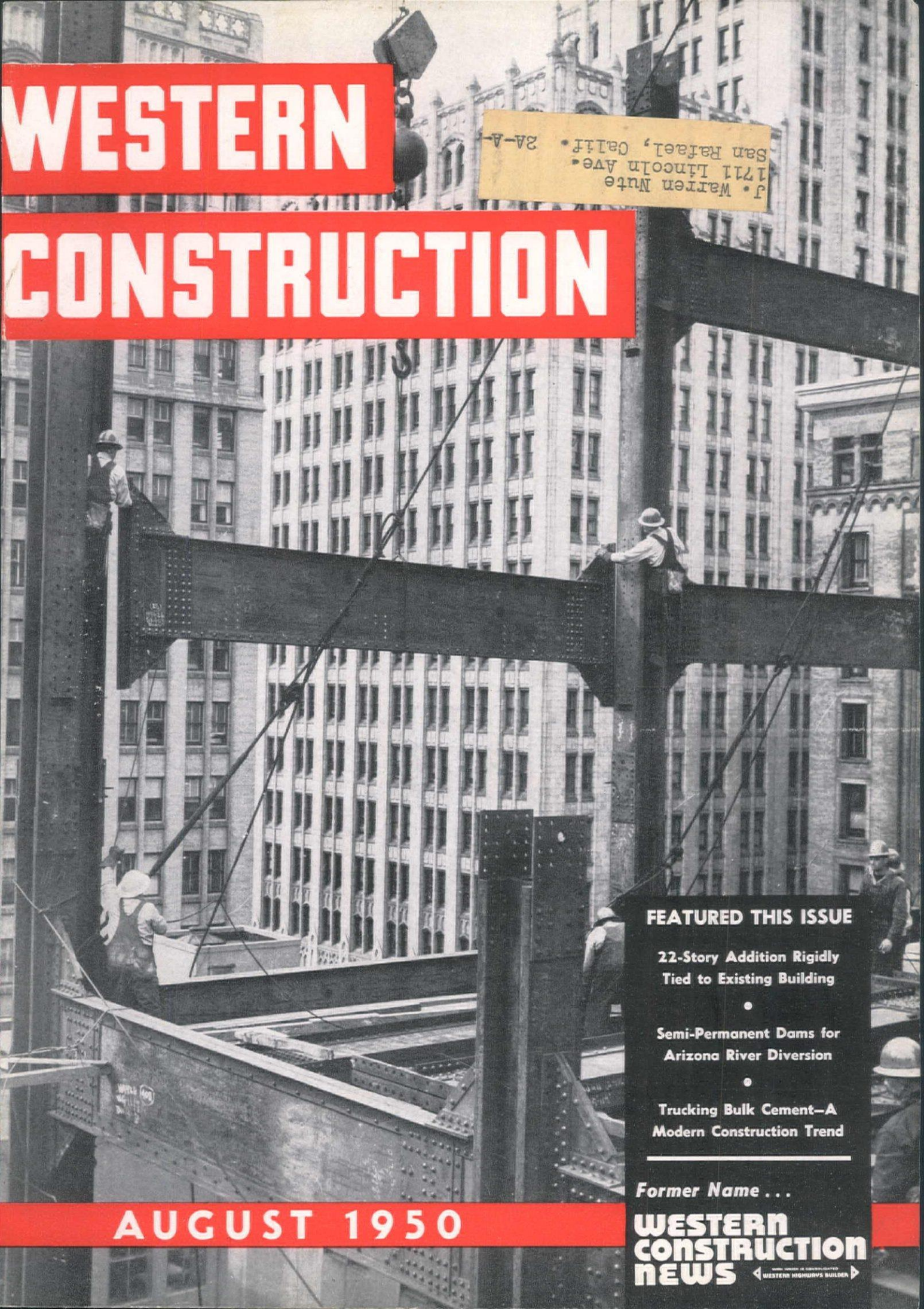
WESTERN CONSTRUCTION



FEATURED THIS ISSUE

22-Story Addition Rigidly Tied to Existing Building

•

Semi-Permanent Dams for Arizona River Diversion

•

Trucking Bulk Cement—A Modern Construction Trend

Former Name . . .

WESTERN CONSTRUCTION NEWS

AUGUST 1950

Give your engines more "PUSH"

AND reduce operating costs by lubricating with TEXACO URSA OIL X★★

Keep your tractor and truck engines *clean* and you'll have full power when you need it . . . maintenance costs and fuel consumption will both be lower. For heavy-duty gasoline and Diesel engines, the lubricant to use is *Texaco Ursa Oil X★★*. It's detergent, dispersive, dependable in even the severest service.

Texaco Ursa Oil X★★ has oxidation resistance to spare. Thus, engines don't get "lacquered up," rings stay free and valves act the way they're supposed to. You get all the power your engines are designed to deliver. *Texaco Ursa Oil X★★* stands up under heat and pressures . . . protects parts against wear . . . protects bearings against corrosion.

3 Other Maintenance Cost Reductions

Chassis bearings will get extra hundreds of miles of protection, chassis parts will last far longer, when you lubricate with *Texaco Marfak*.

Wheel bearing replacements will be far fewer when you lubricate with *Texaco Marfak Heavy Duty*. It seals out dirt and moisture, requires no seasonal change.

Crawler track mechanisms run better, last longer, protected with *Texaco Track Roll Lubricant*. It gives long-lasting protection against water, dirt and wear.

Follow the Texaco Simplified Lubrication Plan and save maintenance costs all along the line. A Texaco Lubrication Engineer will gladly give you full details. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

HAVE YOU A ROCK PROBLEM?

FIFTEEN NORTHWESTS for Fredrickson & Watson Oakland, California

HERE'S an outfit that can tell you about Rock. Ask Fredrickson & Watson of Oakland, Calif. . . . It is performance in digging like this that makes repeat order buyers. It is performance in digging like this that has made one out of every three Northwests sold a repeat order.

Northwests are real Rock Shovels and if you have a real Rock Shovel you don't have to worry about output in *any kind* of digging.

Northwest Shovels bring you advantages for rock digging found in no other machine. The Northwest Dual Independent Crowd utilizes force most other independent crowd shovels waste. The Cushion Clutch relieves parts under power from shock overload. Cast Steel Machinery Side Frames and Cast Steel Machinery Bases take the strains of hard digging, maintain shaft and bearing alignment and reduce wear. Other Northwest advantages combine for easier operation, easier upkeep and higher output.

You can't afford anything but the best in the heart of the job. You can plan now for a Northwest in the *Key Spots* where profits begin. Why not ask for details and place an order for a Northwest and be sure of a real Rock Shovel?

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street, Chicago 3, Illinois

local NORTHWEST sales agents

BUTTE, MONTANA
Hall-Perry Machinery Co.

SIDNEY, MONTANA
Northland Machinery Co.

MEDFORD, OREGON
Cal - Ore Machinery Co., Inc.

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State Tractor & Equip. Co.

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WESTERN CONSTRUCTION

Volume 25 **AUGUST 1950** Number 8

FEATURE ARTICLES

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B.F.Goodrich

BFG users report: Continued savings —thanks to double bruise protection

B. F. GOODRICH *Universals* were reported by one operator to be in good condition after daily quarry service for over 21 months. Another operator reports over 4500 service hours from Universals against only 1600 hours from another make in identical service. Still another report told of tires that were still "young" at 3200 hours and probably good for thousands more. These actual user reports spotlight the great difference between various makes of off-the-road tires.

When *results* are measured, BFG tires always stand high. There are many reasons for the continuing top performance of B. F. Goodrich tires. For example, notice the tread on the Universals in the picture above. It's designed to give traction both ways. More than that, it is made of specially compounded rubber . . . armor against sharp rocks and other tire killers.

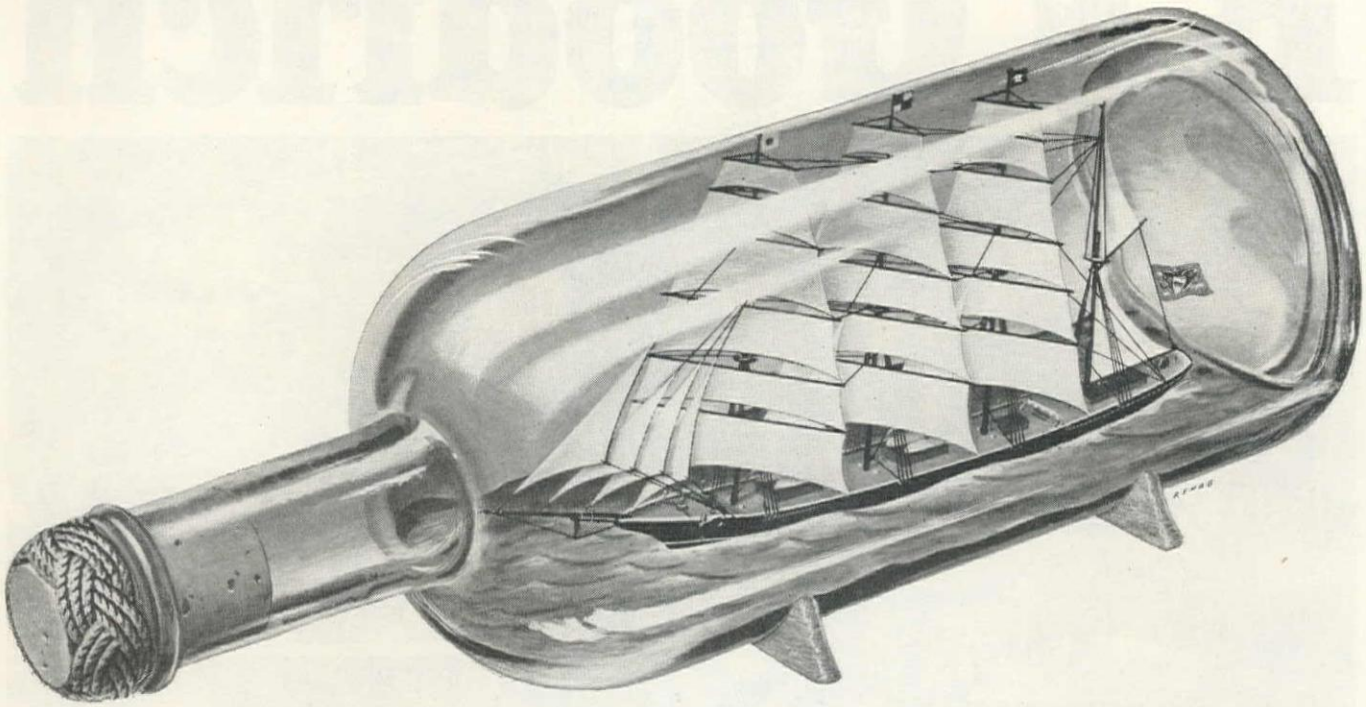
Also, BFG tires have double bruise protection in the form of a *double nylon shock shield* . . . layers of nylon cord built between the tread and the body plies. Under impact, the strong, elastic nylon shields the cord body. And there are two shields for double protection!

Only B. F. Goodrich gives you the added protection of the nylon shock shield; the added savings from (1) longer tire life (2) increased bruise resistance (3) less danger of tread separation (4) more recappable tires. Nylon shock shield costs no extra—you pay no premium.

There's a specially designed *BFG off-the-road tire for every need. See your B. F. Goodrich dealer or call *The B. F. Goodrich Company, Akron, Ohio.*

**Typical example: New ALL-NYLON tire for tough construction projects, quarry work, strip mining, etc. In all tests not a single tire blew out, not one flex break occurred!*

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER
Truck Tires



It's craftsmanship that counts

This example of craftsmanship symbolizes something that every producer of quality structural shapes must know: *Painstaking care is essential.*

Such craftsmanship is *fundamental* at Kaiser Steel, where every step in the production of structural shapes is rigidly and completely controlled. The result is structural shapes which measure up to precise specifications of construction engineers.

Kaiser Steel's modern facilities produce a wide range of quality structural shapes. Because these facilities are nearby, carrier delivery time is cut — and engineering service is prompt.

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet • alloy bars carbon bars • structural shapes • cold rolled strip • cold rolled sheet • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

You hear it from coast to coast...*

"It's BLUE BRUTES For My Money!"

***OREGON**

It's another Blue Brute UMW Wagon Drill. Ready to swing into action at any angle, it is here helping to cut through a road out where the timber grows tallest. The Kuckenberg Construction Company of Portland, Ore., are the owners and the report from this firm says they **"wish all their other machines on the job were as good . . . and are going to change to Blue Brutes in future replacements."**

***PENNSYLVANIA**

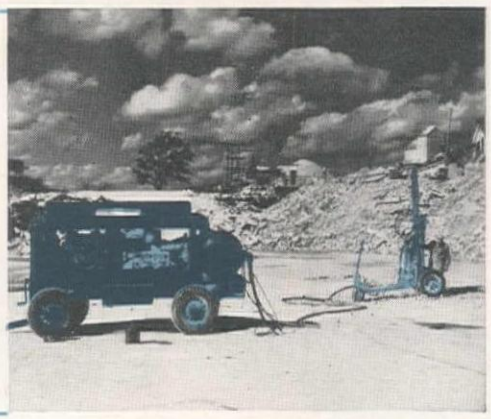
A 315′ Portable Compressor and UMW Wagon Drill, one of many Blue Brute teams owned by Cramer Construction Co. of Lebanon, Pa. Pres. G. B. Cramer writes: **"We have used Blue Brutes for several years, and on our Lebanon Veterans' Hospital job have five Blue Brute Compressors powering Worthington Wagon Drills and Rock Hammers. As evidence of their entirely satisfactory performance we recently purchased another 315′ Blue Brute Compressor."**

***OHIO**

In Waterville, Ohio, the Crawford Steel Construction Co., Inc., of Cincinnati, erected the structural steel on the new highway bridge across the Maumee River. Company official J. A. Crawford says: **"Our 210′ Blue Brute Compressor is efficient, well constructed and rugged. It has given us excellent service, and we are more than willing to recommend it highly . . . This first experience with your products is evidence to us of Blue Brutes' superiority.**

***WISCONSIN**

Opening up a new limestone quarry in Sussex, Wisconsin, is easy work for these rugged, hard-hitting Blue Brute team-mates. The fast, versatile UMW Wagon Drill is drilling 6-foot holes for explosive charges. Power source is a 315′ Blue Brute Compressor, that gets all the air out of every drop of fuel. Vice-President Lloyd Wolf of the Quality Limestone Corporation, reports: **"After thorough investigation we decided Worthington equipment was best . . . They are fine machines."**



From the Atlantic to the Pacific you'll find Blue Brute owners — on every type of construction project, from the smallest to the largest — glad to tell you of the cost-cutting, trouble-free performance that is helping make estimates pay handsomely.

There are a lot of sound reasons for this country-wide acclaim — all adding up to the fact that *there's more worth in Worthington*. Your nearby Worthington-Blue Brute Distributor is ready with those reasons, and can make immediate deliveries. See him, or write us direct.

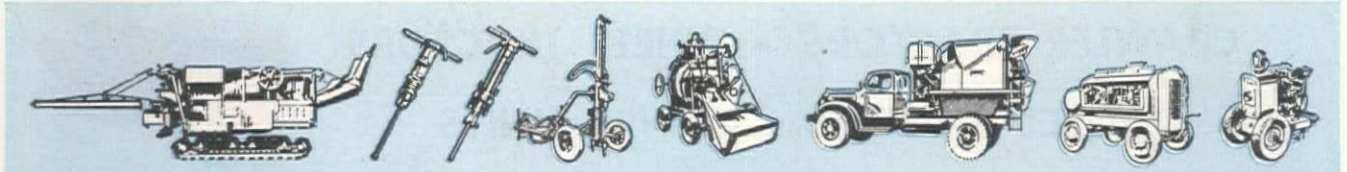
Worthington Pump and Machinery Corporation
Construction Equipment Department
Harrison, New Jersey

Distributors In All Principal Cities

WORTHINGTON

BUY BLUE BRUTES

HO.5



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

CHAMPION

WORKIN'EST

Here are some of the exclusive features that give the TD-24 its matchless work capacity:

1. 180-h.p. International diesel engine with gasoline-conversion starting and unmatched "lugability".

2. Synchromesh transmission for easy shift-on-the-go operation; plus eight speeds forward and eight reverse.

3. Planet Power drive, smooth and rugged, for instant speed change up or down one gear without declutching.

4. Planet Power steering to provide power on both tracks in gradual turns and permit feathered or pivot turns.

5. Separate reverse lever for quick change of direction of travel in any of the eight transmission speeds.

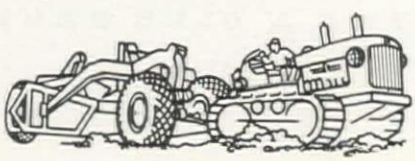
6. High-speed track assemblies with new recoil mechanism that holds front idlers in position against full-load track pull.

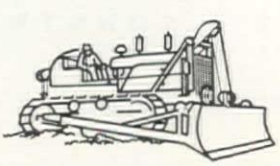
The NEW TD-24

CRAWLER TRACTORS • WHEEL TRACTORS

DIESEL ENGINES • POWER UNITS

Standardize on Power that Pays





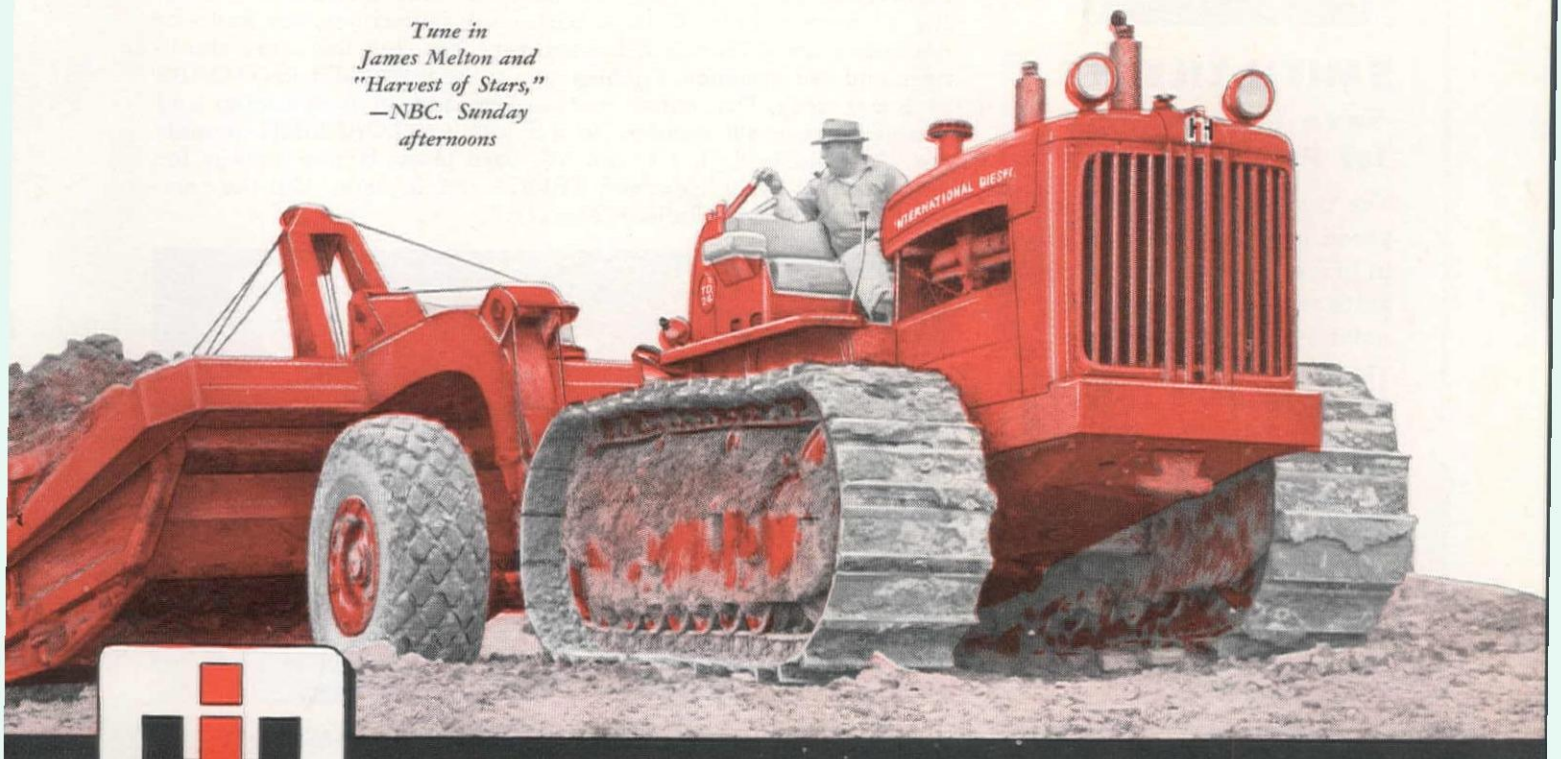
# of Crawlers

TRACTOR ON ANY JOB

● *"THE TD-24 is definitely outhauling every other tractor on the job. It will do so much work that we are sure our job costs will show a great saving!"* That's the report of the foreman on the 247,000-yd. University of Maryland stadium project. • *"I don't have to stop on any grade,"* the operator reports, *"and we have 25% or better on this job. Why, I just go up in 4th gear easy while the other tractors have to switch to low to make it."* And the TD-24 hauls a 17-yard scraper, heaped! • Yes, the TD-24 is the "workin'est tractor" on any job. Yet, its operator is the worker with the easiest day! See your International Industrial Power Distributor. Get a TD-24 demonstration. Discover how you, too, can save job time, cut costs, earn extra profits.

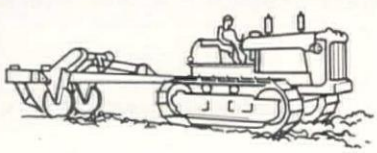
INTERNATIONAL HARVESTER COMPANY • Chicago

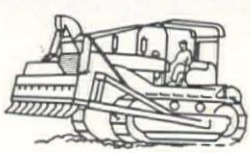
Tune in James Melton and "Harvest of Stars," —NBC. Sunday afternoons



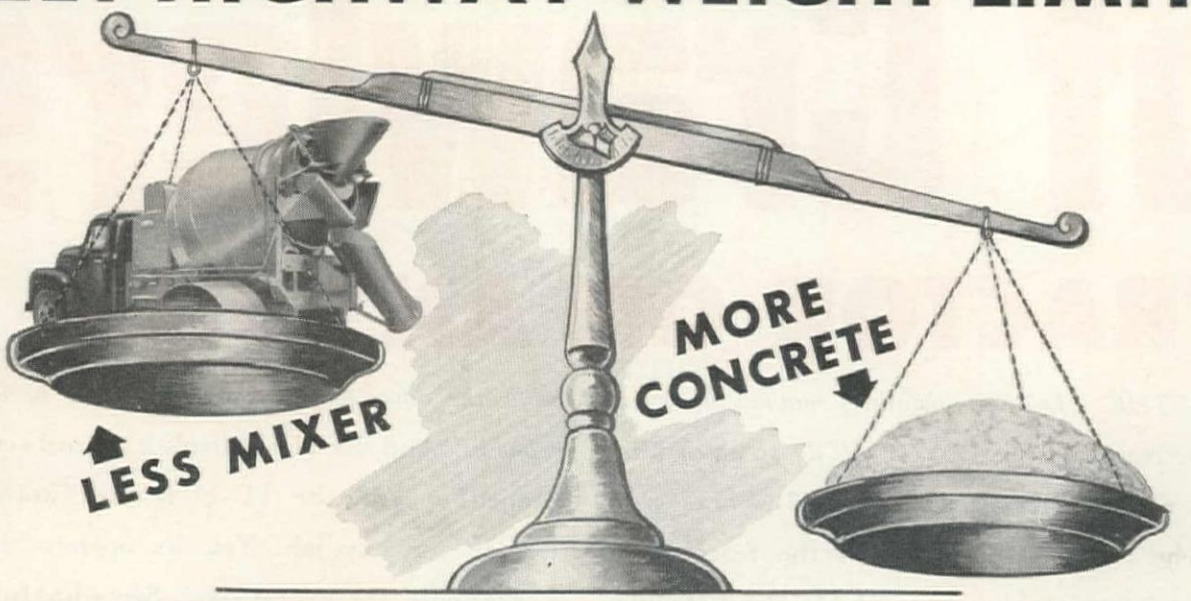
INTERNATIONAL HARVESTER

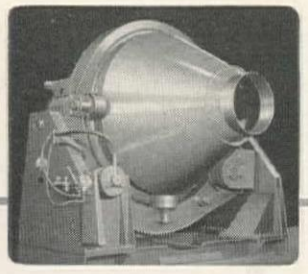
INTERNATIONAL
INDUSTRIAL POWER





MEET HIGHWAY WEIGHT LIMITS





SMITH TILTERS

Save More Dollars for Pre-Mix Plants

The cost of a Smith Tilter is saved over and over again in bigger payloads for your agitators and time saved in getting agitators out of the yard. A Smith Tilter shrinks the batch in a hurry and mixes it smoothly, without the usual violent action of other concrete mixers. In discharging the batch, there isn't the slightest segregation. Six sizes available — 1, 2, 3, 4, 5 and 6 yards per batch. Write for bulletins.

BIGGER PAYLOADS in New Smith-Mobile LOAD LIMIT TRUCK MIXERS

Have you load limit problems? Then use Smith-Mobile LOAD-LIMIT Truck Mixers. You get less dead weight. So you can haul more concrete. And you can do it without sacrificing quality. It's all very simple. Certain parts and assemblies not basic or necessary are eliminated. Less mixer? Yes, but the same sturdiness and performance. Enables you to haul BIGGER PAYLOADS at lower cost. The initial cost is less and both operating and maintenance costs reduced to a minimum. LOADLIMIT models are available in 2, 3, 4½ and 5½ yard sizes. Higher ratings for agitators. All carry approved NRMCA rating plates. Get the complete story. Ask for Bulletin No. 247.


The Standard Smith-Mobile, shown here, can easily be converted to a LOADLIMIT model. A LOADLIMIT model can easily be converted to a Standard Smith-Mobile.

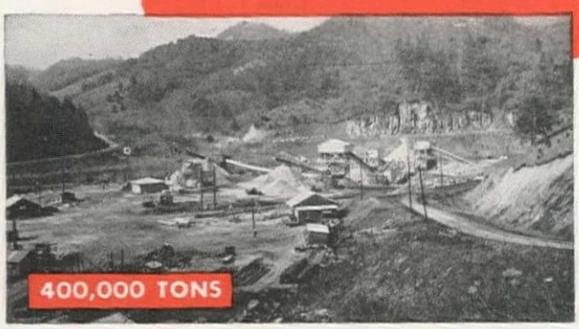
THE T. L. SMITH COMPANY
2871 N. 32nd Street • Milwaukee 45, Wisconsin, U. S. A.

SMITH MOBILE

Our 50th Anniversary — A HALF CENTURY OF PROGRESS BUILDING BETTER MIXERS!
1900 1950

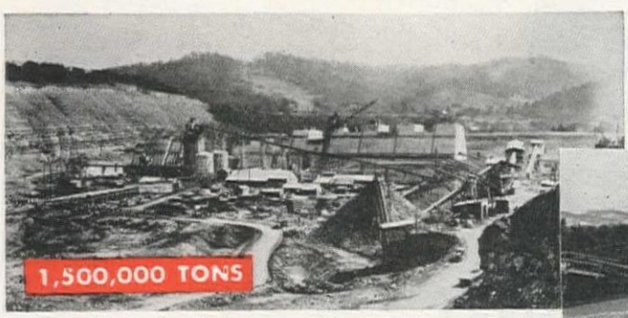
A 5777-1P

TELSMITH® EQUIPMENT FOR DAMS



TVA's Watauga Dam, Tenn. Four different types of Telsmith Crushers used on this job.

