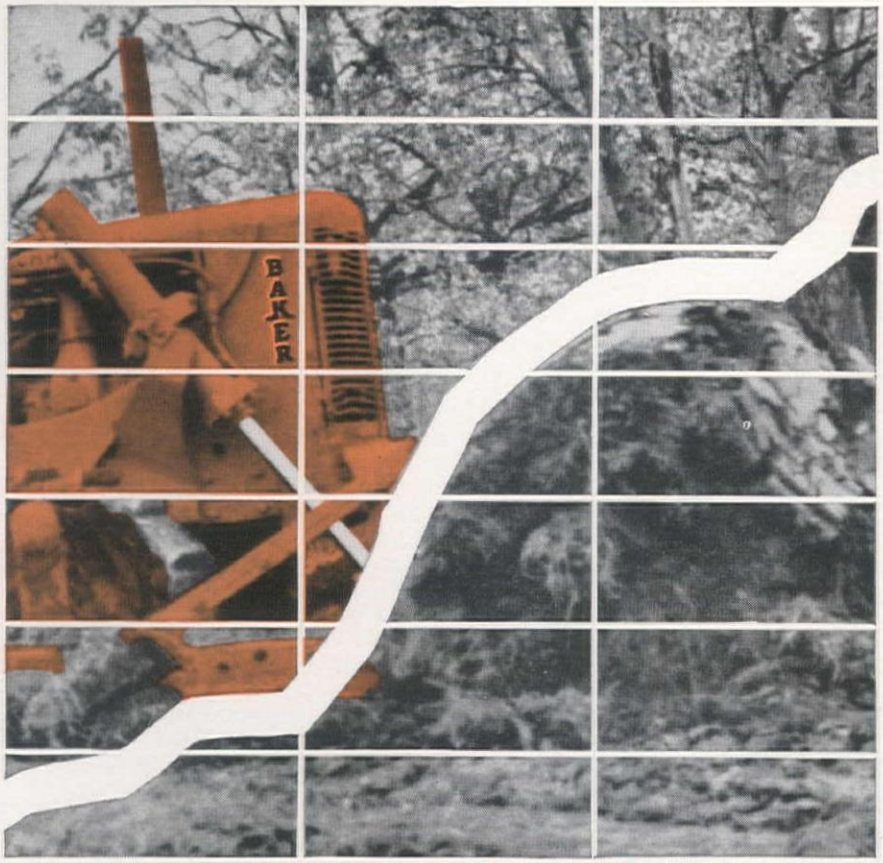
CONSTRUCTION of a sewage treatment and disposal plant at an estimated cost of $16,000,000 for San Diego has been recommended by a board of engineers after a year's study. The board, headed by A. M. Rawn, chief engineer and general manager of the Los Angeles County Sanitation Districts, was retained by the San Diego County Board of Commissioners to outline a master sewerage plan. Other members of the board were David Caldwell, San Francisco consultant, and Charles Gilman Hyde, retired University of California professor of sanitary engineering.

The board proposes that all sewage from the San Diego metropolitan area be conveyed to the treatment plant to be built on the Fort Rosecrans Military Reservation well outside of the residential area. After treatment, the sewage would be disposed of into the Pacific Ocean through a 7,500-ft. outfall.

Survey for second toll bridge over Lake Washington

WITH THE AWARD of a contract to an eastern firm, Lake Washington's second toll bridge seemed closer to reality.

A. C. Allyn & Associates, under terms of the contract, will conduct a traffic and engineering survey for the proposed structure, to determine whether it could pay for itself. The Allyn firm's low bid calls for state payment of $4.48 for every $1,000 worth of bonds issued to finance the structure.



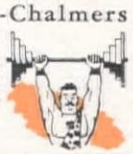
Designed with the *Profit Curve* in mind...!

Baker Blades have the *maximum* "ROLL-ACTION"—from cutting edge to mold-board top, they're scientifically contoured to roll the load *with minimum resistance.* Thus you get more push from your investment in horse-power—bigger pay-loads from Baker's advanced DESIGN-FOR-PROFIT curve.

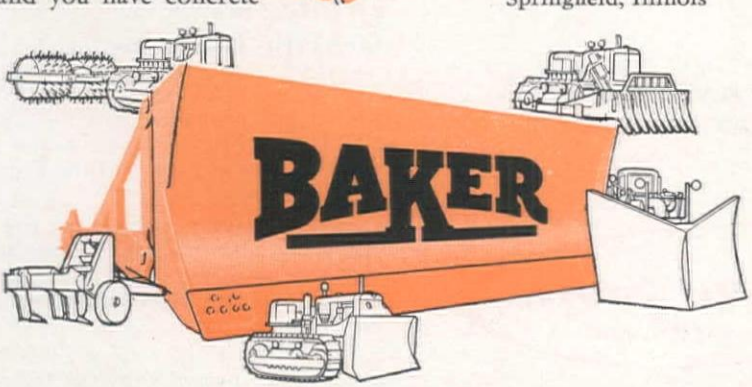
Add Baker's job-proved positive down-pressure to "ROLL-ACTION"—plus Baker *fingertip control* and *quick direct-lift*—and you have concrete reasons why more buyers are saying, "I want an A-C with a *Baker* Blade."

Baker Bulldozers, Gradebuilders and Root Rippers—available in engine-mounted hydraulic, frame-mounted hydraulic (the new no-pushbeam 9-X), and cable-controlled units—featuring easy interchangeability—are designed exclusively for the Allis-Chalmers crawler line.

Ask your Baker, A-C Dealer to come out now—get the *complete* facts.



THE BAKER MANUFACTURING COMPANY
Springfield, Illinois



Baker—The *most versatile* line of tractor attachments

They're sold together

A-C ALLIS-CHALMERS BAKER

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Albuquerque, New Mexico

Smith Machinery Company, Inc.
Roswell, New Mexico

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Dielschneider Equipment Oregon, Ltd.
The Dalles, Oregon

Farm & Industrial Equipment Co.
Eugene, Oregon

West-Hitchcock Corporation
Klamath Falls, Oregon

Oregon Tractor Company
LeGrande, Oregon

Tractor Sales & Service, Inc.
Medford, Oregon

Wood Tractor Company
Portland, Oregon

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Cate Equipment Company, Inc.
Salt Lake City, Utah

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A. H. Cox & Company
Seattle, Washington
Wenatchee, Washington
Tacoma, Washington

Northern Harris
Walla Walla, Washington

Yukon Equipment, Inc.
Seattle, Washington
Fairbanks, Alaska
Anchorage, Alaska

American Machine Co.
Spokane, Washington

•

Studer Tractor & Equipment Co.
Casper, Wyoming

New Mexico highway dept. turnover has big drop

TURNOVER OF EMPLOYEES in the New Mexico State Highway Department has dropped in a two-year period from 40% to 14%, according to State Highway Engineer C. O. Erwin. Neither figure includes seasonal employees. Credited for the big drop in loss of employees was a 1949 constitutional amendment designed to remove the state's highway commission from politics and generally better morale inspired by long range plans aimed at giving employees more security and greater opportunities. The organizational changes and amendment followed a study made by Public Service Administration, a private agency.

Breakdown of reasons why employees left the department during the first six months of 1952 is as follows: Into armed forces, 0.28%; return to school, 0.21%; dissatisfied with job, 1.7%; better paying job, 3.49%; personal convenience, 5.3%; unable to perform duties, 1.35%; neglect of duties, 0.85%; insubordination, 0.21%; unsuitable characteristics, 0.5%; retirement, 0.15%; for convenience of the department, 0.36%.

10-year pollution control program in Washington

TECHNICAL STUDIES, which began in 1948, paid off for the City of Seattle, Wash., in the State Pollution Control Commission's approval of a 10-year, $25,000,000 sewerage-construction program.

At the same time the Board of Public Works awarded two contracts for the elimination of pollution in the Alki Point area. The city council has appropriated $650,000 for several sewerage construction projects.

Seattle, for the purposes of the projected plan, is divided into four districts, which will receive expanded sewerage facilities.

In accepting the plan, E. F. Eldridge, commission director, urged immediate attention to industrial waste problems in the Duwamish Valley, where the salmon migration might be affected if these wastes are not controlled.

Drilling starts at Oroville Dam site

ACCESS ROAD construction to the site of the proposed Oroville Dam in California's Feather River is now under way by crews of Lefever-Bing Construction Co.

The firm has a contract for the drilling of two 1,000-ft. tunnels into the bedrock as a means of testing footing strength for the dam, which would be 710 ft. high.

This is the initial step of $92,000 from the $800,000 provided by the legislature in the interests of the $1,000,000,000 California Water Plan.

Working on first section of San Diego second barrel

BIDS HAVE BEEN OPENED and work will start soon on the first stretch of the San Diego aqueduct's second barrel which will deliver about another 80 mgd. of Colorado River water to San Diego County. The first bids cover about 31 mi. of the 95-cu. ft. per sec. capacity concrete pressure pipeline, extending from near Hemet at the equalizing reservoir near the western outlet of the San Jacinto Tunnel of the Metropolitan Water District's Colorado River aqueduct. From there, this first section reaches to near the Riverside-San Diego County border. Eventually, the new line will extend southward 71 mi. to empty into San Vicente reservoir in San Diego County.

Principal items of work for the first section include earthwork, 48- and 60-in. diameter precast concrete pipe, transition sections, valves and other structures. Specifications allow 730 days for completion of the work.

Schedule No. 1, Sta. 138+86 to Sta. 620+00, was bid low at $2,575,000 by R. V. Lloyd Co. Schedule No. 2, Sta. 620+00 to Sta. 1146+60, was bid low at $2,065,000 by Engineering Constructors, Inc. Schedule No. 3, Sta. 1146+60 to Sta. 1901+60, was bid low at $3,193,000 by Johnson Western Constructors. Each of these firms presented only a single bid on one of the schedules. Government estimate for this first section of the second barrel was: Schedule 1, $2,587,000; Schedule 2, $1,791,000; Schedule 3, $2,957,000.

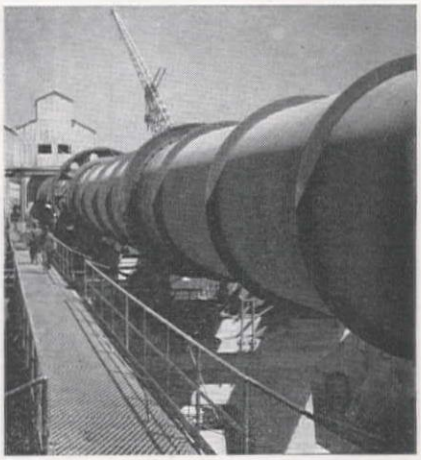
Construction of the second barrel is provided for in an agreement between the Departments of the Interior and Navy. E. A. Moritz, director of the Bureau of Reclamation's Region 3, Boulder City, Nevada, is the designated representative of the Bureau of Reclamation, while the design and construction of the barrel is under the direction of L. N. McClellan, the Bureau's chief engineer at Denver, Colorado.

The Bureau of Reclamation is doing the job with funds to be provided by the Navy. Upon completion, the second barrel will be turned over to the San Diego County Water Authority, which, with the Metropolitan Water District of Southern California, will operate and maintain it. Repayment with interest is to be made to the Government over a 40-year period.

The first barrel of the San Diego aqueduct, designed by the Bureau of Reclamation under an agreement similar to the new agreement, was constructed by the Navy and placed in operation in November, 1947, two years after construction began. It is now being operated by the Authority under a special arrangement with the Navy, pending final completion. Its costs, amounting to approximately $15,000,000, also will be repaid by the Authority. Due to increased costs since construction of the first barrel, the second barrel is expected to equal that of its twin even though construction to full capacities of the tunnels and limited reaches of the pipe was included in the cost of the first.

The present delivery of Colorado River water to San Diego County has

KILN ROLLS AT CALAVERAS



360-ft. long new fourth kiln went into operation at the San Andreas, Calif., plant of Calaveras Cement Co. early in September. The kiln, with its related equipment, increases plant capacity by 50%. Its start marks the completion of a modernization and expansion program costing $2,500,000.

averaged 66,700 acre-feet annually, or an average of 60 million gallons a day, since the first barrel was placed in operation. Completion of the second barrel will provide capacity to more than double the annual quantity.

Prolonged drought and heavy demands by the Navy and other military installations have caused the critical water shortage in San Diego County. This led to construction of the aqueduct which supplements local surface and underground supplies with Colorado River water diverted from Havasu Lake behind Parker Dam, more than 300 mi. to the east.

Colorado still hasn't picked that site

DANGER! PROCEED WITH CAUTION! This could be the slogan for Mark U. Watrous, state highway engineer of Colorado, who is simply trying to find a suitable location on the outskirts for the highway department's new $2,500,000 office building.

At press time, the much harried state engineer announced that a special meeting was to be held with the highway commission to decide on one of three new locations for the proposed structure. A three-member sub-committee will decide upon the eventual site of the long-postponed building which has been the object of citizen protest wherever Watrous decided to locate it.

Watrous, who refused to tell reporters what sites in the outlying districts of Denver were now under committee consideration, did state that the 9½-ac. site already purchased by the department near South University Blvd. would be sold in the near future. Residents of this area, which boasts a country club and polo grounds, successfully squelched department efforts to build the structure in that vicinity.

Contractors borrow dirt, incur government's wrath

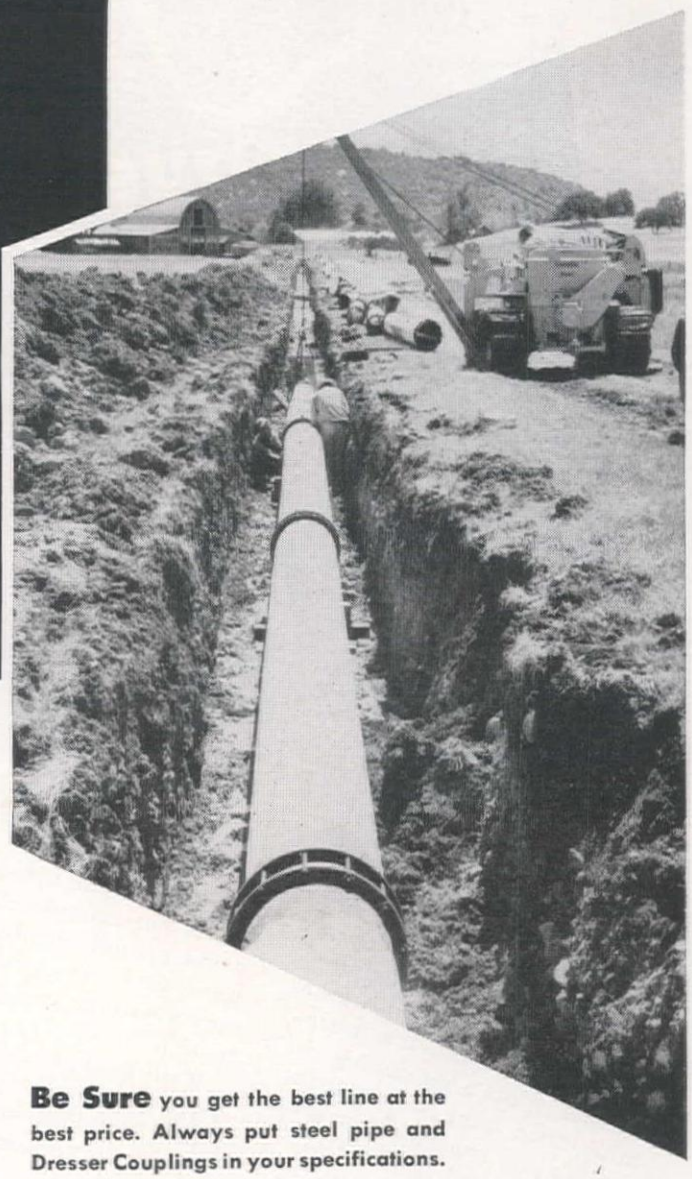
TWO CONTRACTORS in New Mexico are being sued for $148,838 by the U. S. Government, based on the claim that they unlawfully took and used gravel, sand and other materials from a pueblo that was under guardianship of the government. The firms are Construction Materials Co. and Robert E. McKee.

The government suit charges that the unlawful actions took place in April 1951, and in addition Construction Materials Co. removed similar materials after May 1951 "therefore damaging the pueblo irreparably." The government sets the value of the material at about $80,000 and asks that amount from Construction Materials Co. Also charging that some of the materials were sold to Robert E. McKee, general contractor, who "converted same for his own use," the suit demands about $70,000 from the contractor.

In addition to the value of the materials, the government seeks restitution of interest charges and recovery costs.

MEDFORD, OREGON: 20″ Dresser-Coupled Steel line going into Medford reservoirs from Big Butte Springs. This line involved numerous creek, canal and railroad crossings as well as grades up to 55 per cent.

A DRESSER-COUPLED STEEL LINE delivers water cheaper



The cheapest way to deliver water to the place where it turns into revenue is with a Dresser-Coupled steel line—the line that . . .

CUTS INSTALLATION COSTS—Longer lengths of lightweight steel pipe can be Dresser-Coupled by small joining crews with no special skill. Construction proceeds rapidly in any weather, over any terrain with a minimum of heavy equipment.

CUTS LEAKAGE LOSSES—Joints are 100% tight, made to last. Correct sealing all around the joint, assured by the controlled gasket pressure of Dresser Couplings, eliminates leakage.

CUTS MAINTENANCE COSTS—Resilient Dresser gaskets *keep* joints "flexible-tight", absorbs shocks of ground shift, vibration, contraction and expansion. Combination of tough, shatterproof, long-lived steel pipe with Dresser Couplings means savings of thousands of maintenance dollars in the years to come.

Installations in cities all across the country prove Dresser performance and economy. See your Dresser sales engineer or write for literature today.

Be Sure you get the best line at the best price. Always put steel pipe and Dresser Couplings in your specifications.

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"FLEXIBLE-TIGHT"

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Dresser Manufacturing Division, 59 Fisher Ave., Bradford, Pa. (One of the Dresser Industries). Warehouses: 1121 Rothwell St., Houston, Texas; 101 S. Bayshore Highway, South San Francisco, California. Sales Offices: New York, Philadelphia, Chicago, Houston, South San Francisco. In Canada: 629 Adelaide St., W., Toronto, Ont.

Job accidents take their toll

REPORTS of fatal accidents on the West's construction jobs reach the offices of *Western Construction* in a slow—but all too steady—stream. Beginning this month, we will begin reporting these accidents in as much detail as possible. Behind every accident can be found a reason—human, mechanical or act-of-God. The facts as we report them will automatically indicate the fault, and the lesson.

In Wyoming last month, a newcomer to construction, 18-year old Joseph J. Olsen was killed within 20 minutes of completion of a summer-long highway job at Twogotee Pass near Jackson. Working with a chip sealing crew, young Olsen ran to jump onto a gravel spreader that was moving toward him. He missed his footing and fell beneath the wheels, which passed over his body.

Near Shippee in Butte County, Calif., Thomas Arnold, 33 years old, was killed on a bridge project when a concrete mixer cable touched a 44,000-volt power line. Arnold was directing the placing of concrete for a bridge abutment when he touched the mixer just as a cable from the machine contacted the high tension line which led to an irrigation pump. He died instantly.

Near Downieville in Sierra County, Calif., Walter Wyatt, 58, was killed on a road clearing project when he was trapped by a falling tree toppled by a bulldozer. Wyatt was working ahead of the bulldozer when the accident happened.

Near Skykomish, Wash., 44-year Ira M. Gregory, member of a Bonneville Power Administration survey crew, was killed by a rolling rock on September 4. His crew was surveying a power line from Chief Joseph Dam to the Snohomish substation.

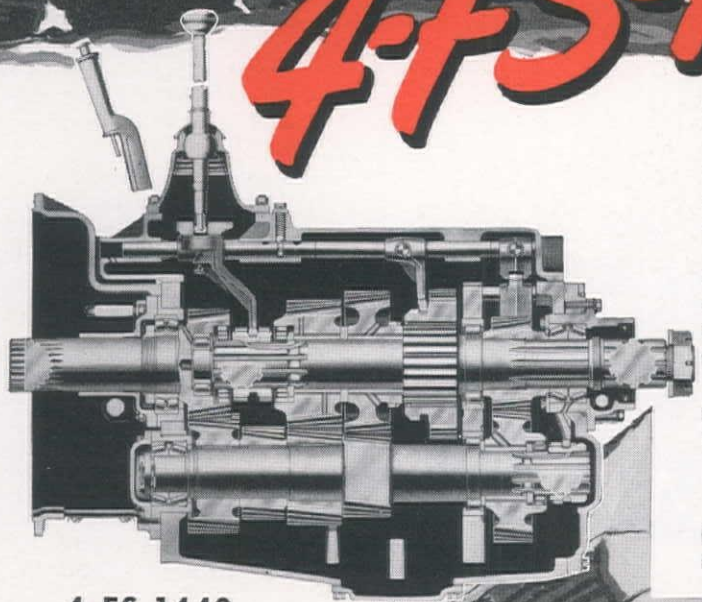
At Grants, New Mexico, a 125-ft. fall from a scaffolding on a water tank killed two men September 3. The men, 28-year old Marion Smith and 18-year old Ernest W. Watts, were dropped to the ground when one cable supporting the working platform broke.

Near Malta, Montana, on September 3, Clark M. Nelson, contractor, was fatally injured on a road construction project. Nelson, a partner in the Riggin-Nelson Construction Co., Harlem, Mont., was operating an earthmover purchased the day before in Great Falls, on the firm's highway construction project on U. S. 2 near Malta. When the machine started to roll over the edge of a 40-ft. embankment, Nelson jumped out ahead of the machine but was unable to get in the clear. The lower half of his body was crushed, and he died five hours later in a hospital.

Not a death, but a serious injury occurred at Black Eagle, Mont., when William Carver, 22, backed his tractor onto a railroad track, the tractor engine stalled, and Carver was squeezed between his tractor and a wall by a slow-moving freight train. The tractor and an attached hoist were crushed; Carver may lose both legs.

Now—Get the Advantages of Torque Converters on Your Biggest Trucks—with

The New Fuller 4-FS-1440



4-FS-1440

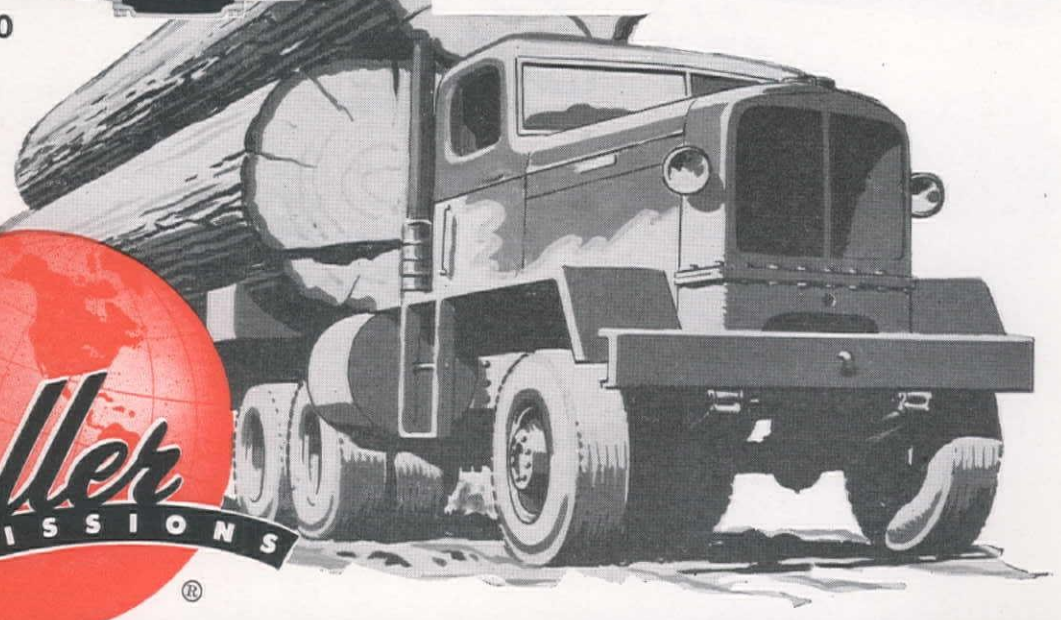
In keeping with its tradition of setting the pace with "The Best for the Biggest," Fuller announces its new 4-FS-1440 Transmission with closely spaced ratios for use with truck-type torque converters. This new unit makes new load-and-road performance possible in heavy duty service.

Built to deliver the power from the biggest automotive diesel engines now available plus ample capacity for high torque multiplication from the most advanced torque converters, the new 4-FS-1440 puts up to 400 hp. to work efficiently and dependably.

For maximum service plus maximum versatility in the toughest of heavy hauling, investigate the new 4-FS-1440. Write for performance and application data.

VITAL STATISTICS

Hp. handled—400. Speeds forward, 4: first, 1.98; second, 1.40; third, 1.00; fourth, .71. Reverse, 1.61. Weight 775 pounds.



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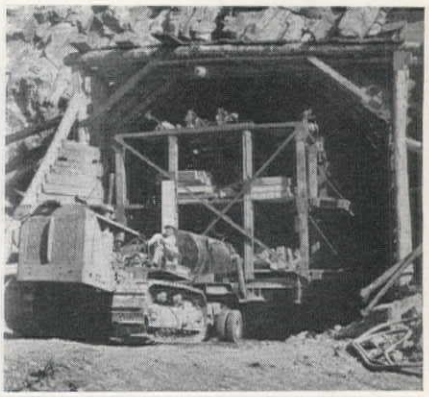
DRIVING DIVERSION TUNNELS AT PALISADES DAM

Near Irwin, Idaho, on the South Fork of the Snake River, the big warm-up has started for full-scale construction of the $76,000,000 Palisades Dam, largest earthfill dam ever undertaken by the Bureau of Reclamation. J. A. Terteling & Sons is now carrying out the work for two 28-ft. diameter tunnels, 1,200 ft. and 1,580 ft. long, power and outlet, respectively. Terteling operations are illustrated here. Left —Koehring electric shovel in outlet tunnel loading Koehring wagon. Right—Triple-deck jumbo drill rig. Drill rig mounts 15 compressed air drills and enables crews to average 25 ft. of progress per day.



Water storage plan for Santa Clara Valley

WATER STORAGE and distribution facilities needed for the Santa Clara Valley and Oxnard Plain would require two dams and the expenditure of about $18,500,000, according to Julian Hinds, chief engineer of the United Water Conservation District. The plan would call for a dam on Sespe Creek (cost, about $9,000,000), a dam on Piru Creek (cost, about $7,000,000) and a surface distribution and spreading system (cost, about $3,000,000).

According to Hinds, original plans were to construct a dam and bring stored water to the Oxnard Plain by allowing it to percolate through spreading grounds into the underground basins. However, studies have shown that underground conditions would prevent sufficient water from reaching the basin underlying the plain. It also was found that the Pleasant Valley area does not get its water from this same basin, but from another unconnected basin supplied by another watershed. Therefore, Hinds believes it will be necessary to pump as much water as possible into the underground basin, and to augment this supply with above-ground pipelines for both areas.

McNary Dam power soon will reach "brownout" area

SOUTHWESTERN WASHINGTON and northwestern Oregon will soon have the benefits of McNary Dam power, according to a contract issued by the Bonneville Power Administration.

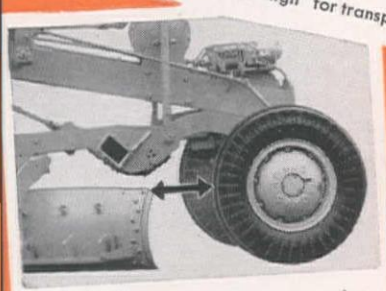
The $2,100,000 contract was awarded to Parker-Schram Co., Portland, for construction of a 78-mi. transmission line, which is scheduled to be in operation by December of 1953. BPA officials deemed this one of the largest ever awarded for Pacific Northwest power line construction. Approximately 160,000 kw. of power will be piped into the Portland and Willamette Valley, Ore., areas and the Longview, and Vancouver, Wash., points.

Work will begin immediately on construction of concrete footings for the 325 towers required. Approximately 200 men will be employed on the project. The line is designed to withstand 60-mph. winds when coated with an inch of ice.

Ditch Cuts to Bank Cuts—or vice versa—in less than a minute—without mechanical adjustments. Saves time on alternate cuts.

Blade Adjustable Under Load—to deliver material where needed on grade balancing work while grader is in motion.

8 Forward Speeds—2 more speeds than most graders—an extra working speed and a higher "high" for transport.



Plenty of Blade Clearance — at tires and all other points. Operator gets all blade positions quickly, easily.

Big, Comfortable Cab—plenty of headroom for a tall man to stand and to see all his work—2-way adjustable seat.

Only ADAMS

Gives you all of these big operating advantages

Yes, in Adams Motor Graders you get all of these important advantages—and many more . . . advantages that help your operator to do high-speed, precision work—at lowest cost.

Adams Motor Graders are powerful and husky, too—built with big reserves of strength and stamina for long-life dependability and low-cost maintenance.

Let your local dealer show you how Adams Motor Graders pay extra dividends the whole year around.

J. D. ADAMS MANUFACTURING CO.
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NEW BOOKS

MOTOR'S TRUCK AND TRACTOR REPAIR MANUAL—(5th ed.)

Here is a book worth noting as a source of much valuable information on gasoline-driven trucks and farm tractors. It should be mentioned that the information is tabulated for farm tractors but is also applicable to engines, transmissions, etc., found on road building machinery. The indexing is arranged for rapid location of details by use of the make and model number of the unit in question. You can easily determine whether your engine, transmission, etc., is included by this means of reference, and since most of the prominent lines are covered in the four general headings —stock engines, service details, trucks, farm tractors—the book offers much to the field. It would be difficult to summarize all the details given in this excellent manual, but it can be said that the tables, diagrams, photographs and text carry a large amount of useful information. Published by "Motor," New York. 960 pages. 8¾ x 11. Priced at $8.00.

HOW TO TRAIN SUPERVISORS—Beckman (4th ed.)