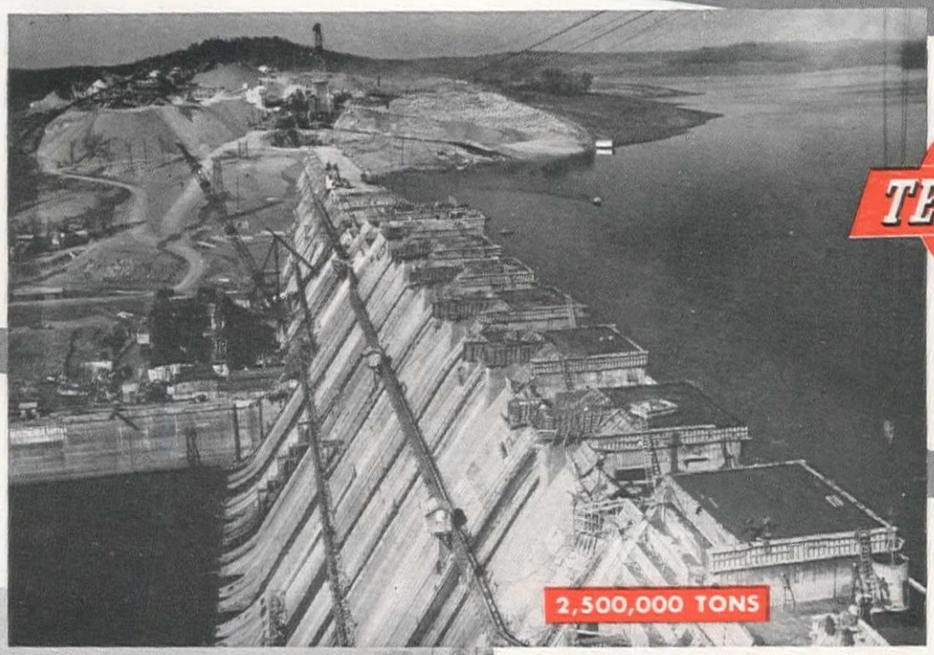
● Huge dam projects and Telsmith Aggregate Plants go together. Many dam builders call in Telsmith engineers right at the start—for consultation as to the proper plant layout and the right equipment to use. Then Telsmith makes the detailed drawings for the erection of the plant and furnishes most of the machinery. Telsmith designed plants have proven their efficiency on many large projects and Telsmith equipment has a world-wide reputation for the production of low-cost aggregate. The ruggedness of Telsmith equipment is strikingly demonstrated by long life in severest service, on successive projects. After producing 1,500,000 tons of aggregate at Center Hill Dam, the same Telsmith equipment is now turning out about the same amount of aggregate at Buggs Island Dam.



Center Hill Dam, Tenn. Telsmith designed complete crushing-screening plant; and furnished most of the equipment.

Buggs Island Dam, Va. This Telsmith crushing plant also produced the aggregate for Center Hill Dam.

Save TIME and MONEY Consult Telsmith Engineers—Ask for Bulletins 266 and 271



Norfork Dam, Ark. This 500 ton per hr. capacity combination quarry and sand and gravel plant was Telsmith designed and equipped.

Philpott Dam, Va. Here, too, the crushing-screening equipment is Telsmith.

Mount Morris, Dam, N. Y. The 300-350 tons per hour rock crushing plant is Telsmith designed and equipped.

OTHER DAMS BUILT WITH TELSMITH EQUIPMENT

- Alatoona Dam, Georgia
- Ariel Dam, Ariel, Wash.
- Boysen Dam, Shoshoni, Wyo.
- Carpenter Dam, Arkansas
- Cascade Dam, Washington
- Clark Hill Dam, Augusta, Ga.
- Conowingo Dam, Conowingo, Md.
- Dale Hollow Dam, Tennessee
- Davis Dam, Nevada
- El Presidente Dam, Mexico
- Fort Gibson Dam, Oklahoma
- Grand Coulee Dam, Washington
- Kortes Dam, Wyoming
- Morony Dam, Montana
- South Holston Dam, Tennessee

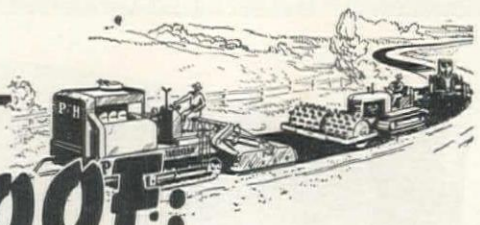
MS-11

Manufactured by
SMITH ENGINEERING WORKS, MILWAUKEE 12, WISCONSIN

MINES ENGINEERING & EQUIPMENT CO.
369 Pine Street • SUtter 1-7224
SAN FRANCISCO 4, CALIFORNIA

P&H

SINGLE PASS STABILIZER



HERE'S THE PROOF:

MORE FOR YOUR ROAD DOLLARS!

Both these roads are now 4 years old. Both are stabilized base jobs. Both cost the same per mile to build. As a contractor, engineer, public official, or plain citizen, which one should you choose?

THIS TYPE OF ROAD IS PRODUCED BY THE P&H SINGLE PASS STABILIZER. Proper surveys and testing were basis for engineering design. Accurate field control, simplified by the use of the P&H Stabilizer, assured this uniform quality.

THIS TYPE OF ROAD IS PRODUCED BY THE ORDINARY METHOD which makes quality control very difficult — if not impossible. Note the cracking and sagging—telltale symptoms of non-uniformity which results in high maintenance cost.

ACCURATE CONTROL MAKES THE DIFFERENCE!

Whatever your stabilized base work — soil-bituminous, soil-cement or clay-gravel — it pays big dividends to have the uniform quality control made possible by the P&H Single Pass Soil Stabilizer. It means a better, longer-lasting road that will save you maintenance money for years to come. Yet the original cost is no greater.

The P&H Single Pass Soil Stabilizer performs all of these 8 basic construction requirements:

1. Accurate and uniform depth control
2. Proper pulverization of soil
3. Thorough blending of materials
4. Maintains true sub-grade
5. Accurate liquid application
6. All materials thoroughly mixed
7. Mixture evenly spread for compaction
8. Processing at a good rate of speed — at a single pass.

Ask us for complete information and job records.

P&H

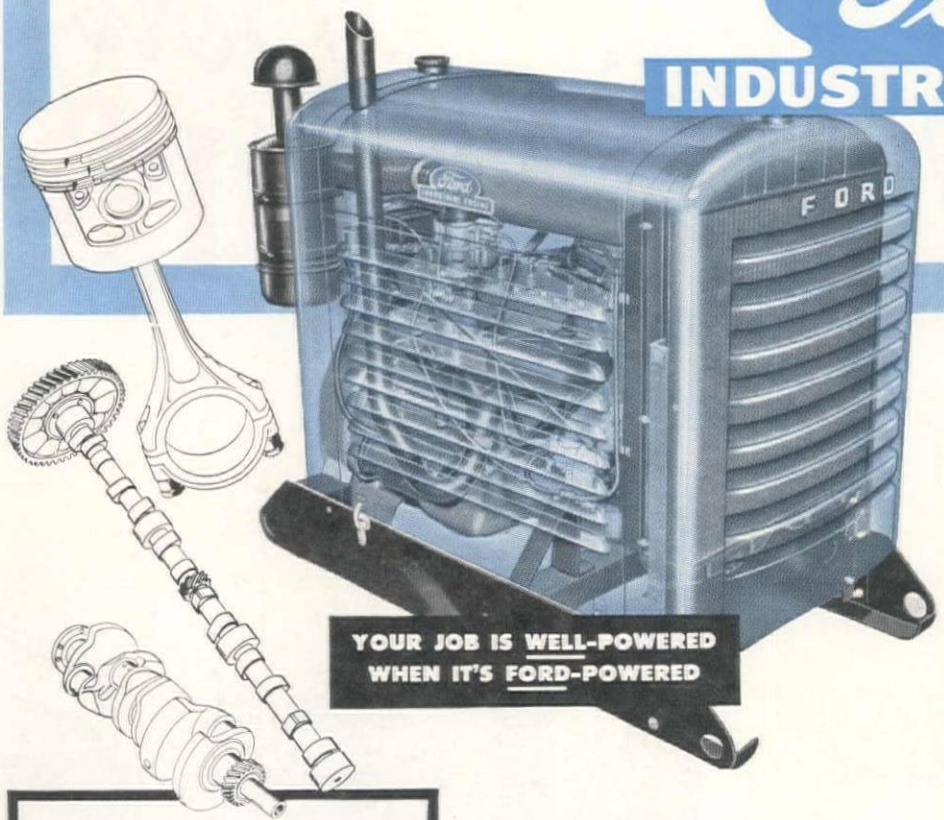
SINGLE PASS STABILIZER

4490 W. National Ave.
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLER AND TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

For the RIGHT Features* specify Ford INDUSTRIAL ENGINE



Ford "254" POWER UNIT
6 cylinder, 254 cu. in. displacement
(also available as engine assembly alone)

When it comes to industrial engines and power units, one of the most important factors in building and keeping satisfied customers for your equipment is to use—

MODERN POWER . . . with the RIGHT FEATURES

● For example—autothermic pistons with chrome top compression ring . . . high lift camshaft . . . counterbalanced crankshaft . . . heavy duty, precision type, replaceable, steel backed, copper lead main and connecting rod bearings . . . hard face cobalt exhaust valves . . . valve rotators . . . moly-chrome alloy valve seat inserts. That's Ford Power . . . the industrial engine-power unit line that is made throughout to Ford's famed high standards of progressive engineering and quality design.

Bring your power problem to your Ford Dealer, to the Ford District Sales Office nearest you or the Ford Industrial Engine Department at Dearborn, Michigan. There's a Ford Industrial Engine that's *right* for your job.

***Don't forget, too,** the *right* power . . . five great engines in the Ford Industrial Engine line; the *right* service . . . as near as your nearest Ford Dealer . . . as well as the *right* features—all 3 big reasons why equipment builders know Ford Industrial Engines can add important user acceptance to their applications.

Ford Industrial Engines are offered as complete power units, either open or closed, or as individual engine assemblies, both with a wide variety of special attachments. They are made in the following types and sizes:

120 cu. in. 4 cyl. • 239 cu. in. V-8
226 cu. in. 6 cyl. • 254 cu. in. 6 cyl.
337 cu. in. V-8

For full details, MAIL THIS . . .

Industrial Engine Department
FORD MOTOR COMPANY
Dearborn, Michigan

INDUSTRIAL ENGINE DEPT., FORD MOTOR COMPANY, DEARBORN, MICHIGAN

Send me complete details on your Industrial Engines and Power Units.

Name_____

Street_____

City_____ State_____

D

Bucyrus-Erie B-type Scraper...

The Pay Dirt Your BIG

Matched for Championship Dirt Moving

See Your INTERNATIONAL

Member of RED Team

BUCYRUS-ERIE B-TYPE SCRAPERS are perfectly matched to the champion of crawler tractors — the new International TD-24. These scrapers do an outstanding job of applying the superior power and speed of this tractor to dirt moving. Operating behind TD-24's, these scrapers produce greater yardage at less cost than any other tractor-scraper combination, including other scrapers working with TD-24's.

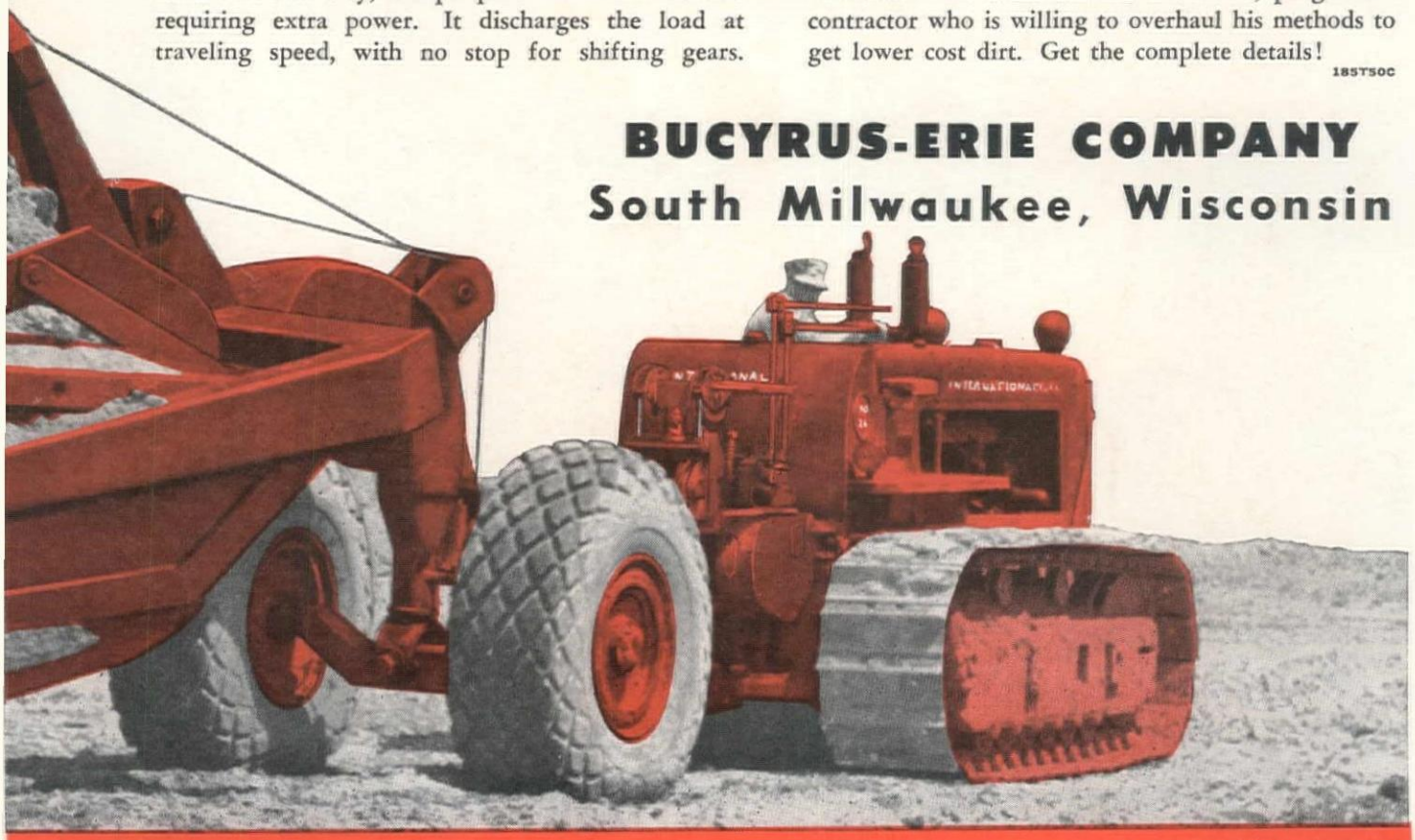
THE B-170 (15-yard struck capacity) operates without a pusher in normal loading. It has greater struck capacity than any other scraper available for self loading. Like other Bucyrus-Erie scrapers, it loads fast and easy, dumps quick and clean without requiring extra power. It discharges the load at traveling speed, with no stop for shifting gears. Front bowl lift provides extra stability for backsloping or finishing on steep grades.

THE B-250 (22 yard struck capacity) is for loading with pusher assistance. It's the largest scraper in current production available for use with any crawler tractor. It has the same excellent operating characteristics as the B-170. Its big capacity opens up great possibilities for high production on relatively long haul work. Both scrapers are built like battleships and have ample tires for flotation and low rolling resistance.

The BIG RED team — TD-24 tractor and B-170 or B-250 — is a natural for the smart, progressive contractor who is willing to overhaul his methods to get lower cost dirt. Get the complete details!

185T50C

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin



Industrial Tractor Distributor

BARRETT* PROTECTIVE PRODUCTS
COVER EVERY PIPE-COATING NEED

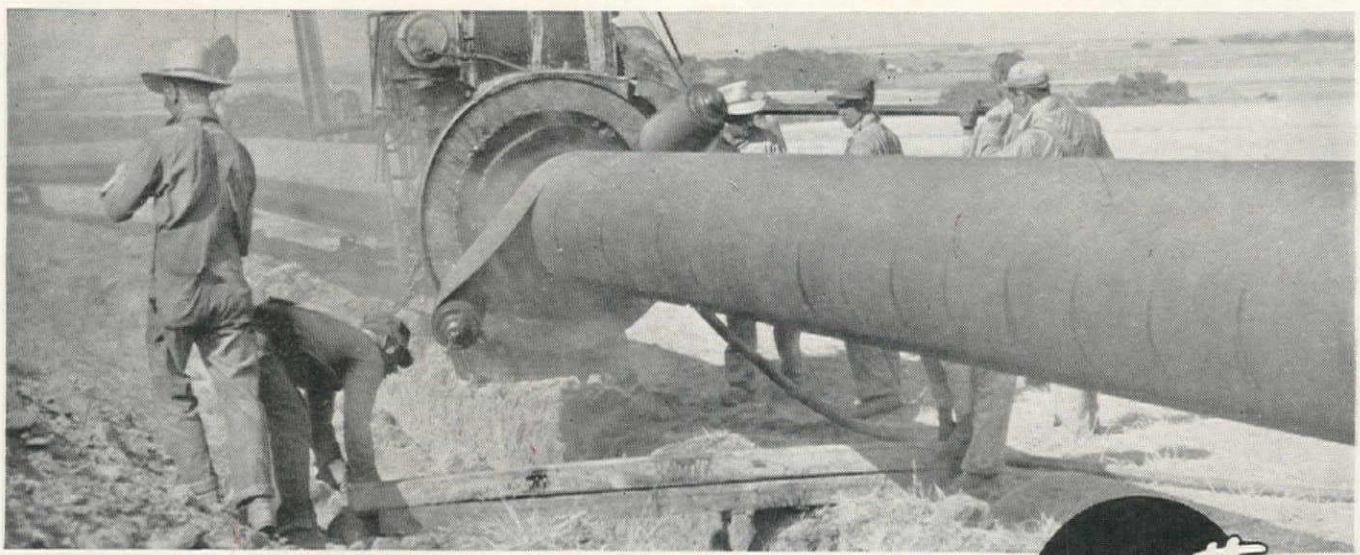
1 **Pipeline Enamel**
2 **Millwrap Enamel**
3 **A.A. Enamel**
4 **Asbestos Felt**
5 **Materials for Special Uses**

BARRETT* ASBESTOS FELT

Barrett* Asbestos Pipeline Felt bonds to the enamel, and shields it from forces which tend to cause enamel penetration, disruption, or displacement. It is flexible enough to withstand curvatures when the coated pipe is handled, and tough enough to prevent shearing at pipe bearing slings.

Asbestos Felt has long been accepted as one of the most durable, most effective, and most economical pipe-wrapping materials known. Barrett coal-tar saturated Asbestos Pipeline Felt is high in the enamel shielding and reinforcing qualities essential to the construction of corrosion-proof pipelines.

This high-quality felt is available in rolls of various widths required by pipeline diameters, and in lengths to suit the different types of coating and wrapping machines.



✓ *Memo:* **FOR CORROSION ENGINEERS**

Barrett coal-tar materials for special uses are all dependable, durable and economical. Eternium* Paint for exposed metal work. CA-50 Heavy-Duty Cold Application Coating for concrete and metal exposed to extremely corrosive conditions. Marine Enamel for ships, barges and off-shore service vessels. Service Cement and Pipeline Fabric for field joints—no torching required. Asbestos Pipeline Felt for soil stress shield. Tank Bottom Compound for sour crude storage. 34 YB Paint for exposure to salt water spray conditions.

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

*Reg. U. S. Pat. Off.

Barber-Greene

FIRST! because they LAST!

The on-the-job lasting ability that identifies B-G Standardized Belt Conveyors is in large part due to these B-G all-welded tubular steel belt carriers. Protected from dust and grit by "four-pass" grease seals, their bearings—roller, ball or plain as the job requires—keep them rolling smoothly with minimum maintenance.

Heavy die-formed support brackets are welded to the self-cleaning base. And along with Barber-Greene sturdiness, B-G Belt Conveyors bring you the advantages of standardized design: selection of the right one for the job and erection on the job are simplified. See your Barber-Greene distributor or write Barber-Greene Company, Aurora, Illinois.

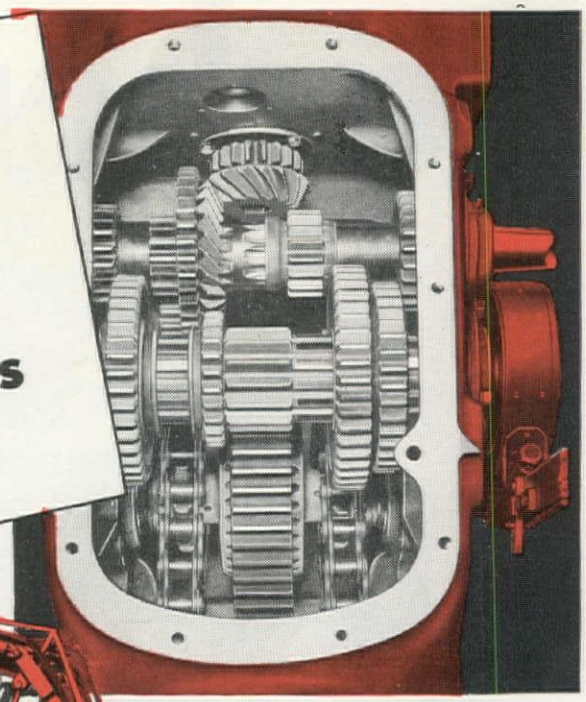
BARBER-GREENE COMPANY · AURORA, ILLINOIS

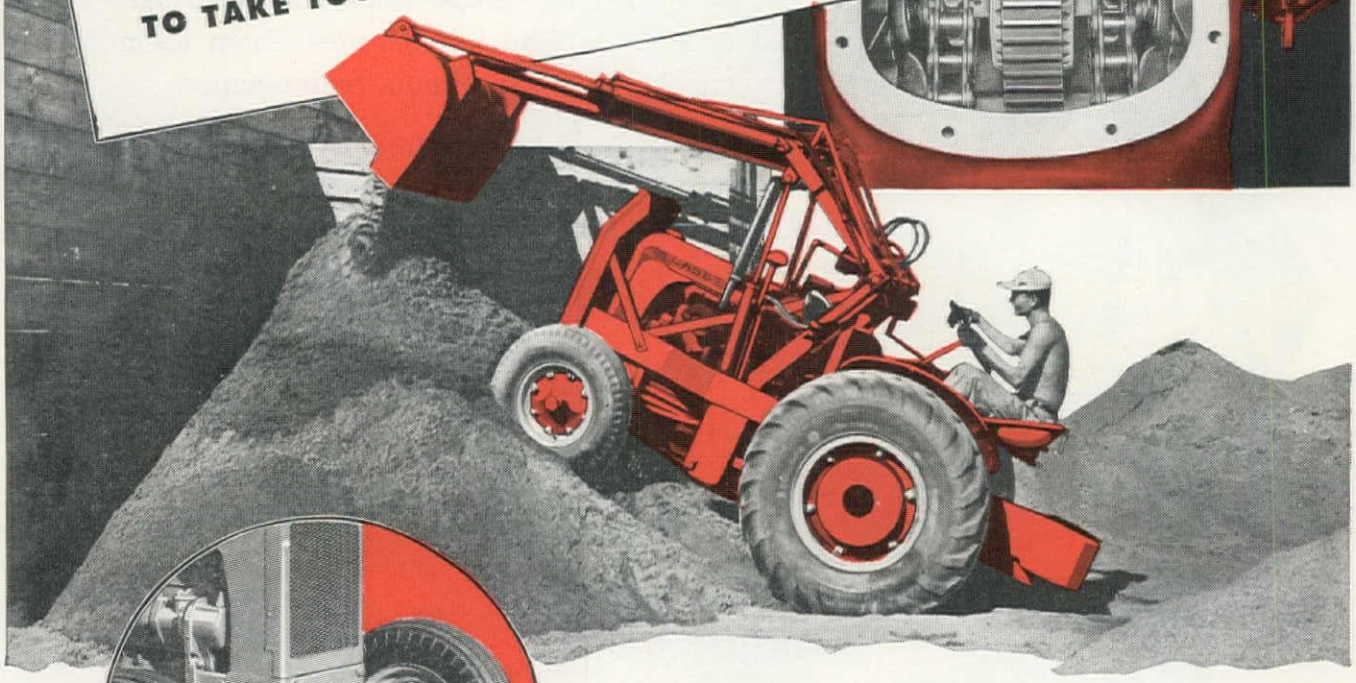
Constant Flow Equipment

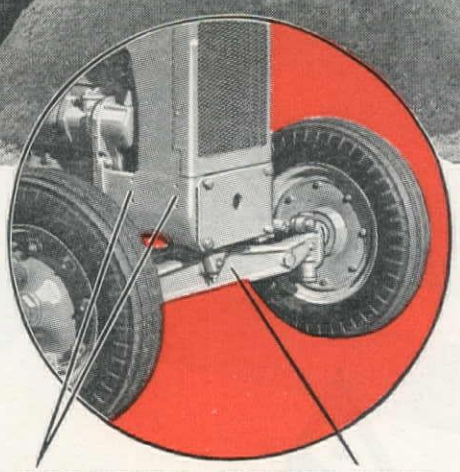
FOR SALE BY: Brown-Bevis Equipment Co., Los Angeles 11, California; Columbia Equipment Co., Spokane, Washington, Seattle, Washington, Boise, Idaho, Portland 14, Oregon; Wilson Equipment & Supply Co., Cheyenne, Wyoming, Casper, Wyoming; Contractors' Equipment & Supply Co., Albuquerque, New Mexico; Ray 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, Arizona.

Strong Gears Stubby Shafts

ALL-AROUND STRENGTH IN CASE INDUSTRIAL TRACTORS TO TAKE TOUGH LOADS







EASY MOUNTING

A rugged, rigid casting, with tapped holes in flat front and sides, forms firm anchorage for front-mounted equipment. Power may be taken from crankshaft.

HEAVY AXLE

This is the trim drop-forged front axle of Model "SI," shown in action above. Extra-strong steel front axles are standard on all Case industrial tractors.

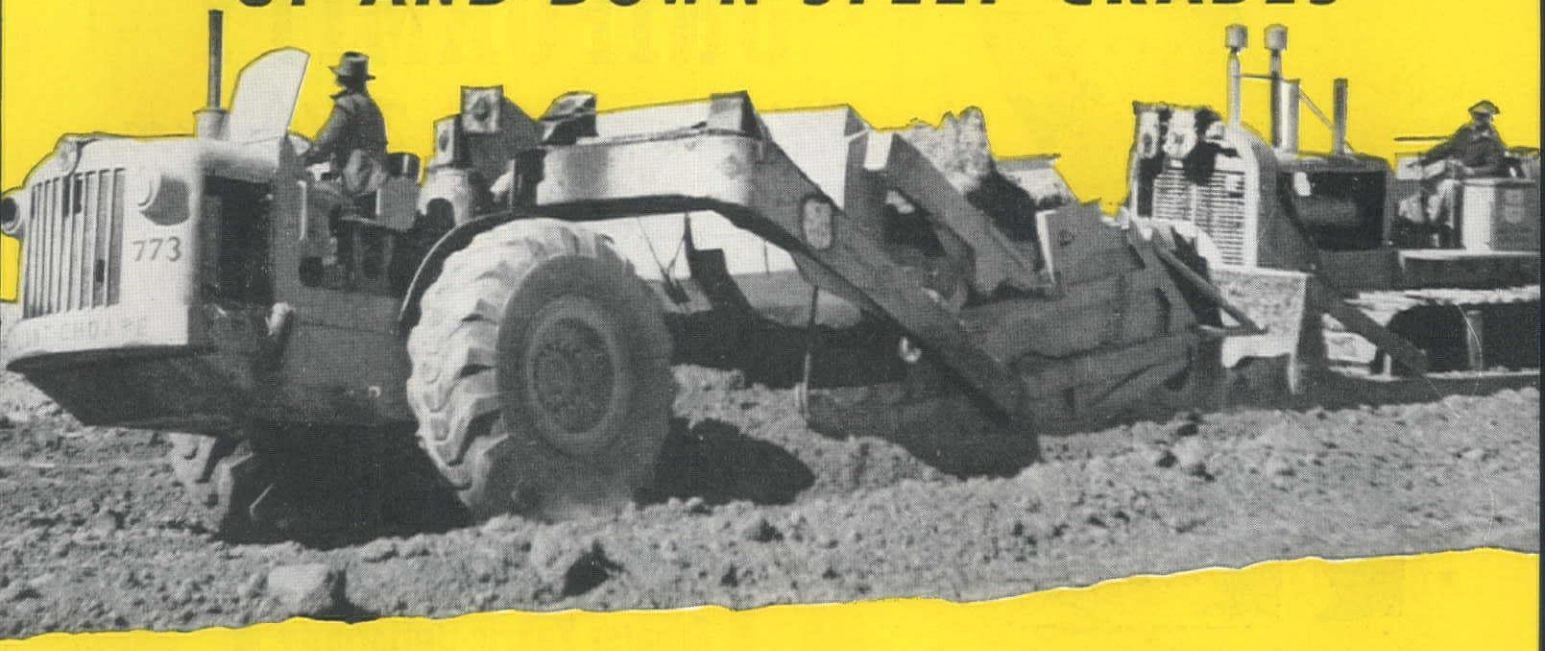
● When you lift off the top cover of this Case industrial tractor transmission, you get the idea that it's built crosswise. It is! Those short, stiff shafts ride in big tapered roller bearings, adjustable from the sides of the staunch cast case which is both gear housing and tractor backbone. The spiral bevel gears give the first moderate reduction, carry only moderate load. All others are spur gears, with plenty of face width for positive lubrication and long life.

Inside the big gear on the third shaft is the differential. Motion is faster, loading is lighter and lubrication is more certain because it precedes the major reduction in the twin roller-chain final drive. This power-saving transmission is used in the mighty Model "LAI," similar designs in the next smaller Models "DI" and "SI." Get the full story on these time-saving, money-saving tractors from your Case industrial dealer. J. I. Case Co., Racine, Wis.

State Tractor & Equipment Co.	Phoenix, Ariz.
Hayward Equipment Co.	Los Angeles, Calif.
Contractors Machinery Co.	San Francisco, Calif.
Lake County Equipment Co.	Lakeport, Calif.
E. O. Mitchell, Inc.	Bakersfield, Calif.
Liberty Truck & Parts Co.	Denver, Colo.
Western Equipment Co.	Boise & Idaho Falls, Ida. & Spokane, Wash.
Hilton's, Inc.	Las Vegas, New Mexico
Growers Supply & Equipment Co.	Fresno, Calif.
Electric Tool & Supply Co.	San Bernardino, Calif.
Growers Tractor & Impl. Co.	Sacramento, Calif.
Hiway Farm Equipment Co., Inc.	Modesto, Calif.
Farmers Machinery & Supply Co.	Reno, Nevada
Robison Machinery Co.	Salt Lake City, Utah
Nelson Equipment Co.	Portland, Oregon - Seattle, Wash.
Wortham Machinery Co.,	Cheyenne, Sheridan & Greybull, Wyoming - Billings, Montana

CASE ★ ★

4 LaPLANT-CHOATE MOTOR SCRAPERS MOVE 5000 YARDS A DAY *UP AND DOWN STEEP GRADES*



• 4 Motor Scrapers working for Frank J. Hickey on the 610,000 yard job at the University of California at L.A., are moving dirt at a profit-making pace, up and down steep grades. Each of the four LPC units is moving 1250 yards of 2600-lb. clay every 10 hour shift, on a 2800-ft. cycle, easily negotiating the steep grades occasioned by 30-ft. cuts and 60-ft. fills.

ON the level, LPC Motor Scrapers can't be beat! And up and down grades or in tough conditions, they're more unbeatable than ever for moving the *extra* yardage that gets the job done faster at lower cost per yard. Frank Hickey and other big time contractors lay the blue chips on Motor Scraper performance every time. For day-in, day-out dependability and production, LPC Motor Scrapers are first choice on more and more jobs each day. Get all the facts from your LPC distributor. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa — West Coast Branch, 1022 77th Ave., Oakland, Calif.

FAMOUS LaPLANT-CHOATE DOZERS — both angling and straight blade — are again available in either hydraulic or cable-operated types. See your LPC distributor NOW!

PROFIT-PRODUCING FEATURES

• 225 H.P. Buda Diesel • 45 H.P. Continental Starting Engine • 12 Cu. Ft. Westinghouse Compressor • 32 Amp. Autolite Generator • Lipe Rollway Clutch—17" • Fuller Transmission—4 A 112 • 4-Wheel Timken-Detroit Air Brakes • Double-Acting Hydraulic Steering • Big 24:00 x 29 Traction Type Tires • Big Capacity—14 yds. struck—17.5 yards heaped • Big speeds—up to 21.2 mph • Positive Forced Ejection plus High Apron Lift.

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WESTERN EQUIPMENT COMPANY
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3400 E. Olive Street SPOKANE, WASHINGTON

ENGINEERING SALES SERVICE, INC.
410 Capitol Boulevard BOISE, IDAHO

COLUMBIA EQUIPMENT CO.
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5030 1st Ave. South SEATTLE, WASHINGTON

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505 N. 24th Street BILLINGS, MONTANA
Stephens & Mount Ave. MISSOULA, MONTANA

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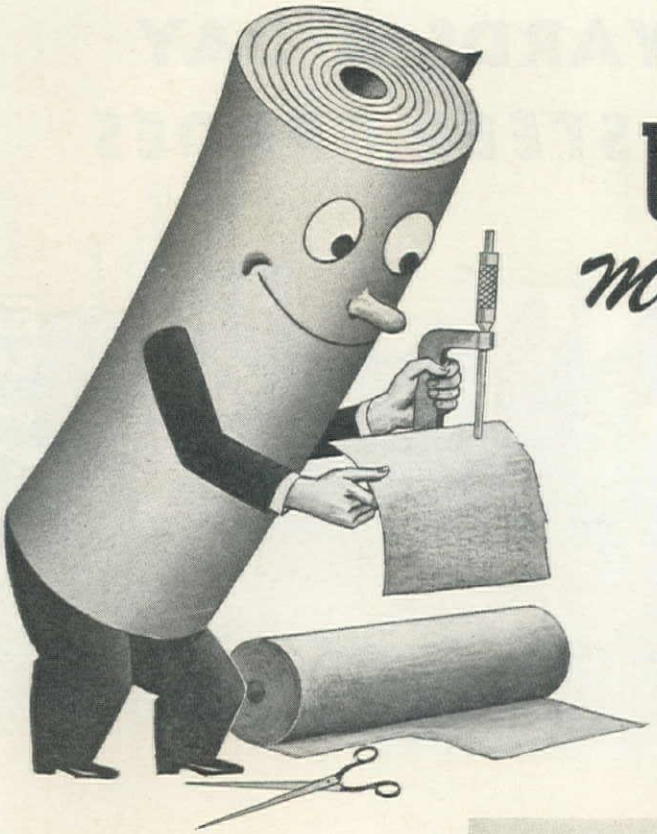


UNIFORMITY

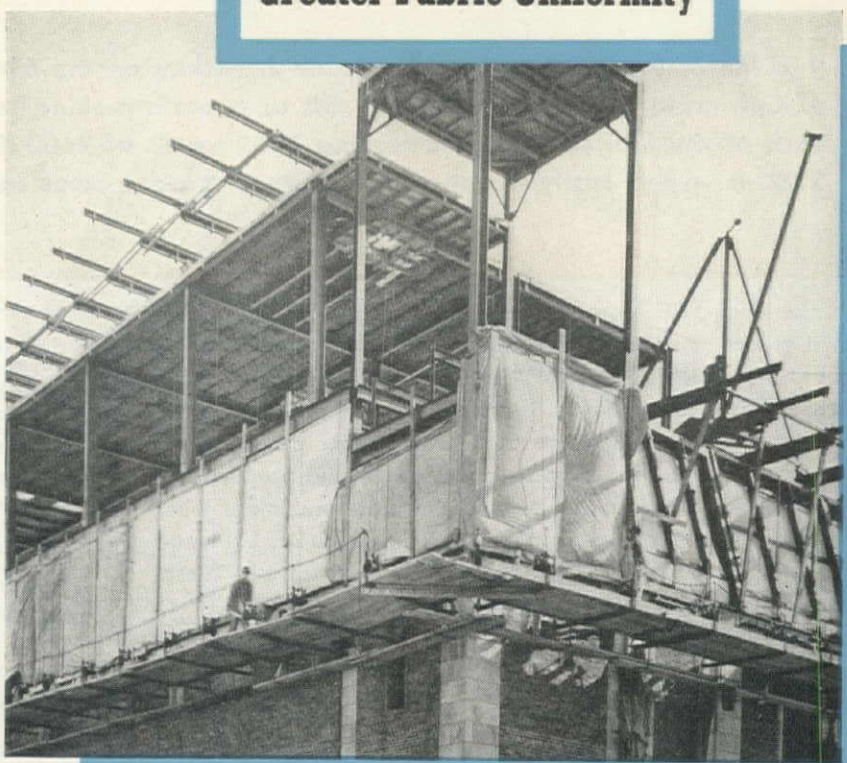
Makes the Big Difference

In TARPAULINS

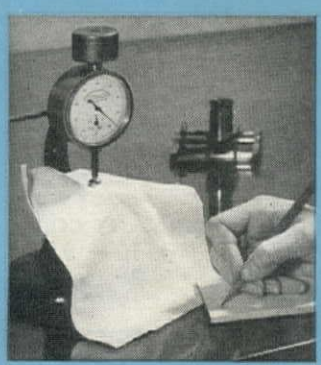
MT. VERNON — EXTRA

Gives You

Greater Fabric Uniformity



The greater uniformity of Mt. Vernon Extra Duck assures you the two most important qualities you want in tarps — top protection and top wear. You'll find your repair and replacement costs reduced considerably.



GAUGING FABRIC THICKNESS AFTER WEAVING. One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

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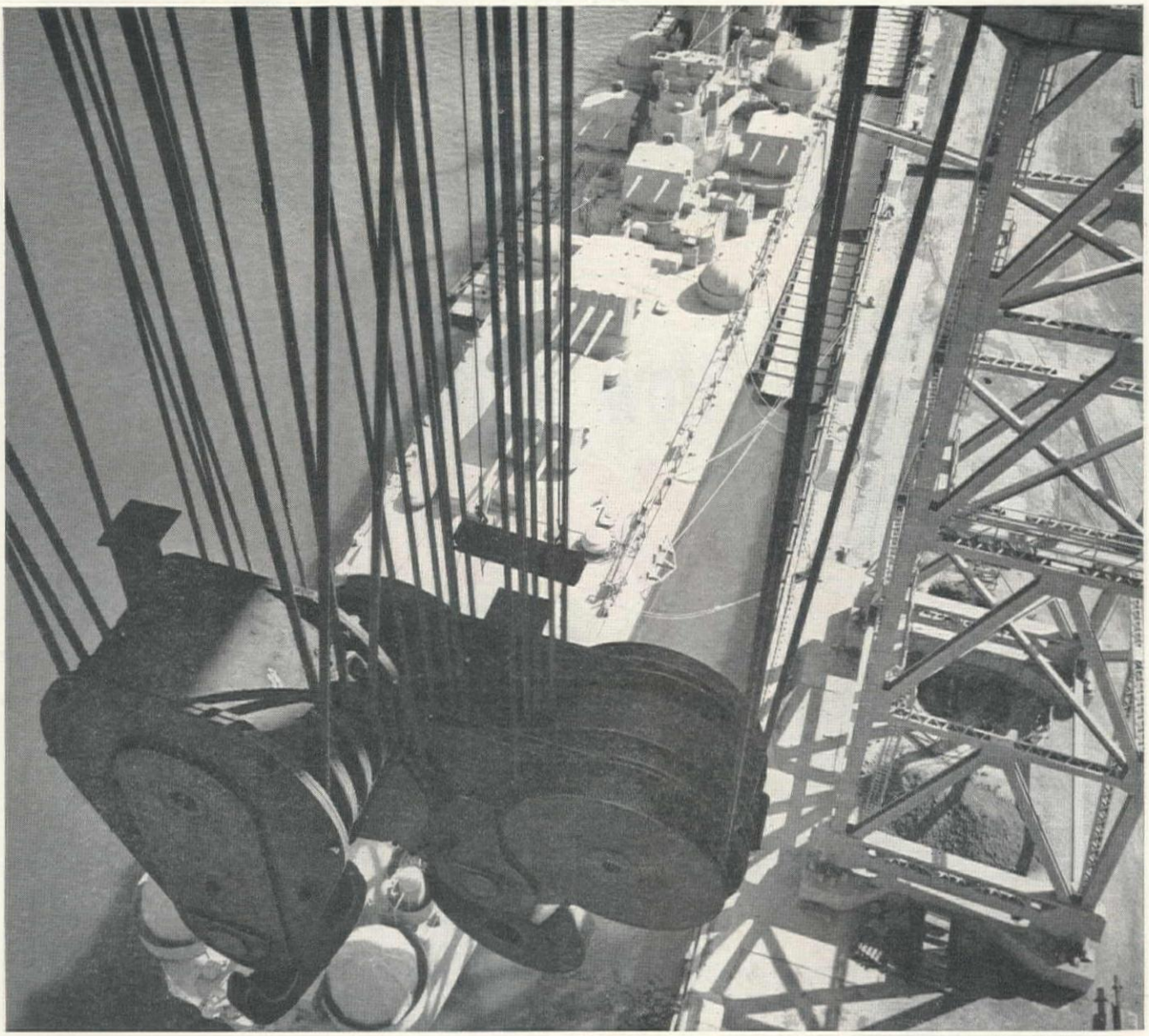


Tiger Brand Wire Rope provides the muscles for the world's largest crane... this 8400-ton giant at San Francisco Naval Shipyard has lifted 630 tons.

Tiger Brand Wire Rope is manufactured from raw ore to finished product under the strict quality controls of United States Steel. To help you get all the stamina engineered into American Tiger Brand, the services of a Field Specialist are available without charge.

Contact your Tiger Brand distributor or write Columbia Steel Company, Room 1422, Russ Bldg., San Francisco 4.

U·S·S TIGER BRAND Wire Rope

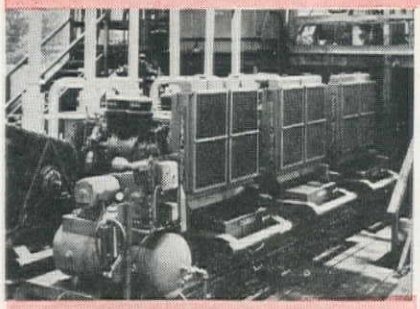
AMERICAN TIGER BRAND WIRE ROPE — UNITED STATES STEEL

UNITED STATES STEEL

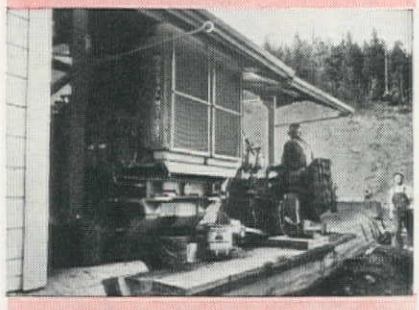
LOCOMOTIVES—Repowered with GM Diesel Torque Converter unit, this 20-ton locomotive hauls double the tonnage without ever shifting into low gear.

HOISTING—Converted from steam to GM Diesel Torque Converter power—estimated operating savings will pay repowering and overhaul cost in less than two years.

EARTH MOVING—Two 190 H. P. GM Diesel Torque Converter units give 34-ton Euclid 1-FFD rear dump a speed of 25.4 m.p.h. with full load.



DRILLING—"⅓ faster than with original engines," says owner of rig repowered with 3 GM "Twin" Diesel Torque Converter units.



LOGGING—Powered with GM Diesel Torque Converter unit, this Washington Iron Works yarder has yarded 140,000 bd. ft. per day.

WRITE FOR YOUR COPY

of 24-page illustrated catalog giving full details on design, operation and application of "The NEW General Motors Diesel Engine-Torque Converter Unit."

How to Get MORE WORK from your Equipment

Operators in every field report they get more work done in less time at lower cost with equipment powered by General Motors Diesel Engine-Torque Converter units.

The combination of a GM Diesel engine with an integrally built torque converter and fluid coupling provides a compact power unit which makes available maximum engine horsepower and torque regardless of the speed of the load. It delivers high torque for starting heavy loads and *automatically* shifts to fluid coupling when load requirements equal engine torque. Gear shifting is cut to a minimum —often eliminated. Smooth transmission of power through a fluid, protects both engine and driven machinery from sudden shock loads—prevents engine stalling under any load condition.

These efficient Diesel Engine-Torque converter units are available with 3-, 4-, and 6-cylinder engines, Twin 4 and Twin 6 multiple engines, rated at 64 to 294 B.H.P. See your GM Diesel distributor or write us for further information.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES . . . *Up to 275 H. P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS . . . *Up to 800 H. P.*

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

Equipment Supply Company, Inc.
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Southern Idaho Equipment Co.
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Seitz Machinery Co., Inc.
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Announcing...

THE NEW T5X

Fortified with *new* compounds that offer you greater engine protection than ever before!

Surpasses "Supplement 1" specifications

The amazing *purple* oil is now better than ever! With even greater alkaline reserve, oxidation resistance, detergency and other upgraded qualities, the *new* T5X surpasses the exacting standards of U. S. Army Specification 2-104B, Supplement 1.

Its superiority has been clearly established in both the Coordinating Research Council gasoline engine tests and the rugged "Caterpillar" Diesel tests.

Recommended for *heavy-duty* operations

Powerful *new* additives have been compounded with a high VI, pure 100% paraffin base to form this *new* T5X. And its improved quality is so high that this great oil is recommended for *any* internal combustion engine operating under *severe* conditions.

Proved under critical field conditions

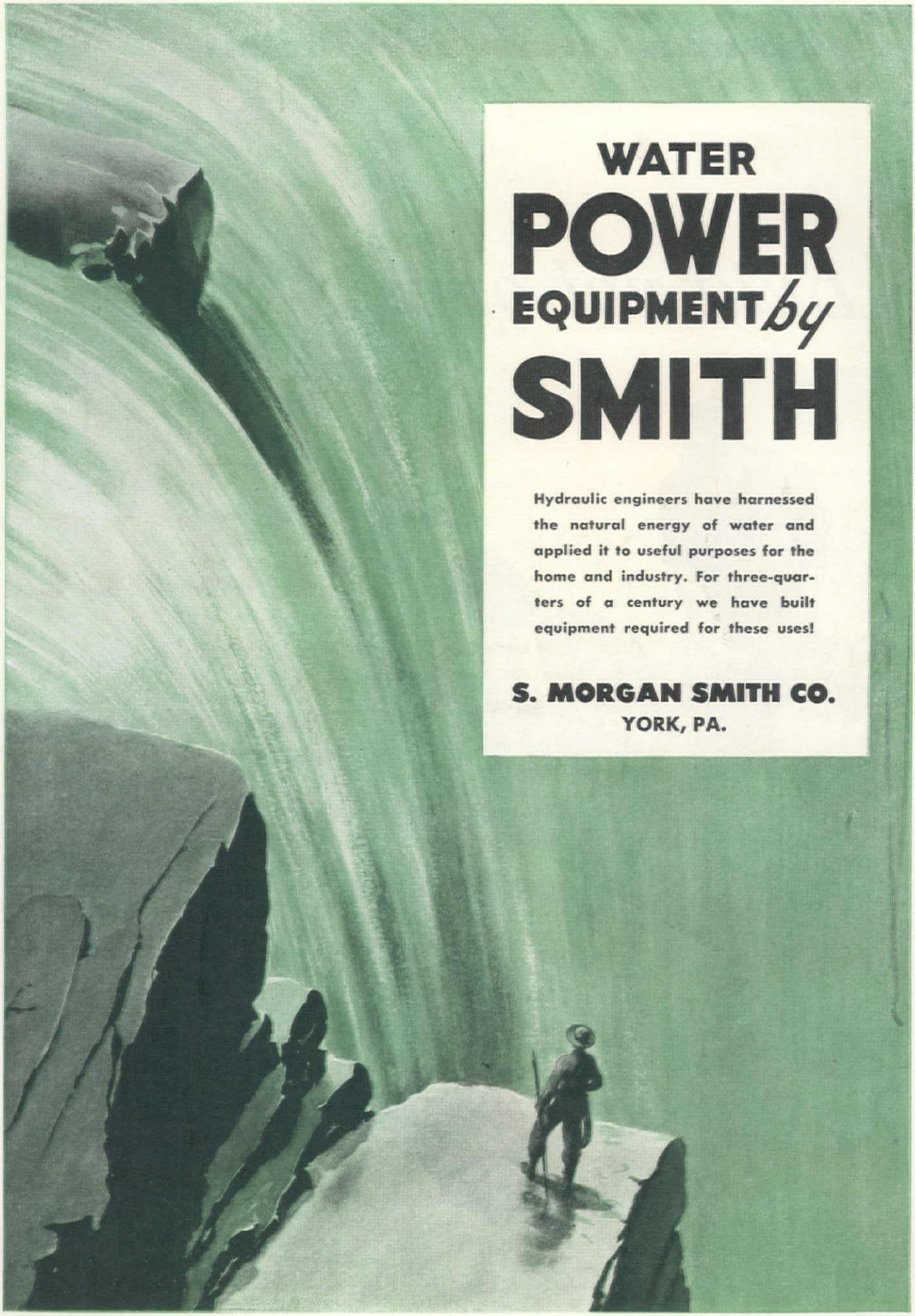
Field tests made by outside companies under critical operating conditions have *also* proved the amazing stability and performance of the *new* T5X in all types of equipment—including trucks, tractors, construction equipment, marine engines and varied types of stationary engines.

Substantially reduces engine wear

What the new, unusually high quality of T5X means to *you* is the opportunity for increased engine efficiency, less wear and lower maintenance and repair costs. And you can prove this for yourself by giving the *new* T5X a trial in your *own* equipment operating under *severe* conditions.

For full information about the new T5X, call your Union Oil Representative. Or write, wire or call Sales Dept., Union Oil Co., Los Angeles 17, Calif.

76 UNION OIL COMPANY OF CALIFORNIA


WATER
POWER
EQUIPMENT by
SMITH
Hydraulic engineers have harnessed the natural energy of water and applied it to useful purposes for the home and industry. For three-quarters of a century we have built equipment required for these uses!
S. MORGAN SMITH CO.
YORK, PA.

Cummins® Custom-built Diesels

Built not once

but Twice

The better-built engine for more profitable power

Yes, they're actually built *twice*. That's what makes a lightweight, high-speed Cummins Diesel such an efficient, dependable, precision-made engine. After initial assembly, each engine is run-in on the test block. Then it is torn down and carefully re-inspected—after that it is re-assembled and tested *again* to assure *peak performance*.

The finest of engine craftsmanship . . . exclusive Cummins fuel system . . . engines that are "custom-built to fit the job" . . . make a Cummins Diesel *a better buy for your power needs.*

Contact your Cummins dealer. He has more facts to show you about making more profits with

Diesel power by CUMMINS

TRADEMARK REG. U. S. PAT. OFF.

CUMMINS ENGINE COMPANY, INC. · COLUMBUS, IND.

EXPORT: CUMMINS DIESEL EXPORT CORPORATION
Columbus, Indiana, U. S. A. · Cable: Cumdex

Lightweight High-speed Diesel Engines (50-550 hp) for: On-highway trucks · off-highway trucks · buses · tractors · earth-movers · shovels · cranes · industrial locomotives · air compressors logging yarders and loaders · drilling rigs · centrifugal pumps generator sets and power units · work boats and pleasure craft.

New! VICTOR CUTTING TORCH

with Stainless Steel Head and Tube Assembly

CTS-400 Series

Rugged stainless steel tip nut, head and tubes.

Uses all standard Victor cutting tips.

New high-capacity, cutting oxygen valve—operated over half million times without detection of wear.

New oxygen and fuel control valves with "O" ring pressure seals—no outmoded packing, no take-ups, no adjustments needed.

Test it *on your severest cutting job . . . see for yourself how fast it cuts, how cool it stays.*

Here's the torch you've been waiting for. Cuts longer and faster than other torches without overheating because mixer and mixer tube are made of high-heat resistant copper alloys—no danger of mixer failures from overheating. Mixer itself is Victor's famous spiral mixer, designed to prevent backfire and flashback.

The stainless steel head and tube assembly is a single unit and can be replaced without buying a complete torch. Comes with either 90° or 75° head. Standard length is 21″; 27″ or longer available on special order.

Call your Victor dealer NOW . . . ask him to demonstrate this new, stainless steel torch on your toughest cutting job.

VICTOR

Welding and Cutting Equipment Since 1910

Welding rods for all uses. Regulators for all gases up to 5000 psi. Machine and hand torches for welding, preheating, cutting, flame hardening and descaling. Portable flame cutting machines. Pneumatic filters and lubricators. Kinmont power positioners. Fluxes. Write today for free descriptive literature.

VICTOR EQUIPMENT COMPANY

3821 Santa Fe Ave.	844 Folsom Street	1312 W. Lake St.
LOS ANGELES 58	SAN FRANCISCO 7	CHICAGO 7

There's a Branch or Distributor to serve you in Portland, Spokane, Seattle, Salt Lake City, Casper, Great Falls, Anchorage, Boise, Denver, Tucson, Phoenix, Albuquerque, Oakland, San Diego, Fresno, Ventura, Sacramento.

LIMA Type 34 "Paymaster"

"Probably most noteworthy is the acceptance by our operators. Our Limas are smooth and easy operating"

"Equals or out-moves and out-digs machines of larger capacity"

KErrisdale 5270

Le Beau Cartage & Contracting, Limited

D. J. LE BEAU
president

Shovels and Trucks for Hire with Backhoe, Dragline and other Attachments

2736 West 32nd Avenue
VANCOUVER, B.C.

April 22, 1949

Mr. W. D. Haley,
District Manager,
Shovel & Crane Division,
Lima-Hamilton Corporation,
1932 - 1st Avenue South,
Seattle, Washington.

Dear Sir,

We would like to take this opportunity of expressing the outstanding performance and operation we have experienced on the second Lima Type 34 "Paymaster" Shovel we have purchased from your company. This is the finest 3/4 yard machine our company has owned, and was purchased as a result of the first Type 34 we obtained approximately a year and a half ago.

Probably most noteworthy is the acceptance by our operators. Our Limas are smooth and easy operating, which, we feel, develops from the use of anti-friction bearings at every vital point. This, together with the many other qualities you have incorporated in the 3/4 yard Lima, provides relatively low maintenance which means a great deal to contractors such as ourselves.

Our shovels and draglines are employed on one job or another in a rugged country where a machine has to be able to take it. This is where we have found our Lima Type 34's so successful and readily received by the trade, and particularly so when you move them in beside a machine of larger capacity and they either equal or out-move and dig under similar working conditions.

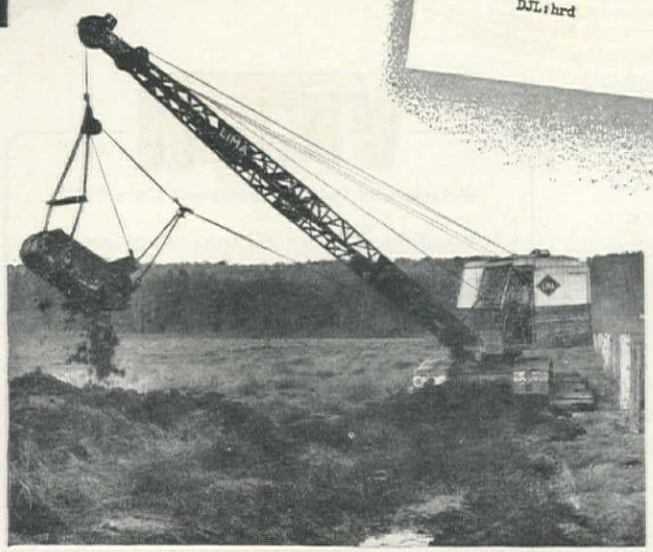
We felt you and your officials at Lima would be interested in the success we have enjoyed both from an owner's and an operator's point of view.

Yours very truly,

LE BEAU CARTAGE & CONTRACTING, LIMITED

DJL:hrd

Per: D. J. Le Beau Pres.