This book was first published in 1940 as a service to those in need of guidance in developing leaders or supervisors in all phases of business. Though the art of dealing with people effectively can never be an exact science, this well-written book offers a course of 32 discussion session suggestions, with advice on how to lead such discussions for the best results. In many aspects the book is up to date with the most recent developments in labor relations legislation, for example. Though the book could be used as a training manual, its information is so presented that it would serve as an excellent personal reading project for anyone who now supervises or will supervise people on his job. Sections on waste of time and how to cope with it, safety and accident prevention, the right man for the right job and many more are very applicable to the construction field and, therefore, of direct concern to the men who supervise and direct construction activities. Published by Harper & Brothers, New York. 335 pages. 6½ x 9½. Priced at $4.00.

THE STANDARD MANUAL OF THE SLIDE RULE—J. E. Thompson (2nd ed.)

There are few time savers in the construction field like the slide rule and few of us who would not like to keep abreast of the most efficient way to take advantage of its abilities. This book gives the history, principle and operation of the slide rule in its pages. Happily, Professor Thompson choses to present his material in a very readable style which can be understood by student or advanced engineer alike. The Mannheim, Poly-

phase, Log Log Duplex and their combinations are covered in the book. Practice exercises (with answers), plus well-chosen examples and illustrations will benefit the learned and the learning. The book is a guide for self-instruction, and, therefore, is not dependent upon classroom-type presentation for its effectiveness. Published by D. Van Nostrand Co., Inc., New York. 216 pages. 6 x 8½. Priced at $2.75.

HIGHWAY CURVES—Ives and Kissam (4th ed.)

The advancements in highway design since the first appearance of this fine book have been tremendous, as pointed out in the preface. This edition aims at the simplification of the great mass of mathematic complexity required in present day location survey. Field methods presented have been chosen because of their speed, adaptability to various situations and accuracy. Naturally, to bring the material into the streamlined form, almost a complete rewrite was necessary with some of the material from Field Engineering, previous text, retained. You could say that this new edition was aimed at meeting the increased need for simplification and time-saving, while at the same time preserving the qualities of precision which have always characterized the planning of highways. Published by John Wiley & Sons, Inc., New York. 389 pages. 4½ x 7¼. Priced at $7.00.

P. G. AND E. OF CALIFORNIA—Coleman

Published to commemorate the 100th birthday of this huge California public utility, this book offers much more than a chronological summary of PG&E organization and development. It tells of the pioneering spirit and the frontier problems that confronted the men who brought light to the state in 1852. Over 500 companies went into the making of this giant utility, and the growth and development of this great chain of transmission lines, hydroelectric plants, etc., is a story that lends itself well to book form. Those who enjoy history — and especially a history of a gigantic venture will find this book interesting reading. Though it is the story of the PG&E, there is much here which is common to all utilities which strive to bring power to the people. Published by McGraw-Hill Book Co., Inc., New York. 385 pages. 6½ x 9¼. Priced at $4.50.

Books reviewed in this section are made available by J. W. Stacey, Inc., retailers of technical books (stores at San Francisco and Denver). You may obtain a copy of any book reviewed this month by sending an order to J. W. Stacey, Inc., c/o Western Construction, 609 Mission St., San Francisco 5, California. C.O.D. orders will be accepted.

USBR calls bids for October openings

INFORMATION from the Bureau of Reclamation indicates September 15 as the date calls were issued for construction of the Gateway Tunnel, Weber Basin Project, Utah. Specifications call for construction of 3.3 mi. of 9.5-ft. diameter concrete-lined horseshoe-shaped Gateway tunnel of 435-cfs. capacity; 64,000 cu. yd. of excavation are required for the project.

Calls were expected September 30 for construction of the Wellton Canal, Gila Project, Ariz. This reach of Wellton canal and Unit 1 of the distribution system includes 20.4 mi. of unreinforced concrete canal and laterals and short reaches of protective dikes. Concrete structures required are siphons, culverts, turnouts, checks, drops, and lateral turnouts.

The distribution system at Porterville, Calif., for the Central Valley Project, was expected to be the subject of bid calls September 30. Alternate schedules for construction of 43 mi. of precast concrete pipe lines for Unit 1, Saucelito irrigation district on the Friant-Kern canal distribution system, will request bids on furnishing and laying the 12- to 60-in. diameter concrete pipe or laying government-furnished pipe, or a combination of the two alternates. Other work includes constructing monolithic concrete moss screen and pumping plant structures and plain concrete encasement; install moss screens, pumping units, valves, slide and flap gates and metalwork. Approximately 239,000 cu. yd. of excavation are required.

Calls were expected September 18 for construction of Camp Creek Tunnel, Central Valley Project, Calif. The work is located about 12 mi. southeast of Camino, and consists of a 2,900-ft. long, 500-cfs. capacity, concrete lined Camp Creek tunnel to serve as a conduit from Camp Creek diversion dam to Sly Park reservoir. Alternate schedules will permit the contractor to bid on 6-ft. or 7-ft. diameter horseshoe tunnel sections.

Seattle-ites turn green; highway men philosophical

PAINTING THE TOWN green, might not sound correct unless you happen to live near Seattle, Wash.'s Aurora Bridge.

When the bridge was given a new coat of paint recently by Runnels Paint Co. brushes could not be used on the finely laced girders. The firm used spray paint and the winds took it from there.

Complaints from boat owners about paint-spattered decks and car owners about paint-spattered cars came rolling in, but L. J. Runnels, the paint company head and D. D. Forgey, district engineer for the State Highway Department, were philosophical about the damage. It is a common occurrence on bridge painting jobs when spray is used, and spray is frequently used.

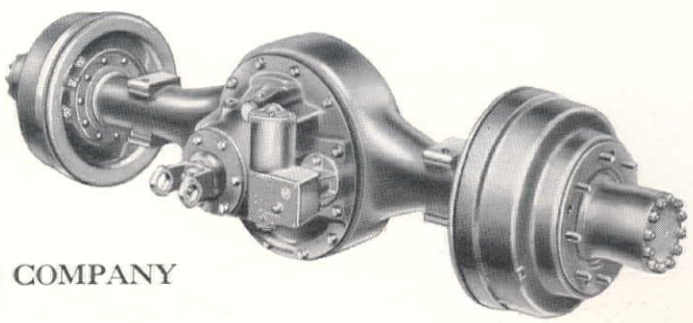
Runnels says that boat decks are being scraped and cars are being cleaned now that the bridge has its new coat.

The Planetary Gears in Eaton 2-speeds save money for truckers

With Eaton's exclusive planetary design, gear speeds are slower; gear loads are distributed over several gear teeth, holding down stresses and wear. Planetary pinions turn only in the low speed range. In the high speed range they are locked out. The axle then operates as a conventional single-reduction unit. Eaton 2-Speeds are quiet in operation, easy to shift, and run long, trouble-free mileages. Genuine dollars-and-cents savings for truckers are assured by actual performance records representing billions of miles of operation.

Your truck dealer will be glad to explain how Eaton 2-Speeds will enable your trucks to haul more, faster, and longer, at lower cost.

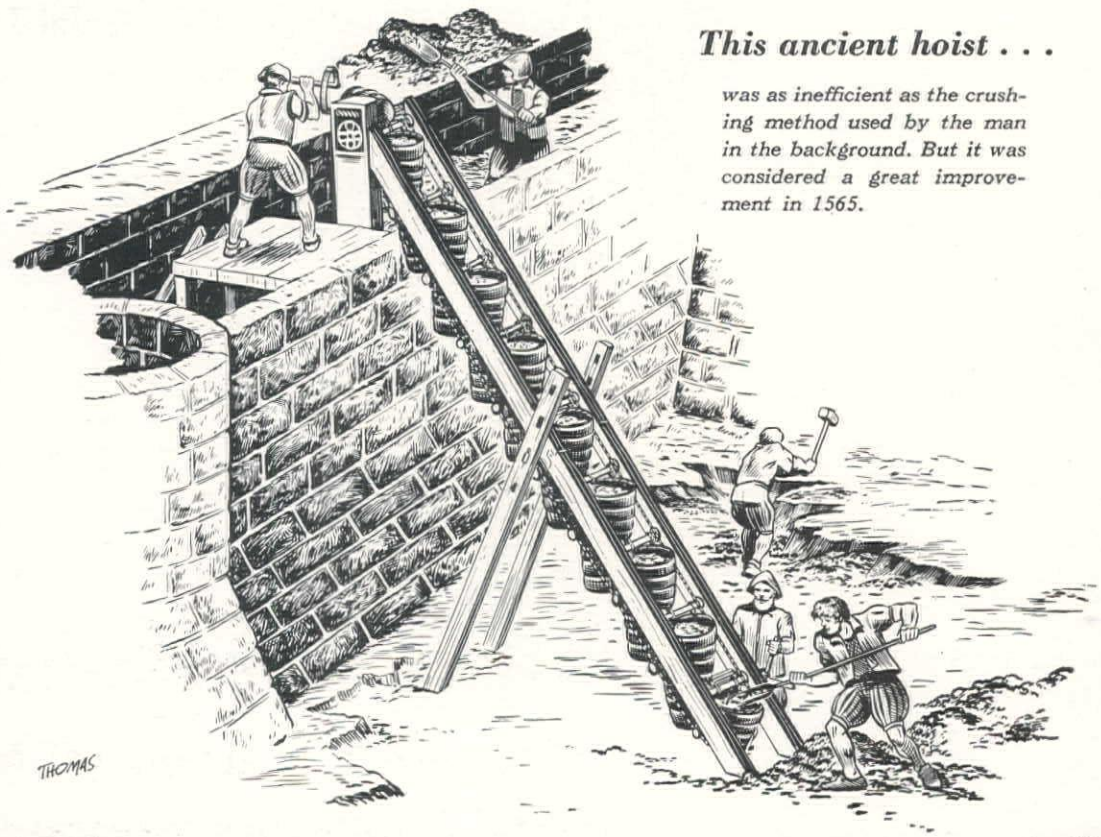
EATON *2-Speed Truck* AXLES



Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

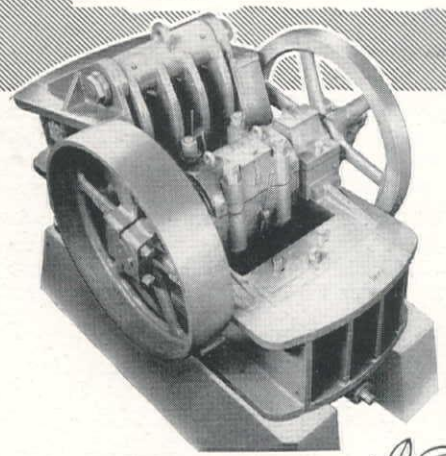
INSIST ON ADEQUATE ROADS

Today, America's roads are crowded with twice the traffic they were designed to carry. Help end the national traffic jam by speaking up for more and better roads.



This ancient hoist . . .

was as inefficient as the crushing method used by the man in the background. But it was considered a great improvement in 1565.



Traylor Type H and HB Jaw Crushers require less power per ton of rock crushed than any other jaw crusher, size for size. Ask for Bulletin 4105 for complete details.

Every century is marked for its notable achievements and the 20th century is no exception. Our Machine Age contains engineering and production feats which men only a short time ago considered impossible. For 50 years, Traylor has contributed its share in this development by advancing new and better stone crushing machinery for the construction industry. Construction men know that it takes experience to solve the wide variety of problems in the production of aggregate. Traylor has experience . . . half a century of it.

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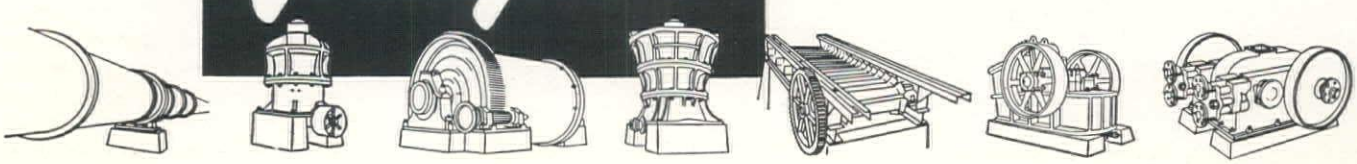


Elevator-type garages planned in Denver

TWO ELEVATOR-TYPE parking garages will probably be built in Denver during the next year, if the city's parking commission has its way. The buildings, each ten stories high, would be built with $4,000,000 in off-street parking bonds sold last month by the Denver City Council to A. C. Allyn & Co., Chicago bond house.

The parking commission is recommending to the city council that the garages, to be located at 1700 Stout St., and 1400 Champa St., would be patterned after the "Bowser Garage," an elevator-type structure developed by Bowser Engineering Co., Des Moines, Iowa. The structures would provide parking for about 930 automobiles.

Originally, it was planned that structures at these sites would be of the ramp type. However, high property costs mean that about $300,000 could be saved by use of the elevator type, according to the commission. And the commission is recommending that this savings be applied toward building yet another elevator-type garage.

Tucson plans $1,500,000 flood control project

A $1,500,000 flood control project for the Greater Tucson, Ariz., area received the okay of the Pima County Board of Supervisors in a recent meeting.

October 6, bids will be opened for first stage construction which consists of building a 168-ac. detention basin, interceptor channel, outlet channels and dike.

CALENDAR OF MEETINGS

October 19-21 — Associated Equipment Distributors, Regional Meeting, Santa Barbara Biltmore, Santa Barbara, Calif.

October 27-31 — American Water Works Association, Calif. Section, Huntington Hotel, Pasadena, Calif.

October 31—Forestry Products Research Society, Fall Meeting, Sacramento, Calif.

November 12-14—National Reclamation Association, at Long Beach, Calif.

December 5-6—Northern California Chapter, AGC, annual meeting, at the Palace Hotel, San Francisco.

December 9-12—American Association of State Highway Officials, Annual Meeting, Kansas City, Mo.

December 20—Nevada Chapter, AGC, annual meeting, at Reno.

January 12—Portland Chapter, AGC, annual meeting, at Multnomah Hotel, Portland.

January 16—Mountain Pacific Chapter, AGC, annual meeting, at Benjamin Franklin Hotel, Seattle.

January 30-31—Colorado Contractors Association, AGC, annual convention, at Shirley-Savoy Hotel, Denver.

ENGINEERS ON THE MOVE

Bard Livingstone retired as superintendent of the Municipal Water Department of San Bernardino, Calif. **Leslie A. Hosegood** has been serving as superintendent and chief engineer.

* * *

Edward L. Evans, supervising highway engineer, California State Division of Highways, retires after a career of 45 years in engineering, 24 of which he spent with the Division. Evans' experience included mining, railroad projects, private practice, etc., in several Western states. He came to California and service with the Division in 1928 as assistant resident engineer on highway work in San Diego County. Following duties as resident engineer in several districts, Evans became a specifications writer and has remained in this department for the past 16 years. **T. A. Roseberry,** highway engineer, also recently retired from District VII. Roseberry began his service with the U. S. Indian Service as a chainman. He decided some advanced schooling was in order and attended engineering classes in San Francisco. After survey work in Lassen County, Roseberry joined the Division in 1918 as instrument man in District II, and became draftsman, and then assistant resident. After leaving for a job with the Southern Pacific Co. in 1920, Roseberry returned in 1925 as assistant resident engineer, District VII.

* * *

The American Public Works Association announces the award of an honorary membership in the association to **Walter N. Frickstad,** district highway engineer for the State of California. The honor was announced at the close of the Association's Works Congress and Equipment Show in Los Angeles, Calif.

* * *

William C. Reimund, Chico, Calif., ground-water geologist for the Bureau of Reclamation becomes the seventh Bureau technician to go to Iraq under terms of the Point Four program. He will join six other reclamation men cooperating with the Iraqi government for development and increased food production.

* * *

Raymond E. Layton, consulting engineer, announces the opening of new offices located at 1035 B Street, Hayward, Calif. Layton is a civil engineer who specializes in structural and hydraulic design.

* * *

A. A. Anderson, former manager of the Highways and Municipal Bureau of the Portland Cement Association and well known in the concrete paving field, becomes chief highway consultant for PCA. **L. M. Arms,** former assistant manager of the Highways Bureau will succeed Anderson. Anderson joined the PCA in 1923 as a field engineer. Arms came to PCA in 1932.

* * *

Leo H. Corning becomes director of promotion and **Thor Germundsson** is now manager of the Structural and Railways Bureau of Portland Cement Association. Corning has been a member of the PCA staff for 23 years. Germundsson joined the Association in 1930.

* * *

W. A. Sanford has reported to the site of Tiber Dam, near Chester, Mont., where he will serve as construction engineer. Sanford was originally acting engineer on the project before the government called a halt to the activities two years ago. The project resumed in July with a $2,500,000 appropriation from Congress.

* * *

William E. Willey, economics and planning engineer for the Arizona Highway Department, is considering a $15,000 per year offer from the American Motor Truck Association, Washington, D. C. Willey received permission from State Highway Engineer **Cy Perkins** to fly to Washington to discuss the terms of the new position. Willey dislikes the idea of leaving Arizona, which the new job would, of course, require him to do if he accepts.

* * *

Charles S. Hale will become acting project engineer on the second barrel of the San Diego aqueduct project to be designed and constructed by the Bureau of Reclamation under an agreement with the Department of the Navy. Hale, who headquarters in Escondido, was in charge of building the 123-mi. Coachella branch of the All-American Canal System and appurtenant works. This project is almost complete, but remaining activities will be supervised by **H. W. Van Loo** as acting construction engineer.

* * *

Don Eyinck, city engineer of Fairbanks, Alaska, was recently appointed acting city manager of the territorial city, until the position is staffed. The position was left vacant after the city council called for the resignation of **Evan E. Peterson.**

* * *

Gerald E. Arnold, who became city water director of San Diego, Calif., when the position was created in 1947, is leaving to take the head post in Philadelphia, Pa.'s water department. Arnold has been on leave from his San Diego position while acting as director of the Water Resources Division of the National Production Authority. The city manager announced that **Paul Beermann,** who has been serving as acting director, will be named to fill Arnold's position.

* * *

The resignation of **Robert R. Rose,** Assistant Secretary of the Interior, submitted his formal resignation to the department in order to seek election to the House of Representatives from his native state of Wyoming. Rose won the Democratic nomination for congressman in the primaries and now must campaign actively against the incumbent Republican.

* * *

Frank Bonner becomes consulting engineer for the Richvale Irrigation District, in Butte County, Calif.

* * *

Philip W. Storm is the new city manager of the resort town Avalon, Catalina Island, Calif. Storm was formerly city manager in Redding.

* * *

Newly elected chairman of the Colorado River Board of California is **Fred W. Simpson,** San Diego, Calif. Simpson replaces the late **Franklin Thomas,** who represented the Metropolitan Water District on the board. Simpson is a representative of the San Diego County Water Authority.

* * *

Paul F. Keim, formerly of Knappen, Tippetts, Abbett, McCarthy, engineers, San Francisco, Calif., has accepted a position as professor of civil engineering, University of California, Berkeley.

* * *

Paul H. Dunaway is now project engineer for the Corps of Engineers at Wingate, New Mexico's Ordnance Depot construction program. He will be in charge of the program, which includes magazines, culverts, fencing.

* * *

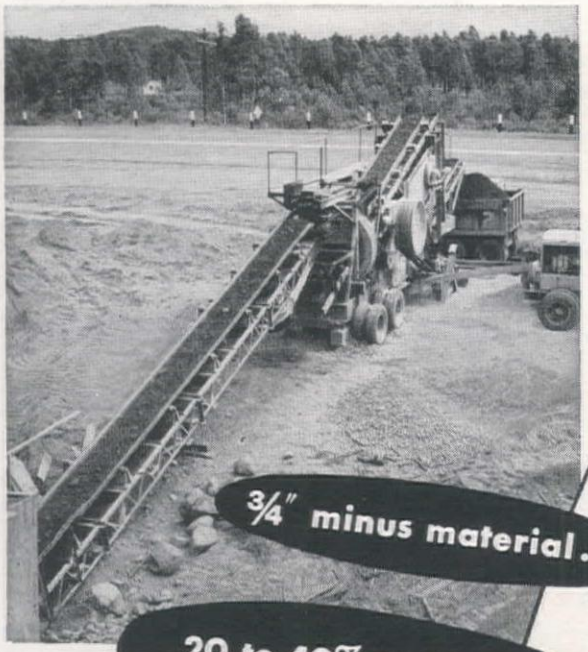
Rogers Rhoades, consulting geologist, will become affiliated with the firms of R. J. Tipton and Associates, Inc., and R. J. Tipton Associated Engineers, Inc. He will act as geologist on all irrigation and water development projects with which the firms are identified.

* * *

Charles L. Bell, assistant city engineer, Los Angeles, Calif., was honored at a testimonial dinner by his fellow employees recently. Bell is leaving his position on the West Coast to join a construction firm at work on the Ohio Valley atomic energy project.

* * *

Adolph Teichert, Jr., president of the A. Teichert & Son, Inc., construction firm of Sacramento, Calif., is a newly appointed member of the construction and civic development committee of the National Chamber of Commerce. This group consists of 34 members who will study markets, government controls, planning of private and public projects, etc.



...a *Crushing Record* by:
ED LUNDIN, General Contractor
Mankato, Minnesota
with his DIAMOND "66"
ROTOR-LIFT PLANT

¾" minus material...

20 to 40% crush...

208 yds. per hr. average!

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Minneapolis, Minnesota

Gentlemen:

I could not help but write you to tell you how satisfied we are with our new Diamond No. 66 Portable Rotor Lift Crushing Plant. Last season we were crushing a job for Highway 61 on the north shore of Lake Superior and averaged 208 yards an hour of 3/4" minus material in a pit that contained from twenty to forty per cent crushing. It is our understanding that the records of the Minnesota State Highway Department show that there has never been another job of this nature that has set such a high production. This production was obtained with a minimum amount of down time, and we certainly wish to let everyone know the success that we have had in using your equipment.

Incidentally, this is the third Diamond Plant that we have operated and all of them have worked out very satisfactory.

We might mention here too that we have worked in most of the gravel pits in the south central, western, and northern sections of Minnesota and have found that we can produce more gravel per hour with our Diamond Plant than most plants of an equal size or larger that have worked in the same pits.

Again we wish to tell you how satisfied we are, and if in the future we will require another plant it certainly will be another Diamond.

Yours very truly
Ed Lundin, Contractor
by
Edward N. Lundin

Edward N. Lundin

UPPER LEFT—Loading some of heaviest pit-run in the state. Note spline-shaft drive, position of power unit. Power unit is easy to get at for inspection and repair.

BOTTOM—Dozing pit-run into Diamond shovel-loading hopper. Diamond grizzly and single eccentric plate feeder keep continuous, regulated feed, make record production possible.

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El Paso, Texas

DEATHS

Peter MacRae, founder of MacRae Brothers Construction Co., died August 5 in his Seattle, Wash., home. His firm was well known in the Pacific Northwest for the construction of such projects as the Spokane Street Viaduct, Skagit River Bridge, Alaskan Way Viaduct approaches, etc.

* * *

George W. Howson, 68, civil engineer, died August 7 in Oakland, Calif. Howson was a water resources expert in the California Division of Water Resources at the time of his death, but his career had carried him to Athens, Greece, at one time to plan municipal water supply facilities, and into public utilities agencies in the West.

* * *

George D. Shannahan, 44, engineering contractor, died August 19 at Lake Arrowhead, Calif.

* * *

Daniel Miller, 68, city engineer of South Gate, Calif., died August 6. Miller was at one time city engineer of Long Beach, Calif.

* * *

C. E. Putnam, 71, consulting engineer, died August 19 in Seattle, Wash. Putnam was a former city engineer of Tacoma, Wash., and had guided city projects in Olympia and Richland. He served at one time as assistant state highway engineer.

* * *

Jackson P. Lewis, 72, contractor, died in Spokane, Wash., August 23. He had been active in the Inland Empire construction field for many years.

* * *

Walter Clist, 72, retired building contractor, died in Laguna Beach, Calif., after an illness of several weeks. Clist built many buildings in the Seattle, Spokane, and Portland areas during his time as a building contractor.

* * *

Raymond Bristow, 44, cement contractor, died August 20 in Woodland, Calif., as a result of encephalitis (sleeping sickness).

* * *

Gordon Francis Van Eaton, 47, highway maintenance supervisor for the Washington Department of Highways, died August 20 at his Mercer Island, Wash., home.

* * *

Perley Crawford, 57, former Corps of Engineers employee, died August 23 in Portland, Ore.

* * *

Henry C. Brown, 82, retired contractor, died August 22 in Great Falls, Mont., after a long illness.

* * *

K. H. Bardizbanian, 43, contractor and owner of the Los Angeles, Calif., structural engineering firm which bears his name, died in an accident August 28 in Los Angeles.

* * *

Joseph Kynaston, 70, contractor and builder, died August 26 in Salt Lake City, Utah.

* * *

William Larson, 41, engineer, died September 1 in San Fernando, Calif., when the car he was driving collided with two others.

* * *

Norman J. Nelson, 72, building contractor, died September 2 in Los Angeles, Calif.

* * *

J. C. Lindsay, 68, engineer, died September 3 in Los Angeles, Calif. Lindsay was retired from his position as civil engineer with Gulf Oil Co.

* * *

Fred J. Miller, 62, general contractor, died September 3 in Tucson, Ariz. Miller was a resident of Sacramento, Calif., for many years before moving to Arizona for his health.

* * *

William H. Stanhagen, 59, draftsman for the Arizona State Highway Department, died September 3 in Phoenix, Ariz.

* * *

Henry R. Tietjen, 53, one time superintendent for Papin & Dudley Co., contractors, died August 23 in Missoula, Mont.

Large Dams committee seeks new members

THE UNITED STATES Committee of the International Commission on Large Dams met in Chicago on September 5, following the meeting there of the Executive Committee of the International Commission.

The meeting of the American Committee was the first since the adoption of its new constitution. Carl P. Vetter of the Bureau of Reclamation, the newly elected chairman, was presiding. The most urgent business before the meeting was to arrange for adequate financing of the Committee's affairs so as to make it independent of contributions from nonmember organizations.

It was decided that no change would be made in the prevailing policy that membership in the Committee would be limited to a relatively small number of highly qualified engineers and other specialists and organizations of exceptional accomplishments in the field of design and construction of large dams. The annual dues to finance the Committee's activities were fixed at $10.00 for individuals and $100 for organizations.

Membership committee named

To ensure a membership of high professional standing a membership committee was appointed under the chairmanship of L. M. McClellan, Chief Engineer of the Bureau of Reclamation, at Denver, Colorado. Other prominent engineers who agreed to serve on the committee are C. E. Blee, S. B. Morris, F. B. Slichter, and W. F. Uhl. It will be the task of the Committee to recommend individuals and organizations for membership. Those interested should contact either the Chairman of the Membership Committee or the Committee Chairman, Carl P. Vetter, Chief, Office of River Control, Bureau of Reclamation, Boulder City, Nevada.

Correct officers listed for American Pipe & Construction Co.

IN THE ANNOUNCEMENT of additions to and changes in the executive staff of American Pipe and Construction Co. (*Western Construction*—September 1952, p. 108), an important omission and an error have been noted. It was correctly stated that William A. Johnson, for more than thirty years an active figure in the industrial and commercial life of Southern California, relinquished on August 1 the presidency of the firm, but remains as chairman of the board and a member of the executive committee. However, the fact was omitted that Howard H. Jenkins, before August 1 the executive vice president of the firm, became the president of the firm on that date. The new position of H. L. White was also incorrectly stated. Mr. White, formerly the company's chief engineer, is now vice president in charge of engineering. Earl E. Jackson, manager of the company's Oakland district, is now a vice president in charge of the San Francisco Bay Area.

SUPERVISING THE JOBS

J. A. Terteling & Sons, Inc., holds the contract for power and diversion tunnel construction on the Bureau of Reclamation's Palisades Dam project near Irwin, Idaho. **Eugene C. Williams** is general superintendent with **Lawrence Stallard** as tunnel superintendent. **A. W. Blanchard** is master mechanic, and **R. C. Ogelsby, C. Pulley** and **Charles Phillips** are walkers. **Vern Haisch** is excavation foreman. **F. R. Kroll, James Harding** and **John E. Brelsford** are tunnel shift bosses. **O. E. Looney** is carpenter foreman. **Vern Wilkie** is greaser foreman. **James Stavast** is office manager and **F. R. Bagley** is engineer. **Joe Markowski** is paymaster.

* * *

Construction of Butler buildings at Folsom and Nimbus dams is under the supervision of **Warren L. Wearer** with **William Wilson** as his assistant. E. E. Myers Co. holds the $70,000 contract.

* * *

C. P. Hamilton is supervising construction of an all underground water line in Sacramento, Calif., for Proctor & Gamble Co. Engineers Ltd. Pipe Line Co. holds the $140,000 contract. **C. Larrson** is assistant superintendent.

* * *

Sewage disposal plant at Eugene, Ore., is being supervised by **Loyd B. Read** with **W. K. Lathrop** as his assistant. **Earl Oldfield** is detail man. **Al De Mers** is carpenter foreman, **Ralph Westover** is steel foreman and **E. G. Flynn** is labor foreman for Lee Hoffman, contractor. **George Steffy** is office manager on the $737,000 job. Economy Forms Corp. holds the steel forms sub-contract and **Chris E. Wagner** is superintendent.

* * *

Lawrence & Continental Construction Co. holds a contract totaling almost $3,000,000 for construction of the Northern California Reception Center & Clinic's 13 buildings in Sacramento, Calif. **Harold T. Neilsen** is superintendent, **Dick Guhse** is job engineer and **Al Miller** is carpenter foreman along with **Bill Harris. Manuel Menchaca** is concrete foreman and **Ernest Dorris** is labor foreman. **Charles Murray** is state superintendent.

* * *

F. A. Bleacher is general superintendent for Guy H. James Co. on construction of Tiber Dam. **H. E. Birdsall** is equipment superintendent.

* * *

Les Bone is superintendent for Milton Kauffman Construction Co., contractor, on the $1,500,000 Rancho San Pedro Housing Project, San Pedro, Calif. **L. S. Greene** is general foreman on the project which concerns the construction of 12 buildings.