What Mr. Le Beau says about his LIMA Paymasters, is equally true of other sizes. The LIMA line includes Shovels 3/4 to 6 yds., Cranes to 110 tons and Draglines variable. LIMA rubber-mounted cranes are available in 20 and 35 tons capacity.

LIMA EQUIPMENT SOLD AND SERVICED BY:

Our Seattle Office: 1932 First Avenue So., Seattle 4, Washington
Our San Francisco Office: 1232 Hearst Bldg., San Francisco 3, California

SALES AGENTS:

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Cascade Industrial Supply, 515 Market St., Klamath Falls, Oregon
Contractors' Equipment & Supply Co., P. O. Box 456, Albuquerue, New Mexico
Feenaughty Machinery Co., 112 S.E. Belmont St., Portland 14, Oregon
Feenaughty Machinery Co., 600 Front St., Boise, Idaho
Foulger Equipment Co., Inc., 1361 South Second Street West, Salt Lake City 8, Utah
Garfield and Company, 1232 Hearst Bldg., San Francisco 3, Calif.
Jameson Engineering Sales, 573 Dexter Horton Bldg., Seattle, Wash.
McCoy Co., 3201 Brighton Blvd., Denver 5, Colorado
Modern Machinery Co., Inc., 4412 Trent Ave., Spokane 2, Washington
Smith Booth Usher Co., 2001 Santa Fe Ave., Los Angeles 54, Calif.
Tulsa Equipment Co., Inc.,
418 East 2nd St., Tulsa 3, Oklahoma

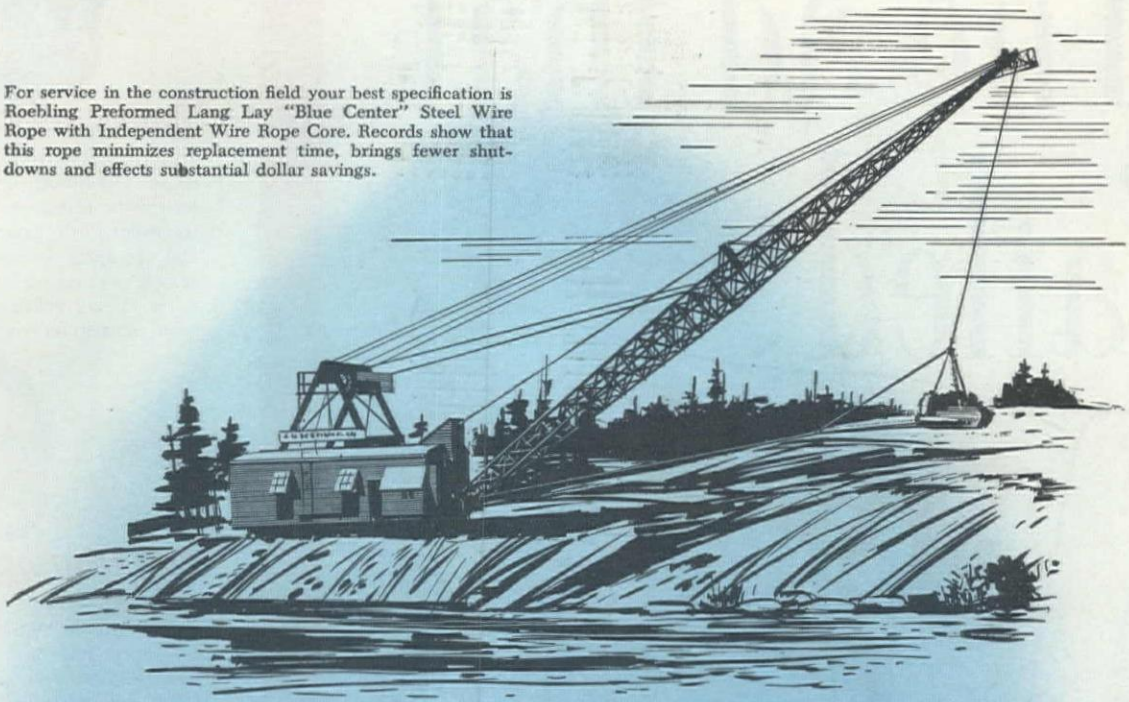
Lima Shovel and Crane Division

LIMA, OHIO

OTHER DIVISIONS: *Lima Locomotive Works Division; Niles Tool Works Co.; Hooven, Owens, Rentschler Co.*

LIMA HAMILTON CORPORATION

For service in the construction field your best specification is Roebling Preformed Lang Lay "Blue Center" Steel Wire Rope with Independent Wire Rope Core. Records show that this rope minimizes replacement time, brings fewer shut-downs and effects substantial dollar savings.



Preformed that lasts longer and saves money!...that's why

Today it's Roebling!

YOU WANT ROPE that's *extra* tough, *extra* long-lived! And you *get* these extras in Roebling Preformed "Blue Center" Wire Rope, for "Blue Center" steel has completely superior resistance to abrasion, shock and fatigue. Roebling developed and is the only maker of "Blue Center" steel... and Roebling research, workmanship and modern, precision machines are your added assurance of rope quality that pays off.

But for everything wire rope can give, be sure to get Preformed. Roebling Preforming makes rope easier to handle and install. It can be cut without seizing. It spools better . . . is not inclined to set or kink . . . minimizes vibration and whipping.

There's a Roebling wire rope of the right construction, grade and size for every type and make of rope-rigged equipment. Have your Roebling Field Man tell you which rope will give the best and the lowest-cost performance for every installation. John A. Roebling's Sons Company of California – San Francisco – Los Angeles – Seattle – Portland.

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A CENTURY OF CONFIDENCE

Atlanta, 934 Avon Ave. ★ *Boston*, 51 Sleeper St. ★ *Chicago*, 5525 W. Roosevelt Road ★ *Cincinnati*, 3253 Fredonia Ave. ★ *Cleveland*, 701 St. Clair Ave., N. E. ★ *Denver*, 4801 Jackson St. ★ *Houston*, 6216 Navigation Blvd. ★ *Los Angeles*, 216 S. Alameda St. ★ *New York*, 19 Rector St. ★ *Philadelphia*, 12 S. Twelfth St. ★ *Portland*, 1032 N. W. 14th Ave. ★ *San Francisco*, 1740 Seventeenth St. ★ *Seattle*, 900 First Ave. S.

The ad that failed

...and why!

Proving that Mack trucks outlast them all!

Mack

Mack-International Motor Truck Corp. — Los Angeles • Sacramento San Francisco • Seattle • Portland • Salt Lake City • Factory branches and distributors in all principal cities for service and parts.

8345

Thanks — but no! "Our fleet comprises 235 motor vehicles and includes 136 Macks, several of which have passed the fifteen-year mark . . . one is in its twenty-fifth year. All are registered and operating profitably. We can see no reason to retire such trucks at this time." C. W. HALL, PRESIDENT, C. E. HALL & SONS, SOMERVILLE, MASS.

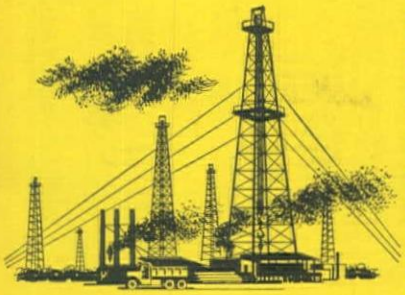
Not trading! "My 1923 Mack still does its share to gross me $3,000 per year in the moving business—and I have spent less than $100 in repairs on this truck in the last 20 years. Obviously, I am not interested in trading." I. V. ASHBY, ASHBY HOUSE MOVING CO., OKLAHOMA CITY.

Will keep! "Our 1934 Mack is still giving good service — it is the oldest of our 30 Macks but still good enough to keep." CLARENCE J. SMITH, SMITH BROS. TRUCK CO., LOS ANGELES, CALIFORNIA.

Still too good! "With reference to your proposal to give us an extra allowance on our Bulldog Mack purchased in 1922 — please be advised that this truck is too good to trade in." J. KOLKO, SPEEDWAY WRECKING CO., CHICAGO, ILL.

Trade? not yet! "Forty-two of our trucks are Macks—some of them 27 years old. They outlast any other make and have proved very economical to operate. Not trading yet." JOSEPH CAPECCI, PHILADELPHIA, PENNA.

For better service use the right rope

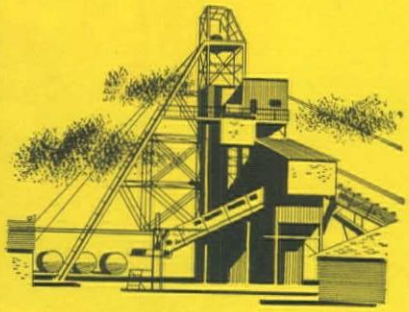


For rotary drilling,
*PRE*formed, Internally Lubricated wire line designed to wind smoothly on drums and to withstand abrasion from running through blocks.

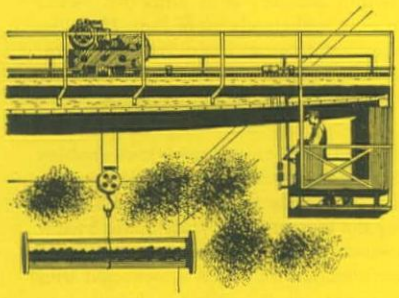
For logging operations,
tough flexible ropes for tractor arch lines, chokers, skidders and loading.

For shovels and draglines,
ropes for different sizes and types of equipment designed to give best service for your particular needs.

The right rope for each job is available from



For shaft mining,
shallow or deep, internally lubricated ropes to meet all load and speed requirements.



For cranes and hoists,
small or large, *PRE*formed Internally Lubricated wire ropes of the correct size and flexibility for each use.

For can conveyors,
there are bright carbon steel, stainless steel and monel metal wire ropes to meet various service conditions.

A thousand and one
MACWHYTE
Internally Lubricated
WIRE ROPES

It pays to choose the right rope for your equipment

Besides the ropes listed above, Macwhyte makes many more such as cable tool drilling lines, elevator cables, incline or haulage ropes, scraper ropes, aircraft control cable assemblies, ropes for ship rigging and guying work, as well as hundreds of sizes and types of single-part, round-braided or flat-braided slings for material handling.

To get the best service, keep down maintenance costs, and *save wire rope dollars*, call your Macwhyte distributor or write direct to Macwhyte Company for recommendations. Catalog on request.

MACWHYTE WIRE ROPE

Portland · Seattle · San Francisco · Los Angeles

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope. Our distributors and mill depots carry stocks for immediate delivery.

907L

BURSTING STRENGTH

Strength factors of Long Life!

No pipe that is provably deficient in any of these strength factors should ever be laid in city streets

BURSTING STRENGTH — In full length bursting tests standard 6-inch cast iron pipe withstands more than 2500 lbs. per square inch internal hydrostatic pressure, which proves ample ability to resist water-hammer or unusual working pressures.

SHOCK STRENGTH — The toughness of cast iron pipe which enables it to withstand impact and traffic shocks, as well as the hazards in handling, is demonstrated by the Impact Test. While under hydrostatic pressure and the heavy blows from a 50 pound hammer, standard 6-inch cast iron pipe does not crack until the hammer is dropped 6 times *on the same spot* from progressively increased heights of 6 inches.

CRUSHING STRENGTH — The ability of cast iron pipe to withstand external loads imposed by heavy fill and unusual traffic loads is proved by the Ring Compression Test. Standard 6-inch cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

BEAM STRENGTH — When cast iron pipe is subjected to beam stress caused by soil settlement, or disturbance of soil by other utilities, or resting on an obstruction, tests prove that standard 6-inch cast iron pipe in 10-foot span sustains a load of 15,000 lbs.

Without bursting strength—or, for that matter—without all of the strength factors listed opposite—no pipe laid 100 years ago in *city streets* would be in service today. But, in spite of the evolution of traffic from horse-drawn vehicles to heavy trucks and buses—and today's vast complexity of subway and underground utility services—cast iron gas and water mains, laid over a century ago, are serving in the streets of more than 30 cities in the United States and Canada. Such service records prove that cast iron pipe combines all the strength factors of long life with ample margins of safety. No pipe that is provably deficient in any of these strength factors should ever be laid in city streets. Cast Iron Pipe Research Association, Thos. F. Wolfe, Engineer, 122 So. Michigan Ave., Chicago 3.

CAST IRON

CAST IRON PIPE SERVES FOR CENTURIES

keep costs down

with CP equipment

CP-20 Sump Pump operates from a 60 c.f.m. compressor. At 40 pounds pressure against a 15-foot head, its capacity is 200 gallons per minute. Operating from a 105 c.f.m. compressor at 80 pounds pressure against a 50-foot head, its capacity is 225 gallons per minute.

It is a single-stage centrifugal pump that requires no priming – starts pumping instantly when air is turned on and the unit lowered into water. For full details write for SP-3017.

New CP-387 Triplex Backfill Tamper – three CP Tampers on a Gunderson-Taylor mounting – enables one man to do the work of four single tampers . . . faster and with more uniformity. Handles higher lifts than single tampers, so that greater thickness of fill can be compacted to specifications.

The Triplex walks easily over the fill. Wheelbarrow type handles make the 140-pound unit easy to guide; smooth tamping action of the three tampers makes unit easy to hold.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

DISTRIBUTORS

BALZER MACHINERY COMPANY, Portland, Oregon; BEEBY MACHINERY COMPANY, Sacramento, California; HALL-PERRY MACHINERY CO., Butte, Montana; HUDSON TUCKER, INC., San Diego, California; SHAW SALES & SERVICE CO., Los Angeles, California; BAY EQUIPMENT COMPANY, Richmond, California; FORNACIARI COMPANY, Los Angeles, California; HONOLULU IRON WORKS COMPANY, Honolulu 2, T.H.; INLAND SERVICE & SUPPLY COMPANY, Las Vegas, Nevada; WESTERN MACHINERY COMPANY, Spokane, Washington; CONTRACTORS EQUIPMENT AND SUPPLY COMPANY, Fresno, California.

MORE POWER AT THE TOOTH POINT

Your shovel's work capacity is limited by the maximum power the machine can exert at the dipper teeth without losing its stability. Because P&H gives you greater stability (without excess deadweight) you have more digging power at the tooth point. This gives you more work capacity —faster cycles at maximum loads—lower costs. Get the proof before you buy your next excavator.

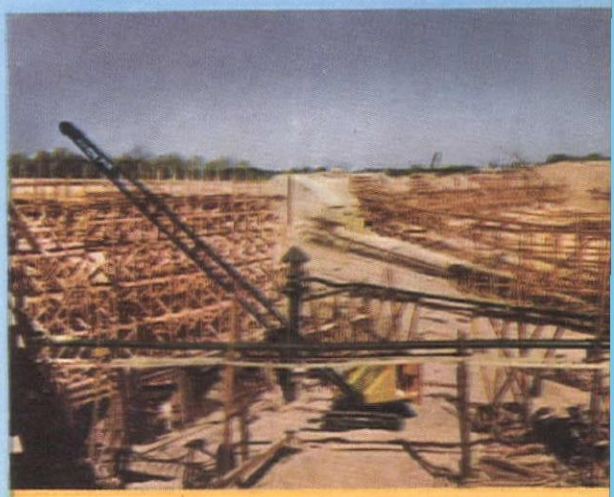
P&H **EXCAVATORS**

4490 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

LITY



MORE ON THE HOOK—AND FASTER HANDLING

In crane service, P&H stability is still more obvious. Lower center of gravity and better weight distribution give you the highest ratio of lifting capacity in relation to gross weight. You can put more on the hook — handle it faster — and safer. Try it!

AND STILL MORE P&H ADDED VALUES

1. All welded construction of rolled alloy steels . . . originated by P&H . . . more highly developed by P&H.
2. True tractor-type crawlers, most efficient traction on any excavator. You can make sharp or gradual turns.
3. Low pressure hydraulic control is smoother . . . more responsive . . . easier on both operator and machine.
4. Rapid reversing planetary chain crowd gives you faster, more positive bite. Crowd chain outlasts 20 to 30 crowd cables.
5. Simpler design gives you an easier machine to work on . . . simplifies maintenance . . . reduces lay-up time . . . cuts costs.

Only P&H gives you these Added Value features and at no extra cost.

ASK YOUR P&H DEALER

ALLIED EQUIPMENT CO.
Fresno, California

BERGLUND TRACTOR & EQUIP. CO.
Napa, California

BOW LAKE EQUIPMENT CO.
Seattle, Washington

CONNELL MOTOR TRUCK, INC.
Stockton, California

FAURE TRACTOR & EQUIP. CO.
El Centro, California

GLENN CARRINGTON & CO.
Seattle 4, Washington

LEE & THATRO EQUIP. CO., INC.
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LOGGERS & CONTRACTORS MACHY. CO.
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MACK TRUCK SALES
Reno, Nevada

OLSON MANUFACTURING CO.
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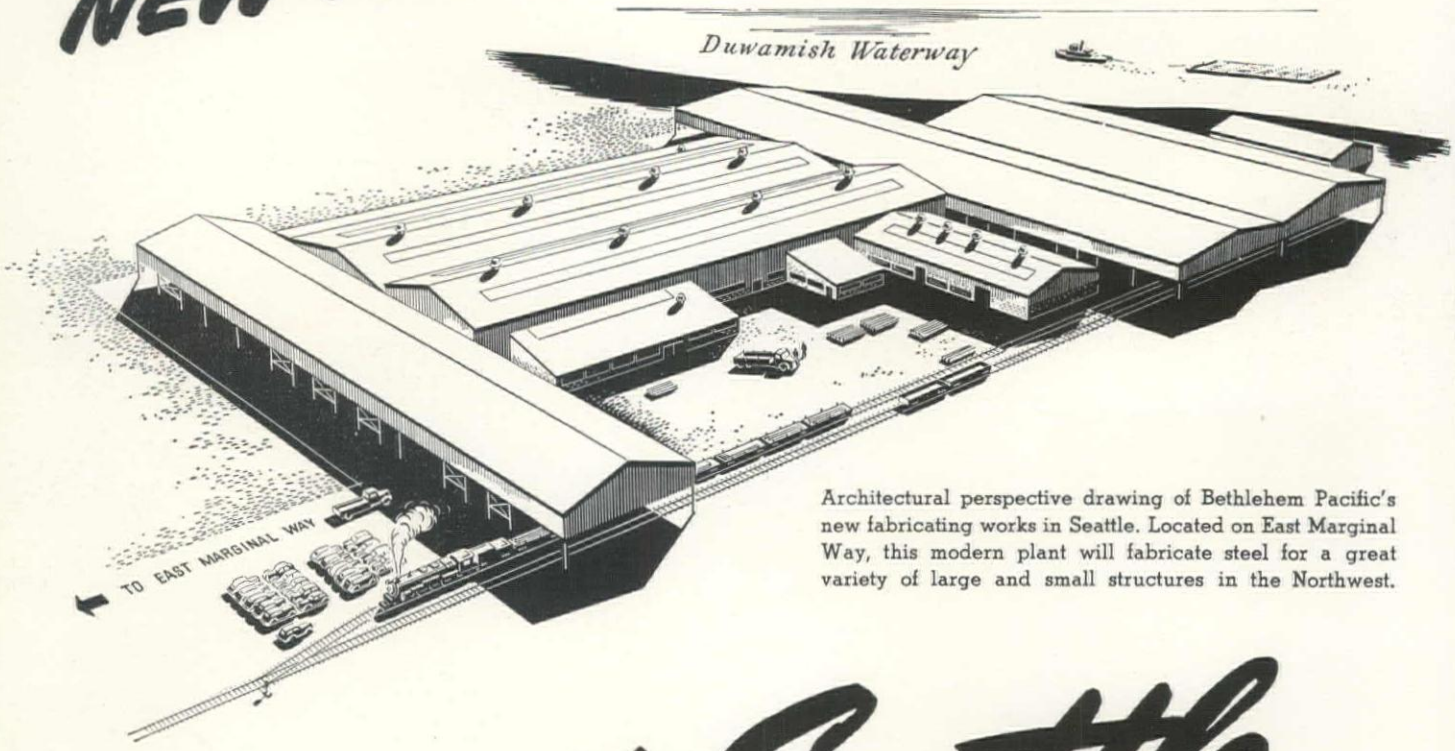
HARNISCHFEGER CORPORATION
San Francisco, Cal.
82 Beale Street

Warehouse, Service Stations:
Seattle
Los Angeles
San Francisco

NEW FABRICATING WORKS at Seattle



Architectural perspective drawing of Bethlehem Pacific's new fabricating works in Seattle. Located on East Marginal Way, this modern plant will fabricate steel for a great variety of large and small structures in the Northwest.

BETHLEHEM STEEL

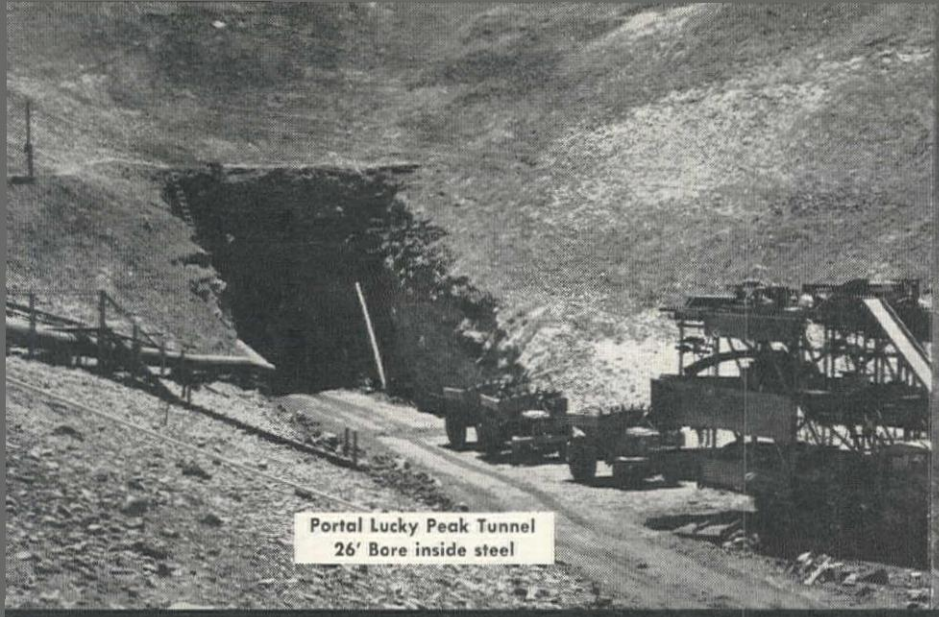
Bethlehem Pacific has backed its belief in the future growth of the Industrial West by building a new structural fabricating works in Seattle. This plant, along with Bethlehem Pacific's other fabricating works at Los Angeles, Alameda, and South San Francisco, gives the company an extensive network of facilities for fabricating steel for buildings, bridges, galvanized transmission towers, and miscellaneous structures.

The Seattle Fabricating Works marks another step toward completion of Bethlehem Pacific's expansion and improvement program that has been underway for several years.

An integrated organization, Bethlehem Pacific now owns and operates 3 steelmaking plants complete with rolling mills, 3 bolt-and-nut plants, and 4 fabricating works to turn out the large variety of steel products needed by industry and commerce in the West.

BETHLEHEM PACIFIC
COAST STEEL CORPORATION
Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

BETHLEHEM PACIFIC



Portal Lucky Peak Tunnel
26' Bore inside steel

Eimco 104 RockerShovel at Lucky Peak

Lucky Peak Tunnel Project near Boise, Idaho, uses an Eimco 104 RockerShovel for mucking out the 26' bore.

"The 104 is faster and more efficient," says project superintendent Paul C. Guinn, a veteran tunnel driver running the job for the Macco Corporation and Puget Sound Bridge & Dredging Company joint contractors. Lucky Peak is Mr. Guinn's 59th tunnel.

The 104 loads the 8' rounds of blocky basalt rock in three hours using a 1¼ yard rock bucket . . . an average of twenty WD-60 Dumptor loads per hour.

Eimco 104 RockerShovels will cut the cost of loading on your job, too. Write for more information.

"In comparing loaders, the Eimco is a mucking machine," says P. C. Guinn, project manager.

EIMCO

THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines

EXECUTIVE OFFICES AND FACTORIES — SALT LAKE CITY 8, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

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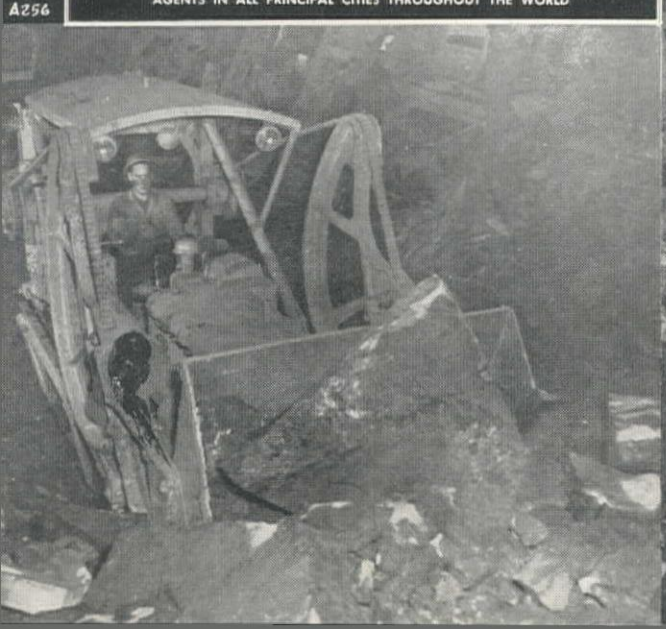
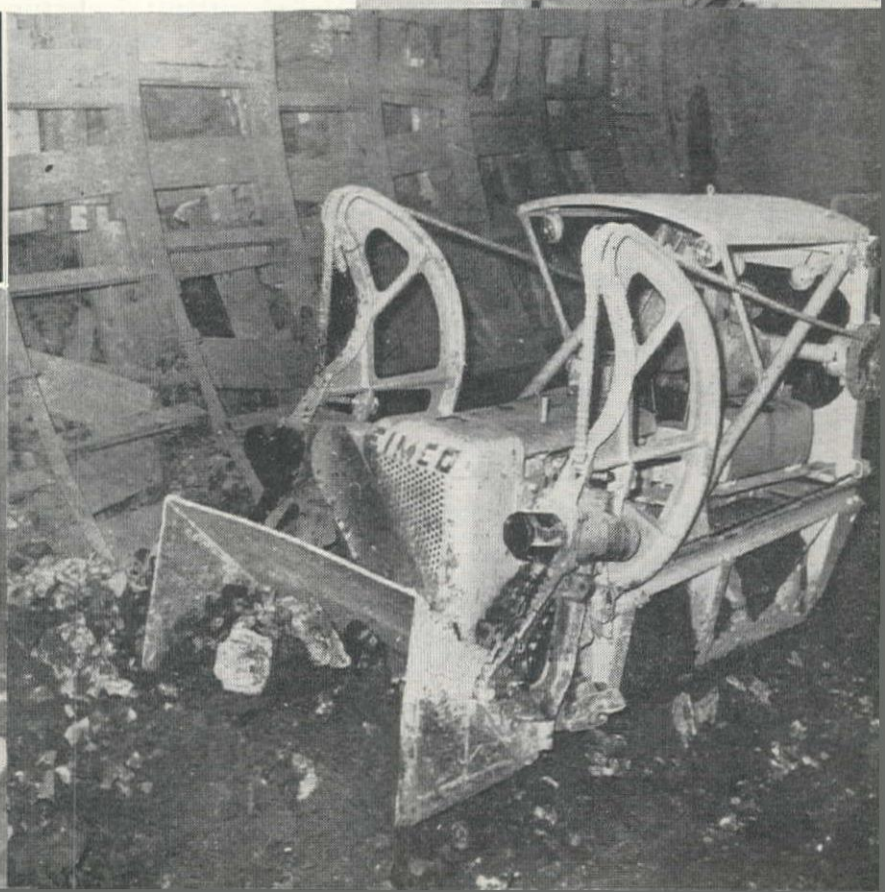
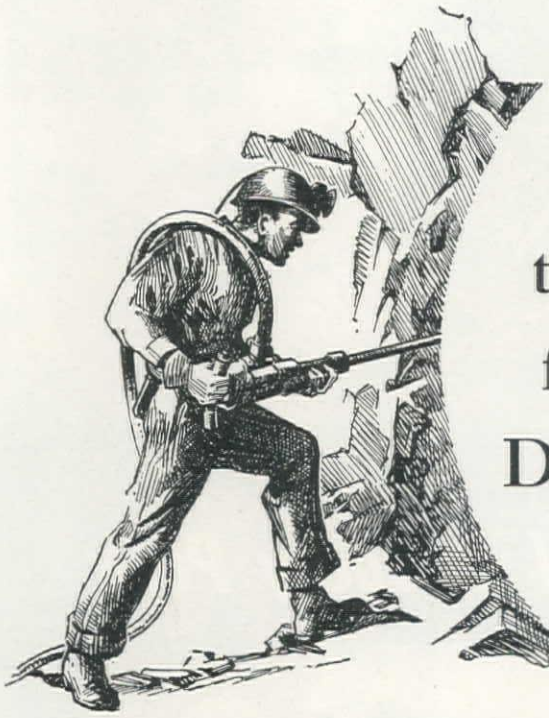
AFFILIATED COMPANIES: SOCIETE EIMCO, PARIS, FRANCE
EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD

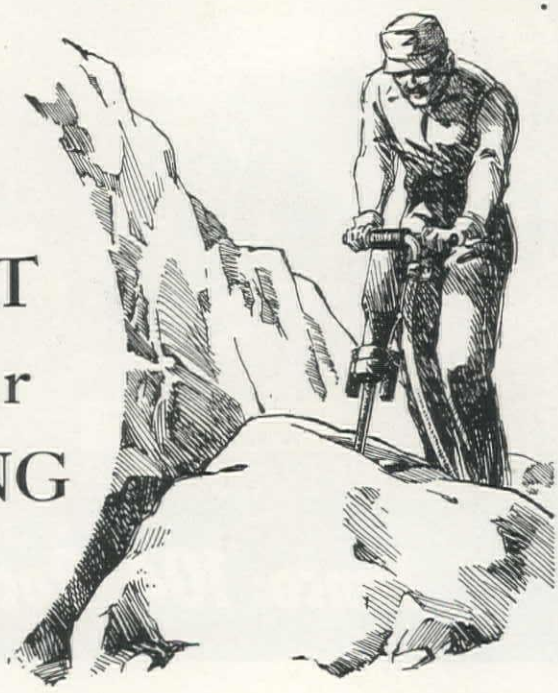
A256







Getting the MOST from your DRILLING ?



ROCKMASTER blasting pays you MORE PROFITS PER DRILL HOLE!

The ROCKMASTER blasting system changes a lot of thinking about drilling blast-holes, because it enables the explosives in each hole to do more work! Many blasters today are saving from 20% to 40% of their former drilling costs—and saving important money on dynamite, too—since putting the ROCKMASTER system into effect in their quarries, mines or construction operations.

The ROCKMASTER system is based on split-second time intervals between blast holes, the timing being controlled within the electric detonators. You have a choice of 16 time intervals, which we help you select to fit your requirements. Explosives are chosen and loaded to fit the ROCKMASTER plan. The result: Explosives gases work behind the burden longer, stepping up blasting efficiency and accomplishing far superior breakage, combined with almost unbelievable control of throw.

In terms of drilling, this usually means that drill holes can be spaced farther apart. Or, it might mean you can use less dynamite with your regular spacing. Drilling for secondary blasting is usually cut way down, frequently eliminated altogether.

Write for booklet showing typical ROCKMASTER loading patterns for various types of blasting work. Or, better yet, call in the Atlas representative and let him tell you frankly what ROCKMASTER blasting can do for you.

Less Bark *More Bite*

ROCKMASTER TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER: Reg. U. S. Pat. Off.

Offices in Principal Cities

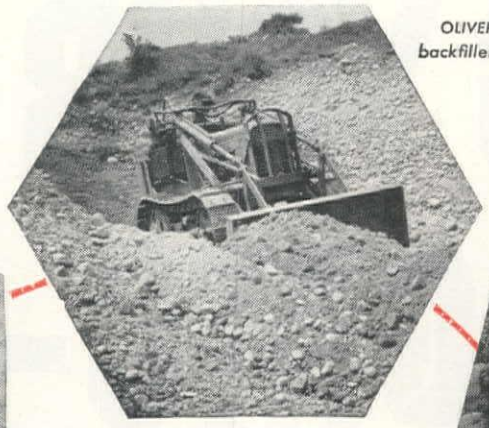
ATLAS EXPLOSIVES

"Everything for Blasting"

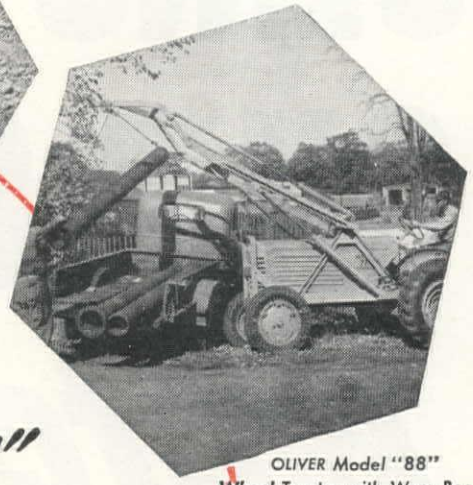
CHEMICALS ATLAS EXPLOSIVES

SAN FRANCISCO 4, CAL. ATLAS POWDER COMPANY SEATTLE 1, WASH.

OLIVER HG Crawler Tractor with Ware Loader loading sand into truck.



OLIVER HG Crawler Tractor with Ware backfiller blade attached to shovel arms.



OLIVER Model "88" Wheel Tractor with Ware Boom handling cast iron pipe.

...take the "Load" out of Your Loading Problems!

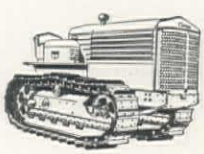
Whatever your loading problem, the easy, economical answer is an Oliver Crawler Tractor or Oliver Industrial Wheel Tractor and Ware Front-End Loader.

These powerful tractors and the hydraulically operated loaders are easy to operate . . . easy on maintenance and operating costs. Lift and bucket are hydraulically controlled. Hydraulic control of bucket assures greater breaking-out action and full loads . . . prevents wasteful spillage. "Midsection" pivot allows longer reach of dumping position and distributes the weight advantageously over the tractor frame to minimize strain. The hydraulic rams are designed to take most of the shock loads, assuring longer life for both tractor and loader.

And, the tractor-loader unit can be quickly converted to backfiller, boom or lifting fork. Special buckets are available for coal, snow or humus loading. The hydraulic system can be used to power other equipment such as mowers, sweepers, etc., in combination with the loader. For all the facts, see your local Oliver Industrial Distributor, or write direct to:

OLIVER Model "88" Wheel Tractor and Ware Loader loading out gravel.

OLIVER HG Crawler Tractor with Ware Loader on ditching job.



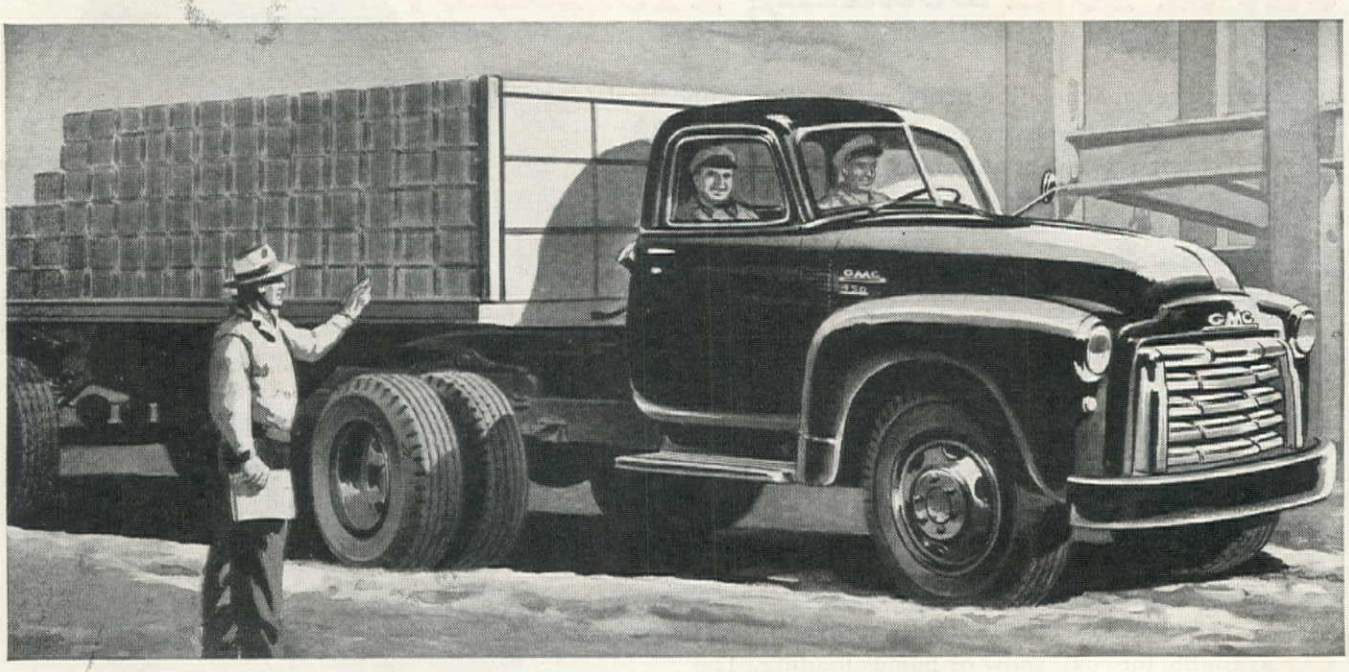
THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

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 Co., 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; Farmers Tractor & Implement Supply Company, Colton. **State of Washington:** Inland Diesel & Machinery Company, Spokane; Pacific Hoist & Derrick Co., Seattle and Puyallup; Melcher-Ray Machinery Co., 202 East Alder Street, Walla Walla; Central Tractor and Equipment Co., Wenatchee. **State of Oregon:** Loggers & Contractors Machinery Co., Portland, Eugene and Klamath Falls. **State of Idaho:** Idaho Cletrac Sales Co., Lewiston and Cottonwood; Engineering Sales Service, Inc., Boise. **State of Montana:** Western Construction Equipment Company, Billings and Missoula. **State of Nevada:** B & M Tractor & Equipment Corp., 1420 S. Virginia St., Reno. **British Columbia:** Pacific Tractor & Equipment, Ltd., 505 Railway Street, Vancouver.

SLING YOUR LOAD ON A GMC-*and watch it roll!*

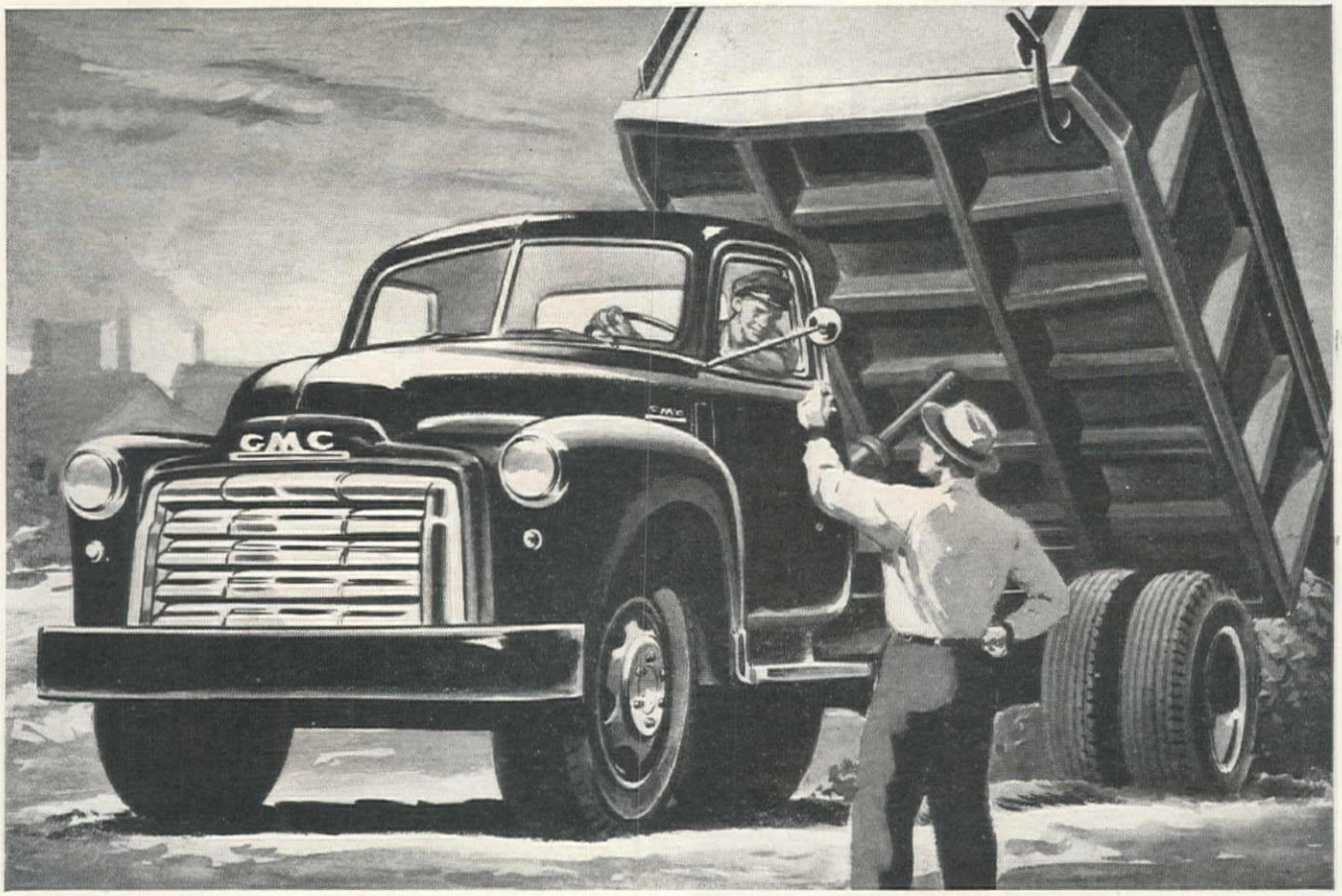


These Middleweight Movers Can Take Most Anything

RIG the short wheelbase with dump body, cement mixer, or fifth wheel for trailer work – or take a longer job with stake or flat body for moving what comes. Mister, you'll *never* find the like of these GMC 450-470 Series for getting your hauling done!

These babies are burly all the way through. Just check on the gear ratios you can get – five-speed direct or over-drive transmissions plus a choice of hypoid, two-speed or double-reduction rear axles. That's why the same truck you see slogging a full load up a tough climb can beat up such a breeze on the highway.

Or put this truck on the hoist and see how it's built underneath – heavy duty in every



detail. Don't miss those alligator cross-members that put rigid strength in the frame with less dead weight. GMC's don't need fishplating to support a body. Note that the spring hangers lap around and *under* the frame—loads don't ride the rivets in GMC's. There's added safety, also, in having the *two* top leaves in the front spring wrap around the shackle bolt.

GMC

GASOLINE & DIESEL TRUCKS

GM

GENERAL MOTORS

FROM ½ TO 20 TONS

Your key to greater hauling profits

Get Behind The Wheel For The Real Story

Drivers would rather wheel a GMC than anything else on the road. No other truck can steer as easy as these jobs with the GMC recirculating ball-bearing gear—and the wide-tread front end boosts road stability. The 120-HP valve-in-head "workhorse" engine, constant-mesh transmission, and cushion-disc clutch—these make a power team that any guy is glad to have on his side. And the GMC lifetime "six-footer" cab has room to spare for the biggest Joe in the outfit.

GMC Series 450-470 comes in wheelbase from 122 to 197 inches, and ranges from 19,000 lbs. GVW to 37,000 lbs. GCW. Let your GMC truck dealer show you full details and full specifications on the truck that's best for your own job. Then, when you read the price tag—you'll see why these GMC's are *far and ahead the best buy in the middle-duty class.*

GMC Truck & Coach Division of General Motors

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT RPM Delo Oil

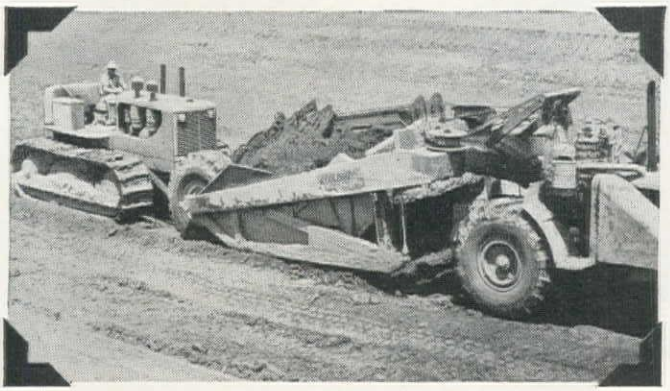
UNITS 148 Diesel engines

CONDITIONS Heavy-duty service 24-hour operation

PERIOD 13½ months

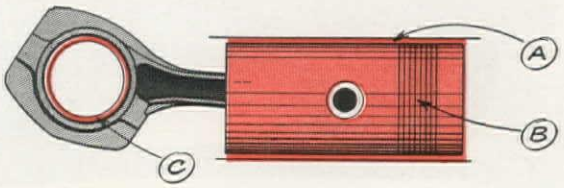
JOB L. A. Airport Extension

Engine-cleaning oil cuts "down time" in half!



LUBRICATED WITH RPM DELO OILS, more than 100 heavy-duty engines like these were pushed to full capacity around the clock. They finished the greatest earth-moving project in the West 150 days ahead of schedule! RPM DELO Supercharged Oil kept parts lacquer-free and reduced wear so that time out for repairs was reduced 50% under that necessary when using ordinary heavy-duty oils.

How RPM DELO Oils reduce wear, corrosion, oxidation in Tractor, Truck, and other Heavy-Duty Engines



A. Contains special additives that provide metal-adhesion qualities . . . keep oil on parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer . . . prevents ring-sticking. Detergent keeps parts clean . . . helps prevent scuffing of metal.

C. Special compounds stop corrosion of any bearing metal and foaming in crankcase.

HEAVY-DUTY DIESEL AND GASOLINE EQUIPMENT, owned by 8 contractors, moved over 12,000,000 cubic yards of earth on this cut and fill job—an extension to the Los Angeles Airport—in 13½ months! General Contractors are N. M. Ball & Sons, Berkeley; Harms Bros., Sacramento; H. Earl Parker, Inc., Marysville; Subcontractors, Lewis & Queen, Fresno; Louis Biasotti & Son, Stockton; Baker Bros., Chico; Gunner Corp., Pasadena; and Far West Construction Co. All used Standard Oil Company of California products 100%.

REMARKS: RPM DELO Oils are designed to meet every heavy-duty engine need: RPM DELO Heavy Duty, RPM DELO Special, RPM DELO Supercharged-1 and RPM DELO Supercharged-2 Lubricating Oil.

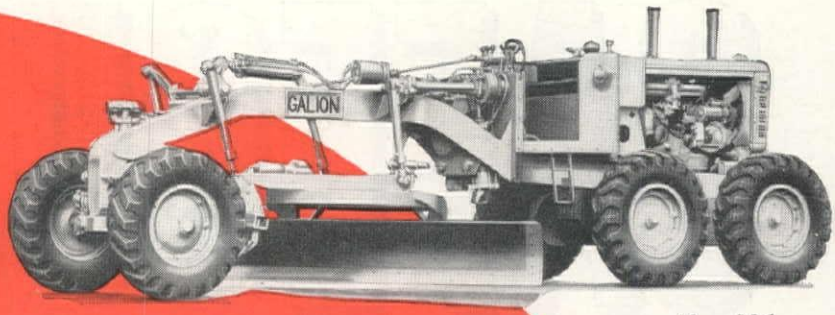
RPM DELO LUBRICATING OILS

STANDARD TECHNICAL SERVICE checked this product performance. If you have a lubrication or fuel problem your Standard Fuel and Lubricant Engineer or Representative will give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20.

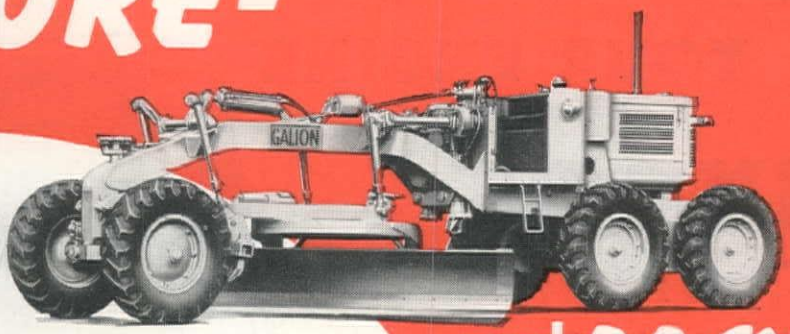
Trademark "RPM DELO" Reg. U. S. Pat. Off.

STANDARD OIL COMPANY OF CALIFORNIA

MORE and MORE-



No. 116
MOTOR GRADER
Extra Heavy-Duty
100 h.p.
Diesel Engine

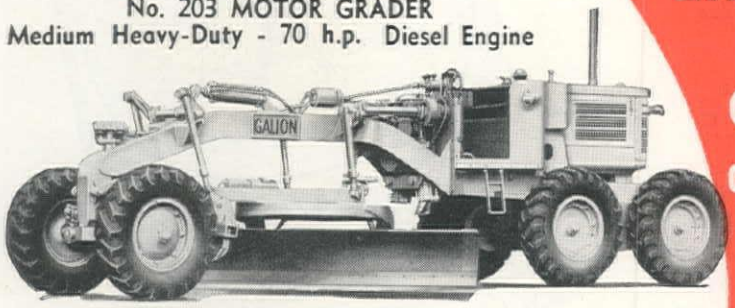


No. 103
MOTOR GRADER
Heavy-Duty
- 76 h.p.
Diesel Engine

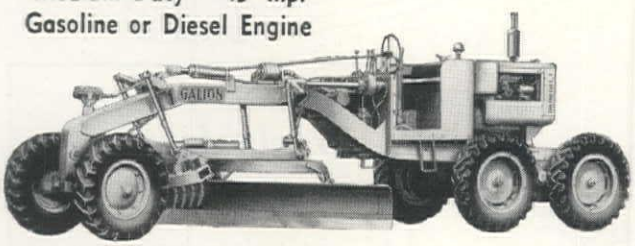
and MORE-

CONTRACTORS, HIGHWAY and STREET DEPTS. ARE USING GALION GRADERS

No. 203 MOTOR GRADER
Medium Heavy-Duty - 70 h.p. Diesel Engine



No. 303 MOTOR GRADER
Medium-Duty - 45 h.p.
Gasoline or Diesel Engine



No. 402
MOTOR GRADER
Light-Duty -
31 h.p.
Gasoline
Engine

GALION DISTRIBUTORS

ARIZONA:
Phoenix.....ARIZONA-CEDAR RAPIDS CO.
Tuscon.....F. RONSTADT HARDWARE CO.
CALIFORNIA:
Los Angeles 11.....BROWN-BEVIS EQUIPMENT CO.
San Francisco 7.....WESTERN TRACTION COMPANY
COLORADO:
Denver 1.....H. W. MOORE EQUIPMENT CO.
IDAHO:
Boise.....WESTERN EQUIPMENT CO.
Salt Lake City 1.....ARNOLD MACHINERY COMPANY
Spokane; Wash.....MODERN MACHINERY CO., INC.
MONTANA:
Butte.....HALL-PERRY MACHINERY CO.
NEVADA:
Reno.....GENERAL EQUIPMENT COMPANY
NEW MEXICO:
Las Vegas.....HILTON'S INCORPORATED
OREGON:
Portland 14, Eugene, Kalamath Falls.....
LOGGERS & CONTR. MACHY. CO.
Boise, Idaho.....WESTERN EQUIPMENT CO.
UTAH:
Salt Lake City 1.....ARNOLD MACHINERY COMPANY
WASHINGTON:
Seattle.....PACIFIC HOIST & DERRICK CO.
Spokane.....MODERN MACHINERY CO., INC.
Portland, Oregon.....LOGGERS & CONTR. MACHY. CO.
WYOMING:
Rapid City, S. D.....J. D. EVANS EQUIPMENT CO.

GALION

ESTABLISHED 1907 **MOTOR GRADERS • ROLLERS**

THE GALION IRON WORKS & MFG. CO., General and Export Offices — Galion, Ohio, U. S. A.
Cable address: GALIONIRON, Galion, Ohio

SAFEGUARD

YOUR ENGINE

NEW TYDOL
HEAVY DUTY
COMPOUNDED

MOTOR OILS FOR GASOLINE, DIESEL AND BUTANE ENGINES

New Tydol HD, HD S-1, HD S-2 solve every problem of modern lubrication for automotive and stationary engines using gasoline, butane or diesel fuels. Tydol Heavy Duty Motor Oils are made of high quality, high VI paraffinic base oil compounded with the new types of "additives." Tydol *cleans* as it *protects* as it *lubricates.*

TYDOL HD

Especially recommended for high speed diesel, gasoline, butane fueled engines in automobiles, buses, trucks, tractors, stationary units under normal Heavy Duty conditions. SAE grades 10, 20, 30, 40, 50. Sold in drums and cans.

TYDOL HD S-1

Has higher detergency level than Tydol HD. For operation under cold start and stop conditions and under unusually severe continued overloaded conditions in all types of engines. SAE grades 20, 30, 40. Sold in drums.

TYDOL HD S-2

Has highest detergency level of the Tydol Heavy Duty series. For high performance and supercharged diesel engines using all kinds of diesel fuels under the most extreme conditions. Available in SAE grade 30. Sold in drums.

Call your Associated Representative for expert help on any lubrication problem.