* * *

Paul Beach, general contractor of Camptonville, Calif., is acting as his own superintendent on construction of a $2,500,000 plant for E. J. Lavino Co., Newark, Calif. The plant includes about 89,500 sq. ft. of floor space and more than a mile of rails to be installed in the floor. Facilities will be prepared for the manufacturer of refractory and high temperature brick. **O. Silva** is general foreman for the contractor, **J. McIntyre** is carpenter foreman and **H. Halligan** is labor foreman. Started in February, this job should be completed about the end of the year.

* * *

Allen R. Bacon is project manager for Albeni Constructors, Newport, Wash., on construction of Albeni Falls Powerhouse. This is a joint venture of Donovan Construction Co., B. F. Lytle Co., Foley Brothers, Inc., Winston Brothers, and James Construction Co.

* * *

Construction of warehouse and offices for the City Warehouse and Storage Co., Long Beach, Calif., is under the supervision of **William E. Lessley. J. S. Garland** is caprenter foreman and **Vic F. Steffen** is cement finisher foreman on the $75,000 project. Millie & Severson, Inc., holds the contract.

* * *

Crushing operations in Inkom, Idaho, for Union Pacific Railroad is under the supervision of **Ellis A. Bunn. L. G. Seifert** and **Fred Schwartz** are crusher foremen. **Art Frederickson** is pit foreman with **Herb Neider. Wallis Hooton** is office manager for Morrison-Knudsen Co., Inc.

* * *

An excavation contract for a new San Diego Gas & Electric Co. installation near San Diego, Calif., is held by E. Paul Ford Co. **E. Paul Ford, Jr.,** is general superintendent with **James Loob** as superintendent and **V. E. Posey** as dirt superintendent. **M. G. Odall** is engineer for the San Diego Gas & Electric Co.

* * *

C. C. Bryan is general superintendent for Charles MacClosky Co. on construction of a bridge at Oceanside, Calif. **John B. Wong** is the firm's engineer on the job. Sub-contract for steel is held by Union Steel Co. with **Jack Long** as superintendent.

* * *

General superintendent on the Folsom Dam Project is **L. E. McCarthy** for Merritt, Chapman & Scott Corp. and Savin Construction Corp. **R. B. Jenkinson,** formerly at Pine Flat Dam, replaces **Fred N. Geis, Jr.,** as resident engineer. Geis is retiring.

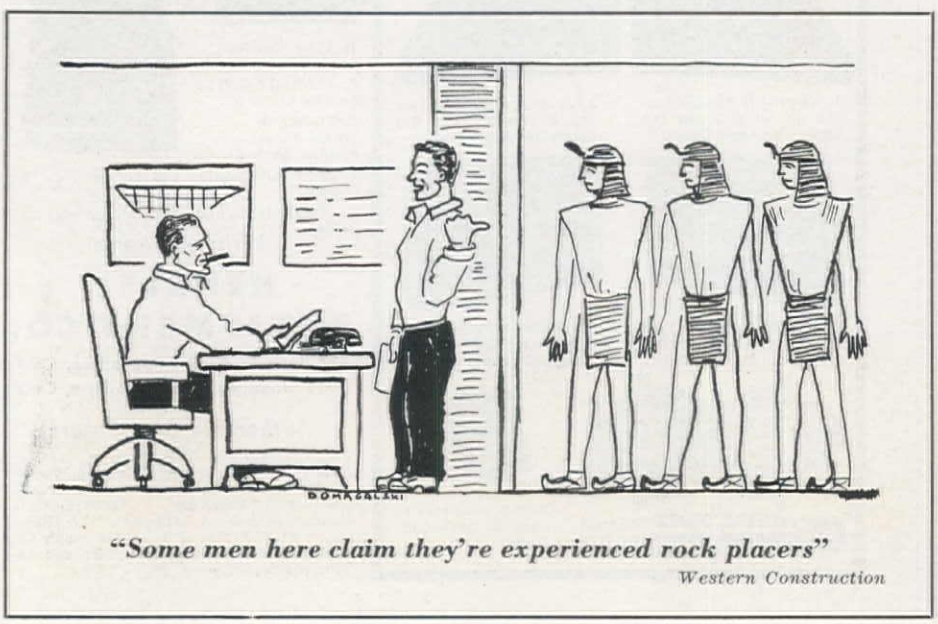
* * *

Harold Tehan is general superintendent for O. L. Carpenter, San Diego, Calif., on construction of Cajon Valley High School District's Roanoke School. **Bob Choate** is foreman.

* * *

Carl Daniel is general superintendent for E. C. Hall and J. C. Compton on the surfacing and paving of Highway 99 from Goshen to Eugene, Ore. **Doug Holmes** is paving superintendent, **Lawrence Gunter** is gunite foreman and **Sam Welch** is plant foreman. **Paris Chase** is another plant foreman and **Clyde King** is master mechanic.

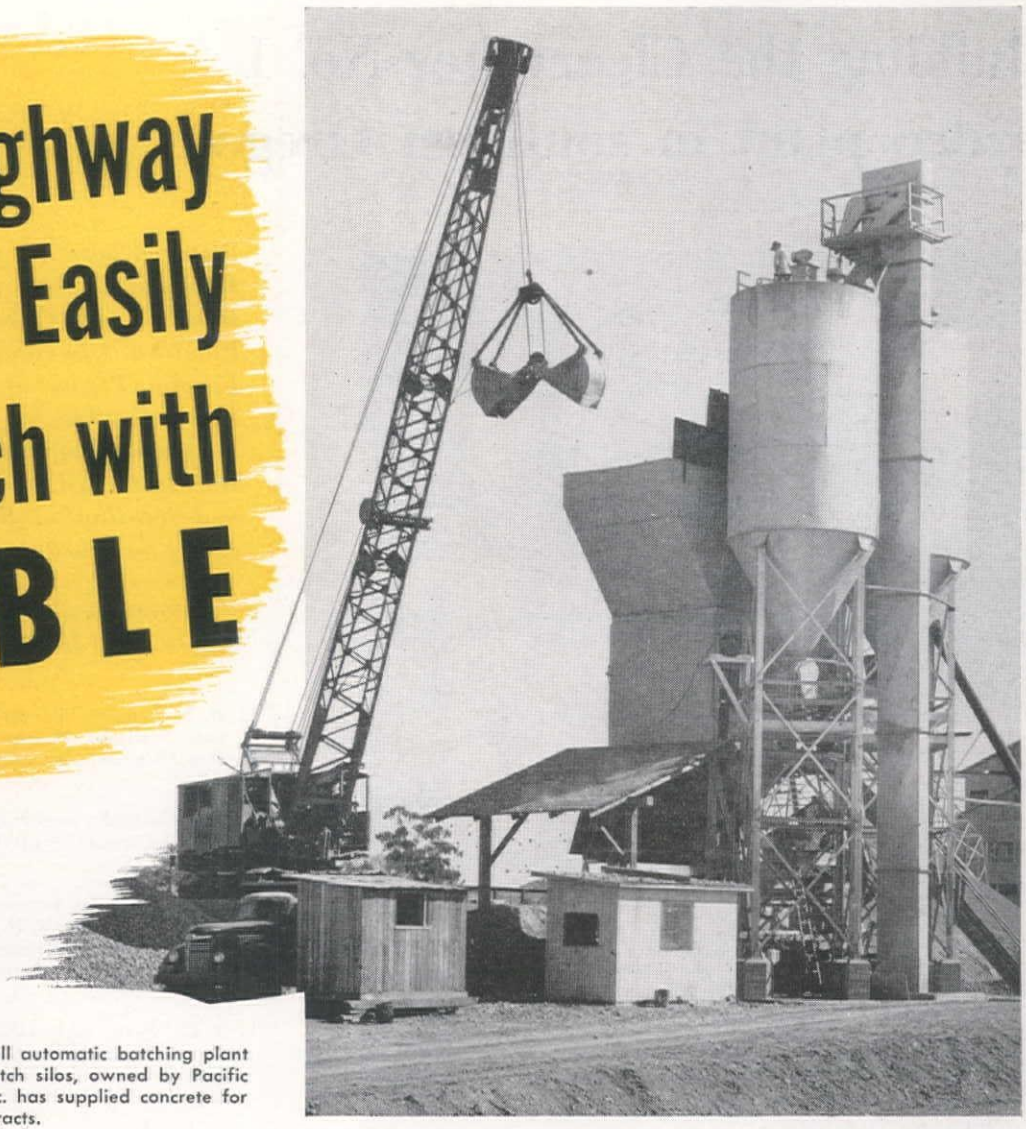
Down-time . . . . . By Domagalski



"Some men here claim they're experienced rock placers"

Western Construction

Meet Highway "Specs" Easily ...Batch with NOBLE



This NOBLE CA154 full automatic batching plant with two 500-bbl. batch silos, owned by Pacific Coast Aggregates, Inc. has supplied concrete for several highway contracts.

Contractors who have recently rebuilt highways with NOBLE-batched concrete—

Guy F. Atkinson Co.	U. S. 99 & 466
N. M. Ball & Sons	U. S. 50
Fredrickson Bros.	U. S. 40
M. J. B. Construction Co.	U. S. 50
Peter Kiewit Sons' Co.	U. S. 101 & 4
Fredrickson & Watson	San Jose Freeway
C. F. Wilder-Gaasland Const. Co.	U. S. 10
Charles L. Harney Co.	U. S. 101
Fiorito Bros.	U. S. 99

NOBLE clamshell-type automatic batchers, built especially for highway contractors, offer you accuracy, fast production and portability.

Right-on-the-nose accuracy is assured by NOBLE's exclusive photo relay control—neither heat nor humidity affects it. Your operator simply sets poise beam scales, batching gates automatically cut off cement and aggregate at correct weight.

Gate operation is fast, too—125 yards an hour is not unusual.

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Building the Clearwater No. 1 hydro plant in southern Oregon

Pictured here are the men of Morrison-Knudsen Co., Inc., who are directing construction of Clearwater Hydroelectric Plant No. 1 in connection with the North Umpqua Project of the California-Oregon Power Co. The job, located east of Roseburg near Diamond Lake, got off to a fast start last April, and despite snow in June and freezing weather into July, is currently on schedule.

Names in all ten captions read from left to right in the pictures.

1. *H. E. "Curley" Christman*, project superintendent, with *William Abrahamson*, project engineer, and *Jim Duggan*, cost engineer.

2. *Bill Cutright*, electrical foreman; *George Colvig*, shovel foreman; *Jack Porter*, powder foreman.

3. *W. V. Woods*, excavation foreman; *Sid Murray*, grade foreman; *D. R. Radich*, grade foreman; *Pat Azevedo*, grade foreman; *Max Ware*, excavation and penstock superintendent.

4. *R. C. "Pete" Bassette*, pile driving superintendent; *Henry Fink*, pile driver foreman; *Gordon Jones*, pile driver foreman; *Charles Leedy*, pile driver foreman.

5. *Ted Romaine*, paymaster; *Chet Poor*, engineer; *William Piercy*, office manager; *Neil Spencer*, engineer; *Jim Armistead*, chief steward.

6. *Einar Lindquist*, steel foreman; *Nick Rossi*, labor foreman; *Carl Moody*, labor foreman.

7. *P. C. Chinn*, resident engineer for California-Oregon Power Co.

8. *Herm Berstler*, master mechanic; *R. H. Erickson*, truck foreman; *D. L. Hoover*, shop foreman.

9. *J. O. McGinnis*, concrete superintendent; *Lloyd Condit*, carpenter superintendent.

10. *John Atkins*, purchasing agent; *Harry Lentz*, carpenter foreman.

G. S. Hunt is supervising the job for Henry M. Mason, contractor, on construction of a 1-story, reinforced concrete, brick and frame junior high school, Eugene, Ore. **Merrel Stearns** is carpenter foreman and **Rueben Barsch** is labor foreman. **Dean Smith** is office manager on the contract, which totals approximately $450,000.

* * *

Construction of an ammonium sulphur plant at Union Oil Co., Wilmington, Calif., is under the supervision of **Sid Davis. Charles Moseley** is carpenter foreman and **Bill Swanson** is general piping foreman. Ehrhart & Arthur, Inc., holds the $800,000 contract.

Resurrected ghost from a flood 25 years ago

TWENTY-FIVE YEARS have elapsed since the raging Mission Valley flood of the San Diego River in 1927, but a reminder of its force was turned up by a workman in recent construction operations.

Frank Muller, a bulldozer operator was at work uncovering sand deposits near Powers Street in Mission Valley when his machine struck the remains of a 1924 Autocar truck.

Two trucks had been lost in the flood of 1927 which destroyed the property of A. W. Duquette's Mission Valley sand business. This model was found under 6 ft. of silt, 2 mi. downstream from a loading platform, with its framework bent and rusted with years of burial. The rear solid-rubber tires, however, were found to be still usable.

Muller and his bulldozer were on top of the truck before he realized what he had hit, but when he recognized the object, he proceeded with caution to bring the relic out of its resting place intact.

City drowns its troubles

THERE HAS always been a question as to whether Alpine, Idaho, was really in Idaho or Wyoming, and inhabitants of the little town, which is bisected by the border line, have given their return addresses in both states upon occasion.

Progress at Palisades Dam is going to make Alpine's status clear, however. When the dam is completed the reservoir will cover Alpine with water.

BIG DRAIN FOR A FILL

To install big concrete irrigation pipe to run under a road fill near Wenatchee, Wash., P. L. Sadler & Sons of Wenatchee used Caterpillar diesel-powered Thew-Lorain crane.

CONTRACTS

A Summary of Bids and Awards For Major Projects in the West

****

Alaska

$1,323,340—**Babler Bros. & Rogers,** 4617 S.E. Milwaukie Ave., Portland—Award for 54½ mi. of Seward-Anchorage highway in Chugach National Forest; by USBR.

$1,250,000—**L. E. Baldwin, Inc.,** 1103 N. 36th St., Seattle—Award for construction of 13 two-story, 8-unit apartments with central hot water heating plant, Anchorage; by Fifth Ave. Development Corp.

$2,466,320—**Boen-Sealand Constructors,** 3647 Stone Way, Seattle—Award for 16 eight-family quarters and utilities, Eielson Air Force Base; by C. of E.

$13,482,260—**Lytle & Green** and **S. Birch & Sons,** 1530 2nd St., Seattle—Award for a heat and power plant extension, Ladd Air Force Base; by C. of E.

$2,344,640—**Peter Kiewit Sons' Co.** and **Fred J. Early Co., Inc.,** 1300 Aloha, Seattle—Award for bachelor quarters and utilities, Eielson Air Force Base; by C. of E.

$10,014,370—**Valle-Sommers Construction Co.,** Box 4096, Interbay Sta., Seattle—Award for eight-family quarters buildings at Elmendorf Air Force Base; by C. of E.

Arizona

$126,925—**Harry J. Hagen,** Globe—Award for one 9-span concrete bridge and four multiple-span concrete box culverts and approaches on the Globe-Safford highway; by St. Hwy. Dept.

$276,690—**W. J. Henson,** Box 471, 817 Crest Ave., Prescott—Award for 4.1 mi. of grading and plant-mix bitum. paving betw. Holbrook and Lupton; by St. Hwy. Dept.

$1,316,000—**Del E. Webb Construction Co.,** Phoenix, and **San Xavier Construction Co.,** P. O. Box 1031, Tucson—Joint award for construction of pre-flight apron, Tucson Municipal Airport; by Grand Central Airport Co.

$1,226,900—**Wes Meyer Construction Co.,** 4220 S. 16th, Phoenix—Low bid for 13-story apartment at Central and Monte Vista, Phoenix.

$443,793—**Western Constructors, Inc.,** P. O. Box 1604, Phoenix—Low bid for rebuilding 4¼ mi. of the Tucson-Nogales Highway; by St. Hwy. Dept.

California

$2,595,000—**L. C. Anderson Co.,** 3040 Hancock St., San Diego—Low bid for construction of additional training facilities, Naval Training Center, San Diego; by U. S. Navy.

$163,195—**Basich Bros. Construction Co.,** 1148 N. Gabriel Blvd., Garvey—Low bid for railroad overhead and roadway, 0.6 mi. at Garnet; by Div. of Hwys.

$4,195,000—**The Bein Construction Co.,** Beverly Hills, and **R. J. Daum Construction Co.,** Inglewood—Award for West Los Angeles Housing; by City.

$2,700,000—**Bollenbacker-Kelton,** 8250 Lake Murray Blvd., La Mesa—Award for construction of 300 frame and stucco dwellings, Lake Murray Manor, La Mesa.

$155,490—**Charles J. Dorfman,** 124 No. La Brea, Los Angeles 36—Award for sanitary sewer facilities in Castro Valley Orchards Assessment Dist. 2; by Castro Valley Sanitary Dist.

$2,065,020—**Engineering Constructors, Inc.,** P. O. Box 3428, Terminal Annex, Los Angeles—Award for 4 mi. of 48-in., and 6 mi. of 60-in. concrete pipe, second barrel of San Diego aqueduct; by USBR.

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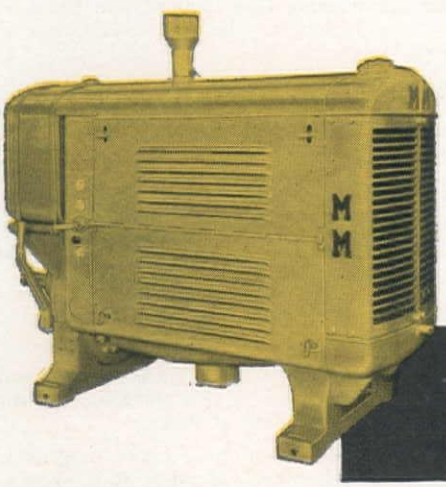

Ol' Man River's Punch was met with preparedness when flood threatened devastation to Omaha's industrial area. The city's disaster committee made arrangements for moving of equipment to minimize loss. MM powered American Cranes were called into service and "not a single American Crane, working around the clock, had to stop or slow down for any reason."

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$1,600,000—**George A. Fuller Co.,** 3445 W. 8th St., Los Angeles—Award for reinf. conc. junior seminary, Van Nuys; by Roman Catholic Archbishop of Los Angeles.

$306,029—**Fredrickson & Watson Construction Co.** and **M. & K. Corp.,** 405 Montgomery St., San Francisco—Low bid for graded roadbed on approaches to Bay Farm Island Bridge, Alameda and Oakland; by Div. of Hwys.

$271,760—**Granite Construction Co.,** Box 900, Watsonville—Award for rebuilding of Melones Bridge, over Stanislaus River betw. Calaveras and Tuolumne counties; by Div. of Hwys.

$1,919,790—**J. E. Haddock, Ltd.,** 3538 E. Foothill Blvd., Pasadena—Award for 1.1 mi. of PCC paving, 19 retaining walls and pedestrian undercrossing on Harbor Freeway in Los Angeles; by Div. of Hwys.

$479,915—**J. E. Haddock, Ltd.,** 3538 E. Foothill Blvd., Pasadena—Award for grading and paving with PCC and asph. conc. of 0.4 mi. in Los Angeles; by Div. of Hwys.

$236,780—**Harms Bros.,** 5261 Stockton Blvd., Sacramento—Award for road-mix surf. of 5.9 mi. and concrete bridge betw. Yreka and Montague; by Div. of Hwys.

$153,530—**E. S. & N. S. Johnson,** 316 Chapman Bldg., Fullerton—Award for 32 timber trestle bridges betw. Danby and Needles to be redecked with reinf. conc. slabs; by Div. of Hwys.

$3,192,825—**Johnson Western Constructors,** P. O. Box 6, San Pedro—Award for 3 mi. of 48-in., and 9½ mi. of 60-in. concrete pipe, second barrel of San Diego aqueduct; by USBR.

$889,000—**Peter Kiewit Sons' Co.,** 345 Kieways, Arcadia—Award to strengthen taxiways and parking areas, Mojave; by U. S. Navy.

$2,574,800—**R. V. Lloyd & Co.,** Box 391, Coachella—Award for second barrel of San Diego aqueduct, to excavate trenches, lay and test 9½ mi. of 75-in. concrete pipe; by USBR.

$168,950—**E. C. Losch,** 8302 E. Center St., Paramount—Award for 20- and 30-in. reinf. conc. cylinder water main from Stearn and Bellflower to Palo Verde and Anaheim Rd., Long Beach; by City.

$221,590—**Madonna Construction Co.,** P. O. Box 910, San Luis Obispo—Low bid for bridge crossing Santa Ynez River near Lompoc; by Div. of Hwys.

$1,447,395—**McCammon-Wunderlich Co.,** Palo Alto, and **C. K. Moseman,** 727 Barron Ave., Redwood City—Low bid to four-lane 7½ mi. of Highway 50 and construct two bridges between the Redmond Overhead in San Joaquin County and the Corral Hollow Rd.; by Div. of Hwys.

$17,987,000—**Gust K. Newberg Construction Co.,** 2040 N. Ashland, Chicago—Low bid for 1,000-bed V. A. hospital at Los Angeles; by V. A.

$454,640—**Oberg Bros. Construction Co.,** P. O. Box 640, Inglewood—Award for two reinf. conc. bridges in Los Angeles; by Div. of Hwys.

$348,000—**The Shea Co.,** 2801 W. Mission Rd., Alhambra—Low bid for Black Canyon Tunnel, Cutherland-San Vicente Conduit, San Diego; by City.

$237,400—**Sully-Miller Contracting Co.,** 1500 W. 7th St., Long Beach—Award for 4½ mi. of highway between Santa Ana and Costa Mesa; by Div. of Hwys.

$182,530—**R. A. Wattson Co.,** 5528 Vineland Ave., North Hollywood—Low bid for interceptor sewer in Magnolia Blvd., Kester Ave. to Balboa Blvd., Los Angeles; by City.

Colorado

$288,175—**Parrish & Linneman Construction Co.,** 1300 Gray St., Denver—Low bid for roads and railroads at Lowry Air Force Base, Denver; by C. of E.

Idaho

$701,660—**Aslett Construction Co.,** Box 799, Twin Falls—Award for plant-mixed bitum. surf. of 8.4 mi. of Old Oregon Trail road in Cassia and Power counties; by Dept. of Hwys.

$550,350—**Peter Kiewit Sons' Co.,** 1024 Omaha Nat. Bank Bldg., Omaha, Neb., and **Morrison-Knudsen Co., Inc.,** Boise Idaho—Award for 18 mi. of new roadway and erection of reinf. conc. bridge at Reactor Testing Station near Arco; by AEC.

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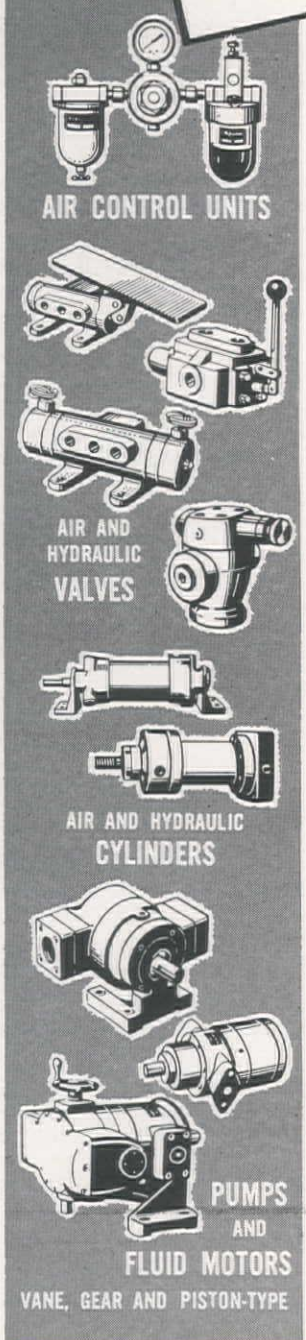

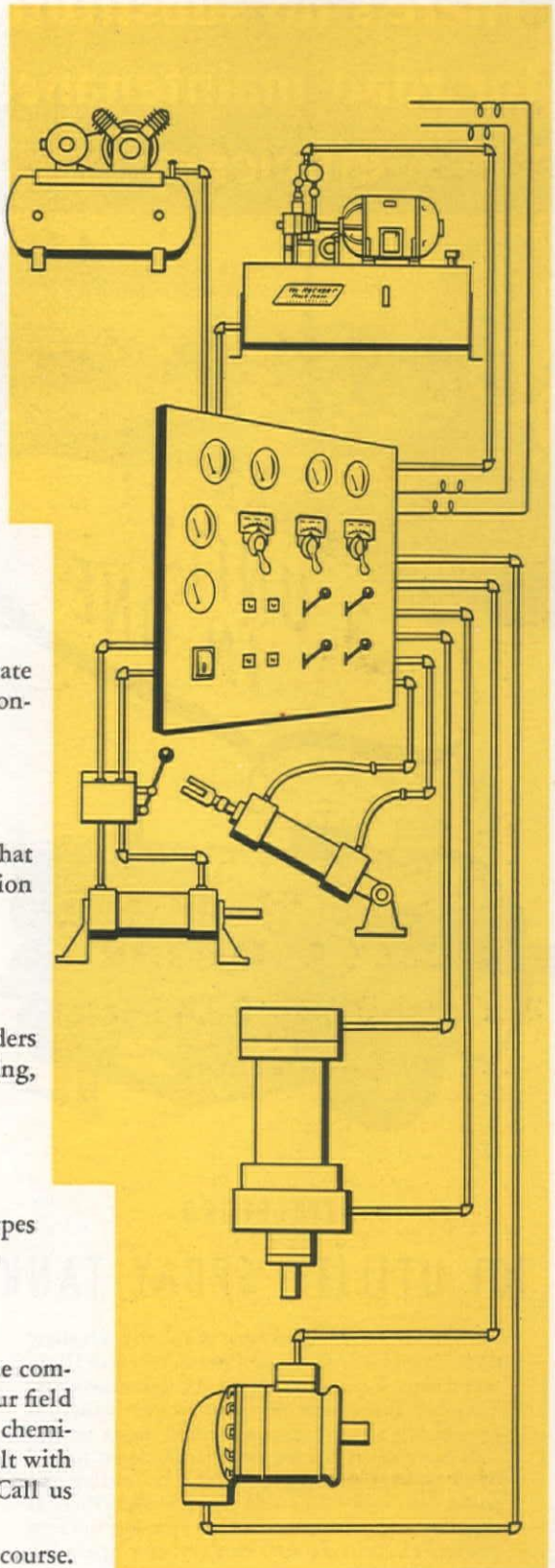

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Montana

$399,875—**F&S Contracting Co.,** P. O. Box 4, Butte—Award for 12 mi. grading and surfacing, Whitehall to Twin Bridges; by St. Hwy. Comm.

$485,125—**Holzworth Construction Co.,** P. O. Box 158, First Nat. Bank Bldg., Miles City—Award for grading and draining 9½ mi. highway, Miles City to Terry, Custer County; by St. Hwy. Comm.

$12,838,690—**Guy H. James Construction Co.,** 1816 First Nat. Bank Bldg., Oklahoma City, Okla., and **Wunderlich Contracting Co.,** Omaha, Neb.—Contract for Tiber Dam and Reservoir, on the Lower Marias River in Toole and Liberty counties near Chester. Work includes 4,300-ft. long earthfill structure, dike and reservoir; by USBR.

$230,535—**Ed Tangmo,** Milltown—Award for grading, gravelling and road-mix oiling 6.5 mi. of Norris-Bozeman road in Madison County; by St. Hwy. Comm.

Nevada

$117,340—**Schwake Construction Co.,** Gardnerville—Award for two reinf. conc. bridges on Route 37 in Douglas County; by St. Hwy. Dept.

$112,098—**Wells Cargo, Inc.,** P. O. Box 1511, 1800 E. 4th St., Reno—Award for seal coating of roads within the Nevada proving grounds near Las Vegas; by AEC.

New Mexico

$713,012—**List & Clark Construction Co.,** 729 Railway Exchange Bldg., Kansas City, Mo.—Low bid for channelization of the Rio Grande fish and wildlife refuge to San Marcial, Middle Rio Grande project; by USBR.

$307,725—**G. I. Martin,** 520 S. Tulane, Albuquerque—Award for black-topping State 176, 28.5 mi. west of Oil Center; by St. Hwy. Dept.

$1,853,700—**Robert E. McKee, Inc.,** 1918 Texas St., P. O. Drawer 562, El Paso, Texas—Low bid for 80 mounded concrete arch magazines at Wingate Ordnance Depot near Gallup, New Mex.; by C. of E.

$143,125—**Wylie Paving Co.,** Box 4025, Albuquerque—Award for 1.3 mi. of grading and asph. paving on Gibson Blvd. in Albuquerque; by St. Hwy. Dept.

Oregon

$378,055—**Acme Construction Co.,** P. O. Box 306, Eugene—Low bid for 4.5 mi. of grading and paving of Pacific Hwy. north from Ashland; by St. Hwy. Comm.

$150,808—**Ausland & Dodson,** 781 Liberty St., Ashland—Low bid for construction of a water treatment plant, Newport; by City.

$141,415—**Central Paving Co.,** Dallas, Oregon—Low bid for 1.5 mi. of grading and 1.8 mi. of paving 6 mi. south of Dallas; by St. Hwy. Comm.

$1,112,370—**Guy F. Atkinson Co.,** 5315 N.E. 101st St., P. O. Box 7528, Portland—Low bid for piers, approaches, deck on steel span, etc., for Wilsonville Bridge over Willamette River; by St. Hwy. Comm.

$468,480—**Gibbons & Reed Co.,** 259 W. 3rd South St., Salt Lake City, Utah—Low bid for 7.2 mi. of grading T. H. Bansfield Expressway in East Portland; by St. Hwy. Comm.

$1,245,875—**Funderburk & Stoen Construction Co.,** Sutherlin—Low bid for 4.6 mi. of grading and paving Oregon Coast Highway south of Depoe Bay; by St. Hwy. Comm.

$120,466—**Larson Construction Co.,** Box 120, Astoria—Award for bank protection work at Stoutenberg location, Willamette River; by C. of E.

$251,123—**J. H. & H. W. Miller, Baker and Russell Olson Construction Co.,** 144 S.E. 1st Ave., P. O. Box 272, Pendleton—Low bid for construction work on Flora-Enterprise highway in Wallowa National Forest; by BPR.