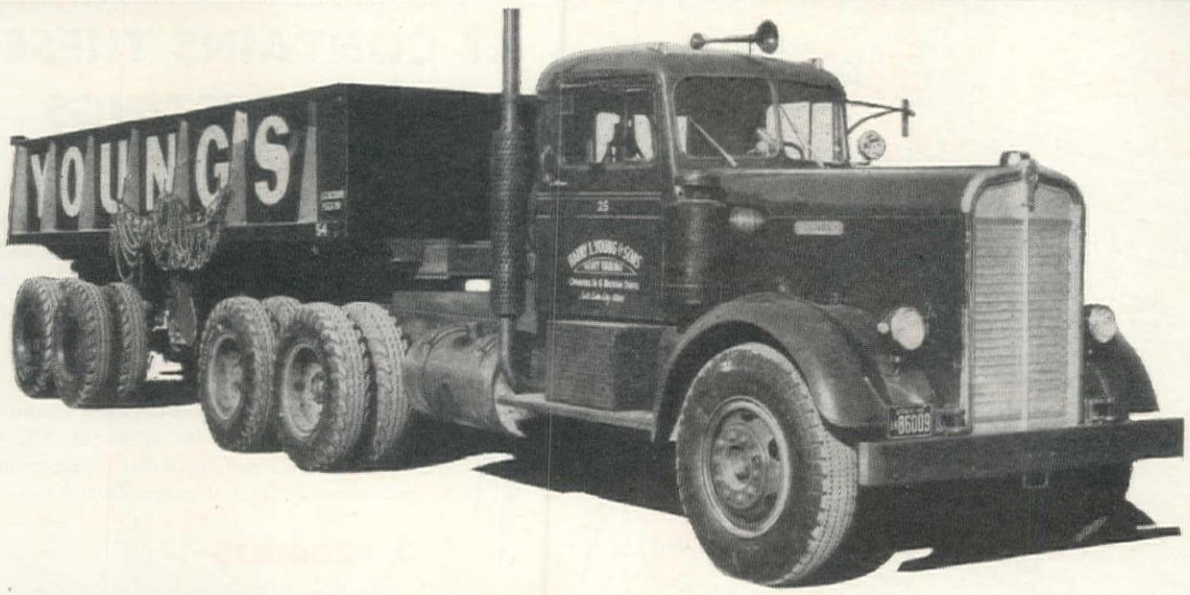
Check these Tydol safeguards

- ✔ Easier starting—heat resistant—stable in service.
- ✔ Contains anti-foam agent and assures positive lubrication. Low oil consumption.
- ✔ Freedom from ring sticking—less piston ring and cylinder wear.
- ✔ Prevents sludge and varnish deposits and clogging of oil ducts and passages.
- ✔ Insures free acting valve stems. Provides cleaner filter elements.
- ✔ Non-corrosive to alloy bearings and other engine parts.
- ✔ *Cleans* as it *protects* as it *lubricates.*

TIDE WATER ASSOCIATED OIL COMPANY

for More Dependability

There's More Worth in KENWORTH



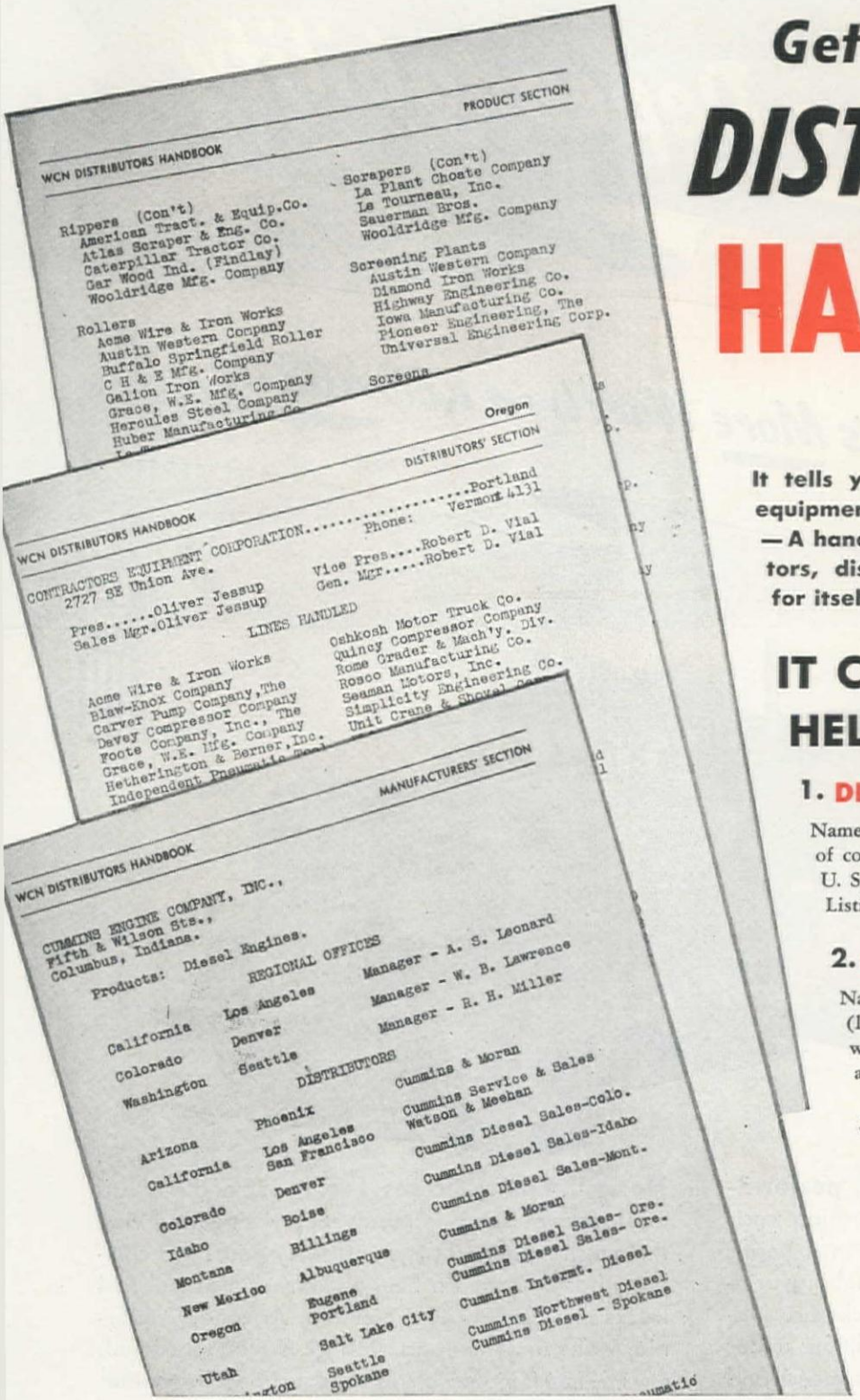
Constant, long dependability of performance is soon reflected in lower operating costs and greatest number of days worked in a year's operation. Kenworth's leadership in reliability originates from the fact that Kenworth trucks are job-engineered to meet and match the conditions under which they operate. Maximum power, speed and capacity provide plenty of what it takes to get the goods there. The extra stamina and endurance built into every Kenworth truck are your assurance of your ability to deliver when the pressure's on.

Harry L. Young & Sons, Inc., is one of the West's most successful trucking firms specializing in serving the construction industry. For many years this company has operated a fleet of Kenworth Model 524 trucks throughout Utah, Nevada, Arizona, California, Idaho and Montana. Harry L. Young, president, says: *"Time is money on my construction job, whether it's heavy machinery, dirt or rocks that are to be moved. The trucks we operate must be dependable. That's one of the most important reasons why we chose Kenworths."*

KENWORTH

TRUCKS ★ BUSES

FACTORY AND HOME OFFICE: SEATTLE U. S. A. DISTRIBUTORS IN THE UNITED STATES AND MOST FOREIGN COUNTRIES



Get the new WCN DISTRIBUTORS HANDBOOK

1950 EDITION

It tells you *Who* handles *What* construction equipment and *Where* in Western half of U. S. — A handy, time-saving reference for contractors, distributors, and manufacturers — Pays for itself in savings on wires and phone calls.

IT CONTAINS THESE HELPFUL LISTINGS . . .

1. DISTRIBUTORS

Names, addresses and phone numbers of distributors of construction equipment in the Western half of the U. S., the lines they handle, names of their branches. Listing is alphabetical by states.

2. MANUFACTURERS

Names of construction equipment manufacturers (listed alphabetically for entire U. S.), together with products, locations of their Western branches, and names of their Western distributors.

3. PRODUCTS

Alphabetical listing of products with names of all manufacturers making each product.

4¼" x 7½"
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YES, I want a copy of WCN 1950 DISTRIBUTORS' HANDBOOK. I enclose $5 (Add 15c if ordering from a California address).

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Address.....

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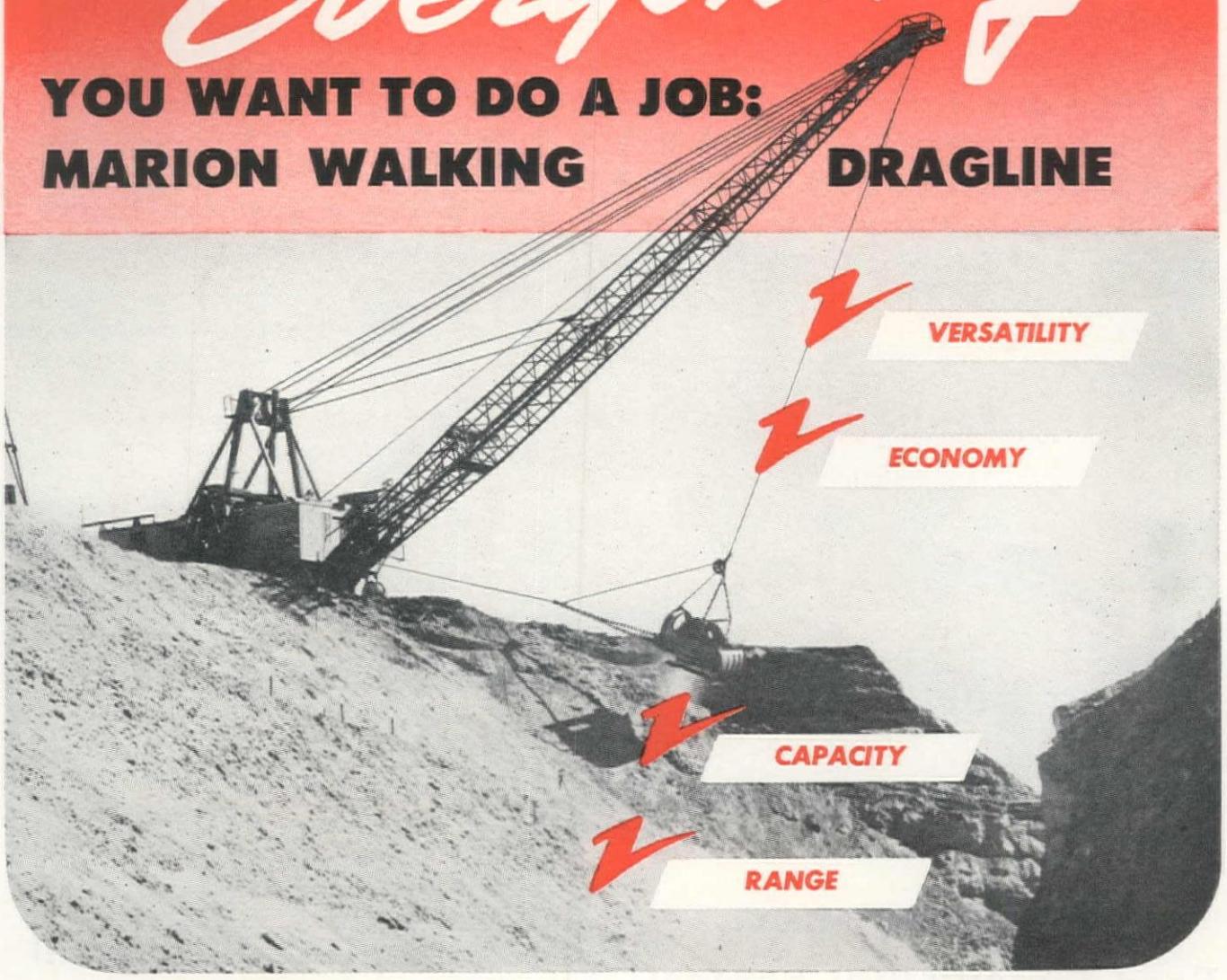
Everything

YOU WANT TO DO A JOB: MARION WALKING DRAGLINE

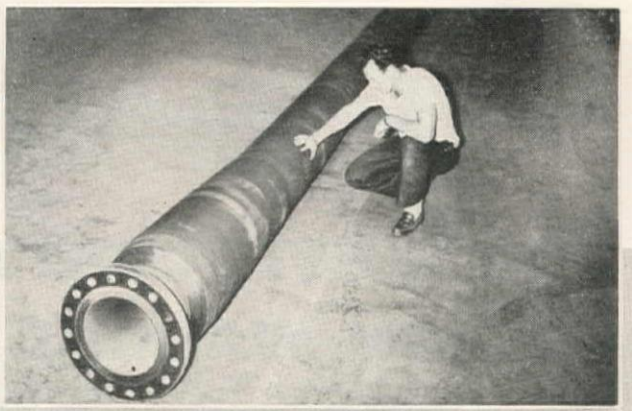


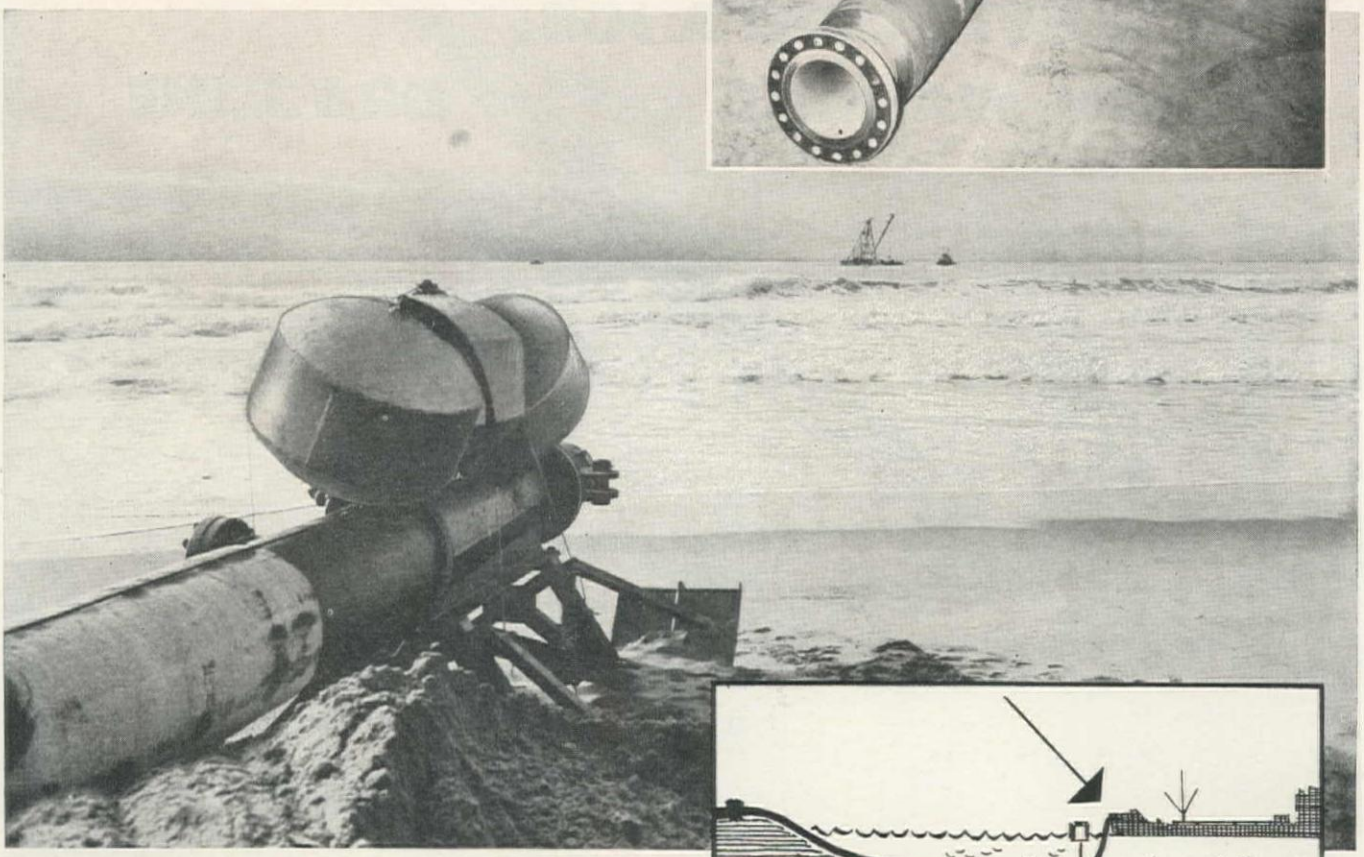
A rare combination of performance features is available in MARION Walking Draglines. . . . Before you buy excavating equipment for drainage, reclamation, stripping, levee, heavy construction or sand and gravel work, first learn—without obligation—how MARION Walkers might do the job better, faster and more economically. . . . MARION Walkers are making proud records on many jobs across the country. They work and travel easily in soft footing. For example, the MARION 7200 pictured here is on a construction project, can swing a 7 cu. yd. load up to 230 feet and dump 135 feet above grade. A 5 cu. yd. load can be swung 305 feet, raised 137 feet.

MARION Walkers in three sizes (5 cu yds. to 30 cu. yds.), are built in the MARION tradition—expertly designed, made of the finest materials and incorporating many extra-value features that make you glad, year after year, that you chose a MARION. . . . Your nearest MARION sales office will be happy to give you the details. Or write to the factory for information.

MARION POWER SHOVEL COMPANY.....571 Howard Street, San Francisco 5, California
STAR MACHINERY COMPANY.....1741 First Avenue, South, Seattle, Washington
RAY CORSON MACHINERY COMPANY.....351 Kalamath Street, Denver 9, Colorado
M & F EQUIPMENT COMPANY.....2521 Isleta Highway, Albuquerque, New Mexico
MARION POWER SHOVEL COMPANY.....2505 N. E. 33rd Avenue, Portland, Oregon
BROWN-BEVIS EQUIPMENT COMPANY.....4900 Santa Fe Avenue, Los Angeles 11, California
C. H. GRANT COMPANY.....1401 Eastshore Highway, Berkeley 10, California
STAR MACHINERY COMPANY.....E. 415 Sprague Avenue, Spokane 8, Washington
STAR MACHINERY COMPANY.....701 Larson Building, Yakima, Washington
MARION POWER SHOVEL COMPANY.....114 W. Adams Street, Phoenix, Arizona
RASMUSSEN EQIUPMENT & SUPPLY COMPANY.....1960 South Second West, Salt Lake City, Utah

This Victor Submarine Hose was fabricated in eight 25' lengths–12" in diameter–at PIONEER'S Pittsburg, California factory.





COMIN' ASHORE...

Feed for 402,000 horses!

Pacific Gas and Electric's new 402,000 horsepower electric generating plant on California's Monterey Bay will consume 13,500 barrels of oil every 24 hours. Fuel oil for the hungry generators is supplied by tankers that discharge their cargo in the manner of a "seagoing service station" over a half-mile offshore, where the surf is rough and the waves run high.

To compensate for the oil tanker's rise and fall, a flexible submarine oil hose has been designed by PIONEER RUBBER MILLS Engineers. Impervious to both salt water and oil, flexible to instantly follow every whim of wind and tide, strong to withstand high-pressure pumping, the hose PIONEER delivered is 200 feet long, 12 inches in diameter, and can unload tankers at the rate of 8000 barrels an hour.

While a majority of industry's rubber needs can be filled from PIONEER'S large stock of commercial rubber components, PIONEER RUBBER MILLS has specialized in solving unusual industrial rubber problems involving custom fabrication.

Call on your PIONEER RUBBER MILLS Distributor's on-the-job-know-how. It is backed by the research laboratories and manufacturing technicians of PIONEER RUBBER MILLS—leaders in Industrial Rubber Development since 1888.

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SEATTLE • TACOMA *Washington Belting & Rubber Co.*
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YOU CAN'T DO THIS with any other single unit!

PLAN your job for the MultiFoote with the HighLift Boom. Built in three capacities from single to double drum it brings you high output, gives you better control of your concrete delivery and will place concrete 23 ft. up with a standard boom (greater heights with longer booms).

Crawler traction permits easy travel over the ordinary rough ground conditions of a construction job and will not dig itself in as do wheels. Bucket controls are at the bucket where they should be to handle exact placement to hoppers or spouts. MultiFoote Simplicity makes maintenance easy and keeps costs low. Check this column at the right and see what you eliminate for cost cutting and note what the MultiFoote and the HighLift Boom make possible. More information on how it will help you if you will ask us.

THE FOOTE COMPANY, INC.
Subsidiary of Blaw-Knox Co.
Nunda, New York

MULTIFOOTE PAVER
FOR EVERY PLACE CONCRETE MUST BE POURED

What the Direct Pour will do!

- Places concrete 23 ft. up with a standard 35 ft. boom. Greater heights with longer booms.
- Loads open truck bodies.
- Feeds Pumpcrete.
- Feeds hoppers or concrete buggies.
- Will travel along and pour direct to forms.
- Travel and pour series of basement foundations and / or wall.
- Travel between forms and pour footings.
- Pour walls in low headroom where crane can't work.
- Pour floor or highway.

What the Direct Pour Saves!

- Eliminates crane and concrete bucket.
- Eliminates mixer.
- Eliminates chuting tower or other elevating equipment.
- Reduces ramps and false work required.
- Reduces ground crew.
- Reduces concrete haul for buggy men.
- Reduces time always lost in transferring concrete from one piece of equipment to another.

A BLAW-KNOX PRODUCT

WESTERN MACHINERY COMPANY
Phoenix, Arizona

C. H. GRANT COMPANY
San Francisco, California

LEROI-RIX MACHINERY COMPANY
Los Angeles, California

LIVELY EQUIPMENT COMPANY
Albuquerque, New Mexico

CONTRACTORS EQUIPMENT COMPANY
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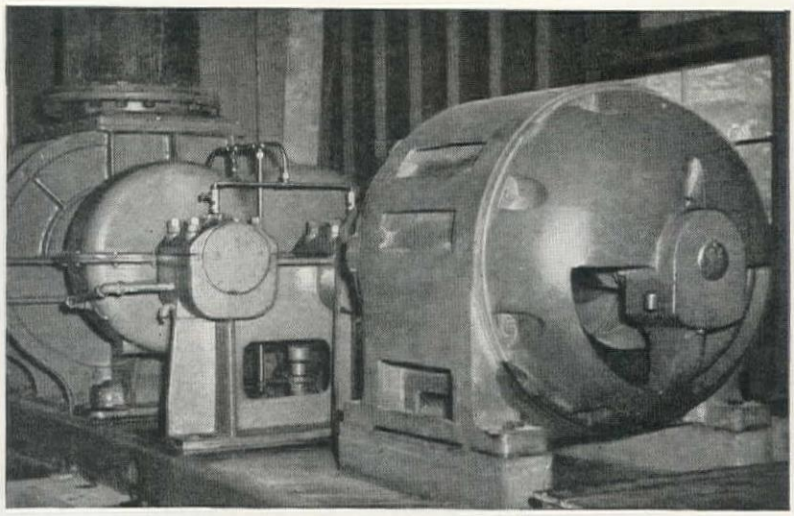
COLORADO BUILDERS' SUPPLY CO.
Denver, Colorado

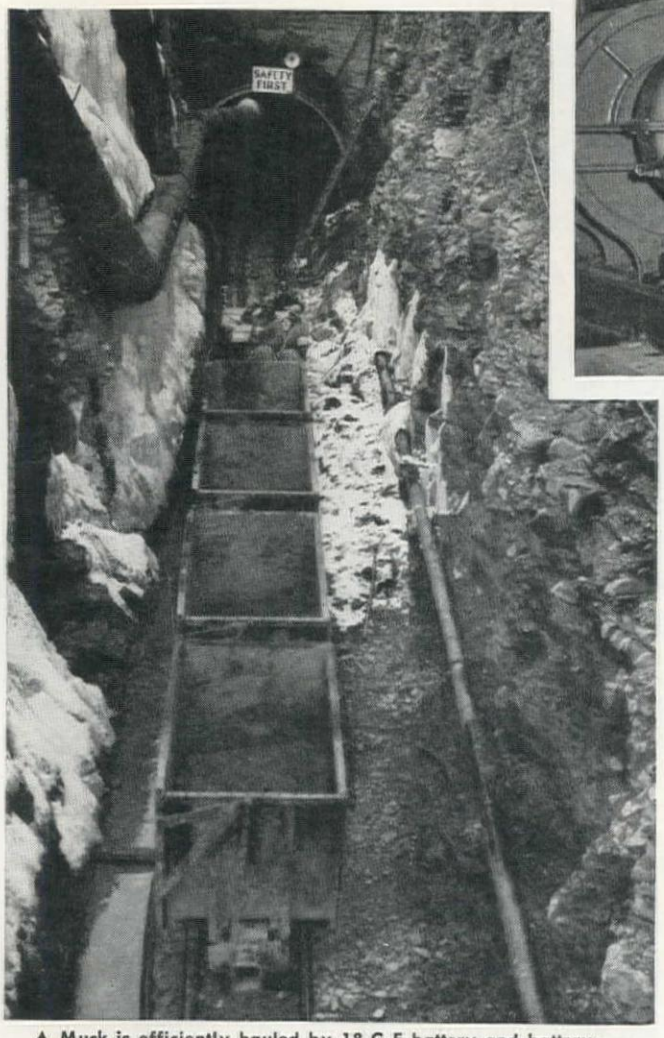
LANG COMPANY, INC.
Salt Lake City, Utah

AIR-MACK EQUIPMENT CO.
Seattle, Washington

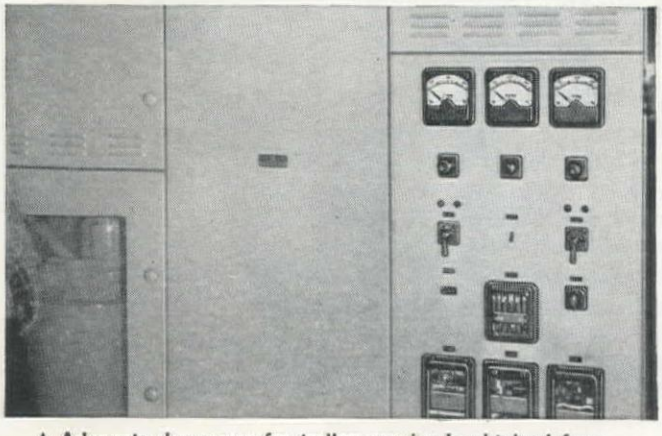
WESTERN EQUIPMENT COMPANY
Spokane, Washington; Boise, Idaho Falls, Idaho

Ventilation for the Delaware Aqueduct tunnel is provided by blowers driven by sturdy G-E 200-hp induction motors. ▶





▲ Muck is efficiently hauled by 18 G-E battery and battery-trolley locomotives.



▲ Adequate d-c power for trolley service is obtained from eight G-E 150-KW stationary mine-type mercury-arc rectifiers specially designed for this project.

WESTERN PLANTS OR SERVICE SHOPS: Anaheim, Denver, Los Angeles, Oakland, Ontario, Portland, Richland, Salt Lake City, San Diego, San Francisco, San Jose, Seattle. WESTERN SALES OFFICES: Bakersfield, Butte, Denver, Eugene, Fresno, Los Angeles, Medford, Oakland, Pasco, Phoenix, Portland, Riverside, Sacramento, Salt Lake City, San Diego, San Francisco, San Jose, Seattle, Spokane, Stockton, Tacoma.

tunneling through the CATSKILLS

... Electrically

to bring more water to New York City

Adding 300 million gallons a day to New York City's water supply is a big job no matter how it's done. To help bring it from the Delaware River, the Walsh Construction Co. and B. Perini and Sons must bore 25 miles through the Catskill Mountains. At about 70 feet a day, they've still a long way to go, but expect to complete the job around July 1955 with *electrified* equipment co-ordinated and engineered by General Electric.

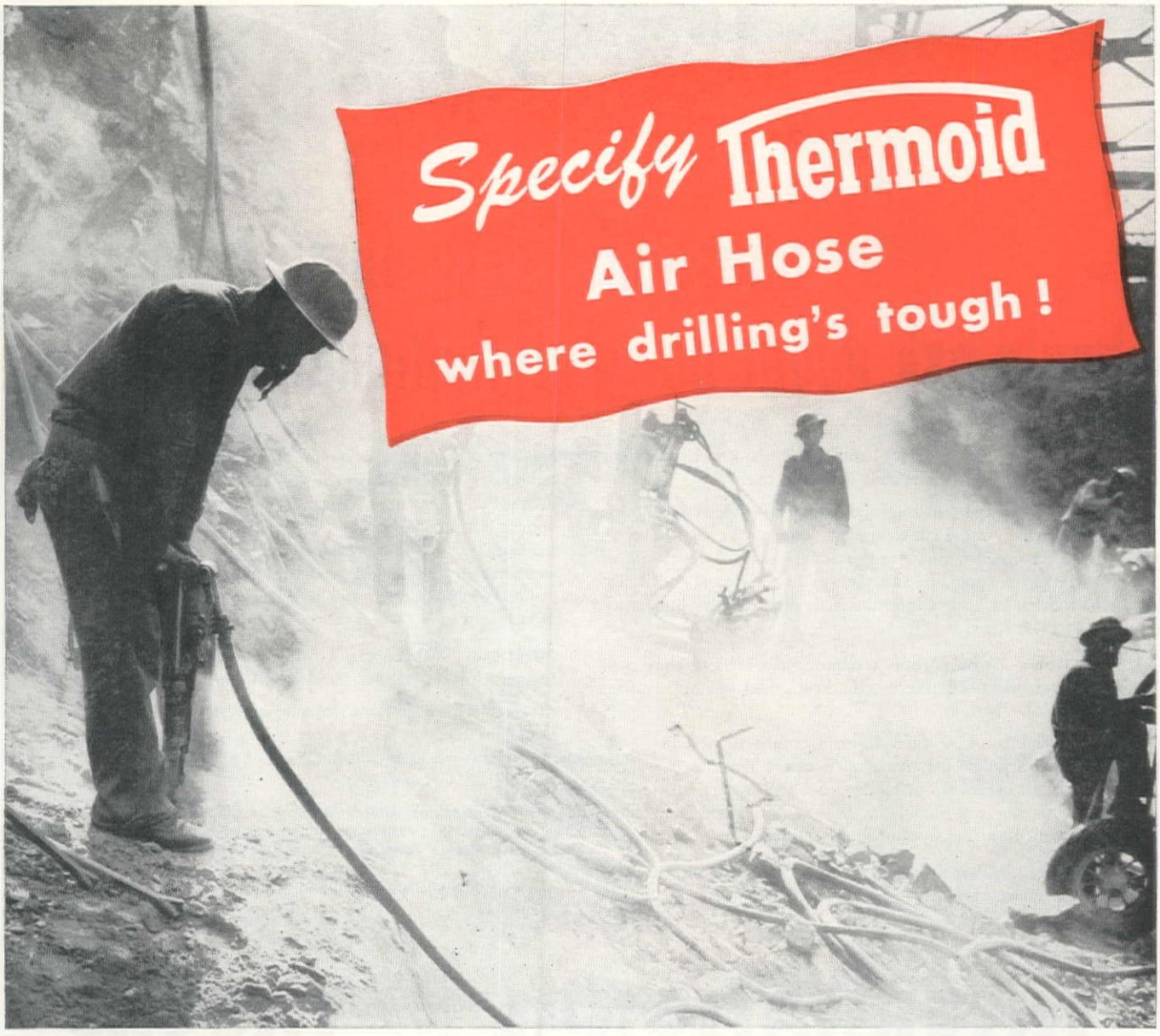
Every day, more contractors are looking to reliable *electrified* equipment for flexibility, safety, and ease of maintenance. With equipment driven by G-E motors and control, and supplied from G-E power distribution systems they get modern *electric drives* with the added advantages of G-E engineering assistance in application, installation and service. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

Ask him Today!

Whether you buy or build construction equipment, your G-E representative can show you how to do a better job—at lower cost—by complete electrification. Write him now, and he'll call on you at your convenience.

GENERAL ELECTRIC

664-10



Thermoid Research Gives Greater Flexibility and Wear-ability to New-Type Hose!

Thermoid has designed *Thermine* Air Hose especially for more efficient and economical use in drilling operations—from construction jobs to mining.

Increased flexibility allows greater freedom of movement and permits bending the hose easily around tight corners. A heavy synthetic rubber oil-proof tube is reinforced with heavy braided rayon cord. Smooth, extra-heavy rubber cover offers maximum resistance to abrasion and cutting by sharp rocks.

Thermine Air Hose is mandrel-built from ¼" to 1½" inclusive in 50 ft. lengths. Available at your nearest Thermoid Distributor.

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

For *Complete* Satisfaction *Specify* Thermoid!

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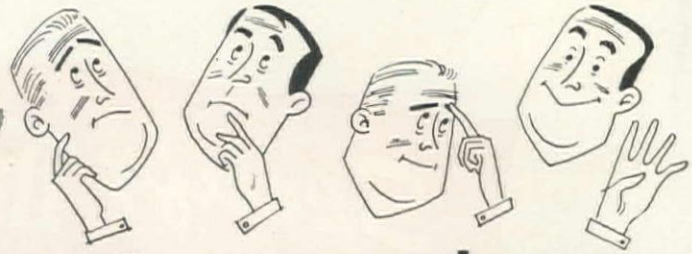


4 questions every dump truck user should ask about new International 6-wheelers

QUESTION: "I hear new Internationals are heavy-duty engineered. What does that mean to me?"

ANSWER: "Heavy-duty engineered" means that extra stamina and durability are built into every one of the thousands of parts that go into new International 6-wheel Trucks. This gives you the long life and savings in operation and maintenance that have kept Internationals first in heavy-duty truck sales for 18 years.

QUESTION: "What other assurance do I have that new International 6-wheelers will do a good job on *my* particular job?"

ANSWER: From new valve-in-head engine to new bogie assembly, every new International 6-wheel Truck is *specialized* for years and years of outstanding 6-wheel truck performance. In addition, every model has been *proved* right from every standpoint in actual 6-wheeler operation.

QUESTION: "What do new Internationals offer in the way of new advancements?"

ANSWER: You get the new Comfo-Vision Cab—"roomiest cab on the road." You get the new third differential that eliminates the need for an extra propeller shaft and a power divider, thereby reducing truck weight. You get new Super-steering and new Super-maneuverability for easier handling and turns in the shortest practical circle. You get a new valve-in-head engine, new frame, new improvements from bumper to tail light.

QUESTION: "Where can I find out *more* about how new International 6-wheel Trucks will cut my hauling costs?"

ANSWER: Get in touch with your nearest International Truck Dealer or Branch. He'll gladly give you facts and figures on the right 6-wheel model for you.

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

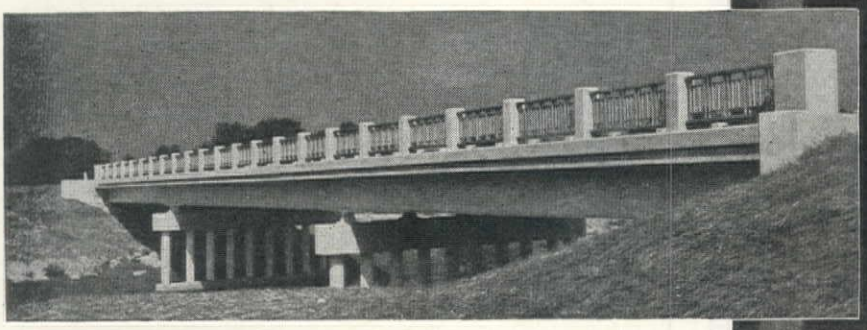
Tune in James Melton and "Harvest of Stars," NBC, Sunday afternoons

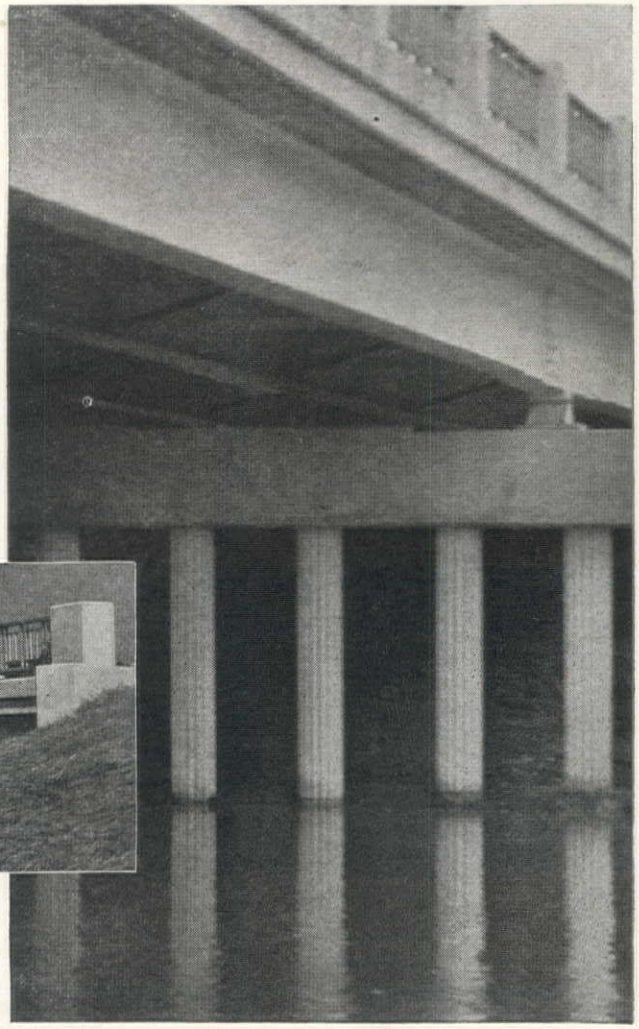
ALL NEW, ALL PROVED

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY CHICAGO

foundation costs go down





WHEN MONOTUBES GO IN!

Bridge on Ohio State Route 161, near Granville, with Monotube steel foundation piles. Another example of the adaptability of Monotubes for any type job.

YOU can check Monotubes, feature by feature—and you'll see how every one helps make important savings.

Take weight, for example. Although Monotubes are inherently strong, they're light in weight and easy to handle. That made it possible on a recent job for the contractor building an overpass to move in with a light truck crane, over a difficult access road, and within 4 hours start driving Monotubes!

And consider Monotube strength. In the job pictured above, single rows of Monotube piles form the piers . . . without longitudinal bracing. *Acting as columns,* these Monotube piles not only provided the necessary strength but saved approximately 90% of the concrete in solid pier construction. In addition, the fluted columns add to the beauty of the structure.

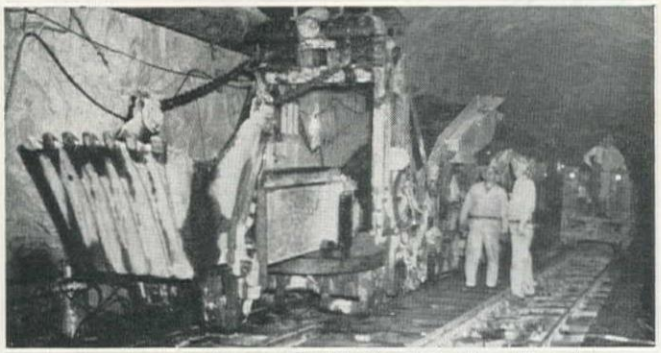
Here are *more* cost-saving, time-saving Monotube advantages. They're easily extendible. There's minimum cut-off waste. And, jobs started with Monotubes can be *completed* with them because they come in a range of lengths, gauges and tapers adaptable to varying soil conditions and different types of structures.

Get the complete story. See how Monotubes can help you design with certainty and save on foundation costs. For information, write to The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

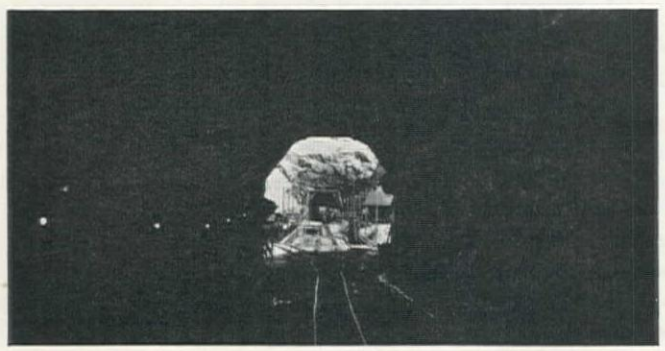
Monotube Foundation Piles

Southern California Edison Breaking Own World's Record With General Petroleum Products



Huge scooper in tunnel of Bechtel-Morrison-Knudsen project at Big Creek Dam for Southern California Edison Company.

View of Big Creek Dam at Auburry, California.



Mouth of Big Creek Dam Tunnel.

Crew of tunnel workers at mouth of tunnel.

New construction records are being set at Southern California Edison's #4 Plant on the San Joaquin River. The two world-wide contracting firms of Morrison-Knudsen and the Bechtel Corporation combine the know-how of their capable organizations in this $19,000,000.00 project consisting of a power house, a 245 foot dam utilizing 250,000 cubic yards of concrete, and a two-mile horseshoe type of tunnel 10,500 feet long and 24 feet in diameter.

Construction started on July 1st, 1949 and a two-year completion schedule was established. Within ten months the halfway mark had been reached and it is now apparent that the plant will be in operation at least 6 months ahead of schedule. Already a world's record has been set in the building of the dam, breaking a previous Southern California Edison record and present indications are that other records will be set upon completion of the project.

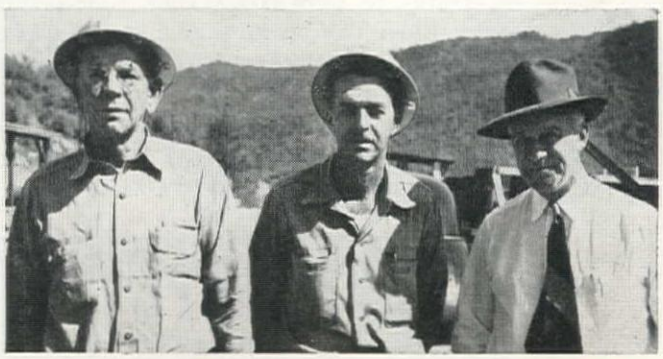
Credit for the feat goes to careful planning, an expert professional crew, and to the operation and maintenance of the 115 major pieces of motorized equipment on the job. The entire project is fueled and lubricated with General Petroleum products and the outstanding record of equipment performance is a testimonial to the quality of these products and the all inclusive service provided by General Petroleum lubrication engineers.

Take Advantage of this G. P. Service

The G. P. Lube-Engineer is an expert trained to save you money through proper lubrication. The preventive-maintenance program he will put into effect for your equipment will result in longer machinery life, simplified lubrication methods, less buying and stocking problems.

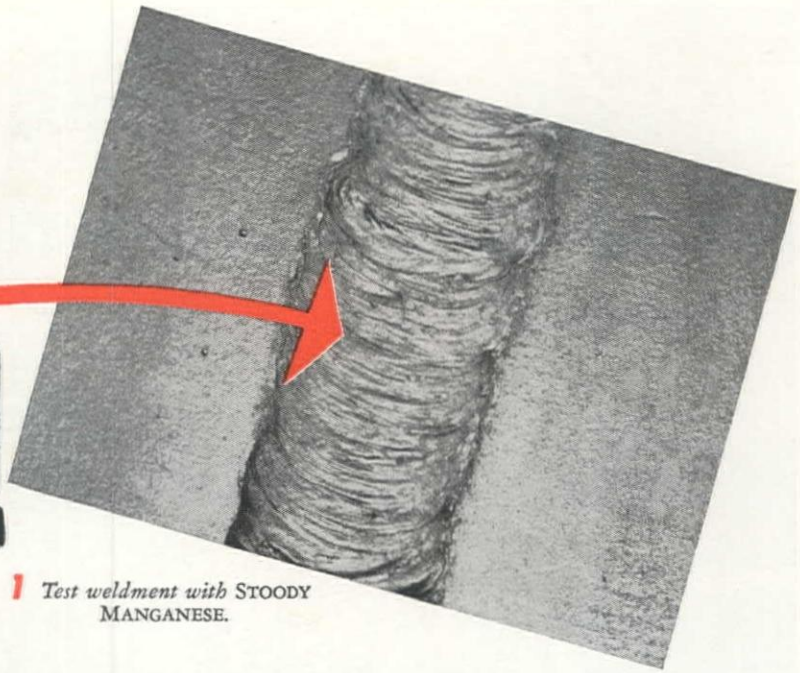
GENERAL PETROLEUM CORPORATION
— using nature's gift to better mankind

Mobilgas

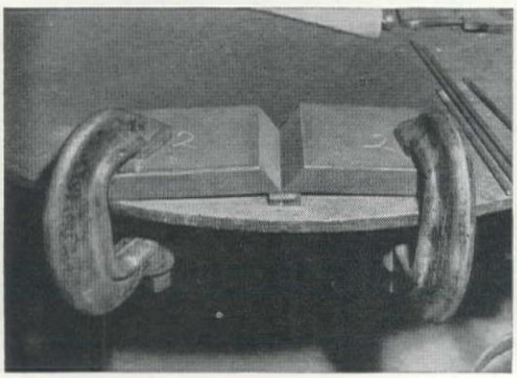


Left to Right: H. L. Leventon, Project Manager, Big Creek Dam; L. C. Wicks, Master Mechanic; D. G. Tait, General Petroleum Representative.

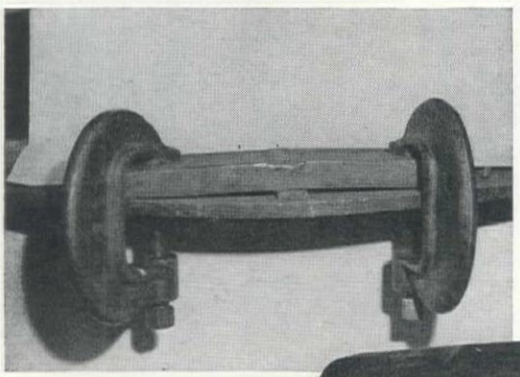
LOOK no cracks!



1 *Test weldment with* STOODY MANGANESE.



2 *Manganese plates beveled and ready to weld.*



3 *Warpage is counteracted with husky "C" clamps.*

A simple test that proves Superiority of STOODY MANGANESE!

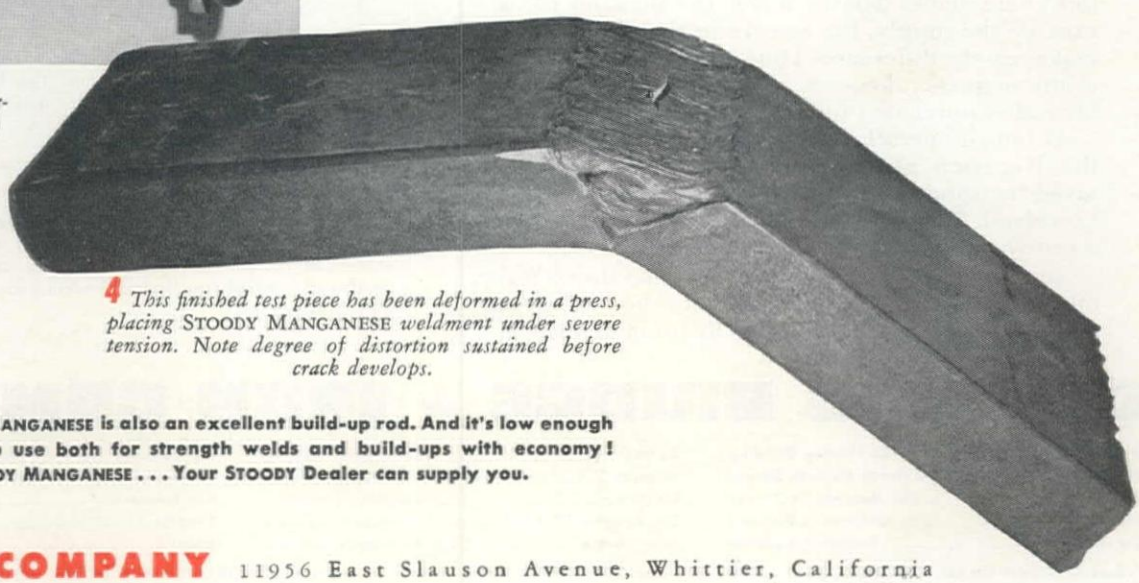
Experienced welders fully recognize the "feel" of a good electrode... with the new STOODY MANGANESE it's a faster, snappier action, improved speed of deposit, good looking bead, and low spatter loss.

But if you want to SEE the superiority of STOODY MANGANESE ... if you want to prove its exceptional resistance to cracking, try this simple test!

Bevel two ¾" manganese plates for vee-groove welding. Shim under the beveled edges to produce a slight reverse bow, such as would normally be allowed for contraction.

Now restrain the ends with husky "C" clamps and fill the vee with STOODY MANGANESE. Since the test pieces cannot move, the contraction strain is obviously placed on the weldment itself. NOTE THE COMPLETE ABSENCE OF CRACKS! Try this with any other bare manganese and compare results.

WHAT THE TEST PROVES: Absence of cracking indicates unusually high ductility, a quality in STOODY MANGANESE which insures extra strength... keeps welded parts WELDED where unusual shock and impact are encountered.



4 *This finished test piece has been deformed in a press, placing* STOODY MANGANESE *weldment under severe tension. Note degree of distortion sustained before crack develops.*

STOODY MANGANESE is also an excellent build-up rod. And it's low enough in cost to use both for strength welds and build-ups with economy! Try STOODY MANGANESE... Your STOODY Dealer can supply you.

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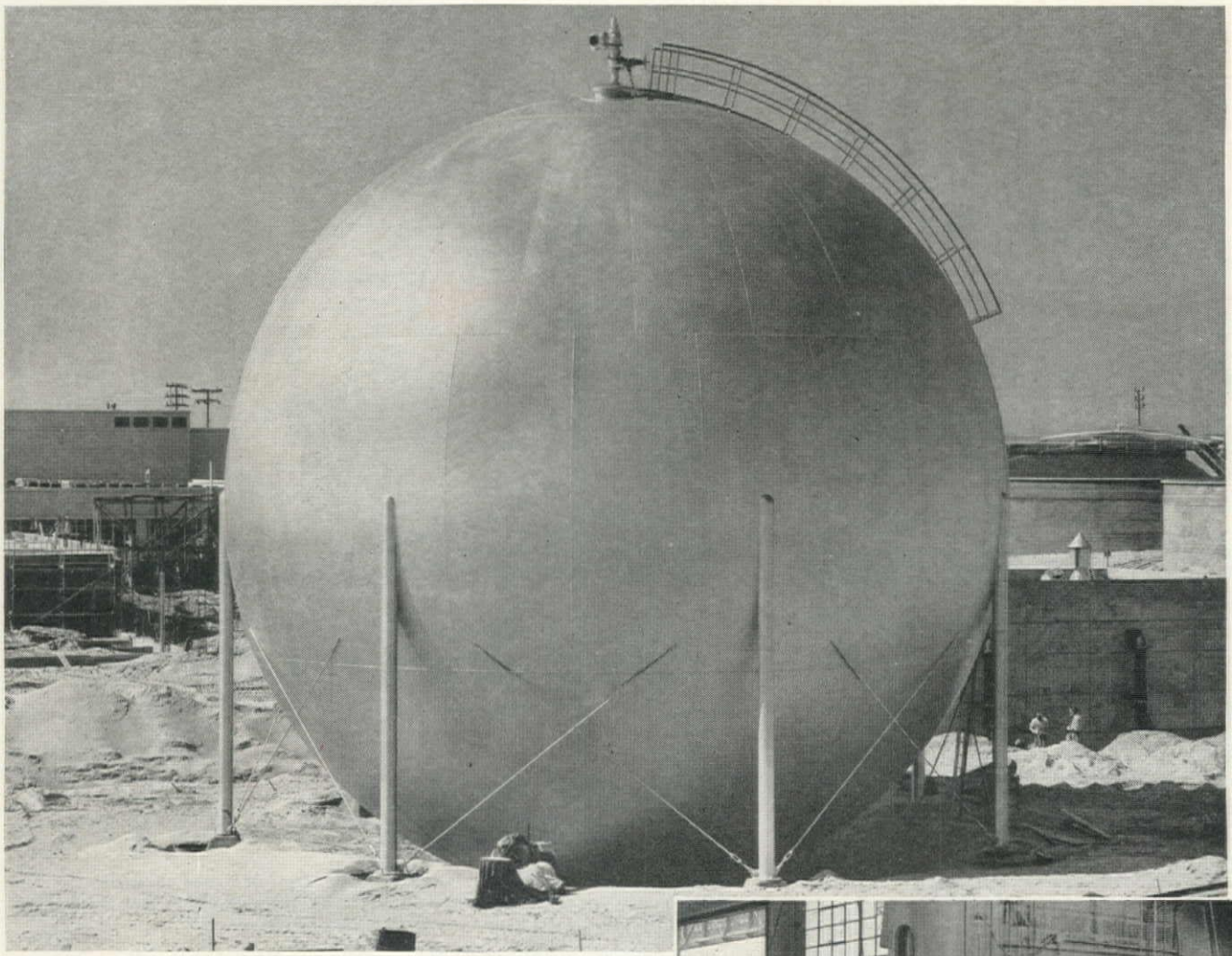


Hortonsphere cuts fuel costs at Hyperion sewage plant

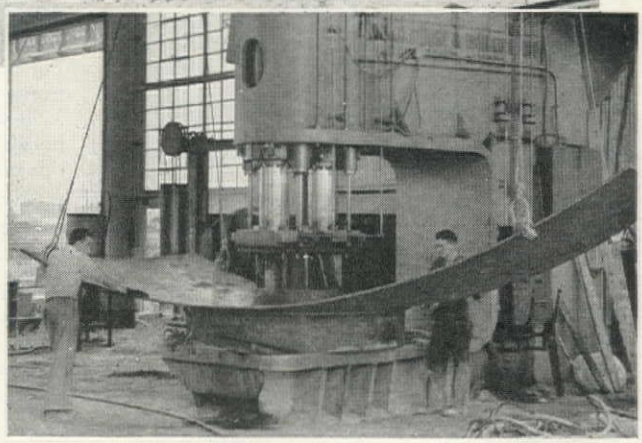
The new Hyperion sewage treatment plant in Los Angeles will keep fuel costs low by storing and using digester gas instead of wasting it.

Sewage gas from the digesters will be one of the fuels used in drying sludge by heating. It will also be the basic fuel for nine 1000 h.p. dual-fuel engines.

When the digesters produce more gas than is used, the surplus will be pumped into the 67-ft. 6-in. Hortonsphere shown above. When the demand for gas exceeds the supply, the reserve in the Hortonsphere makes up the difference. Thus . . . in either the dryers or the engines . . . low-cost, by-product gas will be used instead of purchased fuel.

Although operating data is not yet available from the Hyperion plant, here's what other cities have saved by using digester gas stored in Hortonspheres: Cleveland, $6,500 in one year; Sheboygan, $26,063 in seven years; Duluth, $10,105 in one year.

You can't afford to ignore savings like these. Write our nearest office for information on how a Hortonsphere can help you lower costs by using digester gas.



This view shows one of the plates for the 67-ft. 6-in. Hortonsphere which we built for the Hyperion Sewage Treatment Plant at Los Angeles being dished at our Salt Lake City plant.

The Hortonsphere is used for storing highly volatile liquids as well as gases. Examples of volatile products stored in Hortonspheres are butanes, the more volatile grades of natural gasoline, anhydrous ammonia, isoprene, and isobutylene.

CHICAGO BRIDGE & IRON COMPANY

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Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

WESTERN CONSTRUCTION

August 1950 Vol. 25, No. 8

Prevent, Don't Cure, Highway Slides

SIDE SLOPES for highway cuts are usually designed to provide the natural angle of stability for the excavated material. The steeper the angle the more the saving in yardage of excavation, and frequently moisture holds the key to the final slope. In the past most of the attack on the moisture problem has been confined to ditching at the top of the slope to reduce infiltration, and along the roadway to remove seepage. Then, if and when movement or slides developed, time and money were required and inconvenience to traffic was involved in applying corrective measures. Through this process much has been learned in the theory of earth slides and the equipment and procedures helpful in handling moisture problems on existing highways. Some of these are reviewed in this issue. But, emphasis seems to be directed to the remedy rather than the correction of the original situation. It has been a case of spending money for "providing an ambulance in the valley, rather than building a fence at the top of the cliff." With increasing knowledge of soil behavior, and the growing accumulation of field information on the curing of slides after they have occurred, it would seem proper to give more thought to the removal of the causes of slides when highways are being built.

"For All the People . . ."

NATIONAL PARKS and Forest areas have long been hailed as the recreational areas for all the people of the country. They also represent areas which provide important run-off for the rivers of the West, and include an occasional reservoir site. In these cases the slight marring of pristine grandeur for "all the people" must be balanced against the life and progress of a community or area in this region. Only recently the *New York Times* has voiced concern over use of such a reservoir site as drawing an issue between "immediate material benefit and the long-range, intangible interest of the nation." The conflict of interests can never be completely answered, and the East should remember that there are equally ardent conservationists in the West. Each case involving a reservoir in a Park or Forest must be considered individually. Years ago, the building of Hetch Hetchy dam was pointed out as the beginning of the end of Yosemite Park, but not more than one in one thousand of the visitors talked about by the *New York Times* even knows of its existence. In the meantime the storage is providing a water supply essential to the life and growth of San Francisco. Many Western communities may be faced with the need for a reservoir on Federal property. These requirements cannot be lumped together and ruled out by a starry-eyed slogan. The future of the West is too important.