$204,890—**Pacific Dredging Co.,** 14409 S. Paramount Blvd., Paramount, Calif.—Award for dredging a 30-ft. channel in Coos Bay; by C. of E.

$4,002,625—**Ralph & Horowitz,** 1835 N. Flint Ave., Portland—Award for eight-story office building for use by the Bonneville Power Administration, Portland.

$515,865—**T. W. Thomas,** 10248 N.E. Holladay, Portland—Award for 5½ mi. of grading and paving, Medford highway; by St. Hwy. Comm.

Utah

$337,090—**W. W. Clyde & Co.,** Springville—Award for plant-mix bitum. surf. betw. Layton and North; by St. Rd. Comm.

$199,970—**R. M. Jensen,** 1057 South 4th West, Salt Lake City—Award for Upalco U. S. 40, highway construction; by St. Rd. Comm.

$145,040—**LeGrand Johnson,** 595 E. 1st So., Logan—Award for plant-mix bitum. surf. road and conc. bridge Logan to Nibley; by St. Road Comm.

$176,890—**Parson & Fife Construction Co.,** 620 E. 5th So., Box 563, Brigham City—Award for construction of highway between Smithfield and Richmond; by St. Rd. Comm.

Washington

$695,060—**Roy L. Bair & Co.,** W. 1220 Ide Ave., Spokane—Award for construction of apron paving and utilities, Fairchild Air Force Base; by C. of E.

$1,196,000—**Bennett-Campbell, Inc.,** 815 Seaboard Bldg., Seattle—Award for four barracks, mess hall, motor maintenance shop, etc., at Fairchild Air Force Base; by C. of E.

$597,000—**Cisco Construction Co.,** Portland—Award for feeder mains to connect with Richland water supply system; by AEC.

$347,582—**Fiorito Bros.,** 1100 Leary Way, Seattle—Award for 3.5 mi. construction, Paxton Road to Rocky Point, Primary State Highway No. 1, Cowlitz County; by St. Dept. of Hwys.

$307,250—**General Construction Co.,** P. O. Box 3244, Seattle—Award for 56,000 sq. ft. of wharf area construction, etc., for extension and modernization of East Waterway Terminal, Seattle; by Port of Seattle.

$2,384,060—**Morrison-Knudsen Co., Inc.,** 603 Hoge Bldg., Seattle—Award for construction of Battery St. vehicular subway, Seattle; by St. Dept. of Hwys.

$739,250—**Northwest Construction Co.,** 3950 6th Ave. N.W., Seattle—Low bid for two reinf. conc. bridges and paving 3.9 mi. of state highway No. 2 east of Tanner; by St. Dept. of Hwys.

$269,235—**Northwest Construction Co.,** 3950 6th Ave. N.W., Seattle—Award for two 12-ft. traffic lanes as first major unit of Empire Way extension in Seattle; by City.

$137,595—**Port Construction Co.,** P. O. Box 868, Port Angeles—Award for reinf. conc. box girder bridge across Judd Creek, Vashon Island, King County; by St. Dept. of Hwys.

$3,929,600—**Sound Construction & Engineering Co.,** 1300 Aloha St., Seattle—Award for plant addition at Boeing Airplane Co., Seattle; by U. S. Air Force.

$168,660—**Scheuman & Johnson,** 1001 Lloyd Bldg., Seattle—Award for Cub Creek Dam and water system for Arlington Naval Radio Station; by U. S. Navy.

$143,710—**Stone & Thaut Construction,** 1001 W. Ide Rd., Spokane—Award for highway, Narcisse Creek to Park Rapids, Stevens County; by St. Dept. of Hwys.

Wyoming

$147,235—**Lichty Construction Co.,** P. O. Box 1068, Riverton—Award for 8-mi. highway, Ethete, Fremont County; by St. Hwy. Comm.

$305,560—**Platte Valley Construction Co.,** Grand Island, Neb.—Award for 11½ mi. improvement, Green River-Linwood Road, Sweetwater County; by St. Hwy. Comm.

$192,840—**Read Construction Co.,** 706 W. 19th St., Cheyenne—Award for 11 mi. highway work, Medicine Bow-North Road, Carbon County; by St. Hwy. Comm.

$182,010—**A. H. Read Construction Co.,** 706 W. 19th St., Cheyenne—Low bid for plant-mix surfacing 91 blocks in Cheyenne; by City.

NEVADA FOUR-LANE

. . . Continued from page 78

double 6 x 6-ft. reinforced concrete box was constructed under the new roadway at a point opposite the railroad structure. These two structures will carry the runoff from a drain ditch which now flows in from the north at this point, to the new channel on the south side of the railroad right-of-way. Under present drainage setup, the drain ditch on the north flows into the north borrow ditch and under the present highway through an 8 x 20-ft. reinforced concrete bridge about a mile to the east. The new plan eliminates the need for this present borrow ditch which will be covered by the new construction.

The Testing and Research Department was fortunate in locating the remains of an ancient lake beach deposit about mid-way on the job and 800 ft. to the north. From this source of material the gravel bases as well as the aggregate for plantmix will be obtained. Raw material first goes through a primary crusher set for 3-in. maximum size, before being processed in a screening plant set up at the pit site.

Although the grading had not progressed far enough to receive the base, the plant was started and the material stockpiled. This was done so the plant could be released and used on other contracts. The plant was operated on a three shift basis.

To gain access to the pit the contractor constructed a haul road on a fill 18 in. high, which under normal conditions would have been ample. But as the flood water began to rise he was forced to place additional courses to keep the road above water. At the time the flood had reached its crest this haul road had been raised to a height of about 7 ft. This was barely enough to clear the high water mark.

Contract for the improvement was awarded to the Isbell Construction Co. of Reno on its low bid of $530,136.25, with 225 working days allowed for completion. Some of the major items included in the 3.14-mi. section are:

Roadway excavation "A"	301,715 cu. yd.
Roadway excavation "B"	74,605 cu. yd.
Type I gravel base	49,930 tons
Type II gravel base, 1-in.	24,550 tons
Liquid Asphalt, Type SC-6 (plantmix)	824 tons
Class F2 plantmix	18,300 tons
Class "A" concrete	689 cu. yd.
Emulsified asphalt (seal)	131 tons
Screenings	746 tons
Reinforcing steel	71,190 lb.

The contractor's work has been carried on under the direction of Frank Zielinski, superintendent, with an average working force of from 50 to 60 men for each shift.

The improvement is located in Division 2 of the Nevada Department of Highways of which J. L. Hancock is Division Engineer with headquarters in Reno. Headquarters for the department are in Carson City, with H. D. Mills, State Highway Engineer; W. T. Holcomb, Assistant Highway Engineer, and J. D. Meacham, Engineer of Construction.

UNIT BID PRICES

Selected bid abstracts for Western projects

Tunnel

Toston Tunnel in Montana

Montana—Missouri River Basin Project—USBR. A. J. Cheff Construction Co., Seattle, Wash., submitted the low bid of $326,963 for construction of the Toston Tunnel and access road, Crew Creek Pumping Unit, Missouri River Basin Project. Unit prices were as follows:

(1) A. J. Cheff Construction Co. $326,963
(2) K. S. Mittry Construction Co. and N. M. Saliba Co. 450,799
(3) Carson Construction Co. $474,455
(4) Engineer's estimate 381,057

	(1)	(2)	(3)	(4)
32,700 cu. yd. excav., common, for canal	.33	.40	.45	.40
2,050 cu. yd. excav., common, in open cut	1.00	5.00	1.40	1.00
1,325 cu. yd. excav., rock, in open cut	3.00	5.00	10.00	3.00
4,080 cu. yd. excav., all classes, in tunnel	40.00	52.00	30.00	46.00
60 cu. yd. excav., all classes, for tunnel enlargement	40.00	90.00	30.00	50.00
1,200 cu. yd. backfill about structures	.60	1.50	.75	1.20
950 cu. yd. compacting backfill about structs.	.60	4.00	5.00	3.50
88,800 lb. furn. and installing perm. steel tunnel supports	.16	.24	.35	.22
56 M.b.m. furn. and erecting perm. timbering in tunnel	200.00	400.00	350.00	300.00
200 lin. ft. drilling feeler or pilot holes ahead of tunnel excav.	1.00	8.00	5.00	1.50
200 lin. ft. drilling grout holes through conc. tunnel lining	2.00	3.00	5.00	2.00
560 lb. furn. and placing grout pipe and connections	.50	1.00	1.50	1.00
1,000 cu. ft. pressure grouting	3.00	6.00	3.75	3.00
127 cu. yd. concrete in structures	60.00	90.00	138.00	70.00
1,240 cu. yd. concrete in tunnel lining	48.00	45.00	125.00	50.00
2,110 bbl. furnishing and handling cement	5.40	8.00	6.90	7.00
13,000 lb. furnishing and placing reinf. bars	.18	.20	.37	.20
157 lin. ft. placing rubber water stops in joints	.50	2.00	2.50	2.00
1,240 lb. furn. and installing weep pipes in tunnel lining	.30	1.00	1.00	.75
240 lb. furn. and installing miscl. metal-work	1.00	1.00	1.00	.75
10,000 cu. yd. excav., common, for roadway	.50	2.00	.80	.70
18,000 cu. yd. excav., rock, for roadway	1.50	2.00	3.00	1.60
40 cu. yd. excav., all classes, for roadway culverts	1.50	3.00	4.00	4.00
15 cu. yd. backfill for roadway culverts	1.00	4.00	3.00	2.00
66 lin. ft. furn. and laying 12-in. diam., 16-ga., corrugated-metal pipe for roadway culverts	5.00	8.00	8.00	3.50

Exploratory drilling in railroad tunnel

Oregon—Sherman County—Corps of Engineers. Messer, Toye & Associates, Inc., Portland, submitted the low bid of $6,430 to the Corps of Engineers for exploratory drilling for offset chambers in O.W.R. & N.R.R. tunnel, located 7 mi. southwest of Maupin. Unit prices were as follows:

(1) Messer, Toye & Associates, Inc. ..... $ 6,430
(2) Boyles Bros. Drilling Co. 23,021
(3) Government estimate $11,865

	(1)	(2)	(3)
1 lump sum, mobilization, demobilization, and clearing tunnel	530.00	$6,890	$2,370
90 lin. ft. excav. of access drifts and raises	31.67	105.00	38.50
4 ea. excav. of offset chamber (Type A-1, A-2, B-1 and B-2)	200.00	957.75	$1,075
2 ea. excav. of offset chambers (Type C and D)	$1,125	$1,425	865.00

Bridge and Grade Separation

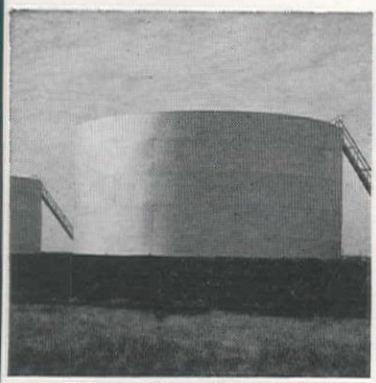
Reinforced concrete box culvert

California—Fresno County—State. Thomas Construction Co., Fresno, submitted the low bid of $68,802 to the State Division of Highways for construction of a reinforced concrete box culvert and about 0.15 mi. of roadway to be graded and bituminous surface treatment applied at Location 1. At Location 2, a reinforced concrete bridge to be constructed and about 0.2 mi. of approaches to be graded and bituminous surface treatment applied. Unit prices were as follows:

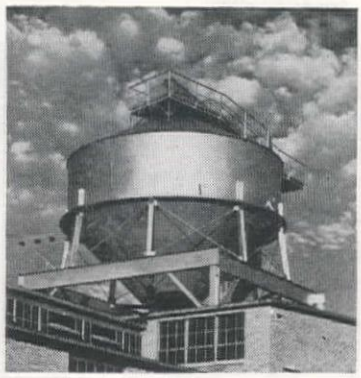
(1) Thomas Construction Co. $68,802
(2) Trewhit-Shields & Fisher 76,505
(3) E. G. Perham $79,848

SALES CREEK (LOCATION 1)	(1)	(2)	(3)
Lump sum, removing existing bridge	700.00	$1,500	$2,000
Lump sum, clearing and grubbing	590.00	$1,000	500.00
400 cu. yd. roadway excav.	1.40	2.50	2.00
240 cu. yd. structure excav.	7.00	5.50	6.00
60 cu. yd. channel excav.	5.00	3.65	4.00
325 sq. yd. compacting original ground	.30	.25	.50
3,550 cu. yd. I.B.M.	2.10	2.00	2.25
Lump sum, dev. water supply and furn. water equip.	870.00	500.00	500.00
250 M. gal. applying water	1.00	3.70	4.00
8 sta. finishing roadway	20.00	37.00	25.00
40 ton liquid asphalt, SC-3 or SC-4 (B.S.T.)	32.00	37.00	40.00
2,900 sq. yd. preparing, mixing and shaping surface (B.S.T.)	.25	.32	.30
1 ton asphaltic emulsion (sl. ct.)	50.00	100.00	100.00
50 sq. ft. B.S.T. slope drains	1.00	.65	1.00
120 cu. yd. Class "A" P.C.C. (structure)	65.00	63.00	75.00
15,000 lb. bar reinforcing steel	.11	.12	.14
100 lin. ft. metal plate guard railing	5.00	6.00	10.00
10 ea. install. guide posts and clearance markers	6.00	10.00	5.00
116 lin. ft. new property fence	.60	1.00	1.00

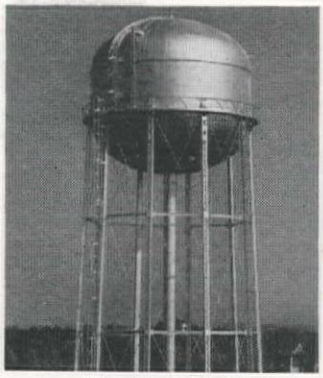
(Continued on next page)



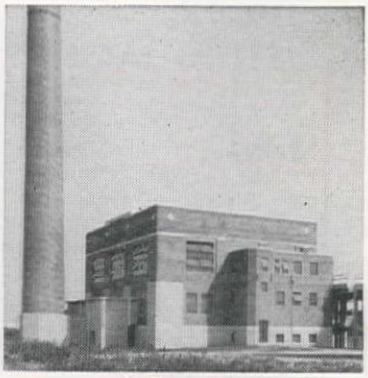
Oil and Gasoline Tanks



Bins



Elevated Tanks



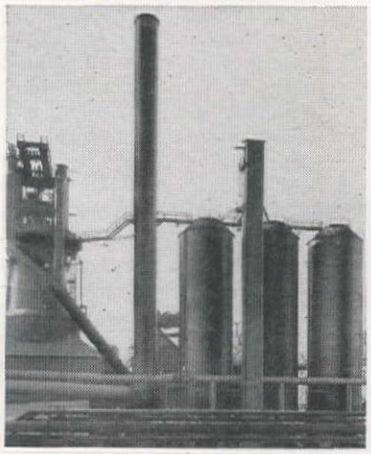
Incinerators

Structural Steel

Designers

Fabricators

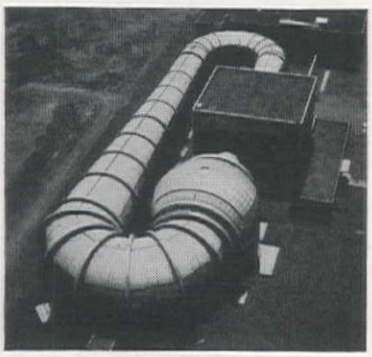
Erectors



Steel Plate Construction

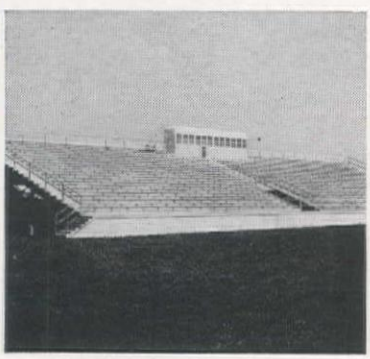
IN STEEL...

PITTSBURGH •DES MOINES

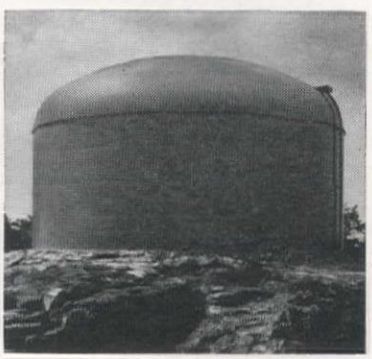


Wind Tunnels

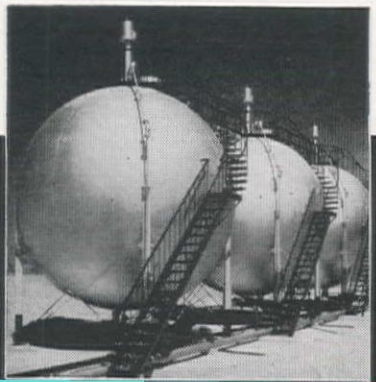
Industrial Buildings

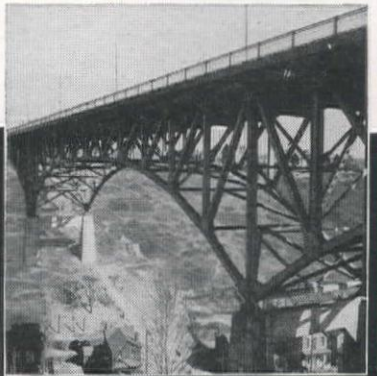


Steel Deck Grandstands



Steel Reservoirs





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LOS ANGELES (48), ... 6399 Wilshire Blvd.
DES MOINES (8), 921 Tuttle Street
DALLAS (1), 1225 Praetorian Bldg.
SEATTLE . . . . . 528 Lane Street
SANTA CLARA, CAL. . . 627 Alviso Road

LIFTING JACK TIPS

. . . Continued from page 86

ceptionally rough handling. However, with a minimum amount of preventive maintenance all classes of lifting jacks will give better, longer, and more economical performance. Proper maintenance differs from type to type, but there are a few simple rules which apply to all jacks. These rules are:

Rules for maintenance

1—Have a sufficient supply of the right types of jacks on hand for routine operations and for all emergencies. Along this line, the most important point to remember is that a workman never should use a jack to attempt to lift more than the rated capacity. A 10-ton jack may be able to lift 13-ton loads, but it will not do so safely. The risk to equipment and personnel is not worth taking the chance.

2—Set up a place for storage, and see that all jacks are kept there when not in use. An additional "good housekeeping" habit is to keep them painted a bright color for quick identification. If a jack cannot be located, too often the workman is tempted to use his muscle instead of lifting the load the right way.

3—Do not use defective or unsuitable jacks or handles. It will pay you to conduct periodic checks of your jacks, and instruct your men to inspect the jacks themselves before each use. A damaged handle can waste time and energy, and, more important, it can cause serious injury.

Who should use them?

4—Do not allow incompetent men to handle your jacks—they are valuable tools. Be sure the workmen using them are competent and careful, as the cost of the jack is negligible compared to the cost of the equipment it lifts and supports, or to the cost of an accident.

5—Don't overstrain jacks. If the load is heavier than the jack's rated capacity, or if there is doubt that it is, use a stronger jack.

6—When using the foot lift, place the lifting toe all the way and squarely under the load. Particularly during the raising operation, watch the load to see that it does not work out on the toe. If this happens, it will tend to throw the jack off balance and upset the load or slide it.

Centered, plumbed, blocked

7—Make sure jacks are centered, plumbed and properly blocked. At all times the base should rest on an even, unyielding surface. If terrain does not permit this, block up the jack bottom. Also, always be sure the head of the jack is against a solid part of the load, so that movement will not cause the load to slide or rock. Do not jack against steel. A wood shim will substantially increase the safety factor. In order to obtain maximum lift in your jack, always block it as closely as possible to your load.

8—Never leave the load on a jack

Concluded on page 140

UNIT BID PRICES . . . CONTINUED

BIG DRY CREEK (LOCATION 2)	(1)	(2)	(3)
Lump sum, removing existing bridge	$1,100	$2,600	$3,000
Lump sum, clearing and grubbing	$3,760	450.00	500.00
1,830 cu. yd. roadway excav.	1.75	3.45	2.00
470 cu. yd. structure excav.	14.00	15.00	12.00
24 cu. yd. channel excav.	5.00	27.00	6.00
550 sq. yd. compacting original ground	.20	.30	.30
1,500 cu. yd. I.B.M.	1.00	2.35	2.50
Lump sum, dev. water. supply and furn. water. equip.	825.00	500.00	500.00
250 M. gal. applying water	1.00	3.40	4.00
11 sta. finishing roadway	20.00	55.00	25.00
50 ton liquid asphalt, SC-3 or SC-4 (B.S.T.)	35.00	41.00	40.00
3,600 sq. yd. prepar. mix. and shaping surface (B.S.T.)	.25	.40	.25
1 ton asphaltic emulsion (sl. ct.)	50.00	125.00	100.00
50 sq. ft. B.S.T. slope drains	1.00	.65	1.00
280 cu. yd. Class "A" P.C.C. (structure)	60.00	59.00	70.00
34,000 lb. bar reinforcing steel	.11	.11	.14
50 cu. yd. broken concrete and rock riprap	20.00	25.00	30.00
145 lin. ft. corrugated metal bridge railing	6.50	6.00	10.00
90 lin. ft. temporary timber railing	2.00	3.00	4.00
6 ea. portable timber barricades	30.00	35.00	50.00
15 ea. install. guide posts and clearance markers	6.00	10.00	5.00
807 lin. ft. new property fence	.75	.60	.50

450-ft. steel and concrete bridge

Montana—Toole County—State. McKinnon-Decker Co., Helena, received an award from the State Highway Commission on its low bid of $231,996 for construction of a 450-ft. steel and concrete bridge on Shelby South highway. Unit prices were as follows:

(1) McKinnon-Decker $231,996
(2) Walter Mackin & Son 239,547
(3) Anderson Construction Co. 245,338
(4) W. P. Roscoe Co. $263,972
(5) Montana Engineering and Construction Co. 274,730

	(1)	(2)	(3)	(4)	(5)
407,850 lb. structural steel	.22	.22	.23	.252	.255
74,380 lb. reinforcing steel	.15	.17	.16	.172	.185
696.0 cu. yd. Class "A" concrete	70.00	70.00	69.00	72.70	66.00
279.1 cu. yd. Class "AD" concrete	75.00	80.00	80.00	72.70	83.00
907.5 lin. ft. steel beam bridge rail	8.00	5.00	7.00	3.50	10.00
6,320 lin. ft. untr. timber foundtn. piling	3.00	2.50	2.00	3.50	2.20
2,050 cu. yd. struct. excav.	15.00	21.00	23.00	24.00	27.50
5 ea. test piles	500.00	150.00	150.00	205.00	160.00
199 ea. pile shoes	10.00	10.00	12.00	10.00	7.00

363-ft. steel and concrete bridge in Idaho

Idaho—Lewis and Clearwater counties—State. J. H. Wise & Son, Boise, submitted the low bid of $177,777 to the State Department of Highways for construction of a 362.75 ft. concrete and steel bridge over the Clearwater River on State Highway No. 11 at Greer in Lewis and Clearwater counties. Unit prices were as follows:

(1) J. H. Wise & Son $177,777
(2) Commercial Builders 195,896
(3) Sather & Son 217,479
(4) Roy L. Bair $225,636
(5) Clifton & Applegate 233,130

	(1)	(2)	(3)	(4)	(5)
1 ea. removal of bridge	$7,400	$17,800	$15,000	$10,000	$11,000
470 cu. yd. excav. for structs.	4.30	8.00	10.00	12.00	6.50
865 cu. yd. concrete, Class A	57.00	68.00	82.50	82.00	86.00
30 cu. yd. concrete, Class C	30.00	35.00	60.00	35.00	40.00
93,300 lb. metal reinforcement	.12	.135	.14	.135	.13
Lump sum, steel bridge	$87,000	$69,850	$77,000	$90,811	$109,000
730 lin. ft. str. steel handrail conc. str.	9.00	8.70	9.00	9.00	9.00
Lump sum, furn. pile driving equipment	700.00	$1,600	$1,500	$1,000	$1,100
450 lin. ft. furn. timber piles treated	1.90	1.60	1.50	2.00	1.95
420 lin. ft. driving timber piles treated	1.50	2.00	1.50	2.00	2.66
30 lin. ft. driving test piles	10.00	5.00	6.00	10.00	6.40
Lump sum, shoring, cribbing, cofferdams, etc.	$10,900	$22,360	$25,000	$25,000	$12,500

Irrigation

Parshall Flume for Aspen Creek Siphon

Colorado—Colorado-Big Thompson Project—USBR. Crocker & Ellett, Inc., Denver, submitted the low bid of $99,115 for construction of Parshall Flume and Inlet for Aspen Creek Siphon Power Canal No. 1, Colorado-Big Thompson Project. Unit prices were as follows:

(1) Crocker & Ellett, Inc. ..... $ 99,115
(2) L. J. Hesser 102,362
(3) Engineer's estimate $69,905

	(1)	(2)	(3)
2,000 cu. yd. excav., common, for structs.	8.00	10.00	6.00
1,500 cu. yd. excav., rock, for structs.	8.00	12.00	8.00
2,200 cu. yd. backfill about structs.	5.00	4.00	1.00
800 cu. yd. compacting backfill about structs.	5.00	6.00	3.50
250 cu. yd. concrete in structs.	150.00	120.00	100.00
375 bbl. furn. and handling cement	8.00	10.00	7.00
13,500 lb. placing ⅝-in. reinf. bars	.12	.20	.10
22,000 lb. furn. and placing reinf. bars	.20	.20	.20
100 lin. ft. placing 9-in. rubber water stops in joints	5.00	2.00	2.00
0.75 M.b.m. furn. and erecting untreated timber in structs.	400.00	500.00	350.00
140 lin. ft. furn. matls. and constr. 4-in. diam. sewer-pipe drains with uncemented joints	8.00	5.00	3.00
35 cu. yd. removing existing concrete	50.00	50.00	30.00
Lump sum, furn. and installing slide gate	$1,000	$1,000	$2,500
Lump sum, removing and reinstalling trashracks	500.00	500.00	750.00
2,925 lb. furn. and installing miscl. metalwork	1.00	1.50	.70
Lump sum, furn. and installing recorder house electrical systems	$1,500	$1,000	300.00

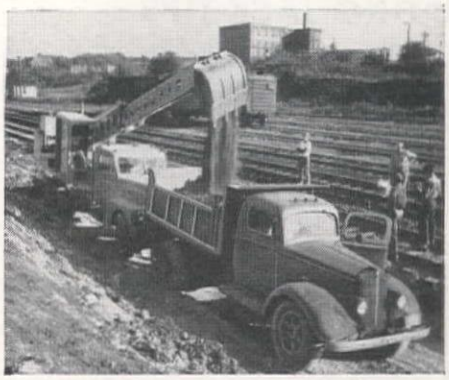
No "Elbow Room"...

BUT ROOM FOR GRADALL'S FAMOUS ARM-ACTION!

GRADALL CONTRACTORS are often called on for many unusual jobs. And a Cleveland contractor, James Murphy & Sons, recently took on this tricky railroad job that required working in an area not much wider than the truck itself. On one side was a cut that had to be trimmed. On the other, a busy main line track where traffic had to be maintained.

But the Gradall's unique *arm-action* and *controlled down pressure* did the job fast—and better than the hand labor and machines it replaced. Working from the top of the bank—around posts and other obstacles—it first trimmed the top part of the slope. Then, backed into the narrow passageway, its hydraulic-telescoping boom "reached out" to finish the slope's lower portion, as well as digging a drainage ditch and cleaning the roadbed right up to the ties—all from this cramped position—with no hand labor.

The multi-purpose Gradall is one machine you're sure to keep busy on all sorts of earth-moving and construction jobs. For a field demonstration of its cost-cutting efficiency, see your nearest Gradall Distributor.



Gradall's 360° mount and telescoping boom permitted loading spoil over cab into waiting truck, necessitated here by one-way approach to work area.

Hydraulic arm-action boom tilts bucket to work at any angle.

Note accurate, uniform grade of finished slope and close work around ties—without hand labor.

SALES AND SERVICE:

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CONTRACTORS MACHINERY COMPANY, *San Francisco 7, California*
WESTERN CONSTRUCTION EQUIPMENT CO., *Billings, Great Falls, Missoula, Montana*
WILSON EQUIPMENT & SUPPLY CO., *Cheyenne, Casper, Wyoming*
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Gradall®
DIVISION OF WARNER & SWASEY *Cleveland*

GRADALL—THE *Multi-Purpose* EARTH—MOVING AND CONSTRUCTION MACHINE

LIFTING JACK TIPS

. . . Continued from page 138

without blocking. After the lift has been made, block it to prevent sudden dropping in case the jack is accidentally jarred or tripped.

9—Always remove the jack handle from the socket after a lift has been made to prevent men from stumbling over it or accidentally moving the load.

10—Do not set the jack in the lowering or tripping position until ready to lower. Instead, leave it set for lifting; then if the lever is moved accidentally, the jack will raise instead of lower.

11—Oil jacks regularly, at least once each month. Keeping jacks well oiled makes them work easier and also saves wear on moving parts.

12—It is good practice to always set hydraulic jacks in an upright position, even while not in use to avoid oil leakage from the jack or air from getting into the jack. An air loaded hydraulic jack is useless.

CLEANING OLD PIPE

. . . Continued from page 79

take the cleaner from the pipe line. It was then possible to observe the results of the cleaning run. As is usual, it was necessary to use a small crew of men to examine the interior and do additional hand cleaning before the cement-mortar lining work could start. This hand cleaning is principally around the riveted or welded seams. Access for the workmen to the pipe is provided through existing manholes or other 24-in. access holes cut in the top of the pipe.

Completed in three reaches

On this contract the hydraulic cleaning of the 57,000 ft. of pipe was completed in three reaches, with the cleaning machine revised at the end of each reach to fit the pipe size ahead. Sizes were 66-in., 62-in., and 58-in., all riveted. A cleaning run usually consumes one day, with three days allowed for removal, revision and re-insertion of the cleaning tool; also moving of valve installation and refilling of the line preparatory to another cleaning run.

Previous articles in *Western Construction* have described in some detail the equipment and method used in the subsequent placing of the cement-mortar lining.

Personnel

The work done under this contract was for the City and County of San Francisco, H. E. Lloyd, manager and chief engineer; Wm. W. Helbush, senior civil engineer, and Tom Condon, resident engineer. The cleaning operations were under technical supervision of L. S. Olding, in his capacity as superintendent for the National Water Main Cleaning Co. of New York City, with J. W. Thomson, field superintendent for Pipe Linings, Inc., in general charge of the work for the contractor. Pipe Linings, Inc., will carry out the lining of the cleaned pipe.

UNIT BID PRICES . . . CONTINUED

Dam

Tiber earthfill dam and dike in Montana

Montana—Missouri River Basin Project—USBR. Guy H. James Construction Co., Oklahoma City, Okla., and Wunderlich Contracting Co., Omaha, Neb., submitted the low bid of $12,838,691 to the Bureau of Reclamation for construction of Tiber Dam and Dike, Lower Marias Unit, Marias Division, Missouri River Basin Project. Unit prices were as follows:

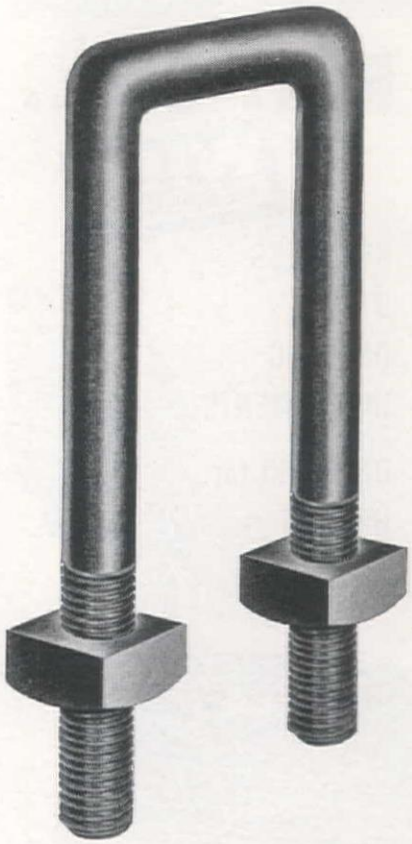
(1) Guy H. James Const. Co. and Wunderlich Contracting Co. $12,838,691
(2) Guy F. Atkinson Co. 12,887,210
(3) S. A. Healy Co. 12,920,171
(4) Morrison-Knudsen Co., Inc. and Peter Kiewit Sons' Co. 13,283,929
(5) Rocky Mountain Constructors 13,430,856
— Massman Construction Co. and Western Contracting Corp. 13,715,544
— C. F. Lytle Construction Co. and Assoc. $14,361,844
— The Utah Construction Co. 14,436,567
— J. A. Jones Construction Co. and Assoc. 14,671,747
— Grafe-Callahan Construction Co. 18,922,084
(6) Engineer's estimate 12,682,324

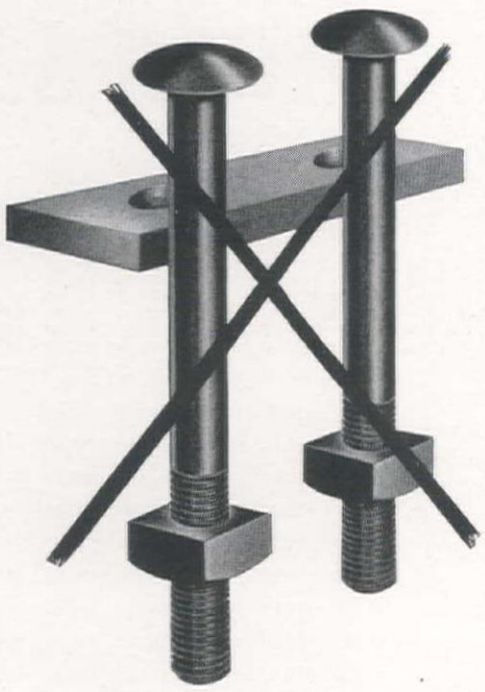
		(1)	(2)	(3)	(4)	(5)	(6)
	Lump sum, diversion and care of river during constr. and unwatering foundtns.	170,000	120,000	114,000	138,810	118,800	175,000
1,000,000	cu. yd. excav., unclass., in open cut for spillway and river outlet	.60	.52	.54	.55	.75	.45
180,000	cu. yd. excav., uncl. in open cut for canal outlet	.40	.55	.50	.55	.80	.60
20,000	cu. yd. excav., uncl., in tunnels	24.00	20.00	21.00	22.00	25.00	22.00
970,000	lb. furn. and placing perm. structl.-steel tunnel supts., stl. tunnel-liner plates and stl. lagging	.22	.16	.25	.15	.15	.22
417,500	cu. yd. excav., uncl., for dam fdtn., first 417,500 cu. yds.	.70	.93	.50	.66	.85	.60
417,500	cu. yd. excav., uncl., for dam fdtn. over 417,500 cu. yds.	.48	.45	.30	.48	.50	.48
250,000	cu. yd. excav., uncl. for fndtn. of dike	.30	.35	.26	.30	.25	.30
1,250,000	cu. yd. excav., stripping borrow areas	.25	.18	.26	.30	.19	.27
875,000	cu. yd. excav. in borrow area "E" and transpt. to dam embank., first 875,000 cu. yds.	.40	.49	.40	.44	.45	.42
875,000	cu. yd. excav. in borrow area "E" and transpt. to dam embank., over 875,000 cu. yds.	.30	.19	.26	.39	.45	.34
1,390,000	cu. yd. excav., in borrow area "H" and transpt. to dam embank.	.35	.28	.39	.39	.45	.33
3,675,000	cu. yd. excav. in borrow area "M" and transpt. to dam and dike embank. and blanket under disposal area "A" first 3,675,000 cu. yds.	.55	.57	.55	.59	.55	.52
3,675,000	cu. yd. excav. in borrow area "M" and transpt. to dam and dike embank. and blanket under disposal area "A", over 3,675,000 cu. yds.	.33	.26	.44	.39	.38	.44
800,000	cu. yd. excav. in borrow area "N" and transpt. to dike embank., first 800,000 cu. yds.	.40	.53	.34	.32	.24	.30
800,000	cu. yd. excav. in borrow area "N" and transpt. to dike embank., over 800,000 cu. yds.	.20	.20	.24	.26	.18	.22
11,000	gal. covering shale surf. with sprayed protective coating	1.25	.55	1.00	1.00	1.00	1.00
2,060,000	cu. yd. earthfill in dam embank., zone 1 and 2, first 2,060,000 cu. yds.	.20	.24	.20	.20	.16	.16
2,060,000	cu. yd. earthfill in dam embank., zones 1 and 2, over 2,060,000 cu. yds.	.10	.17	.15	.14	.08	.12
25,000	cu. yd. special compaction of earthfill in embank.	3.50	3.75	2.75	4.00	4.00	3.50
700,000	cu. yd. earthfill in dike embank., zone 1, first 700,000 cu. yds.	.20	.24	.20	.15	.16	.16
700,000	cu. yd. earthfill in dike embank., zone 1, over 700,000 cu. yds.	.10	.11	.15	.09	.08	.12
2,650,000	cu. yd. sand, gravel, and cobble fill in dam emb., zone 3, first 2,650,000 cu. yds.	.12	.22	.09	.12	.12	.12
2,650,000	cu. yd. sand, gravel, and cobble fill in dam emb., zone 3, over 2,650,000 cu. yds.	.08	.09	.065	.08	.08	.08
500,000	cu. yd. sand, gravel, and cobble fill in dike emb., zone 3	.12	.15	.09	.10	.12	.11
2,700	cu. yd. placing and sluicing sand, gravel, and cobble fill around canel-outlet structs.	.60	.33	.50	.90	4.00	1.00
47,000	cu. yd. backfill	.60	.20	.50	.67	1.00	.50
14,000	cu. yd. dumped riprap	6.00	7.50	7.35	8.00	8.00	8.00
170,000	cu. yd. riprap on upstream slopes of dam and dike embankments	6.00	7.50	7.35	7.00	8.00	7.50
4,500	cu. yd. placing graded sand and gravel base layer for filter under spillway floor	3.00	2.25	1.50	2.15	3.00	2.25
4,500	cu. yd. placing graded gravel top layer for filter under spillway floor	3.30	2.75	2.50	2.90	4.00	3.00
220	cu. yd. continuous grav. drs. back of splwy. walls	8.50	6.50	6.00	8.20	6.00	8.00
8,200	lin. ft. furn. 8-in. diam. sewer pipe and constr. embank. drs. with uncem. jts.	2.50	1.70	2.50	3.20	3.00	2.50
4,200	lin. ft. furn. 12-in. diam. sewer pipe and constr. embank. drs. with uncem. jts.	3.00	2.00	3.75	5.50	6.00	3.75
3,600	lin. ft. furn. 4-in. diam. sewer pipe and constr. spillway drs. with uncem. jts.	1.20	1.50	1.50	1.95	2.50	1.50
900	lin. ft. furn. 6-in. diam. sewer pipe and constr. spillway drs. with uncem. jts.	1.50	1.60	2.00	2.50	3.25	1.80
5,700	lin. ft. furn. 8-in. diam. sewer pipe and constr. spillway drs. with uncem. jts.	1.80	1.65	2.30	3.20	3.75	2.40
400	lin. ft. furn. 12-in. diam. sewer pipe and constr. spillway drs. with uncem. jts.	2.75	2.50	3.75	5.20	6.00	3.75
500	lin. ft. furn. and laying 4-in. diam. sewer pipe with cem. jts. for spillway	1.30	1.60	1.50	1.95	2.50	1.50
130	lin. ft. furn. and laying 12-in. diam. sewer pipe with cem. jts for spillway	3.00	2.50	3.75	5.00	6.00	3.50
170	lin. ft. drilling weep holes	3.00	3.00	3.00	2.80	2.00	3.00
5,800	lin. ft. drilling grout holes in stage betw. depths of 0 foot and 20 feet	2.50	4.30	2.00	3.10	3.75	2.75
1,650	lb. furn. and placing std. black pipe and fittgs. for grouting	.70	.70	.55	.90	1.00	.60
1,800	lb. furn. and install. std. zinc-coated pipe and fittings, and special grout outlets	1.15	1.80	.70	1.03	2.00	1.00
5,800	cu. yd. pressure grouting	2.70	3.50	2.75	2.00	4.00	2.50
6,800	cu. yd. conc. in lining of tunnels	50.00	50.00	37.00	35.00	35.00	35.00
425	cu. yd. conc. in river-outlet trashrack struct. and upstream retaining walls	70.00	69.00	42.00	66.00	60.00	55.00

(Continued on next page)

SAVE Man-Hours and Materials with Your Own

SPECIAL FASTENERS





If you analyze the fastening operations on your assembly lines or your construction jobs, you may see places where you could save motions that add up to man-hours, or save materials and improve the design of your product. When this happens, call Bethlehem Pacific for engineering advice. One of our engineers will gladly study your problem and help you design the special fastener you need.

In addition to turning out special fasteners for all industries, we manufacture a full line of standard bolts, nuts, rivets, spikes, threaded rods and other fastener items at each of our three plants. No matter what you need in fasteners, we can give you complete service.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

SALES OFFICES:
San Francisco, Los Angeles, Portland, Seattle, Honolulu
BOLT AND NUT MANUFACTURING PLANTS:
South San Francisco, Los Angeles, Seattle

BETHLEHEM STEEL

BETHLEHEM PACIFIC

UNIT BID PRICES ... CONTINUED

		(1)	(2)	(3)	(4)	(5)	(6)
255	cu. yd. conc. in river-outlet valve house and downstream retaining walls	100.00	55.00	60.00	78.00	75.00	60.00
365	cu. yd. conc. in river outlet, second stage	70.00	82.00	41.00	44.00	110.00	50.00
17,000	cu. yd. conc. in spillway floors	22.00	20.00	22.25	21.00	18.00	21.00
13,000	cu. yd. conc. in spillway walls	40.00	40.00	43.00	43.40	50.00	38.00
2,450	cu. yd. conc. in spillway crest struct. below elev. 2980.0	30.00	24.00	23.50	25.00	20.00	22.00
1,150	cu. yd. conc. in hwy. br., operating br., curtain walls, and center piers above elev. 2980.0	70.00	56.00	60.00	55.00	100.00	55.00
90	cu. yd. conc. in gutters	48.00	50.00	25.00	66.50	100.00	50.00
65	cu. yd. conc. in spillway battery house and piezometer terminal well	90.00	140.00	140.00	155.00	130.00	100.00
1,150	cu. yd. conc. in canal-outlet upstr. from gate structure	100.00	35.00	46.00	52.00	50.00	40.00
630	cu. yd. conc. in canal-outlet gate struct. below elev. 2989.0	45.00	54.00	75.00	41.00	70.00	45.00
210	cu. yd. conc. in canal-outlet gate struct. above elev. 2989.0	58.00	75.00	100.00	80.00	75.00	60.00
6,000,000	lb. furn. and placing reinf. bars	.15	.12	.133	.15	.13	.13
2,750	lin. ft. furn. and placing type "M2" metal seals	2.80	2.75	3.00	2.00	2.60	2.00
3,600	lin. ft. furn. and placing type "N1" metal seals	2.20	2.90	1.75	2.20	2.10	1.75
550	lin. ft. placing rubber water stops	2.00	1.60	2.25	1.60	2.10	1.70
250	sq. ft. furn. and placing resilient-type jt. filler	2.00	1.15	1.50	2.00	2.50	2.00
289,000	lb. installing radial gates	.09	.07	.09	.06	.10	.07
93,000	lbs. installing radial-gate and slide-gate hoists	.07	.07	.09	.08	.10	.09
25,000	lb. installing stop-log guide keys	.07	.11	.12	.07	.15	.13
4,600	lb. installing ice prevention air system	1.10	.55	.45	.30	1.50	.35
21,600	lb. installing slide gates	.19	.11	.10	.06	.10	.12
3,600	lb. installing hydraulically operated gate valve	.10	.25	.20	.15	.25	.15
79,000	lb. installing high-pressure gate and metal conduit liners	.10	.09	.12	.09	.10	.10
12,000	lb. installing control apparatus for high-pressure gate and for hydraul. oper. gate valve	.75	.28	.30	.25	.50	.40
80,000	lb. installing outlet pipe	.12	.09	.15	.09	.15	.10
2,500	lb. installing butterfly valve	.13	.11	.12	.15	.20	.15
16,000	lb. installing trashracks	.11	.07	.09	.09	.10	.09
3,000	lb. installing reservoir level gage pipe and copper tubing	.40	.55	.40	.28	.60	.40
18,000	lb. installing ventilating system	.30	.24	.30	.30	.40	.25
4,600	lb. installing metal pipe, fittings, and valves	.19	.32	.40	.37	.60	.30
6,500	lb. installing pipe handrailing	.17	.15	.35	.35	.60	.25
600	lin. ft. installing wire fences	1.25	.28	1.10	1.00	2.00	1.00
9,300	lb. installing miscl. metalwork	.25	.27	.25	.25	.40	.25
85	sq. ft. furn. and installing metal doors	10.50	10.00	9.00	9.00	15.00	10.00
40	sq. ft. furn. and installing metal-sash windows	5.70	6.00	6.00	4.60	10.00	6.00
25	sq. ft. furn. and installing metal louvers	8.50	5.00	6.50	5.00	10.00	7.00
360	sq. ft. furn. and placing roofing	.85	1.00	1.00	.95	1.00	.85
2,050	lin. ft. furn. and install. elect. metal conduit 1-in. or less in diam.	1.20	1.80	1.50	1.60	2.00	1.50
990	lin. ft. furn. and install. elect. metal conduit 1¼ and 1½ in. in diam.	1.20	2.50	1.65	2.10	2.20	2.00
160	lin. ft. installing elect. metal conduit 2 and 2½ in. in diam.	1.70	3.50	3.00	2.80	2.50	1.75
225	lb. furn. and installing ground wire	2.60	2.00	2.65	2.00	2.00	1.60
1,590	lb. installing elect. conductors	1.70	1.00	1.50	1.60	2.00	1.00
2,825	lb. installing elect. apparatus	.60	.60	1.50	1.00	2.00	.80
Lump sum,	installing spillway storage battery	775.00	500.00	$1,000	900.00	$2,000	800.00
30	lin. ft. drilling 4-in. min. diam. holes for settlement apparatus extensions	6.00	10.00	15.00	11.00	20.00	8.00
250	lin. ft. drilling 1½-in. min. diam. holes for piezometer apparatus	2.10	5.00	3.00	3.00	5.00	3.40
2,200	lb. installing settlement apparatus in dam	1.30	1.00	1.00	1.00	1.50	.70
1,550	cu. yd. trenches for test apparatus	6.20	11.00	6.00	8.80	10.00	7.00
38,000	lin. ft. installing piezometer tubing in dam emb.	.12	.23	.10	.13	.20	.12
Lump sum,	installing test apparatus in term. well for dam	$1,140	$1,500	$2,500	$1,500	$2,500	$2,000
50	pts. installing surf. settlmt. pts. on dam emb.	20.00	35.00	10.00	20.00	20.00	12.00
14	structs. constr. type-HS struct. with 50-ft. poles	740.00	400.00	480.00	370.00	480.00	350.00
28	structs. constr. type-HS struct. with 55-ft. poles	785.00	460.00	520.00	400.00	525.00	375.00
20	structs. constr. type-HS struct. with 60-ft. poles	830.00	520.00	560.00	450.00	560.00	402.00
12	structs. constr. type-HS struct. with 65-ft. poles	885.00	560.00	600.00	480.00	590.00	430.00
4	structs. constr. type-HS struct. with 70-ft. poles	940.00	640.00	625.00	500.00	630.00	462.00
2	structs. constr. type-HS struct. with 75-ft. poles	$1,030	720.00	675.00	540.00	670.00	495.00
1	struct. constr. type-3A struct. with 60-ft. max. pole length	$1,095	440.00	700.00	550.00	700.00	512.00
1	struct. constr. type-3A struct. with 65-ft. max. pole length	$1,170	480.00	750.00	600.00	750.00	555.00
1	struct. constr. type-3A struct. with 70-ft. max. pole length	$1,260	540.00	800.00	640.00	790.00	600.00
1	struct. constr. type-3AC struct. with 65-ft. max. pole length	$1,370	610.00	885.00	620.00	880.00	645.00
1	struct. constr. type-3AC struct. with 70-ft. max. pole length	$1,452	680.00	950.00	730.00	940.00	690.00
1	struct. constr. type-3AC struct. with 75-ft. max. pole length	$1,560	740.00	$1,000	780.00	$1,000	740.00
1	struct. constr. type-3AT struct. with 55-ft. max. pole length	$1,140	410.00	680.00	540.00	690.00	512.00
1	struct. constr. type-3AT struct. with 60-ft. max. pole length	$1,200	450.00	730.00	600.00	730.00	552.00
1	struct. constr. type-3AT struct. with 65-ft. max. pole length	$1,280	490.00	790.00	660.00	780.00	595.00
1	struct. constr. type-3AT struct. with 70-ft. max. pole length	$1,360	560.00	830.00	700.00	825.00	640.00
1	struct. constr. type-3T struct. with 50-ft. max. pole length	$1,095	470.00	700.00	560.00	680.00	560.00
1	struct. constr. type-3T struct. with 55-ft. max. pole length	$1,250	530.00	775.00	600.00	765.00	597.00
1	struct. constr. type-3T struct. with 60-ft. max. pole length	$1,320	570.00	820.00	680.00	820.00	637.00
1	struct. constr. type-3T struct. with 65-ft. max. pole length	$1,400	610.00	880.00	730.00	880.00	680.00
1	struct. constr. type-3T struct. with 70-ft. max. pole length	$1,480	680.00	930.00	770.00	930.00	726.00
1	struct. constr. type-3T struct. with 75-ft. max. pole length	$1,600	730.00	$1,000	820.00	$1,000	775.00
1	struct. constr. type-4SWT struct. with two 50-ft. poles, and two 70-ft. poles for overhead grd. wire; and compl. with 3-pole discon. switch	$3,330	$7,700	$7,500	$4,250	$7,340	$3,000
5	x-braces assembling and attaching x-braces	90.00	50.00	66.00	45.00	65.00	45.00
10	guys constr. single guy 115-kilovolt line	35.00	32.00	31.00	58.00	30.00	30.00

(Continued on next page)

3 Ways to get BIGGER PAYLOADS *Legally!*

Your problem today is to deliver BIGGER loads of concrete and *still stay under highway weight limits.* You can solve the problem with any one of these three job-tested Smith-Mobile Truck Mixers. They permit better weight distribution, greater payloads and more take-home dollars. All carry NRMCA rating plates. Write for new bulletin.

SMITH-MOBILE 1
with Rear Engine Drive

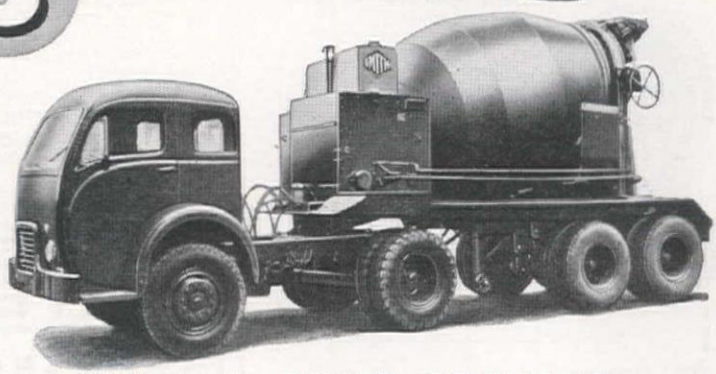
Engine moved to rear of mixer, thereby cutting almost 20" off the over-all length. Enables you to move your mixer forward, thus shifting center of gravity and putting a bigger share of the load on the front axle. Gives you better weight distribution without using Cab-Over or Cab-Ahead type of trucks. Or, you can use a shorter wheelbase truck and get greater maneuverability. Both engine and transmission are completely accessible. Three standard LOADLIMIT sizes: 4½, 5½ and 6½ cubic yards as mixers, with higher ratings for agitators.

SMITH-MOBILE 2
with Truck Engine Drive

Mixer engine eliminated. Reduces dead weight of mixer by about 1300 lbs. Mixer can be mounted closer to cab, removing considerable weight from rear axle and putting it on front axle. Enables you to meet stringent rear-axle load restrictions. One engine instead of two also means less fuel consumption, less engine maintenance. Available for both LOADLIMIT and CLOSED END models, in 4½, 5½ and 6½ yd. sizes, higher ratings for agitators.

SMITH-MOBILE 3
Trailer Mixer

Enables you to carry from 8 to 9 yard payloads and still be within highway load limits. Most states are more liberal with payloads allowed on semi-trailers than they are with loads carried in standard truck mounted mixers. Trailer Mixer can carry up to 12,000 lbs. additional concrete, legally, depending on state regulations . . . is just as easy to maneuver in most cases. Tractor can also be used for many other purposes. Available for 6½ yd. mixer, 8⅝ yd. agitator, LOADLIMIT and CLOSED END models.



SMITH
THE T. L. SMITH CO. MILWAUKEE, U.S.A.

THE T. L. SMITH COMPANY
2871 N. 32nd Street • Milwaukee 45, Wisconsin

CONCRETE MIXERS

For BIGGER and BETTER Concrete Mixers and Truck Mixers . . . LOOK TO SMITH

UNIT BID PRICES ... CONTINUED

		(1)	(2)	(3)	(4)	(5)	(6)
50	guys constr. double guy 115-kilovolt line	70.00	43.00	50.00	85.00	49.00	40.00
1	guy constr. stub guy with 60-ft. pole	240.00	155.00	265.00	160.00	260.00	175.00
1	guy constr. stub guy with 65-ft. pole	270.00	170.00	300.00	170.00	300.00	200.00
55	anchors placing plate or cone anchor 115-kilovolt line	48.00	19.00	40.00	18.00	40.00	25.00
5	anchors placing grouted anchor	33.00	13.00	80.00	26.00	80.00	35.00
5	protectors installing guy protector	14.00	12.00	17.00	11.00	20.00	8.00
609	assemblies assemb. and attaching susp.-insulator assemb. with 7 insulator units	40.00	26.00	40.00	27.00	38.00	28.00
6	assemblies assemb. and attaching susp.-insulator assemb. with 8 insulator units	47.00	30.00	45.00	31.50	45.00	32.00
18	assemblies assemb. and attaching susp.-insulator assemb. with 9 insulator units	55.00	32.00	50.00	35.50	50.00	36.00
54	assemblies assemb. and attaching tension-insula. assemb. with 9 insulator units	100.00	35.00	55.00	35.50	56.00	40.00
12	3-phase circuit mi. stringing No. 4/0 AWG steel-reinf. alum. conductor	$1,790	$2,900	$2,300	$2,600	$2,300	$2,250
54	dampers attach. vibra. damper to alum. condctr.	18.00	5.00	15.00	8.00	16.00	10.00
3	wgts. attaching 50-lb. hold-down weight for susp. insulators	115.00	12.50	30.00	30.00	29.00	20.00
3	wgts. attaching 100-lb. hold-down wgt. for susp. insulators	180.00	21.00	50.00	43.00	50.00	35.00
12	mi. of line stringing two ⅜-in. galv.-steel overhd. ground wire	$1,029	$1,350	$1,000	$1,270	$1,000	800.00
50	posts placing fence grnd. post and grndg. fences	10.00	6.20	21.00	17.00	21.00	10.00
6	structs. constr. type-SS struct. with 35-ft. pole	47.00	79.00	65.00	84.00	66.00	80.00
27	structs. constr. type-SS struct. with 40-ft. pole	57.00	91.00	80.00	90.00	80.00	90.00
6	structs. constr. type-SS struct. with 45-ft. pole	70.00	103.00	95.00	104.00	92.00	100.00
4	structs. constr. type-SS struct. with 50-ft. pole	94.00	130.00	115.00	116.00	115.00	120.00
1	struct. constr. type-SD struct. with 35-ft. pole	67.00	97.00	80.00	91.00	80.00	100.00
1	struct. constr. type-SD struct. with 40-ft. pole	84.00	108.00	95.00	97.00	97.00	110.00
1	struct. constr. type-ST struct. with 40-ft. pole	99.00	120.00	110.00	208.00	108.00	105.00
1	struct. constr. type-ST struct. with 45-ft. pole	115.00	134.00	120.00	220.00	120.00	145.00
1	struct. constr. type-SA struct. with 50-ft. pole	63.00	130.00	130.00	145.00	130.00	100.00
1	struct. constr. type-SAT struct. with 45-ft. pole	84.00	102.00	100.00	210.00	105.00	120.00
2	structs. constr. type-SAT struct. with 50-ft. pole	99.00	130.00	125.00	350.00	127.00	140.00
10	guys constr. single guy 12.47-kilovolt line	33.00	32.00	27.00	53.00	45.00	30.00
25	guys constr. double guy 12.47-kilovolt line	52.00	43.00	45.00	70.00	45.00	40.00
35	anchors placing plate or cone anchor 12-47-kilovolt line	35.00	19.00	25.00	23.00	25.00	25.00
90	insulators furn. and installing crossarm insulator with pin	5.30	4.00	4.00	2.70	4.00	6.00
45	insulators furn. and install. pole-top insulator	5.30	4.00	3.00	3.00	3.00	6.00
47	insulators furn. and install. spool-type insulator and bracket	5.30	3.00	3.50	5.00	3.50	6.00
9	clevises installing insulated clevis	7.30	4.00	5.00	5.00	5.00	7.00
30	assemblies furn. and attach. single-unit tension insulator	9.30	14.00	12.00	6.00	11.50	9.00
2	4-wire-circuit mi. of line stringing No. 4A copperweld-copper conductor	$1,350	$3,000	$2,050	$1,680	$2,050	$1,800

Sewerage

Three trunk sewers in Orange County

California—Orange County—County. J. S. Barrett, Newport Beach, submitted the low bid of $218,545 on Alternate B to the County Sanitation Districts for construction of three trunk sewers in the Costa Mesa area, Sanitation District No. 6. Unit prices were as follows:

(1)	J. S. Barrett	$218,545	(5) Michael Izzi $259,382
(2)	Vella & Arciero Co.	224,398	(6) Bosko & Bradarich 303,678
(3)	R. A. Wattson	234,370	— J. P. Evans 324,895
(4)	Brown & Vukich	256,351	— Jerry & N. A. Artukovich 355,768

OLD SANTA ANA ROAD TRUNK		(1)	(2)	(3)	(4)	(5)	(6)
1,851	lin. ft. 18-in. VCP extra strength	9.30	8.50	8.00	11.00	10.00	13.00
4,482	lin. ft. 21-in. VCP extra strength	10.0085	10.40	9.00	16.00	12.00	14.50
400	ton bedding rock, complete	3.0091	2.50	3.00	4.00	3.50	3.00
12	brick manholes	249.00	300.00	250.00	375.00	350.00	340.00
12	concrete manholes	319.00	340.00	250.00	375.00	350.00	345.00
NEWPORT BLVD. TRUNK							
500	lin. ft. 12-in. VCP standard strength	7.15	9.50	4.00	7.65	7.00	9.00
1,325	lin. ft. 15-in. VCP standard strength	9.40	10.75	18.00	10.60	11.00	12.00

(Continued on next page)

UNIT BID PRICES ... CONTINUED

		(1)	(2)	(3)	(4)	(5)	(6)
1,176	lin. ft. 15-in VCP extra strength	9.78	11.35	10.00	11.00	12.00	14.00
255	lin. ft. 18-in. VCP standard strength	9.43	13.40	8.00	9.00	12.50	14.50
1,565	lin. ft. 18-in. VCP extra strength	10.85	14.00	9.00	11.50	13.00	15.50
226	lin. ft. 12-in. CIP	11.56	14.20	10.00	11.30	12.00	13.50
715	lin. ft. 15-in. CIP	20.00	18.50	20.00	15.50	15.00	16.00
560	ton bedding rock, complete	3.91	5.00	3.00	4.00	3.50	5.50
11	brick manholes	163.00	290.00	250.00	300.00	3.20	300.00
1	brick drop manhole	403.00	350.00	300.00	425.00	365.00	450.00
6	concrete manholes	330.00	320.00	250.00	300.00	320.00	305.00
182	lin. ft. 12-in. VCP concrete encasement	2.75	3.75	2.00	5.00	3.00	4.00
310	lin. ft. 15-in. VCP concrete encasement	3.08	5.50	3.00	7.00	5.00	4.50
115	lin. ft. 18-in. VCP concrete encasement	3.56	6.00	4.00	8.00	6.00	5.00
	17TH STREET TRUNK SEWER						
817	lin. ft. 15-in. VCP standard strength	6.53	8.45	7.00	8.50	10.50	12.00
1,246	lin. ft. 15-in. VCP extra strength	8.66	9.10	9.00	8.85	12.00	14.00
1,185	lin. ft. 18-in. VCP standard strength	7.66	9.40	10.00	9.50	11.50	14.50
3,895	lin. ft. 18-in. VCP extra strength	10.05	10.00	12.00	10.00	12.50	15.50
450	ton bedding rock, complete	3.91	5.00	5.00	4.00	3.50	5.50
12	brick manholes	183.00	290.00	250.00	300.00	340.00	300.00
12	concrete manholes	330.00	320.00	250.00	300.00	340.00	305.00

8-in. concrete or vitrified clay storm sewer

Washington—Chelan County—State. John B. Knowles, Contractor, 1040 Monroe Street, Wenatchee, received an award from the State Department of Highways on his low bid of $17,953 for construction of a storm sewer in Chelan. Unit prices were as follows:

(1) John B. Knowles, Contractor $17,953
(2) Goodfellow Bros., Inc. 18,877
(3) J. N. Payne 21,489
(4) Tom T. Larson $22,087
(5) Don Akins, Inc. 23,068
(6) E. D. Hanson 41,390

		(1)	(2)	(3)	(4)	(5)	(6)
2,800	cu. yd. structure excav.	1.00	2.00	1.00	1.75	1.50	3.60
58	days mechanical tamper	30.00	10.00	45.00	35.00	35.00	59.00
74	M. gal. water	3.00	5.00	10.00	5.00	3.00	30.00
600	cu. yd. selected roadway borrow	2.50	1.50	1.50	2.50	1.25	2.46
200	cu. yd. cr. stone surf. top cou. in place from stkp.	2.00	3.00	1.50	2.50	1.25	1.96
549	lin. ft. plain conc. or V.C. sewer pipe, 8 in. diam.	1.00	1.25	1.50	1.30	1.50	3.55
2,804	lin. ft. std. reinf. conc. culvert pipe, 18 in. diam.	3.20	2.90	4.00	3.45	4.50	6.60
6	only manholes in place (under 10 ft.)	160.00	200.00	200.00	160.00	175.00	295.00
9	only catch basins	90.00	90.00	100.00	160.00	125.00	175.00

Trunk line sewer across river

California—San Joaquin County—City. R. Goold & Son, Stockton, submitted the low bid of $15,421 to the city council of Stockton for construction of a trunk line sanitary sewer across the Calaveras River (from Pershing Avenue on the south to the Brookside Road on the north) for the city. Unit prices were as follows:

(1) R. Goold & Son $15,421
(2) Stockton Construction Co. 16,763
(3) Chastain Construction Co. 17,104
(4) Nomellini Construction Co. $22,661
(5) George Pollock Co. 41,949

		(1)	(2)	(3)	(4)	(5)
300	lin. ft. Type "B" reinf. conc. pipe, 18-in. diam. compl. encased in a min. of 6 in. of poured conc., incl. 4 conc. cut-off walls, complete and in place per lin. ft.	18.96	19.35	20.85	37.69	70.00
505	lin. ft. Type "A" std. str. reinf. conc. culvert pipe 18-in. diam. with poured conc. piers at each jt. compl. and in place, per lin. ft.	9.72	12.90	9.75	12.90	23.00
354	lin. ft. Type "C" cement-asbestos pipe 18-in. diam. complete and in place, per lin. ft.	8.45	8.60	12.80	10.00	21.00
1	std. 4-ft. diam. precast manhole, compl. and in place	250.00	200.00	375.00	300.00	400.00
2	spec. combination box and precast manholes, incl. installation of gate valves and oper. gear supplied by City of Stockton, each	792.00	600.00	510.00	500.00	750.00

Streets and Highways

Plant-mix surfacing on cement-treated base

California—Sutter County—State. Rice Brothers, Inc., Marysville, submitted the low bid of $279,407 for construction of a 4-lane divided highway to be graded and surfaced with plant-mix surfacing on cement-treated base between 0.2 mi. west of Onstott road and Route 3 in Yuba City, Sutter County. Unit prices were as follows:

(1) Rice Brothers, Inc. $279,407
(2) W. H. O'Hair Co. 296,045
(3) Harms Bros. $323,240

		(1)	(2)	(3)
650	cu. yd. removing concrete	5.62	9.50	12.00
Lump sum,	clearing and grubbing	$6,045	$4,000	$4,500
21,150	cu. yd. roadway excav.	.60	.50	.95
2,325	cu. yd. struct. excav.	4.20	3.25	4.00
31	cu. yd. ditch excav.	4.20	3.00	2.00
39,500	sq. yd. compacting original ground	.06	.05	.10
9,600	cu. yd. imp. subbase material	1.00	1.35	1.25
Lump sum,	dev. wat. sup. and furn. wat. equip.	$4,950	$3,500	$2,000
1,135	M. gal. applying water	1.00	1.30	2.00
60	sta. finishing roadway	16.00	11.00	25.00
18,500	ton min. aggregate (P.M.C.T.B.)	3.22	3.50	3.70
5,850	bbl. portland cement (P.M.C.T.B.)	4.80	5.00	4.80
52	ton asph. emuls. (cur. sl., pt. bdr. and sl. ct.)	46.26	50.00	50.00
1,900	ton U.R.B.	2.90	3.10	3.50
9	ton liquid asph., SC-2 (pen. tr. and pr. ct.)	41.00	46.00	50.00
38	ton sand (pen. tr. and pr. ct.)	4.65	5.50	6.00
540	ton paving asph. (P.M.S.)	23.15	24.50	27.50
11,300	ton mineral aggregate (P.M.S.)	3.95	4.40	5.10
575	lin. ft. raised traffic bars	1.50	1.00	1.75

(Continued on next page)

Why every type of stabilized base is stronger when mixed with the SEAMAN

The SEAMAN Self-Propelled PULVI-MIXER. 7 ft. mixing width. Gas or diesel powered.

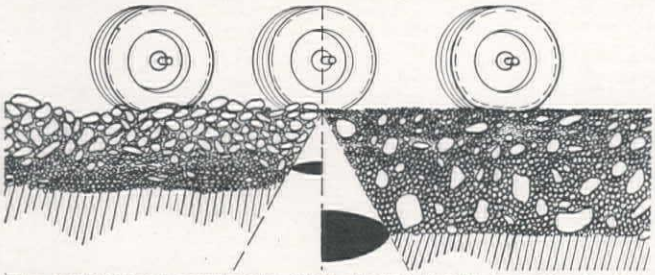
There's a very good reason why SEAMAN-mixed bases carry heavier traffic loads — and carry them longer with less maintenance. For example, take any stabilization which employs gravel. Trucking gravel to the job and especially the subsequent blading causes "segregation," — in other words, the fines sift through to the bottom — which creates an inherently unstable condition.

The SEAMAN PULVI-MIXER completely corrects segregation by *blending* and proportioning the coarse and fines equally throughout the full depth of the treatment — and at the same time thoroughly mixes-in whatever type of binder is employed. All voids are filled with the fines so that after compaction the finished stabilization is uniform and of exceptionally high density.

And if the material has previously been shaped to grade and finished crown the SEAMAN leaves the mix ready for immediate compaction.

This basic mixing action of the SEAMAN builds a stronger, denser, more weather resistant base with every material — from soil or sand to pit-run gravel.

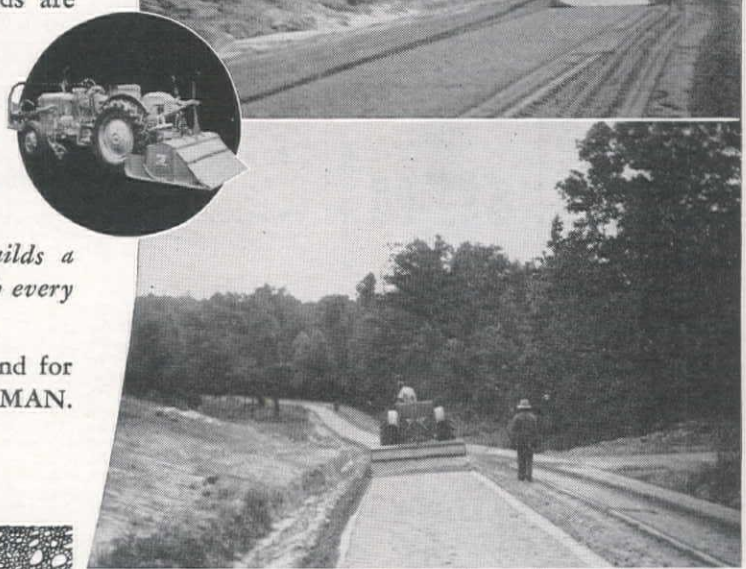
Put a SEAMAN to work on your job — now. And for ever after, you'll do *all* your mixing with the SEAMAN.



The unstabilized aggregate (left above) tends to move to the surface, the fines to the bottom. Thus the material becomes loose and rough under traffic regardless of binders that may be employed unless mixed-in with the SEAMAN.

The SEAMAN stabilized aggregates (right above) form a firmly knit base essential for high load-bearing characteristics. Naturally, binders mixed-in with the SEAMAN further improve the quality.

(Below) In SEAMAN-stabilized aggregate base all stones are securely locked and anchored — a basic requirement regardless of binder.



(Above) Sand-clay stabilization is stronger, more economical with the SEAMAN MIXER.

SEAMAN MOTORS, INC.

285 N. 25TH STREET MILWAUKEE 3, WISCONSIN

UNIT BID PRICES ... CONTINUED

		(1)	(2)	(3)
19	cu. yd. Class "A" P.C.C. (struct.)	88.76	90.00	100.00
590	lb. miscl. iron and steel	.60	.40	.60
720	cu. yd. Class "A" P.C.C. (curbs and gutters)	50.76	54.00	43.00
40	ea. curb dowels	.80	1.00	1.00
78	cu. yd. Class "A" P.C.C. (sidewalks and driveways)	39.46	45.00	40.00
50	ea. right-of-way monuments	7.00	9.00	8.00
5	ea. center line monuments	27.50	22.00	30.00
23	ea. installing guide posts	6.00	5.00	5.00
25	ea. horizontal reflector units	8.50	10.00	7.50
100	lin. ft. new property fence	.75	.50	1.00
420	lin. ft. chain link fence	2.40	1.90	2.10
1,400	lin. ft. 12-in. R.C.P. (std. str.)	2.85	2.65	3.25
2,350	lin. ft. 18-in. R.C.P. (std. str.)	4.25	4.40	4.60
4	ea. manholes (storm drains and sanitary sewers)	210.00	250.00	200.00
11	ea. adj. manholes and drop inlets to grade	50.00	60.00	100.00
13	ea. frames and covers for drop inlets	75.25	62.00	110.00
3	ea. special frames and gratings for drop inlets	114.00	90.00	100.00
1	ea. manhole frame and cover	133.20	115.00	190.00
5	ea. salv. and reinstall. frames and covers	42.00	37.00	100.00
5	ea. abandon. manholes or remove manholes	60.00	83.00	80.00
2,100	lb. bar reinf. steel	.16	.20	.25
25	lin. ft. 1½-in. galv. steel pipe	1.00	1.10	1.25
168	lin. ft. 2-in. galv. steel pipe	1.15	1.25	1.50
700	lin. ft. 2½-in. galv. steel pipe	1.74	1.90	1.75
Lump sum,	traffic signal and highway lighting	$11,278	$14,800	$19,500

Gravel surfaced road in Utah

Utah—Box Elder County—State. Germer, Abbott & Waldron, Tremonton, submitted the low bid of $90,260 to the State Road Commission for construction of a gravel surfaced road between Howell and U. S. 30-S, Box Elder County. Unit prices were as follows:

(1) Germer, Abbott & Waldron ..... $ 90,260
(2) Parson & Fife Construction Co. 90,410
(3) Carl E. Nelson 108,175
(4) Olof Nelson Construction Co. $100,987
(5) Engineer's estimate 83,510

		(1)	(2)	(3)	(4)	(5)
18,500	ton gravel surface, Type "A"	.75	.70	.90	.70	.65
20,600	ton gravel base course	.65	.65	.85	.70	.60
32,000	cu. yd. unclassified roadway excav.	.35	.30	.32	.33	.30
30,000	cu. yd. imported borrow	.30	.20	.32	.40	.30
194,000	sta. yd. Class "A" overhaul	.015	.02	.01	.015	.02
37,000	yd. mi. Class "B" overhaul	.15	.20	.24	.20	.15
1,500	1000 gal. watering	1.75	2.00	2.00	2.50	2.00
120	hr. rolling (pneumatic tire roller or power roller)	6.00	6.00	6.00	7.00	7.00
480	hr. rolling (tamping roller)	6.00	6.00	10.00	10.00	5.00
48	lin. ft. 15-in. C.G.M. pipe	3.00	3.00	3.50	3.05	2.75
684	lin. ft. 18-in. C.G.M. pipe	3.75	4.00	4.00	4.00	3.25
73	lin. ft. 24-in. C.G.M. pipe	5.00	5.00	6.50	6.40	4.25
100	lin. ft. 48-in. C.G.M. pipe	16.00	15.00	20.00	17.00	15.00
24	lin. ft. relaying 18-in. conc. pipe	2.50	2.00	3.00	2.00	1.00
32	lin. ft. relaying 24-in. C.G.M. pipe	2.50	2.00	3.50	2.00	1.00
142	cu. yd. concrete, Class "A"	75.00	85.00	80.00	75.00	65.00
20,725	lb. reinforcing steel	.15	.16	.17	.16	.15
800	cu. yd. excav. for structs., unclassified	3.50	2.00	5.00	4.00	1.50
200	cu. yd. small ditch excav.	.75	.50	1.00	.60	.50
38	ea. guide posts	6.00	7.50	10.00	10.00	5.00
18,600	lin. ft. right-of-way fence, Type "A"	.25	.32	.30	.30	.25
10	ea. 14-ft. gates	40.00	35.00	60.00	40.00	30.00
60	ea. right-of-way markers	6.00	6.00	10.00	8.00	5.25
2	ea. F.A.P. markers	25.00	25.00	30.00	35.00	20.00
Lump sum,	furnishing water equipment	500.00	$1,000	$1,000	$1,000	$1,000
Lump sum,	furn. construction signs	400.00	650.00	$1,000	$1,000	500.00

Grading and asphaltic concrete paving

Washington—Cowlitz County—State. Fiorito Bros., Seattle, submitted the low bid of $347,582 to the State Department of Highways for 3.5 mi. of work from Paxton Road to Rocky Point, Primary State Highway No. 1, Cowlitz County. Unit prices were as follows:

(1) Fiorito Bros. $347,582
(2) Peter Kiewit Sons' Co. $390,216

		(1)	(2)
Lump sum,	clearing and grubbing	$6,000	$3,000
17,510	cu. yd. common excav. incl. haul of 600 ft.	.50	.65
5	cu. yd. common trench excav. incl. haul of 600 ft.	5.00	5.00
5,500	cu. yd. uncl. excav. incl. haul of 600 ft.	.60	1.35
4,750	cu. yd. stas. overhaul	.05	.02
488.0	M. cu. yd. stas. overhaul	4.00	6.00
1,440	cu. yd. struct. excav.	2.50	2.50
16	days smooth wheeled power roller	55.00	70.00
19	days tamping roller	55.00	75.00
42	days pneumatic tired roller	55.00	55.00
34	days mechanical tamper	55.00	45.00
237.9	stas. (100 ft.) finishing roadway	8.00	10.00
2,770	M. gal. water	.10	2.25
285	cu. yd. gravel backfill for drains	5.00	6.50
9,570	cu. yd. salvage selected roadway borrow	.50	.60
48,230	ton special sand borrow	.60	1.05
6,830	ton furn. and placing cr. stone surf. top course	3.00	2.95
3,690	ton furn. and placing cr. stone surf. base course	3.00	2.95
	TYPE I-1 ASPHALTIC CONCRETE PAVEMENT		
526	ton Class C wearing course	9.00	13.20
1,052	ton Class L leveling course	9.00	13.20
	OTHER ITEMS		
49,059	sq. yd. cement conc. pav't. 14 day 5 sack mix 9-in. sec.	3.85	3.95
19,800	lb. pavement reinforcement Type No. 2	.155	.11
168	only dowel bars with rubber caps	.40	.35
4,824	lin. ft. dummy joints	.03	.10
24,528	lin. ft. sawed joints	.40	.50
14	only temp. bridge across pavt. takedown type	150.00	50.00
150	lin. ft. pavement headers	1.50	1.00
156	sq. yd. concrete placed as extra thickness	4.00	3.95

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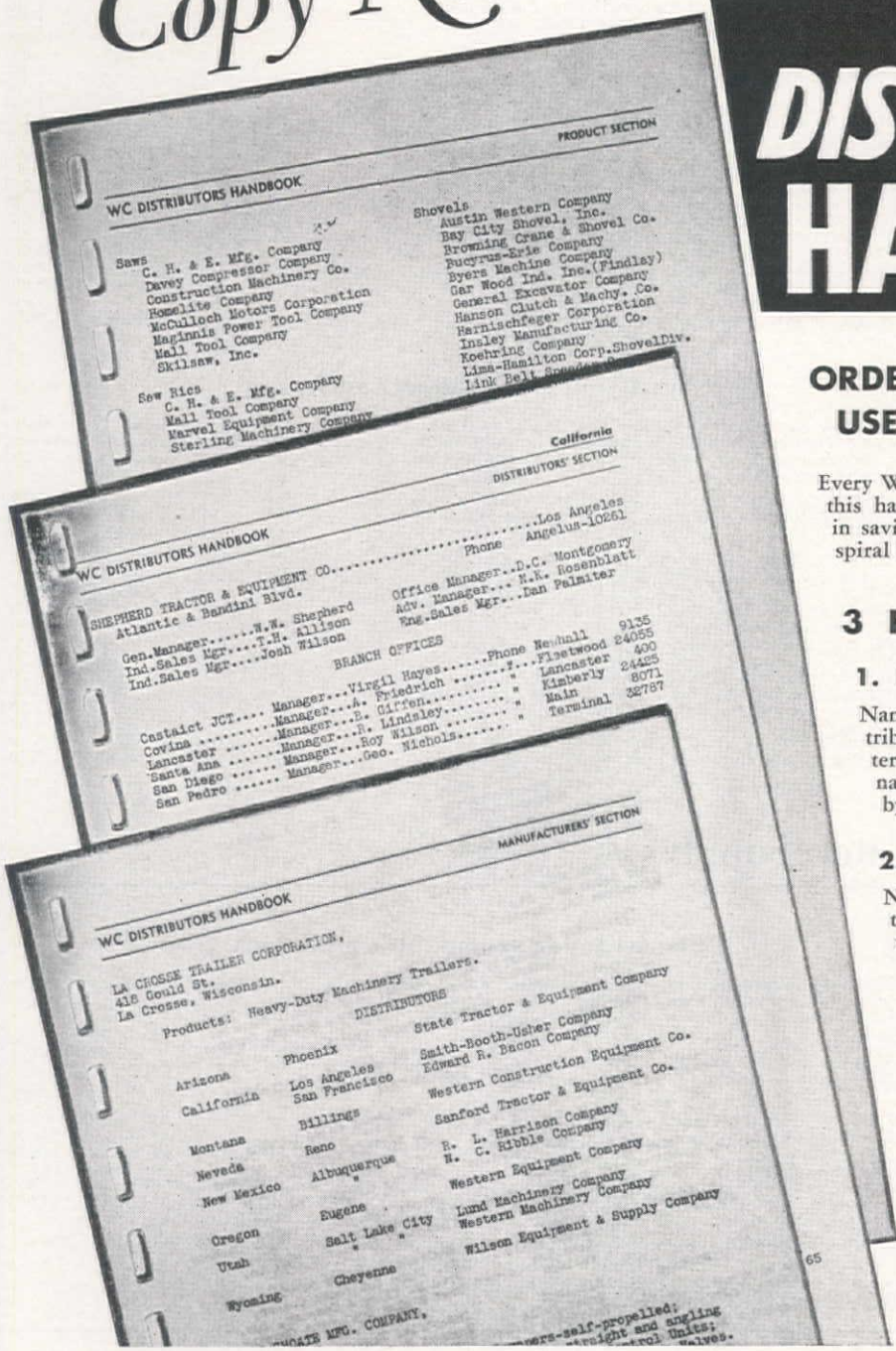

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UNIT BID PRICES . . . CONTINUED

		(1)	(2)
6,420	sq. yd. removing asphaltic conc. pavt.	.50	.65
575	sq. yd. removing cement conc. pavt.	1.00	1.25
3,052	lin. ft. asphaltic concrete cutter	1.00	1.10
50	only resetting precast white reflecting traffic buttons	1.50	1.00
83	only removing precast white reflecting traffic buttons	.50	1.00
376	lin. ft. removing asphaltic concrete traffic bars	.50	1.35
109	cu. yd. concrete, Class G	55.00	40.00
1,566	lin. ft. concrete or V.C. drain pipe, 8-in. diam.	1.25	1.00
615	lin. ft. concrete or V.C. drain pipe, 12-in. diam.	1.75	1.35
66	lin. ft. std. reinf. conc. culv. pipe, 18-in. diam.	4.50	3.30
843	lin. ft. plain conc. or V.C. sewer pipe, 8-in. diam.	1.25	1.20
756	lin. ft. plain conc. or V.C. sewer pipe, 12-in. diam.	2.00	1.75
120	lin. ft. bit. coated corr. met. culv. pipe No. 16 ga., 8-in. diam., Type No. 2	3.00	2.50
5	only manholes	300.00	250.00
10	only catch basins	110.00	100.00
176	lin. ft. resetting standard beam guard rail	2.25	1.25
2,207	lin. ft. removing standard beam guard rail	.75	.90
1,060	lin. ft. resetting temporary beam guard rail	1.75	1.00
125	lin. ft. removing temporary beam guard rail	.80	.70
107	only resetting reinf. conc. spot posts	10.00	5.00
15	only removing reinf. conc. spot posts	2.00	3.50
6	cu. yd. hand placed riprap	25.00	25.00
920	cu. yd. top soil in place including haul	2.50	1.70
1	only reflector unit complete in place	50.00	30.00

Scarifying and plant-mix surfacing

California—Kern County—State. Griffith Co., Los Angeles, submitted the low bid of $274,452 to the State Division of Highways for scarifying and surfacing, with plant-mix surfacing over cement treated base, between Bear Mountain Ranch and west end of Tehachapi Overhead, about 10.8 mi. in length, Kern County. Unit prices were as follows:

(1) Griffith Co. $274,452
(2) Clyde W. Wood & Sons, Inc. 293,507
(3) Clements & Co. $300,029

		(1)	(2)	(3)
363	cu. yd. struct. excav.	6.50	5.00	10.00
Lump sum,	dev. wat. sup. and furn. wat. equip.	$1,200	$4,500	$3,000
915	M. gal. applying water	3.00	2.00	3.00
183,320	sq. yd. mix. and compact. (C.T.B.)	.20	.23	.35
8,883	bbl. portland cement (C.T.B.)	4.00	4.00	3.50
201	ton asph. emuls. (cur. sl. and sl. ct.)	54.00	35.00	40.00
24,887	ton min. aggr. (P.M.S., dense graded)	4.40	4.85	4.50
4,975	ton min. aggr. (P.M.S., open graded)	5.20	5.00	6.00
1,492	ton paving asph. (P.M.S.)	24.00	25.00	22.00
4,350	lin. ft. 6-in. perf. met. pipe under dr. (16 ga.)	1.60	1.75	1.50
400	cu. yd. filter matl.	10.00	10.00	6.00
200	cu. yd. excav. exist. under dr.	4.50	5.00	6.00
1,714	lin. ft. salv. and relay. exist. under dr.	1.20	3.00	1.50

Water Supply

District water system, 50 connections

California—Calaveras County—Water District. E. G. Jesberg submitted the low bid of $24,400 to the Calaveras County Water District, for Schedule I construction of a water system at Copperopolis. Unit prices were as follows:

(1) E. G. Jesberg $24,400
(2) Engineer Limited Pipeline Co. 25,261
(3) MGM Construction Co. 31,204
(4) D. A. Parrish & Son $48,699
(5) R. Good & Son $39,968

		(1)	(2)	(3)	(4)	(5)
1,907	ft. 6-in. transite pressure pipe	3.40	3.03	4.23	5.55	5.05
4,387	ft. 4-in. transite pressure pipe	2.60	2.58	3.56	4.95	4.70
10	fire hydrants	110.00	176.10	174.00	275.00	156.25
50	service connections	30.00	34.63	52.00	135.00	62.50
Lump sum,	galley, pump and pump house	$3,535	$4,343	$3,000	$6,000	$3,937
Lump sum,	converting tank to pressure tank	375.00	333.00	450.00	900.00	$1,093

Miscellaneous

Field-assembled metal plate culvert

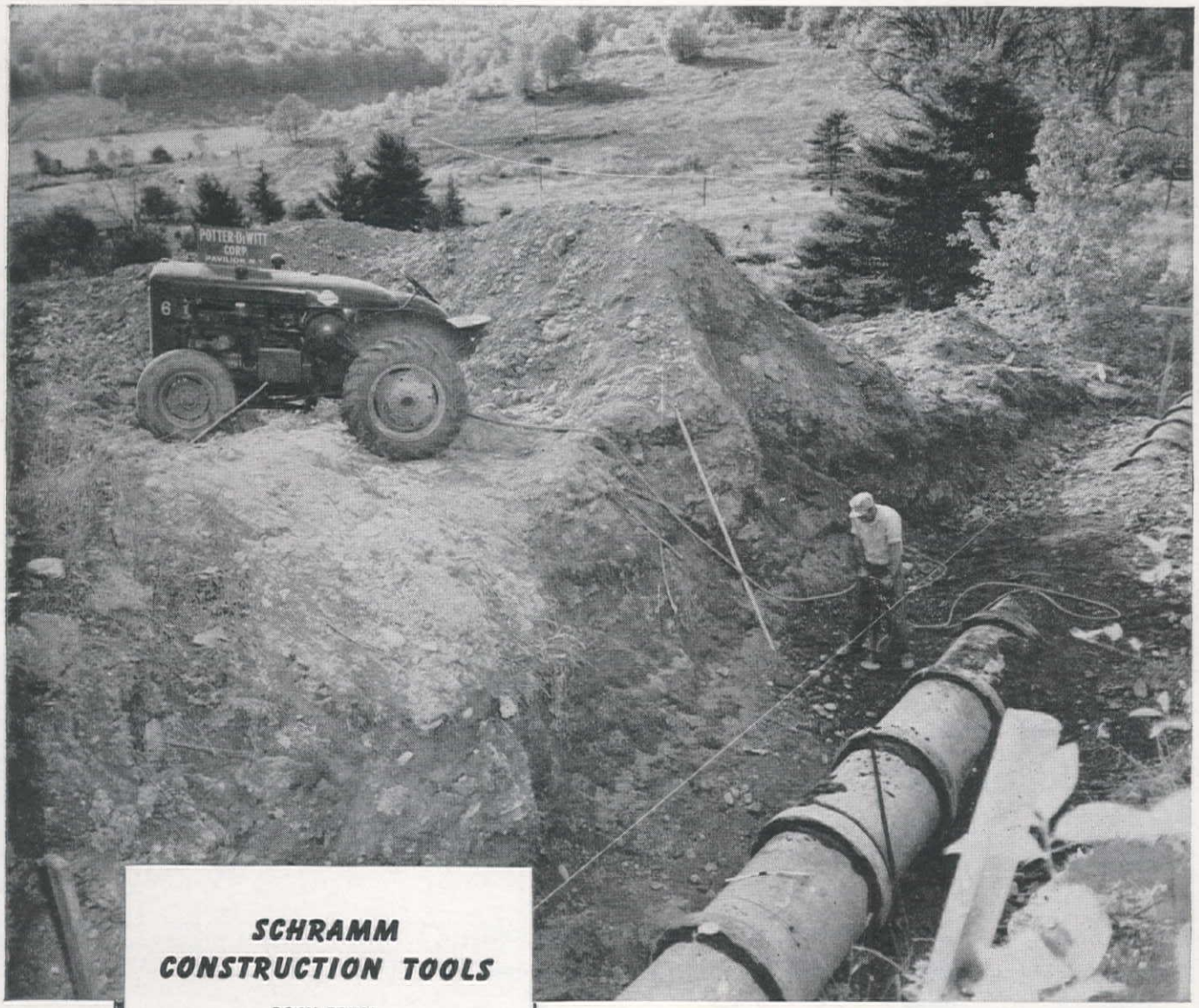
California—Humboldt County—State. Dana R. Tyson Co., Sacramento, submitted the low bid of $16,134 to the State Division of Highways for .04 mi. grading, and a field assembled metal plate culvert to be furnished and installed in Richardson Grove State Park at Durphy Creek, Humboldt County. Unit prices were as follows:

(1) Dana R. Tyson Co. $16,134
(2) E. A. Forde Co. 19,713
(3) Pike & Hill, Carey Bros. and Bailey 20,721
(4) A. C. Johnson & Sons $21,494
(5) Reed & Tuttle 22,260
(6) O'Connor Brothers 25,000

		(1)	(2)	(3)	(4)	(5)	(6)
Lump sum,	removing timber bridge	375.00	$1,000	$1,250	750.00	$1,000	$2,000
60	cu. yd. roadway excavation	2.50	3.00	2.15	2.50	1.00	4.25
180	cu. yd. structure excavation	4.00	7.50	5.00	10.00	10.00	20.00
1,550	cu. yd. imported borrow	3.00	4.00	2.15	2.50	2.50	2.00
4	cu. yd. Class "A" P.C.C.	65.00	150.00	100.00	125.00	100.00	150.00
400	sq. yd. grouted rock slope protection	9.25	11.25	20.50	18.00	20.00	16.00
144	lin. ft. timber guard railing	5.80	9.00	7.50	8.00	7.50	10.00
74	lin. ft. 114-in. field assembled plate culvert	72.00	60.00	71.00	80.00	80.00	100.00
80	lin. ft. salvaging exist. cast iron sewer pipe	1.00	1.00	1.50	1.00	1.00	2.00
225	lb. bar reinforcing steel	.16	.30	.25	.30	.20	.20

"IT IS EASY TO HANDLE AND DOES A PERFECT JOB"...

The Schramm *Pneumatractor* this operator is describing, is working on a tough job for the Potter-DeWitt Corp., Pavilion, New York.



SCHRAMM CONSTRUCTION TOOLS

ROCK DRILLS
WAGON DRILLS
PAVING BREAKERS
CLAY SPADES
TRENCH DIGGERS
TIE TAMPERS
DELUXE *Pneumafeed*
Pneumajack
BACKFILL TAMPERS
TRACK SPIKE & FORM PIN DRIVERS
VIBRATORS
AIR GUNS
PNEUMATIC SAWS
PRUNERS
BITS
DRILL RODS
AIR HOSE
COUPLINGS

The operator finds the Schramm *Pneumatractor* a "vast improvement, now we don't have to wait for a dozer or truck. Just get on it and move it ourselves," he says. ". . . Change from tractor to air compressor or vice versa in an instant."

The Schramm *Pneumatractor* operates as both tractor and air compressor at the same time. It will PUSH, PULL, POWER anything a wheel tractor will, and PROVIDE AIR for any pneumatic tool that can be operated from a 105 cu. ft. air compressor.

You, too, will find the *Pneumatractor* ideal for your varied jobs. For full details, write today for Bulletin Neu-52.

SCHRAMM INC.

The Compressor People

WEST CHESTER PENNSYLVANIA

NEW LITERATURE

1001

106-page reference book for building contractors

A pocket size reference book for the building contractor, entitled Horn Construction Data Hand Book, is now available from **A. C. Horn Company, Inc.** Included in its 106 pages are such construction details as caulking and glazing compounds; defects in painting and what to do; floor materials; moisture repellents; interior and exterior paints and coatings, and roofing products. In addition to being a catalog of Horn products recommended for use in the building trade, the booklet gives 26 pages of information which the contractor uses every day. Handy reference tables show the materials needed for 100 sq. ft. of walls, floors, and sidewalks in slab thicknesses of 2½ in. to 6 in.; materials required for 1 cubic yard of mortar and concrete; handy table for figuring quantities of brick for 1 to 2,000 sq. ft. of wall; tables for estimating paint needs; mortar requirements; quantities of materials required for concrete silos, and plywood uses, grades and thickness. General information regarding mensuration, weights and measures, container measures of materials and weight of building materials are also given. Key number on coupon will bring you your free copy.

1002

Info made available on portable asphalt paving plant

Designed for fast moving, fast set-up and high daily production, The Little Monster portable asphalt plant is comprehensively described and illustrated in this booklet offered by the **Madsen Iron Works, Inc.** Specifications, engineering data and photographic illustrations of the essential features of the plant are covered.

1003

Maintenance guide for "Cat" tractors

Reduction of repair bills and elimination of "down-time" is the purpose of this cartoon-type maintenance guide for Caterpillar DW21, DW20 and DW10 tractors. Using scenes familiar to the operator, the 24-page booklet discusses factory-prescribed techniques for testing brake diaphragm; tire care; wheel and flywheel clutch adjustments; engine and fuel system maintenance. General facts covering cold weather operation, and suggested "start" and "stop" procedures, are explained. **Caterpillar Tractor Co.** publishes this guide in French, Spanish, and Portuguese as well as English.

1004

Victor publishes welding bulletin

A new bulletin, No. 330, contains recommendations and prices of **Victor Equipment Company's** welding and cutting units. Compact and very complete, this illustrates and describes Victor units for flame cutting, heating and welding to meet every requirement.

1005

Job data on Domor grader

Actual job data sheets on the Domor Elevating Grader, taken on a variety of projects across the nation, are presented in an 8-page application booklet issued by **Ulrich Products Corporation.** Factual information covers production figures and job description on loading, terracing, casting, ditching and a number of other types of jobs.

1006

How to use hard-facing alloys

The value of hard-facing alloys in preventing wear from abrasion, corrosion, impact and heat is described in a catalog by **Wall Colmonoy Corporation.** Typical

industrial application of hard-facing alloys together with recommendations for uses in other ways than by welding are given in detail.

1007

Truck-mounted back hoe info

An illustrated folder on its ⅜-yd. truck-mounted back hoe has just been published by the **Schield Bantam Company.** The folder includes detailed engineering information on mechanical features and easily-read chart showing dimensions and operating data for the Bantam hoe, which is said to dig up to 100 ft. of 5-ft. trench per hour.

1008

Facts on St. Paul's hoist and body line

Facts on the new line of **St. Paul Hydraulic Hoist,** to justify its claim of "22% More Payload per Hoist Dollar," are presented by the company in an 8-page catalog. Details of the many basic improvements incorporated in the completely redesigned line of hoists and bodies as well as complete specifications and payload capacities are included.

1009

Details on Parsons' "trenchliner"

A highly mobile, rubber-tired Trenchliner, designed to handle all types of utility trenching assignments is described in a bulletin just issued by the **Parsons Company.** Actual field photographs are used to illustrate some of the features incorporated in the Model 88 Trenchmobile such as: the telescopic ladder-type boom for undercutting sidewalks; the hinged crumber that permits vertical set-ins and the Parsons self-sharpening "Tap-in" bucket teeth for top digging production.

1010

Money-saver joist hangers described

Economies in time, labor, materials and space through the use of Trip-L-Grip framing anchors as joist hangers are described in a folder issued by the **Timber Engineering Company.** How and when to use the anchors are explained in detail drawings.

1011

Basic 5 hose line outlined

The "basic five" multi-purpose hose line, designed by **The Thermoid Company,** to replace 18 hose types offered formerly is comprehensively described in a booklet issued by the company. Application of each hose, construction and specification data given in detail.

1012

Excavator, crane specifications

Help for contractors in selecting the right excavator or truck crane for their job is presented in three specification folders by **Gar Wood Industries, Inc.** Illustrations showing capacities, ranges and dimensions of Models 75A and 75B excavators and the 75BT truck crane, together with additional information on power plants; right angle drive; travel speeds and controls aid in making the selection.

1013

SOS aid for Galion grader users

Complete instructions, clearly illustrated, for service and maintenance of seven Galion motor grader models has just been released by **The Galion Iron Works & Mfg. Co.** Also included is a complete list of distributors where Galion parts and service are available.

1014

All about air compressors

Two-stage, air-cooled radial air compressors capable of producing 80 to 125 pounds pressure are described in Bulletin H-620-B1 published by **Worthington Corporation.** Capacities, sizes, general specifications and cross-section photographs are given for bare, base-mounted multi-V-belt driven, base-mounted flexible-coupled and close-coupled compressors. A request on company letterhead will bring you a copy of this bulletin.

1015

Info on a tough enamel for painting equipment

A tough enamel which dries in a matter of minutes has just been developed by **The Wilbur & Williams Company.** Brochures showing the 24 colors available with full information for its uses are available.

1016

46-page handbook on sluice gates

Sluice gates—their application, general information, specifications and installation are discussed in a 46-page catalog issued by **Pekrul Gate Division of Morse Bros. Machinery Company.** Contractors engaged in civil projects will find particular interest in this comprehensive outline of headgates, automatic flap gates, sluice gates, lifts and gate valves. Each of gate models is illustrated, with recommendation for usage, data

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and dimension tables. Two-page table shows recommended lifts and stems by gate size and operating head, with rule-of-thumb given for lift capacities required.

1017

P & H power shovel manual

Power shovel, easily converted to use as dragline, crane, clamshell, trench hoe, pile driver or magnet crane, is described in a 24-page bulletin by **Harnischfeger Corporation.** Liberal use of big detailed photos show design features of the ¾-yd. Model 255-A and reports on many improvements made over last several years.

1018

Complete specs on axle load scales

Assuring maximum safe loads at lower operation costs is described and illustrated by **The Howe Scale Company** in a folder on its complete line of heavy-duty Howe axle load scales. Installation photographs and construction details fully covered.

1019

Cost control information

Contractors concerned with keeping their jobs going this winter despite bad weather will be interested in obtaining a copy of the cost control booklet produced by **Herman Nelson Division of American Air Filter Company.** Applications of portable heaters on actual construction jobs involving space heating of working areas, thawing, drying materials, preheating mechanical equipment and other uses are discussed and illustrated.

1020

Details on the new 15½-yd. "Euc"

Claimed by its manufacturer to outperform all other scrapers of comparable size, the 15.5-cu. yd. scraper manufactured by **The Euclid Road Machinery Co.** is described and illustrated in an eight-page catalog folder now available.

1021

B-G Mixall bulletin

Here is an 8-page, two-color bulletin from **Barber-Greene Co.** telling all about the new Mixall, portable, one-unit, dryer-mixer. There is a complete explanation of the features of this new model, as well as photographs, drawings and diagrams to point-up various important features.

1022

Complete roofing catalog offered

This 32-page, full color catalog has a three-fold purpose: it shows the complete line of asphalt roofing and siding products manufactured by **Certain-teed Products Corporation**; it shows the contractor the patterns produced by the use of each type of roofing; and it enables the contractor to show to his clients just what their roofs will look like when finished. Recommendations for the use of Certain-teed products inside and out are also described and illustrated.

Literature briefs . . .

1023

AIR-ENTRAINING — A new folder telling the facts about Vinsol air-entraining agent in concrete is available from **Hercules Powder Co.**

1024

LINE — **Dresser Manufacturing Division of Dresser Industries** offers interesting engineering data on several types of applications for Dresser couplings.

1025

HOSE TYPES—A catalog which fully explains **Thermoid Co.'s** new five basic types of hose which do the job of 18 is available to you.

1026

EUCLID REAR-DUMP—A new catalog sheet by **The Euclid Road Machinery Co.** gives detailed specification data for models IFFD and 4FFD 34-ton capacity rear-dumps.

1027

ALL ABOUT HOSE CLAMPS—Bulletin on Le-Hi hose clamps for every industrial rubber hose application is offered by **Hose Accessories Co.** Complete information on all types and sizes, capacities and application details.

1028

CEMENT PIPE—**Keasbey & Mattison** describes its asbestos-cement pressure pipe in a free booklet entitled "Mains without Maintenance."

1029

LUBRICATION — Valuable information on how proper lubrication saves money on equipment operation is offered in a booklet from **Standard Oil Company of California.**

1030

SOIL STABILIZATION — Complete book describes modern construction techniques. How to build the best for the least money—any time—any place. Published by **Seaman Motors, Inc.**

1031

ANCHOR SLOTS—**Superior Concrete Accessories, Inc.,** offers complete catalog on its line of improved dovetail anchor slots.

1032

PNEUMATIC ROLLER — The Ferguson sand-ballast rubber-tired roller is described and prices shown in folder printed by **Shovel Supply Company.**

1033

CONCRETE DRILL—Sizes and prices for the Termite rotary masonry drill complete line are made available by **Termite Drills, Inc.**

1034

PUMPS—**Carver Pump Co.** offers compact bulletin on the firm's self-priming centrifugal pump and diaphragm pump.

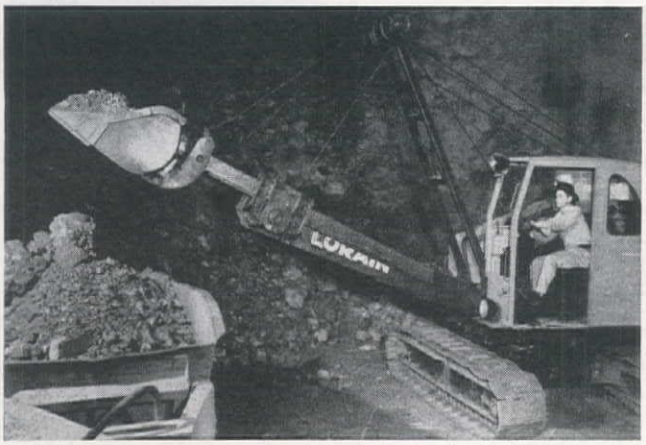
More information on any of the items in this section may be obtained by using coupon on page 153.

NEW EQUIPMENT

1035

Scoop shovel handles underground and surface loading operations

Here is a scoop shovel attachment, consisting of a short rugged boom 8 ft., 6 in. in length at the front end of which is a cable driven shipper shaft with pinions located at the outer ends. Dipper attaches to double dipper stick which is crowded in or out in a telescopic manner through dipper



stick sleeves rigidly fastened to the outer end of the boom. By proper control of reversible shipper shaft, dipper and dipper stick may be crowded out or retracted. Depending upon boom position, machine can load (1) on down grade, (2) on a level grade, (3) on an up-grade. When boom is lowered to a horizontal position, dipper may be moved in or out through a stroke of 6 to 7 ft. Many other operational advantages make this handy job equipment. On underground operations the machine can travel through entries 9 ft., 6 in. high and can operate in headrooms as low as 10 ft., 6 in. **The Thew Shovel Co.** is the manufacturer.

1036

Military requirements dictate new crushing, screening plant design

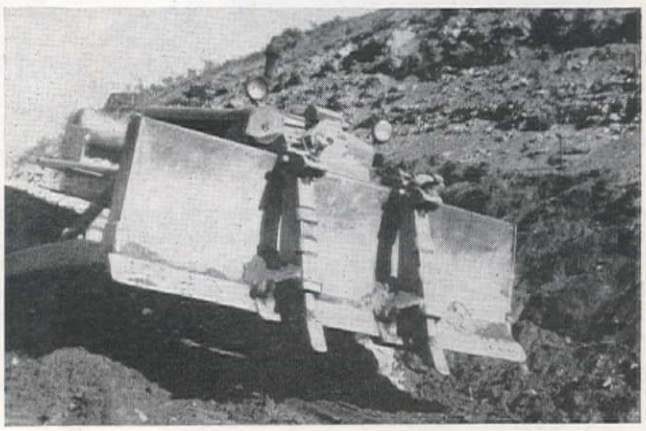
Model DJ-50, new type crushing and screening plant, was designed to meet military requirements for building high-

ways, airfields, staging areas, etc. It is a portable 3-unit plant consisting of a crushing and screening unit, a single-screw, fine material washer and a two-compartment bin and conveyor unit. The crushing and screening unit includes a Cedarapids 1840-640 Dual Jaw Crusher and a Cedarapids Horizontal Vibrating Screen with the vibrating mechanism underslung to cut travel height to the minimum. All three units are 100% portable for travel at convoy speed. Capacities range up to 50 tons per hour or more, and the plant produces two sizes of graded aggregate plus washed sand. Outstanding feature is the use of a new Dual Jaw Crusher, which has two crushing chambers—an 18 in. x 40 in. primary, and a 6 in. x 40 in. secondary—both in one base, with one eccentric shaft. With both primary and secondary crushing accomplished by one unit, the weight of the plant is considerably reduced. **Iowa Manufacturing Co.** is the manufacturer.

1037

Here's a rooter worth a cheer for speed on the job

It takes just one man a few minutes to install the Buck Forte Rooter on the dozer for full-speed ahead operation. The shank is adjustable for five rooting depths—9, 15, 21, 29

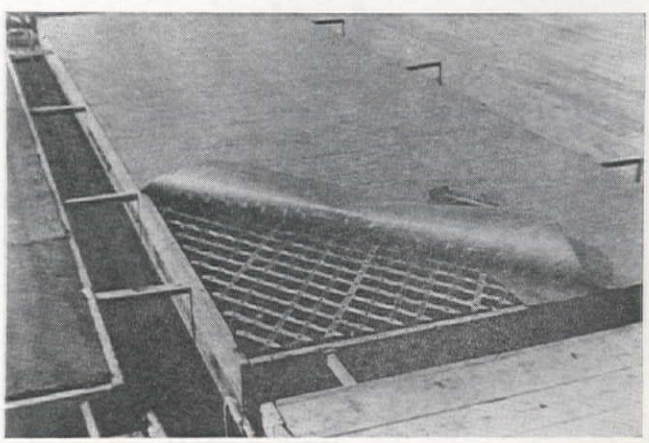


in. It is not necessary to cut or weld the rooter to your dozer, and the trunion mechanism automatically aligns itself to the proper digging angle of mold board. **Kay-Brunner Steel Products, Inc.**, is the manufacturer.

1038

Expansible concrete forms can be re-used 100 times

Rubora forms, which have been used extensively in Europe to cut costs of cast-in-place concrete jobs, are now being distributed in the United States by **Kurt Orban Co., Inc.**



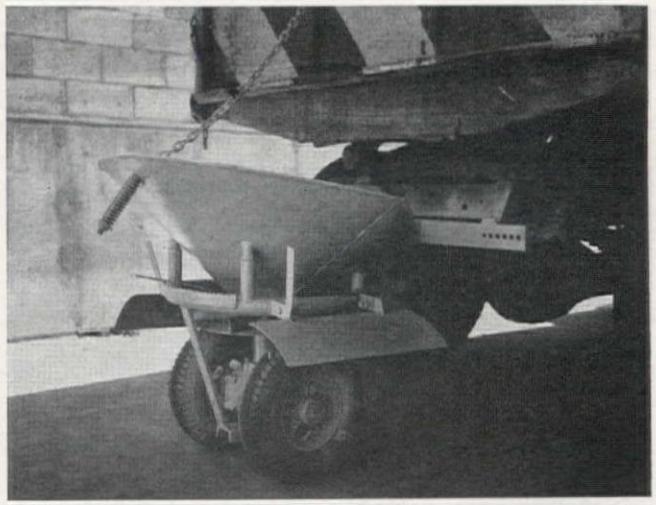
The forms consist of wooden struts which are latticed together and hinged at the intersection points. After adjustment at the job site to the desired panel dimensions, Rubora form is covered with sisalkraft paper for rough finished work,

or with a concrete liner of ⅛-in. composition board for a smooth finish. The paper on board is easily tacked into place on the form, and is stripped off after the concrete has set, leaving the Rubora form clean and ready for re-use. Easily adjusts to size requirements, and can be curved for forming circular walls.

1039

Improvements added in new model pull-type ice control spreader

This is a new model of this popular spreader, which has been a successful weapon in the battle for ice-control. Prime



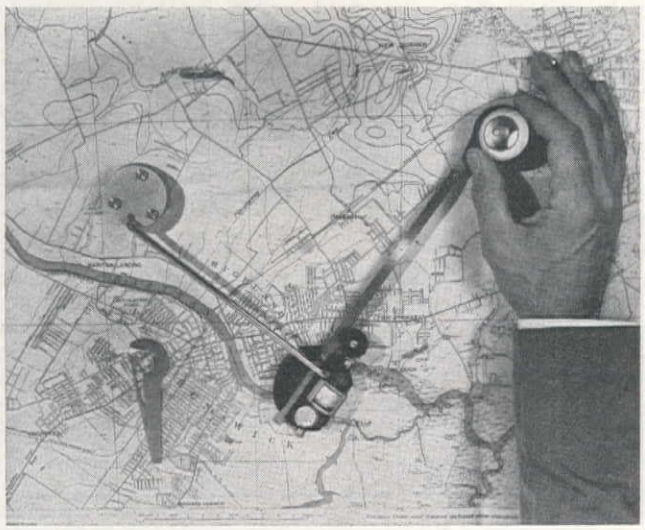
feature of the model SC-52 is the lower location of the traction-powered distributor plate. On standard 3:50 x 6 tires, the plate is only 13½ in. above ground, thus assuring a road-hugging spread pattern with less rebound. A positive locking

tow hitch is standard equipment. Model SC-52 will spread sand, salt, cinders, calcium chloride, chat, chips, etc., in a full 360-deg. circle while running either forward or backward. Spread pattern can be controlled in width and direction (either right or left) by the adjustable deflector plates and by the angle of the distributor fins. A sturdy spring-mounted lifting chain can be adjusted to lift the spreader wheels off the ground when body of towing truck is lowered. When truck body is raised to dumping position, the spreader wheels touch the ground and spreading automatically begins. **Baughman Manufacturing Co.** is the manufacturer.

1040

No squinting with this new optical planimeter

Engineers and surveyors everywhere should be interested in this new optical planimeter. For calculating earthmoving quantities, determining capacities of water basins or artificial reservoirs from topographic maps, etc., a planimeter is prac-

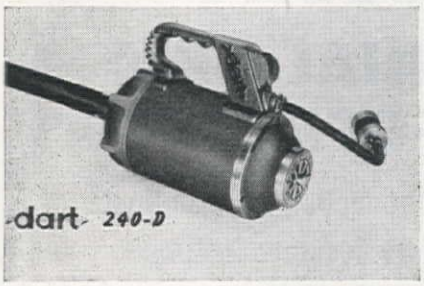


tically indispensible. This new model offers several improvements to further precision and ease of operation. Replacing the old-type needle-point tracer is a bi-convex, magnifying lens that eliminates squinting by allowing the operator to look through it at the magnified line to be followed. This same improvement precludes errors of parallax. Both counting wheel and measuring wheel can be brought to a zero reading with a simple flick of the reset lever. Tracer arm offers graduations from 6 to 20 thousandths of a square inch per vernier unit and may be easily adjusted by using the roll button. The pole block is fixed to the drawing board (see picture) with three adjustable, needle sharp anchoring pins. **Trans-Global Co.** is the American distributor for Filotechnica Salmoiraghi, Milan, Italy.

1041

Electric vibrator with 50% longer life

This new Dart vibrator (Model G. M. 240-D) is equipped with dual multi-directional eccentrics de-synchronized



45 deg. The feature has provided 50% longer life in field tests of the Dart G. M. 240-D. The new head also gives amplitude-frequency combinations brand new to the vibration field. It is possible to pour even lower slump concrete than before, yet the aggregate forms exceedingly close bond in the smallest cracks without segregation. **Dart Manufacturing and Sales Co.** is the manufacturer.

1042

Complete new line of electrical tapes

This line includes a four-coated, ravel-free friction tape; a quick-fusing, high-dielectric rubber tape and a two-in-one plastic tape. Both insulation and protection against weather and mechanical abuse are provided by the plastic electrical tape, with a vinyl plastic body having a dielectric strength of over 8,000 volts. Makes an excellent insulating medium for electrical equipment, and will fit snugly to irregular shapes and surfaces due to its minimum thickness (.007) plus its two-way stretch. **Ideal Industries** is the manufacturer.

1043

Super sweeper has automatic terrain compensator

This super sweeper is a spring-loaded float device which automatically compensates for uneven ground, while maintaining a constant broom-ground contact pressure at all times. More uniform and faster sweeping is claimed for the device. Finger-tip power hydraulic control for regulating broom angle, for determining broom rotation, for adjusting broom speeds and for adjustment of broom height is another prominent feature of this **Lull Manufacturing Co.** product.

1044

This product has a point aimed at pencil pushers

Ever pick up a pencil when in a hurry and have the lead break? Sure, everyone has had this happen and that is why **Alvin Company** has produced this new mechanical lead holder and lead pointer. Engineers and draftsmen should be interested in this gadget which keeps a constantly pointed lead always within reach. Attractive black plastic is the material used for this pointer, which contains razor-sharp blades that can be changed in seconds. The lead holder works on coil spring ejection principle for perfectly balanced rubber barrel which will hold any standard size drawing lead in degrees 7B to 9H. Holder retails for $1.25 ($1.35 with clip) and the pointer sells for $1.75.

1045

New machine bears down on road widening costs

This moldboard frame and roller device is easily attached to the regular motor grader blade in a few minutes. Rollers guide the plow-like blade along

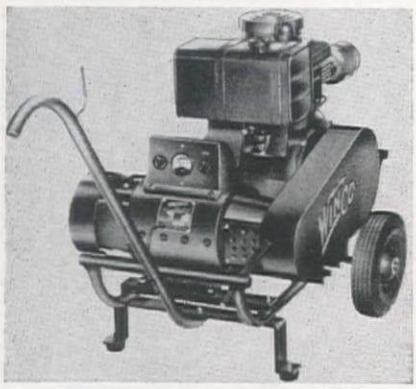
the edge and lip of the paving and cutting edge scours the edge of the paving as it cuts a trench to exact specifications. Depth and width of cut are adjustable, to fit each job's requirements. Operation is through the grader controls. Four grader passes are required to prepare the trench. The first two are regular

blade cuts that remove excess dirt, then the Domor "Road Widener" goes to work and, in two passes, produces a trench that is ready to take concrete without any hand cleaning or labor. All "Cat" motor graders can be fitted with the "Road Widener," manufactured by **Ulrich Products Corp.**

1046

Contractor's model engine-generator set

Model 4500, **Wincharger Corp.'s** new contractor's model engine-generator set, is designed for all output at 115 volts, 60 cycles, AC. Motor starting capacity of 4,500 watts—sufficient to start and run



motors up to 1½ hp. The unit has 3,000 watts intermittent rating and 2,500 watts continuous rating. Many portable tools are easily operated. Klixon thermostatic cut-out switches with manual reset protect the generator from overload and overheating. The model is available with either standard tubular cradle base or "Speedy-Shift" portable base attachment consisting of a single handle and semi-pneumatic rubber tired wheels located to provide practical tip-proof mounting.

1047

Improved tractor-operated industrial loader joins line

Offering a lifting capacity of ½ ton and a lifting height of approximately 11 ft., this new loader is designed to be

operated on the Ford tractor. Finger-tip control is achieved by operator's use of two levers. Hydraulic pump is mounted on tractor rather than the loader itself—resulting in smoother, more positive drive and greater ease in approaching trucks to dump loader bucket. Another advantage of the separate hydraulic pump is that the tractor's hydraulic mechanism is left free to operate additional rear-attached tools. **Dearborn Motors Corp.** is the manufacturer.

1048

Torque converter coupling for construction equipment

Ease of operation coupled with cost saving advantages are claimed for **Fuller Manufacturing Co.'s** new torque converter coupling. The converter coupling drives bring advantages of torque converters to many items of construction equipment such as front-end loaders, travel-loaders, tow truck, cranes, etc. Up to 2 to 1 hydraulic torque multiplication is automatically provided by the Fuller converter coupling, eliminating shock load on all component units of the drive line. During converter operation, the reaction member is locked to the housing through an overrunning clutch—changing the oil direction so the thrust reaction is taken by the housing. Maximum fuel economy features and easy installation procedure are other assets of the converter coupling.

1049

Magnetic tagline for clamshell or electro-magnet

Consisting of a drum, mounted on the extension of the hoisting drum shaft, which is provided with a series of "permanent" magnets, this new type tagline offers many features which should be of interest to the construction field. By the

magnetic attraction of the permanent magnets to the flange of the tagline drum, a constant pull is exerted on the tagline rope. Different "pulls" can be obtained by varying the number of magnets on the job. The fact that the unit is permanent and that no adjustment or maintenance is necessary makes for practicality. **The Osgood Co.** is the manufacturer.

1050

Refuse collecting easier with new load-packer

With an increase in the capacities of three models to 10, 13 and 16 cu. yd., **Gar Wood Industries'** new Load-Packer is aimed at more sanitary and lower-cost

refuse collecting. In conjunction with the increased capacity feature, the new Load-Packer insures greater loads and fewer trips by increased compaction efficiency. Finger-tip control operates the fully automatic compacting cycle, and the ram opens ready for reloading automatically, enabling crew men to make the next pick-up during the compacting cycle. Body design insures no leakage of materials or fluids onto street and no flying papers can escape. Dumping hoist for unloading is offered by the firm as a "packaged unit" with the body.

1051

High-density concrete ingredient for structural applications

"Heatcrete" is a new densifier which makes possible high heat-conductive concrete for radiant heating and structural applications, and the new product might prove useful in all-year-round temperature conditioning. Though the potentialities of the new densifier are worthy of note, the practical applications have already proved it valuable in floor panels using steel, wrought iron or copper pipe; hot water ceiling panels; electric wire heating in sidewalks, etc. Economically speaking, a heating job in which Heatcrete is used, requires the use of less pipe to cover a wider area. **Lee-Don, Inc.,** is the representative for the product.

1052

Tired of barracks life? Try a Trotwood Trailer

Take your home with you to those far-away construction jobs. This new model mobile home from **Trotwood Trailer, Inc.,** was designed with you in mind. It is 31 ft. long, available in models which will sleep four or six. A shower replaces the bathtub in the six-sleeper model. A large table in the living room provides an ideal work surface where blueprints and plans may be studied. When not in use, the sections of the table top are stored in a nearby closet. Closet space is well-planned throughout the trailer for convenience in kitchen or bedroom. Kitchen is equipped with stove and refrigerator and double sink. Unit sells for $3,900, approximately.

1053

Trailer-mounted gas-electric floodlight, power supply light

Production of 5,000-watt Nite-Hawk units has been announced by the **Winpower Mfg. Co.** These units consist of a Winpower 5-kw., 115-volt AC generator,

powered by a Wisconsin 4-cylinder air cooled engine. Four 80,000-candlepower floodlights are mounted, which can be raised to 8½ ft. and aimed in any direction. Operating equipment includes lighted control panel with duplex receptacles for power tools, for emergency power needs or extensions to separate flood lights—fused circuits—rheostat voltage regulator — automatic circuit breaker—separate switches for each light—two built-in, side-mounted tool boxes. Mounted on two-wheel, pneumatic-tired trailer with heavy duty, multiple-leaf, steel springs and retractable caster wheel for parking.

1054

"VPI" crystals prevent corrosion without coatings

VPI is a volatile amine nitrate which offers positive protection against rust without costly coating. Very small quantities of the product are required to give off the protective vapor which is carried to all surfaces of the metal and condenses to provide a thin film. VPI can be applied by placing it in crystal form in a package containing parts to be protected. **Shell Oil Co.** is the manufacturer.

1055

New development announced in loadbinder design

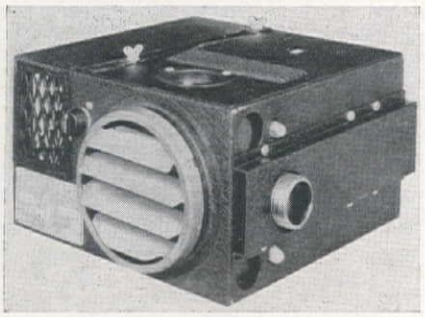
Utilizing a novel system of cams to reduce the physical "pull" necessary to bind a load, this new loadbinder has been licensed by the Institute of Inventive Research to **Texas Foundries of Lufkin.** The device will not slack off when locked

tight and cheater bars are often unnecessary. Cams also reduce kick when the device is released, and it can be used around square corners or curves without slacking off.

1056

Manifolding system features improved Hunter heater

A new and highly efficient manifolding system has brought improvements to the Model UH47 Hunter Gasoline Heater for either gasoline or diesel powered



trucks and tractor cabs. The system permits exhausting of combustion gases at any point desired within a radius of 12 ft. from the heater, as compared with a previous limit of 30 in. Gases may be exhausted to the outside of the vehicle at either side, top, bottom, front or rear. The new manifold permits efficient operation of the heater without use of the exhaust cap. The gas burning heater operates independently of the vehicle engine. **Hunter Manufacturing Co.** is the manufacturer.

1057

Trailer-type concrete mixer advances new features

More horsepower is claimed for the Model 6-SE trailer type concrete mixer now in production by **Knickerbocker Co.** The newly designed, end-discharge, one-

bag model now uses a two-cylinder air-cooled engine developing 10 hp. at 2,000 rpm., compared to 8 hp. for the single cylinder engine used on the old model. This 25% boost is largely due to an increase in the piston displacement from 38.5 cu. in. to 45.9 cu. in. In addition, the new mixer incorporates a cam-operated skip shaker and a tongue and legs that fold completely out of the way for shipment.

1058

Thor announces new pneumatic tool line

Here's a new line of pneumatic drills, screwdrivers, nut setters and grinders from **Independent Pneumatic Tool Co.** Parts standardization will facilitate quick delivery of any service in the line which includes 85 different individual sizes catalogued, ranging in weight from a 1 lb., 1 oz. grinder to a 2 lb., 11 oz. angle screwdriver—all with interchangeability of housings as a prime feature.

1059

Road drag is versatile construction equipment

Efficient leveling of gravel, sand and peastone before rolling for the final finish is the job accomplished by the Kinney Road Drag. The standard 8 ft., 8 in. x 12 ft. model comes complete with 30 replaceable Kinney Spring Steel Drag brooms. User may design his own frame or construct from drawings furnished free by the manufacturer, **Kinney Spring Steel Broom Co.**

1060

300,000-lb. compression tester for use on the job

For compression testing of standard 6-in. x 12-in., and 8-in. x 16-in. concrete cylinder specimens on the job, **Tinius Olsen Testing Machine Co.** offers a compact, portable unit. The specimen is placed between two compression surfaces, the upper of which is self aligning to assure accuracy. The load is applied

by a hand piston pump; and loads are indicated on a gage provided with a maximum load pointer. The standard gage indicates loads from 30,000 lb. to 300,000 lb. Metric scale is also available. The accuracy of this machine is checked with Olsen proving rings prior to shipment.

1061

Fishtail pilot bit for augers speeds earth boring

Rapid penetration in hard-to-bore soils and faster digging in ordinary soils is the job for the new "Pengo Jr." pilot bit for Danuser Augers. The live action "fishtail" design eliminates the centerpoint and resulting tendency to pivot on stones or hard ground. Forward-angled cutting lips either side of the center line "slice" a pilot hole ahead of the wedge-shaped main pilot blade, which in turn breaks up the earth ahead of the auger helix. The Pengo Jr. is cast from special abrasion-resistant alloy and is heat treated for maximum service life. **Petersen Engineering Co.** is the manufacturer.

1062

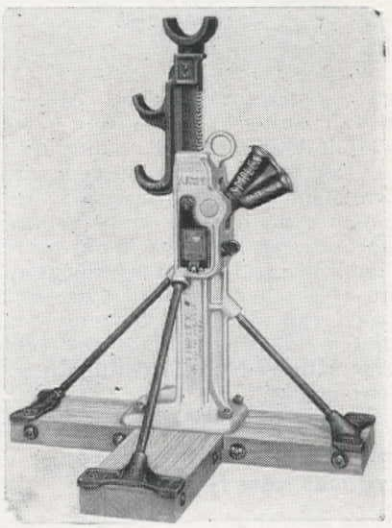
Motorized head pulley has streamlined advantages

A motorized head pulley which eliminates external sprockets, chains, V-belts, and jack-shafts on conveyor drives is being manufactured by the Pulley and Sprocket Department of **Yuba Manufacturing Co.** The pulley consists of a fabricated steel drum with self-contained electric motor and reduction gears. A torque arm at one end of the drum attaches to the conveyor frame to prevent the motor from rotating inside the drum as it drives the pulley. Leads to the motor enter the head pulley through a conduit passing through the drum end bell and bearing. Motor and head pulley are cooled and ventilated by holes in the drum. Heavy duty mounting bearings and bolts are furnished as standard equipment. No motor stands or brackets, no chain guards or jack-shafts are required. Adaptable to both belt conveyors and bucket elevators.

1063

Reel jack has aluminum housing for light weight

This is a single-acting jack which provides easier lifting action than its double-acting predecessor. It has a rug-



ged, laminated oak "T" base and other noted features of Simplex ratchet lowering jacks. Users will find it handy on field work where its reduced weight is convenient. The jack has a 10-ton capacity, closed height of 29 in., lift of 13¾ in., and a weight of 83 lb. A 5-ft. leverbar is supplied. **Templeton, Kenly and Co.** is the manufacturer.

Literature briefs . . .

1064

ROLLER—Free copy of a big, new catalog on Roll-O-Pactor furnished by **Wm. Bros Boiler & Mfg. Co.** Filled with results of soil tests, equipment comparisons and actual job histories.

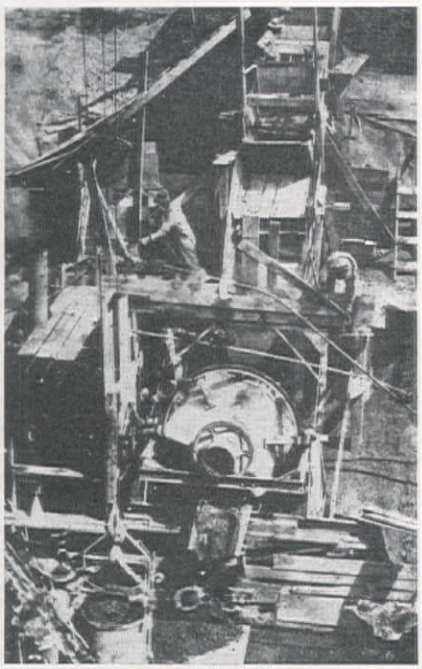
1065

CONCRETE WATERPROOFING—Hydropel—concrete waterproofer, explained, described and illustrated in **American Bitumuls & Asphalt Company** booklet.

1066

COMPRESSORS—Monobloc air compressors specification sheet, published by **Worthington Corporation,** includes discussions of feather valves, aluminum cylinder head, counterbalanced crank and other features.

First concrete cableway was in Montana—1905



DAM CONSTRUCTION, 1905 style. This photo of the concrete mixer at a Bureau of Reclamation diversion dam job on the Yellowstone River shows also the ½-yd. bucket (lower left) used in the first aerial placement of concrete.

A 65-FT. DIVERSION dam built on a reclamation project in Montana back in 1905 has been tentatively established as the first such job to use overhead placement of concrete. The ingenious superintendent on the job was John Harkness, now of San Francisco, who, in a letter to Region 2 (Sacramento) of the Bureau of Reclamation this year, described his innovation:

How it happened

"The only labor I could get to wheel concrete into the forms were cowboys, who aren't famous for walking. So I had to do a little inventing.

"I happened to have inherited a donkey engine with good ⅝-in. steel cable on the drum, sitting at one side of the diversion structure. I had my blacksmith build a carriage out of waste steel plate, and with a block and tackle we were in business with the first overhead system of placing concrete.

"The idea worked so well that we built two more carriages, and were then able to run the concrete mixer to capacity. Each bucket carried ½ cu. yd. of concrete."

Frank Crowe was there

Harkness recalls that Frank Crowe was the reclamation inspector on the work, taking great interest in the makeshift cableway. Crowe later went on to achieve an international reputation in dam construction, climaxing his career at Shasta Dam, where crews under his direction used 8-yd. buckets and a cableway to place more than 11,000 cu. yd. of concrete in a single day.

Long Beach Broadway Bridge jacked up 5 to 8 feet

CHANGING TOPOGRAPHY in the Long Beach Harbor area necessitated raising 9 spans of the Broadway Bridge from 5 to 8 ft. and building up existing piers to the new elevation. Each span, weighing about 700 tons, was jacked up using eight 100-ton and sixteen 50-ton hydraulic jacks with timber blocking. After spans were in position, columns were built under the ends of each girder with Rocklite lightweight concrete masonry units. Jacks and blocking were then removed and concrete piers poured around the concrete masonry units. Load was carried on the lightweight blocks within 24 hours after placing. Guy F. Atkinson Co. was prime contractor for the job; C. R. Crain & Sons subcontracted for placing the masonry units. The project was carried out for the Long Beach Harbor Department.

P. G. & E. power line to San Francisco Peninsula

PACIFIC GAS and Electric Co. is past the halfway point in construction of a 33-mi., twin 220,000-volt transmission circuit which will bring a large new block of electrical energy to the San Francisco Bay Area. The project is scheduled for completion by March. The $4,426,514 project will bring 220,000-volt power for the first time to the fast-growing Peninsula.

The power line route originates at Moraga Substation east of Oakland, heads south of Hayward, turns westward sharply there to cross the bay, almost paralleling San Mateo Bridge, and terminates at P. G. & E.'s San Mateo Substation, which is being expanded to handle the heavy, new incoming power load.

Eighty-seven of the 94 steel towers along the 21-mi. stretch of line from Moraga to eastshore are already erected. Meanwhile three pile-drivers, three derricks and two dredges are busy constructing foundations for the 21 special water crossing towers that span 7.2 mi. of San Francisco bay.

On the eastshore, treated wood piles have been driven for five towers, with three foundations completed, and across on the San Mateo side, untreated wood piles for eight towers have been driven, with four foundations complete.

Altogether along the 33-mi. long route P. G. & E. must erect 139 four-legged

steel towers, soaring skyward at various heights ranging from 91 to 298 ft.

Most spectacular of all the 139 towers are two 298-footers near the westshore of the bay crossing, one to each side of the deep water ship channel. They are so heavy—each weighs 55 tons—that 92 wood piles, driven deep into the bay bottom, are required to support each one. Other towers average only 20 piles.

The new line will give the Peninsula a third source of power. Presently two 110,000-volt lines and a pair of 60,000-volt lines feed energy into the San Mateo Substation and other smaller substations in the area. These lines emanate from P. G. & E.'s master switching center at Newark, just north of San Jose.

A contractor's force of 173 men is working on the bay crossing section of the line. The final seven towers of the 21-mi. east bay section are now being erected.

Stringing the 94 east bay towers with six (three to each 220,000-volt circuit) aluminum steel core wires, measuring 1-1/5 inches in diameter, began at Moraga Substation in mid-September.

Flood control plan for Santa Maria Basin

A PLANNING REPORT for an integrated water conservation and flood control project which would replenish a dwindling underground water supply and provide flood protection for life and property in the Santa Maria Basin, 130 mi. northwest of Los Angeles, has been announced by Under Secretary of the Interior Vernon D. Northrop.

The planning report calls for construction by the Bureau of Reclamation of the 184-ft. high Vaquero Dam and 214,000 acre-foot storage reservoir on the Cayuma River, 7 mi. from the city of Santa Maria, and installation of levees and channel improvements in the Santa Maria Valley by the Army Corps of Engineers. The report has been sent to Federal agencies and California State officials for review and comment prior to submittal to the President and the Congress.

Authorizing legislation and appropriations must be provided by the Congress before the program can be put into effect.

Construction costs are estimated at $24,575,000, of which $14,300,000 would be for Vaquero Dam and Reservoir and $10,275,000 for the Army Engineers' levee and channel improvement work. Water users would repay the Federal Government $10,770,000 of the dam and reservoir cost; the remainder of the project expenditure would be allocated to flood control benefits, for which no reimbursement is provided under Federal law.

The Vaquero Dam and Reservoir would detain Cuyama River flows during flood periods of waste flow to the ocean, the report explains, and subsequently release the conserved water at rates equal to, or less than the percolation capacity of Santa Maria River channel. Thus, an average annual yield sufficient to overcome the present overdraft and to irrigate an additional 3,000 acres for a period of 50 years might be obtained.

The project is unique in the United States in that all hold-over storage would be maintained in the ground-water reservoir and no surface-water delivery to irrigators will be made.

The report emphasizes that there is a serious flood problem confronting the residents of the Santa Maria Valley from floods on both the Santa Maria River and from the Bradley Canyon. Historical accounts of floods in the Santa Maria and adjacent basins dating back to 1811 show 25 floods of such magnitude as to cause widespread damage.

The Santa Maria River levee and channel improvements designed by the Corps of Engineers would protect the Santa Maria Valley from a flood peak of 150,000 second-feet on the Santa Maria, assuming partial control by Vaquero Reservoir. These levees would be located along the river from Fugler Point downstream to a point 600 ft. below the highway bridge at Guadalupe. In addition, the Bradley Canyon levees of about 2 mi. in length are designed to divert 7,000 to 9,000 second-feet of flood waters from Bradley Canyon into the Santa Maria River.

The proposed flood control features would prevent nearly all flood damage that might otherwise occur in the Santa Maria Valley, the report declares.

Improved mechanization and engineered economy for highway work suggested by contractors

HIGHWAY CONTRACTORS have set quite a stint for the manufacturers of roadbuilding equipment, according to A. N. Carter, manager of the AGC's highway division, speaking before the ASCE Centennial convention in Chicago on September 3. Carter paid the construction industry's respects to the equipment manufacturers, noting, for instance, that only improved mechanized techniques have enabled contractors to bid lower on highway earthwork today than they did in 1923.

However, reflecting today's high competition and cost consciousness, contractors seek additional progress in the mechanization of their various operations. They would like, among other things:

1. More flexible equipment
2. More refinements on equipment
3. Higher speed in machines
4. Equipment that is easier on the operator
5. Units that can produce for longer periods without shutdowns for repair or maintenance, other than routine maintenance
6. Machines of lighter weight
7. Units requiring fewer operators, in view of the high wages paid today's skilled and unskilled workers on highway construction
8. Greater ease in maintenance and repair of equipment
9. Greater standardization of repair parts and of the actual equipment itself.

Despite the obviously greater cost of machinery embodying any of these advancements, contractors apparently feel that only with them can long-run economies be achieved in the stupendous highway construction program that lies ahead all over the U. S.

Carter went on to note the magnitude of a highway contractor's investment in equipment. Studies of the Bureau of Public Roads, he said, have recently been summarized in a speech by Commissioner Thomas H. MacDonald, who said that equipment on a road job might well represent 90% of the contract amount. In view of this fact, Carter itemized several points of practice that might be considered by highway engineers and officials for the purpose of achieving more effective contractor operations and, thereby, lower construction costs.

1. Permit the contractor free use of new types of equipment.
2. Be sure land is available and the job ready for the contractor to move in and start work when bids are opened.
3. Use local construction materials to a maximum. (This will also reduce the cost of materials.)
4. Prepare designs that will permit maximum use of the splendid construction equipment now available.
5. Cut hand labor to a minimum.
6. Award programs in contracts of various sizes.
7. Work for greater standardization of design so as to obtain savings, for example, through the use of the same type of bridge forms in neighboring states.
8. Use specifications without revision for as long a period as feasible and practicable; that is, do not change the general specifications each year, and when they are revised, obtain the contractor's suggestions by contacting his state organization.
9. Make the specifications of neighboring states as uniform as possible. Contractors see no need for one state to specify that all batches of concrete be mixed for at least 2 min., and a nearby state to specify a 1-min. minimum mixing period.
10. Utilize to the fullest extent each year's construction season so as to permit maximum use of the contractor's equipment and personnel, and thereby get better prices.
11. Endeavor to set up a balanced construction program. For example, if a highway department schedules a large volume of black-top work for one year and none the next, it will

be difficult for the construction industry to keep in step, and higher prices will result.

12. Pay the contractor promptly for completed work and reduce to a minimum the retained percentage on partial payments; the financial responsibilities of the contractor are extensive.

$8,000,000 deep water terminal for Anchorage

IN A REPORT which favors the construction of deep water terminal facilities at Anchorage, Alaska, Port of Seattle Engineer, G. T. Treadwell, stated the $8,000,000 project would pay for itself over a 30-year period while yielding a profit of $15,000 per year over operating expenses.

Treadwell pointed out that he found the proposed project to be not only feasible from the engineering point of view, but also desirable from the area's point of view. Costs involved in the shipment of goods to Alaska's huge territory are at the present time very high, but deep water terminal facilities, according to Treadwell's report, would make large reductions possible and practical. This would apply to items of construction materials as well as to canned food, which currently comes by rail and truck.

The engineer feels that the most desirable location for the proposed facilities would be north of the present ocean dock. The terminal would have rail and loading facilities off a wide apron from the dock and two 100-ft. wide by 150-ft. long transit sheds with rail facilities.

P. G. & E. celebrates 100 years

FROM 1852 to the present—that's the record of the Pacific Gas and Electric Co. of California.

This year, with banquets and historical brochures, films and programs, the firm celebrates 100 years of public utility service to the state.

Records in electrical output, in construction of facilities, in service and progress have been made by P. G. and E. in its years of accomplishment.

FAST DIRT MOVING IN OREGON

Here's one of three new open-bowl Wooldridge Terra Cobras being used by White Bros. Construction Co. on $1,158,818 contract for grading 5.7 mi. of Pacific Highway near Roseburg, Ore. The 17½-yd. capacity earthmovers are moving 900,000 cu. yd. of rocky shale. Willard White is acting as project manager.

NEWS of DISTRIBUTORS AND FACTORY BRANCHES

Straub appoints Mont. rep.

Miller Machinery Co., Missoula, Mont., is the new sales representative for Straub Manufacturing Co., Inc. Exclusive territory for Kue-Ken crushers includes all of Montana west of Livingston; and Lemhi, Custer, Valley, Butte, Blaine and Clark counties in Idaho. Additional territory on a non-exclusive basis includes the rest of Montana and the southern portion of Idaho.

Howe Scale Co. appointments

William J. Tucey has been promoted to San Francisco branch manager of Howe Scale Co., Rutland, Vt., with offices at 124 Fourth St., San Francisco. His former supervisor, Lierd E. Grant, is now Los Angeles branch manager, located at 1237 E. 8th St., Los Angeles.

Interstate Tractor and Equipment Co. expands

Mushrooming activity in the Coos Bay Area has necessitated a new Interstate Tractor and Equipment Co. store in Coquille, Oregon. It will operate as a branch of the Roseburg store, managed by Joe Chamberlain, and will provide parts and mechanical service for Caterpillar Diesel tractors, engines and road-building machinery, Skagit loading hoists, Trackson shovel loaders, Hyster tractor equipment, Young rigging and U. S. Steel wire rope.

Hunter now manages P & H in Seattle

The Seattle office of Harnischfeger Corp. is now directed by Paul H. Hunter, following the recent death of Manager Robert H. Sturgeon. Hunter, a specialist in the operation and application of large excavators, has been with Harnischfeger since 1937. He had been in charge of large excavator sales in the San Francisco territory since last fall, and formerly was associated with P & H's main office in Milwaukee.

Ebersole *Hunter*

"Bob" Ebersole promoted

Interstate Tractor and Equipment Co. announces the promotion of Robert B. "Bob" Ebersole to its construction equipment sales department. Ebersole, with the company 7 years, will concentrate on the application of Caterpillar and allied earthmoving equipment in heavy construction, and will continue to represent the firm with federal and state agencies, although he will be relieved of his calls on county and city authorities by the local territory managers.

Raybestos-Manhattan has Denver warehouse

A new warehouse serving the Rocky Mountain region with industrial rubber products and packings, plus the Rocky Mountain and Western Canadian oil fields with hose, belting, packing and friction materials, has been opened in Denver by Raybestos-Manhattan, Passaic, N. J. Elton T. Fair, Jr., sales representative for the territory, is in charge.

Baldwin-Lima-Hamilton appoints Bay Cities

Lima shovels from ¾- to 6-yard capacity, Lima draglines, cranes, pull shovels, and truck and wheel mounted cranes will be distributed by Bay Cities Equipment, Inc., for Baldwin-Lima-Hamilton Corp., serving territory covered by Del Norte, Humboldt, Trinity, Mendocino, Lake, Glenn, Colusa, Sutter, Placer, Yuba, Nevada, Sonoma, Napa, Yolo, Sacramento, Eldorado, Marin, Solano, Contra Costa, Alameda, San Joaquin, Amador, Calaveras, Alpine, San Francisco, San Mateo, Santa Cruz, Santa Clara, Stanislaus, Merced, Tuolumne, Mariposa, Monterey, San Benito, Ma-

dera, Fresno, Kings and Tulare counties in California. Bay Cities will offer complete service facilities, and also will have a large stock of replacement parts.

Rundle joins Balzer Machinery

Robert F. "Bob" Rundle is now sales manager for Balzer Machinery Co., Portland. Rundle has a long association with the industry, most recently as Northwest district representative for Murphy Diesel Co.

Crusher sales manager for Baldwin-Lima-Hamilton

A. D. "Al" Bellows, formerly Crusher Sales Engineer for Austin-Western Co., is now sales manager, Crusher Dept., Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Lima, Ohio. Bellows has had nearly ten years of crusher sales and engineering experience with the A-W Crusher Division, which recently consolidated with Baldwin-Lima-Hamilton Corp.

Bellows

White

New "Cat" rep. in West

Caterpillar Tractor Co. announces the appointment of Robert F. White as western division parts representative with headquarters in San Leandro, Calif. He will contact Caterpillar dealers in Oregon, California, Arizona, Nevada, Utah and Idaho. White was promoted to the company's parts department in 1951 and formerly was associated with both the eastern and central divisions.

New line for Bay Cities

Bay Cities Equipment, Inc., now represents the complete line of Pettibone-Mulliken Corp. self-propelled, self-feeding bucket loaders, front-end loaders, fork-lift loaders, motor graders and buckets in the following California counties: Del Norte, Humboldt, Mendocino, Lake, Sonoma, Napa, Marin, San Francisco, Alameda, San Mateo, Santa Clara, Santa Cruz, Monterey, San Benito, and portions of Trinity, Solano and Contra Costa counties.

Heil Co. announcement

Warren Cline has been appointed field service engineer for the Los Angeles district of the Heil Co., a district covering California, Nevada, Arizona and Hawaii.

Pipe Linings, Inc., appoints Southwest rep.

A. J. Gates, with headquarters at Ruidoso, N. Mex., will represent Pipe Linings, Inc., in the Southwest. He has had 25 years of experience in water supply and distribution work. Gates was formerly assistant city engineer of Wichita Falls, Texas, superintendent and engineer for its water department, business manager for Midland, Texas, and also was connected with Joe E. Ward, Wichita Falls consulting engineer.

Frank Cox Equipment Co. moves

New and larger quarters for Frank Cox Equipment Co. are at 3000 W. Valley Blvd., Alhambra, Calif. The telephone numbers remain the same.

Leschen moves in L. A.

The Los Angeles office of A. Leschen & Sons Rope Co., manufacturer of wire rope, has moved from 2439 Hunter St. to 2871 E. Pico Blvd.

Bucyrus-Erie distributor appointed

Brown-Bevis-Industrial Equipment Co., Los Angeles, will distribute in Los Angeles and Orange counties for Bucyrus-Erie tractor equipment, including 4-wheel scrapers, cable and hydraulic bulldozers and Bullgraders, Dozer-Shovels, rippers and grubbers, pusher plates, double drum, rear-mounted and single drum, and front-mounted winches.

Caterpillar distributors' territory divided

Now representing Caterpillar Tractor Co. in territories formerly served for nine years by Hartnett & Braden Tractor Co., are Braden Machinery Co. and Hartnett Machinery Co. Braden Machinery Co., 900 Fourth Ave., Yuma, is dealer for the southern half of Yuma

County, Arizona, and the western portion of the state of Sonora, Mexico. D. F. Hartnett Machinery Co., located on Highway 60, ½ mile west of Blythe, Calif., serves northern Yuma County and eastern Riverside County, Calif.

Edward C. Colson joins AIMME

A new member of the American Inst. of Mining and Metallurgical Engineers is Edward C. Colson, sales engineer for Arizona Equipment Sales, Inc., Phoenix.

New firm in Albuquerque

Morris Steel and Supply Co., 701 Coal Ave. S.E., headed by LeRoy Morris, is now open in Albuquerque, N. Mex., and is anticipating further industrial expansion in the Southwest. It will specialize in steel, other types of metals, oil well supplies, pipe, etc.

"Cat" names Washington rep.

Murphy-Campbell Co., headed by Frank J. Murphy and Barney C. Campbell, is now Caterpillar dealer for Grays Harbor, Lewis, Mason, Pierce and Thurston counties, and a portion of Pacific County in Washington. Charles S. Burdell is secretary of the organization.

AIRCO opens in San Diego

Air Reduction Pacific Co. announces a new branch at 1531 Rigel St., San Diego. The supervisor is E. W. MacCorkle, Jr., vice president in charge of the Los Angeles district; the local representative is J. G. "Sandy" Sanderson.

A. O. Smith distributors

A. M. Castle warehouses at San Francisco, Seattle and Los Angeles are subdistributors for Bufnel Co., Ltd., A. O. Smith safety grating distributor on the West Coast. Eaton Metal Products Co. is A. O. Smith representative in Denver.

NEWS of MANUFACTURERS

P & H sales manager

New sales manager of P & H's Diesel Engine Division, Crystal Lake, Ill., is Don E. Sweeney, who has a broad background in the diesel engine field. He formerly was in charge of distributor operations for seven Mid-West states at General Motors Detroit Diesel Engine Division. During the war he supervised tank production, inspection and shipment. He was previously associated with the Michigan Public Service Co., and with Westinghouse.

Sterling-White sales mgr.

Lee E. Copple has been named sales manager of the construction and Mining Equipment Department of the Sterling Division, The White Motor Co. This is a new department, created to handle special equipment sales and problems of the market for Sterlingoff-highway models.

Nordberg executive

The Nordberg Manufacturing Co., Milwaukee, has elected Admiral A. G. Noble, USN (Retired), as executive vice president, a member of the executive committee, and a member of the board of directors. Admiral Noble was formerly vice president and general manager of Martin-Parry Corp., Toledo, since his retirement from the Navy.

Cummins promotes three

The Cummins Engineering Department, Cummins Engine Co., Inc., Columbus, Ind., has promoted J. C. "Joe" Miller to executive engineer in charge of all product engineering and research from manager of research and refinement. In the same department D. B. "Dan" Worth, formerly manager of product engineering, now manages field quality, and will coordinate field and factory studies of product quality control. N. M. "Nev" Reiners advanced from manager of the research laboratory to succeed "Joe" Miller.

It's now "Skil Corporation"

Skilsaw, Inc., announced its official name and trademark change to Skil Corporation, explaining that the company expansion from one portable electric saw to over 150 different tools necessitated a new more-inclusive name.

Shea of Goodyear succumbs

John A. Shea, advertising manager, Western Division, Goodyear Tire & Rubber Co., Inc., died in his Manhattan Beach, Calif., home on June 26.

Space is sold as advertisers' inches. All advertisements in this section are ⅛ in. short of contracted space to allow for borders and composition.

CLASSIFIED SECTION

Rates are $8.50 a column inch. Copy should be sent in by the 20th of preceding month if proofs are required; by the 23rd if no proofs are required.

AUCTION

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$12,000,000.00 VALUATION

COWELL PORTLAND CEMENT CO.

COWELL (25 Miles From San Francisco) CALIF.

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OCTOBER 20th	OCTOBER 21st	OCTOBER 22nd

STARTING EACH DAY AT 10 A.M.

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WELL DRILLS	TRIPPERS	TANK & MINE CARS
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ROCK DRYERS	CONVEYORS	ORE BINS • MOTORS
HAMMER MILLS	STEAM BOILERS	LABORATORIES
CLINKER GRINDERS	DUST COLLECTORS	TANKS • HOPPERS
CLINKER COOLERS	POWER SHOVELS	SUPPLIES
KILNS • SCALES	BUCKET ELEVATORS	27 CORRUGATED IRON BUILDINGS Covering Approx. 250,000 Sq. Ft.
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STRUCTURAL, MECHANICAL AND ELECTRICAL

for work on hydroelectric power developments. Write giving full experience record and qualifications.

HARZA ENGINEERING COMPANY

400 West Madison Street, Chicago, Illinois

WILLIAMS "Super-Hi" Tensile Steel

CONCRETE FORM HARDWARE
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Soulé Steel Co. names v. p. and genr'l. mgr.

Edward Lee Soulé, Jr., is the newly appointed vice president and general manager of Soulé Steel Co. Soulé was formerly production manager for the firm's West Coast operation in California, Washington and Oregon.

Thermoid changes

Lester J. Hyland, a company employee for over 25 years, was appointed sales manager of the industrial rubber division of Thermoid Co. Since 1949 he had been manager of Thermoid's Western Division industrial rubber products in San Francisco. His successor in San Francisco is Robert Gentles, who began working with Hyland in 1949.

Heil sales rep.

Joseph F. Heil, Jr., is now special sales representative for the organization founded by his grandfather, the Heil Co. Heil will coordinate planning various activities and methods of operation in all field offices, in addition to forming contacts, and providing a training course for Milwaukee sales personnel. He had previously worked in various capacities throughout the company.

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