National Water Policy—and the West

THE WEST occupies a peculiar—possibly a defensive—position in relation to the present emphasis on establishing a national water resources policy. In its assignment to lay out such a policy the commission appointed by the President has been receiving opinions and comments from many sources. One report that will probably be acclaimed, without helping the commission toward a solution of Western problems, is a formal and thoughtfully worded statement from Engineers Joint Council. This report tends to review points that have been well understood and appreciated for years by Western engineers concerned with water resources. The report is warmed-over substance and its conclusions, while true, are as obvious as they are ancient. When the statement opens with the premise that "evaluation of a project is a first requirement," the theme is set for platitudes.

A prominent section of the report relates to Federal inland waterways. The subject is as old as railroads, and actually, it relates more to a national transportation policy than to water. Again, the Council discusses economic feasibility at length, bringing out all the time-honored criteria for appraisal. The comment that any rivers and harbor bill "is not the wisest expenditure of public money" is a typical truism of the EJC report.

One of the matters worthy of the Council's attention was its pointing out the lack of planning and coordination on the Missouri River Basin program. The Council stopped short, however, of its one opportunity for a firm conclusion that Valley Authorities represent an unwanted and unnecessary expansion of Federal control over water resources.

Strangely enough, the Council failed to point out the basic fact that there cannot be a complete national water resources policy, if that means a policy that can be applied to all parts of the country. Of course, any report can reaffirm the sound philosophy that municipal and domestic water needs surmount all others. But whether agriculture in one state is more important than industry in another or flood control in a third cannot be resolved by a national formula. Water means one thing to New York City, another to the Mid-West, still something else to Florida and none of these concepts would be applicable to the West. To set a policy which applies a common set of values to national sources of water supply is next to futile.

What is feasible for New England with its static economy does not apply to the West. Projects which were considered infeasible yesterday may hold the future of the West. Many voices proclaimed Hoover Dam as an extravagance, whereas it has proved to be a foundation stone for the development of this region.

In this region, where growth is well above the national average, it would be fatal to apply a fixed national water policy, particularly when the West has more water problems than exist elsewhere in the country. The report of Engineers Joint Council provides no basis for a proper national attitude toward the water resource problems of the West.

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Extra performance which increases profits by doing the work faster and better, and reducing investment in part-time equipment. All-Wheel Drive and All-Wheel Steer handle either a front- or rear-mounted attachment with no sacrifice of operating efficiency, where ordinary graders—handicapped by a dead front end and lack of rear steer—would be helpless through loss of traction or directional control.

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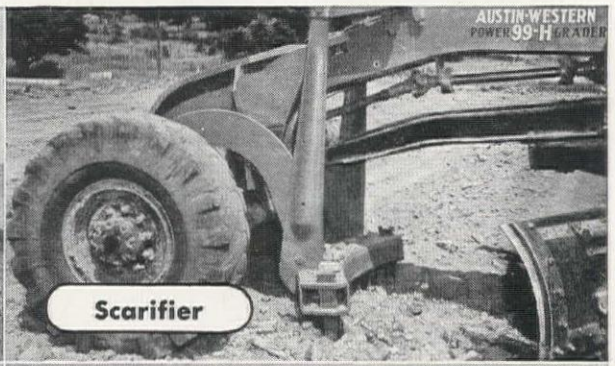

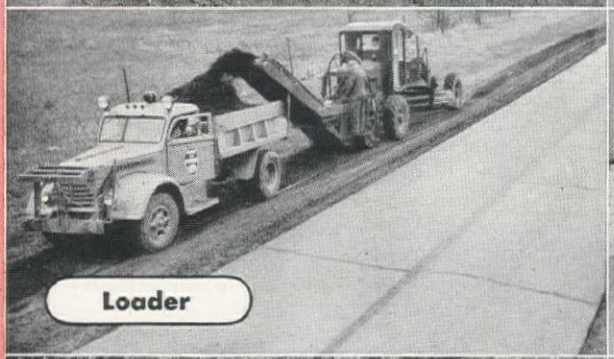

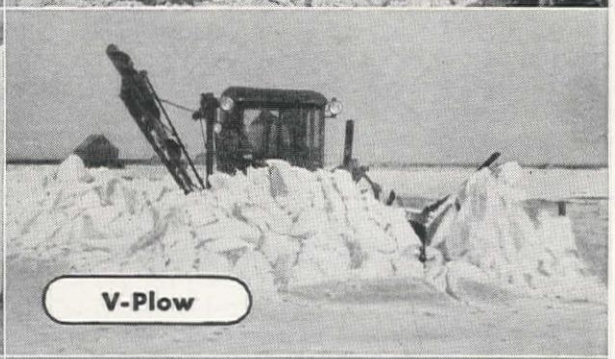

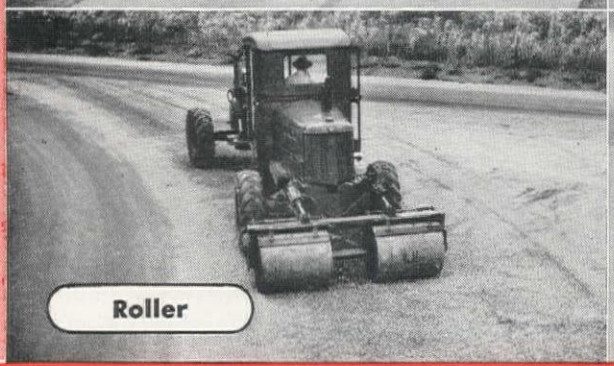

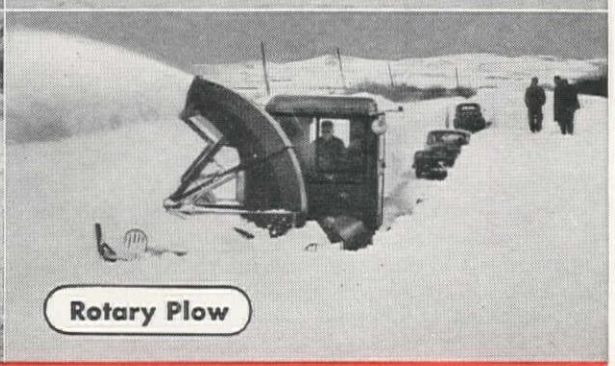

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22-Story Addition Rigidly Tied to Existing Building in San Francisco

Rigid connection poses an unusual foundation problem—Inflexible tie effected by shooting 10-in. layer of gunite over entire wall, with reinforced window openings acting as shear keys

RIGIDLY CONNECTED to the original building the 22-story addition to the Standard Oil Building in San Francisco involved interesting design problems and developed several unusual construction procedures. The new 68 by 137-ft. wing carries out the identical architectural treatment of the original L-shaped building and adds 52% to the floor area. No provision had been made in the original building for any extension, but additional office space was required and the additional land for the new wing was purchased in 1938. Construction contract was awarded to Swinerton & Walberg Co., San Francisco, and work was started at the site June 1948. Several floors have already been occupied and present plans call for complete occupancy about September.

Although the matter of architectural similarity and the provision of corridors through the existing wall required considerable study, the problem of foundation design and connection between the old and new structures represented the feature of outstanding engineering and construction interest. Located at Bush and Sansome Streets the site is near the old, original shore line of the Bay, and has been long conceded to be an area of difficult foundation problems. Settlement records on existing buildings and the logs of many foundation test borings have been compiled by San Francisco engineers for many years, to provide basic information available for all property owners and designers faced with this type of problem.

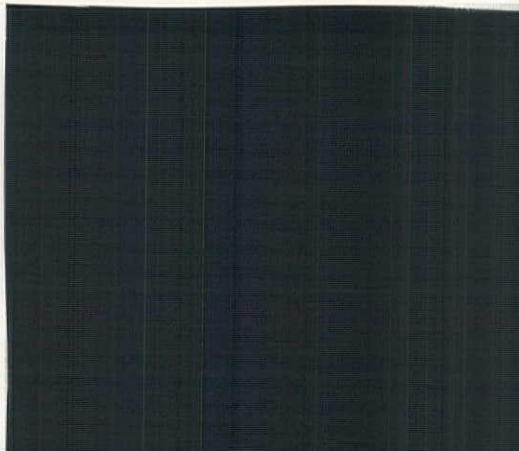
Solving foundation problems

At this particular site the test borings showed several layers of sand-fill, saturated sand, loam and clay on top of the bedrock, which had a depth varying from 145 to 185 ft. As a result the foundation design was selected as a reinforced concrete mat covering the entire area of the new wing, similar to the foundation under the original building. This mat is stiffened by heavily reinforced concrete ribs, 8 ft. or more in depth, which occupy about 80% of the mat area, and extend from wall to wall in both directions.

Work on the foundation can best be reviewed briefly, before outlining the general design problem relating to final settlement and the structural steel frame. Bottom elevation for the mat was established at 26 ft. 7 in. below curb line, for the front and rear sections. This elevation is practically at mean sea level. In the center of the area, where the elevator pits are located, the mat lowers to a depth of 37 ft. 9 in. This required a mat representing three distinct sections which had to be designed and constructed to function as a continuous structural element.

Excavation for this foundation was preceded by driving steel sheet piling (see illustration) around the three sides of the site to depths of about 10 ft. below the bottom of the mat. This permanent feature is similar to that used on the original building and not only tends to confine and improve the supporting material, but also minimizes the effect of moving water on the sand and clay. Piling was driven 1 ft. inside the property line.

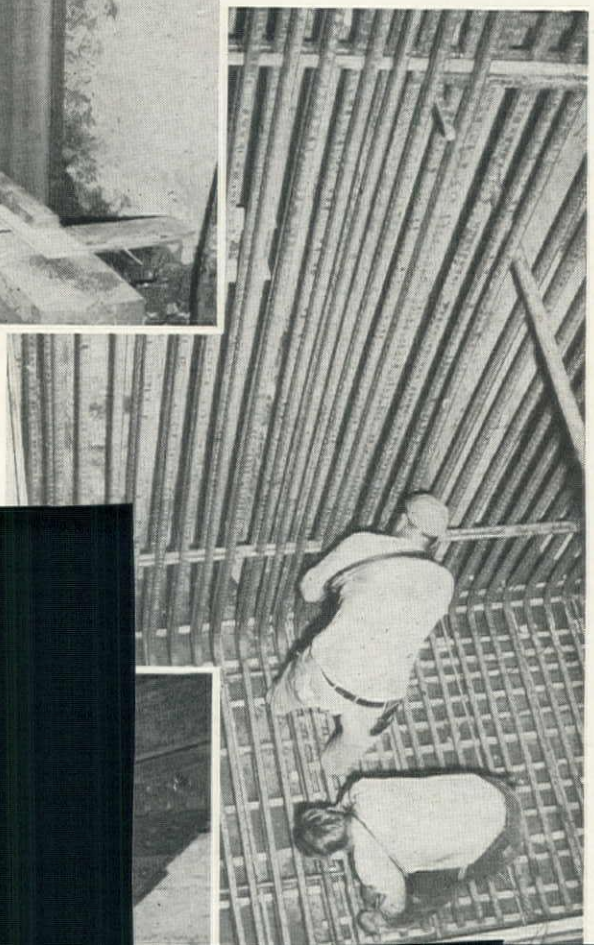
With the work of driving this sheet piling, went the underpinning of two adjacent buildings on the west and south sides of the lot, as well as the street and part of the existing Standard Oil building. Underpinning proceeded with the usual steps of excavating under 8-ft. sections of the old walls to a depth 2 ft. below the bottom of the new mat, pouring a new footing of high-early-strength concrete, preloading this new footing,



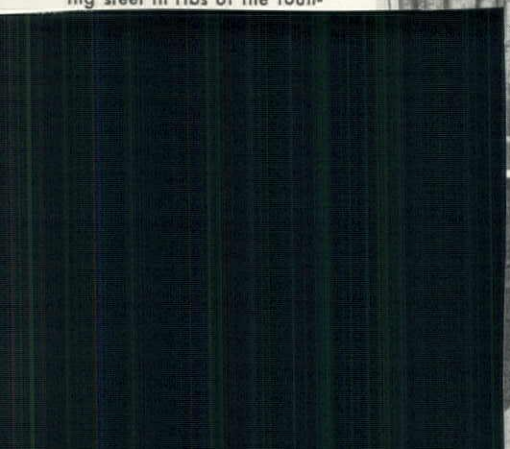
STRUCTURAL STEEL in place. As frame work advanced, terra cotta was removed from the old wall and window openings were prepared for the final connection.

COMPLETED steel work viewed from rear of building, with some concrete in place. Convenient open area at rear was available for delivery of concrete by mixer trucks.

STEEL SHEET PILING driven at the sides of the excavation to depths of about 10 ft. below the foundation mat confine the supporting material and minimize the effect of moving ground-water.



A HEAVY MASS of reinforcing steel in ribs of the foun-



and then completing the new foundation. This exacting operation was carried out on a two-shift basis over a three-month period.

Complicated foundation work

Plans of the contractor for constructing the mat in sections were based on the need for a central section of the concrete of sufficient weight to hold the shoring as the excavation proceeded. This program was further complicated by the foundation design which provided for continuity of reinforcing throughout the entire mat. The heavy layers of bars had to be extended outside the sections, as they were poured, and then be welded to the bars in the adjoining section. The size, locations and the sequence of the pouring of these sections were determined through a series of conferences and plan-discussions attended by representatives of the contractor, consulting engineer and the owner.

Final decision was to excavate for the lowest mat, under the elevators, and pour a double rib 6 ft. wide and 19 ft. high from side-to-side of the site. Using this as the key support for the shoring, the excavation was continued, section-by-section, to final grade. At this lowest level, water was encountered in greater quantities than anticipated and the contractor elected to pour a 4-in. concrete slab on grade to seal off the water and provide a firm foundation for supporting the tons of reinforcing steel. This concrete floor was an important aid in all work done in the foundation area.

Contractor for the reinforcing steel decided to provide and erect structural steel support for the heavy mass of reinforcing steel in the ribs of the mat. Some of these ribs have as much as three layers of 1¼-in. bars at 4-in. centers (see illustration).

Concrete in this area below street level was poured from truck mixers spotted at both ends of the area. Total concrete in the foundation was about 3,200 cu. yd.

Settlement provisions

Closely associated with all elements of the foundation construction was the more general problem of loads, antici-

of this concrete was 103 lb. per cu. ft., and resulted in a total weight saving of about 8,000 tons in the super-structure, and another 2,000 tons in the foundation.

Even with this weight saving, every available square foot of lot area, including 15 ft. under the sidewalk on Bush Street, was utilized on mat footing to keep the soil pressures comparable to those under the existing building.

Provisions for immediate settlement, under the weight of the dead load on the foundation, included the setting of the initial grade 2 in. high. Where the old and new basement walls came into direct contact, oiled plywood was placed to eliminate any bonding and allow the new foundation to take its designed settlement as the load built up.

Frame design and erection

The building was designed for a lateral force of 2% gravity, with 1% carried in the frame and 1% in the walls. As a result this is one of the few tall, structural steel frame buildings in San Francisco to have structural concrete walls. Architectural design calling for high windows on the Bush Street side did not permit any concrete wall below the third floor, and the columns were strengthened and provided with a heavy portal bracing to carry the entire 2% lateral load in the frame.

The main steel frame was designed to provide beams at levels permitting horizontal exterior lines to match up with existing building. An unusual design feature was the use of special "double corner columns" (see illustration).

Columns in the lower floor are 14-in. H section with cover plates and weigh about 6 tons each. Main columns progressively reduce in size up in the building. It is interesting to note that these modern, heavy rolled columns compare to built-up members consisting of columns with 1-in. flanges plus two cover plates on each flange each 1-in. thickness in the old building.

The special design of the corner columns resulted from an architectural requirement of the facing (rounded corner) which did not permit a single column to be placed on the line of the wall columns. These corner columns could have been moved in about 5 in. to put them on line, but space in the building was too important. As a result the double column (see ilustration) was developed.

All steel was erected by two derricks which were "jumped" up in two-floor moves, which required about 2 hr. of moving time. One derrick picked up steel from trucks on the street at the front of the building and the other took delivery from trucks in a parking lot at the rear, which was leased to provide working area. A total of 3,600 tons of structural steel was placed in the frame.

Concrete work

All structural concrete was of the light-weight type, as stated. This included the 5-in. floor slabs and the walls, which resulted in a concrete pour for each floor amounting to about 380 cu. yd.

The additional forming as well as the added concrete resulted in a 10-day pouring schedule per floor (typical 4th to 18th) as compared to a normal of 4 days for usual brick-wall design. The contractor elected to use wall forms similar to those used for a reinforced concrete building, and these caused considerable comment, when used with this steel frame. They were of modified slip-form type and were lifted from floor-to-floor in panels.

THE COVER—

STEEL-ERECTING CREWS swing a beam into place at one of the lower floor levels. Two erection crews of nine men each handled this work for American Bridge Co.

Concrete handling followed conventional procedure. Delivered in 6-yd. mixer trucks in the open area at the rear of the building, it was raised in a 1-yd. bucket, discharged into a receiving hopper and then buggied to point of pour. The light weight of the aggregate reduced the poundage in all of these operations.

The exterior frame and all of the interior columns were given the usual 2-in. fireproofing, with the light-weight concrete. Interior beams and girders were fireproofed with 2 in. of gunite, applied without forms, following the outline of the steel member. Weight of this gunite about equalled that for light-weight concrete placed in the usual forms, but represented considerable saving in time and form work. Actual weight saving was probably about 25 lb. per lin. ft. of beam.

Effecting the rigid tie

After the steel frame was up and most of the concrete poured the major part of the dead load was imposed on the new foundation and the tie to the old building was made effective. As the frame had advanced the terra-cotta had been removed from the old wall and the window openings prepared. The new openings for the corridors were placed.

The solid, and inflexible tie between the buildings was then effected by shooting a 10-in. depth of gunite over the entire wall and into the old window openings. These window openings of 13-in. depth were heavily reinforced and acted as shear keys in relation to any tendency for movement between the old and new wall. This tie also prevents any movement between the two sections caused by possible unequal future settlement.

As a further tie between the structural frames the old columns were uncovered on the top floors and the new columns were banded to them with reinforcing steel before the gunite encasement was placed. This design feature was introduced to prevent any possibility of the old and new buildings taking on seperate periods of motion in case of earthquake.

Facilities provided in the building, in addition to usual power, lights and plumbing, include cooled drinking water, vacuum cleaning system and forced ventilation. All ducts, except for ventilation are laid on the structural concrete slab and covered with a 2⅜-in. of lightweight (80 pct.) concrete and topped with ⅝-in. normal cement finish.

The fresh air system will supply the building from an intake at the 3rd floor level and the storeroom floor between the 18th and 19th floors. On the 18th floor and in rooms having no outside windows, complete air conditioning is provided.

The exterior is granite from the sidewalk to the 4th floor on Bush Street. Above this level, and on the exposed side the facing is terra-cotta with a "granitex" glaze. The rear court wall will have a glazed brick exterior. In the interest of architectural unity the granite and terra-cotta were prepared by the same companies and following the same methods used to produce the facing materials for the original building.

Personnel

Thomsen & Wilson were architects with J. E. Stanton of Los Angeles, consulting architect.

H. J. Brunnier, consulting structural engineer of San Francisco, carried out the structural design. Thomas B. Hunter handled the electrical and mechanical designs. Dames and Moore made studies of the foundation conditions.

General contract was carried out by Swinerton & Walberg Co., San Francisco. A. B. Smith was in general charge and C. H. Brown, superintendent.

Structural steel was supplied and erected by American Bridge Co., under the direction of J. R. Fox, contracting manager.

Oil Made Radioactive To Trace Flow in Pipe

ONE OF THE FIRST commercial uses of atomic energy in American industry involves the use of radioactive tracer materials in the transmission of oil products through a pipe line now under construction from Salt Lake City to Pasco, Wash., by the Standard Oil Co. of California. The radioactive material, produced in the Atomic Energy Commission laboratories at Oak Rridge, Tenn., is being used to determine the "interface," or dividing point between shipments of various products.

The radioactive material, diluted by thousands of times its volume of oil, becomes a tracer liquid, and this is the form in which it is used in the pipe line.

Each time the firm's Salt Lake pump station changes the product being pumped through the line, a fraction of an ounce of diluted tracer liquid is added to the oil stream between the two products. As the junction of the two products moves along the line, the tracer moves with it. At each point where products are delivered sensitive instruments, using Geiger counters attached to the pipe, respond to the arrival of the tracer. From these instruments, the operators know when one product has completed its arrival, and when to change the stream to another tank.

Semi-Permanent Dams of Brush, Rock and Rails

Easily obtainable materials used for unique diversion weirs on the Gila River in Arizona with costs ranging from $2,200 to $34,000—The dams have proven their ability to withstand heavy flood flows and are easily repairable

By W. E. ANDERSON
Engineering Specialist
U. S. Soil Conservation Service
Tucson, Ariz.

MORE DEPENDABLE irrigation diversions have been assured to some 22,600 ac. of farm land in the Safford Valley of Arizona through the recent completion of a series of unique diversion weirs across the Gila River. While not of completely permanent construction, these weirs might be classed as semi-permanent. They have proven their ability to withstand reasonably heavy flood flows with little damage and to be readily repairable with local facilities when maintenance is required.

The Safford Valley was first irrigated by settlers in the early 1870's. Individual and small-group ditches soon served most of the irrigable land, and separate headings for all these ditches have been generally maintained. Early diversion works were sand and brush dikes built out into the stream. Later these were enlarged to structures of 4 to 5 ft. in height and extending entirely across the river. Work on the diversions was largely performed by the farmers themselves, using teams for power.

Floods destroy Valley's dams

Recent changes in the farming patterns of the area, however, have eliminated almost entirely the use of teams. Enlargement and mechanization of the farms have resulted in a situation where the time of the farmer is too valuable and too necessary on his own operations for him to engage in the old-fashioned method of physically working together to rebuild and repair flimsy diversion dams after every small freshet in the river. Furthermore, modern farming operations and high-cost farm machinery have made the farmer reluctant to endanger his equipment by working it in the river.

On the other hand, rising labor costs have made it difficult for the small ditch companies to hire labor for the maintenance of the structures, while rising farm yields and high returns from crops have generally increased the loss that was suffered by individual farms because of water shortages when water could not be diverted. Damage to the light temporary diversions became more and more frequent and repair costs higher and higher for all of the ditch systems in the valley.

Following a severe flood in the spring of 1949, which obliterated practically all of the canal headings in the valley, the Gila Valley Soil Conservation District was approached by a group of the ditch companies with the request that an attempt be made to construct more durable structures to replace those which had been washed out. Seven ditch companies were represented, with irrigation acreages served ranging from 870 for the smallest to 7,400 for the largest.

The 1949 spring floods were quite unusual and the flood peaks had been exceeded only once in the past thirty years. The flood destroyed all but two of the diversion dams which supplied water for irrigation in the entire Safford Valley. Coming right at the start of the 1949 irrigation season, the various ditch companies were faced with a serious problem in replacing the dams and at the same time supplying necessary irrigation water to maintain crops on the farm lands of the valley. A particularly complicating factor in the problem was the division of the valley into many relatively small areas, each of which was served by a separate diversion dam.

Organizational problems

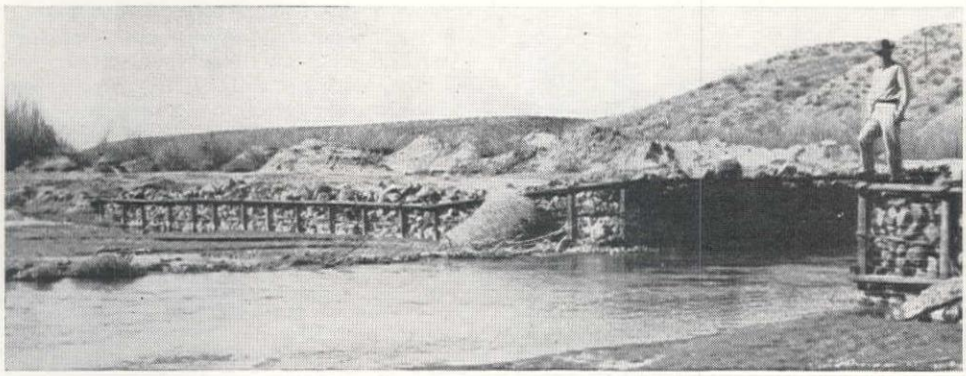
The situation in the valley is such that consolidation of the many canals and dams into a single system would be difficult at best, and impossible under emergency conditions. In view of the relatively small size of the units involved—the largest canal in the valley serves an area of only some 8,000 ac.—and the fact that there are no resident engineering concerns in the locality, the farmers who comprised the mutual ditch companies were faced with a difficult problem in designing and installing the dams. The largest construction agency was the Gila Valley Soil Conservation District, an independent agency organized under provisions of state law and which had been assisting the farmers for a number of years in their construction problems.

Engineers of the U. S. Soil Conservation Service assigned to assist the district in preparing plans for the structures investigated the possibility of constructing permanent diversion works, but soon came to the conclusion that the relatively small acreage involved could not economically justify the construction costs.

No debt desired

In addition to the high total cost for permanent diversions, there existed the possibility of a complete reorganization of the irrigation systems within the valley along lines that have been laid down by the U. S. Bureau of Reclamation and the U. S. Army Engineers. These plans would not fit in with the establishment of a number of permanent diversion works. Furthermore, the farmers of the valley are traditionally thrifty and have been trained by their Mormon leaders for generations to operate on a cash basis and stay out of debt wherever possible. They were not in any way receptive to the possibility of bonding or otherwise financing the construction of permanent dams that could be amortized over a number of years. Accordingly, the engineers turned their attention to the consideration of all possible methods of constructing semi-permanent, fairly low-cost structures that could be built largely of materials available locally and that would be of such type of construction that extensive damage would not be a possibility, but on which repairs could be readily made in the event some damage was incurred.

It was important that design of the structures be such as to permit rapid



CANAL INTAKE at one of the completed weirs, above. Left abutment of the weir is out of picture in foreground. AT RIGHT, view of wing wall during construction. Cables are stretched with tractors and hoists. Heavy rock backfill has not yet been placed.

closing of any breaks by use of local unskilled labor and with a minimum of construction equipment, as there are no general contractors operating in or near the valley who are experienced or equipped to make emergency repairs on this type of structure.

Design studies

Hydraulic designs of the structures as finally adopted were complicated by a number of factors, mostly dealing with flood flow requirements. Entrenchment of the river was such that it was necessary to raise the water's surface as much as 5 ft. in some cases to permit diversion of full-supply streams into the canals. At the same time, however, the reduction of channel capacity by a structure of this height was enough to materially reduce the ability of the channel to carry peak flood flows. Study of flood hydrographs and stage discharge relations, however, revealed that a flood exceeding 15,000 to 18,000 sec.-ft. would be out of the banks of the stream at many points. Since the ditch headings were generally located where the river bed and lower flood plain were quite wide, it was possible in all cases to design the weir sections to safely pass flows in excess of this amount without raising the water surface to a point where additional flooding of farm lands would occur.

Primarily, investigations of the problem by Soil Conservation Service engineers indicated that adequate diversions of a permanent type would range in cost upward from $250,000 each, with the final figure depending on several factors which varied from site to site. The necessity of constructing the diversions in a less expensive manner eliminated all consideration of permanent structures of this type. Physical conditions at the various sites were generally somewhat similar, the river being confined between earth banks ranging up to as much as 10 ft. in height and having a bed of boulders and coarse gravel, many feet in thickness. No solid rock was available, and the gravel beds extended downward some 60 to 80 ft., at which point heavy clays were encountered.

Alternative plans

Possible alternative methods of construction that were considered consisted of sheet pile cut-off and bulkhead walls braced by wales and other anchorages, concrete gravity walls, and several other similar types of construction that are generally familiar in engineering circles. There was included careful consideration of the "beaver dam" type of structure that is commonly used in more eastern streams. Materials considered ranged from timber to concrete and steel. Availability and/or durability of materials and material cost soon eliminated most alternatives. It was quite apparent that with the deep alluvial bed the site was particularly adapted to construction based on piling. Several alternatives considering the use of this type of construction were studied. It was generally felt that locally available equipment and labor would be more suited to work that involved the use of piling than for most other types of construction. And accordingly, tentative plans were worked out.

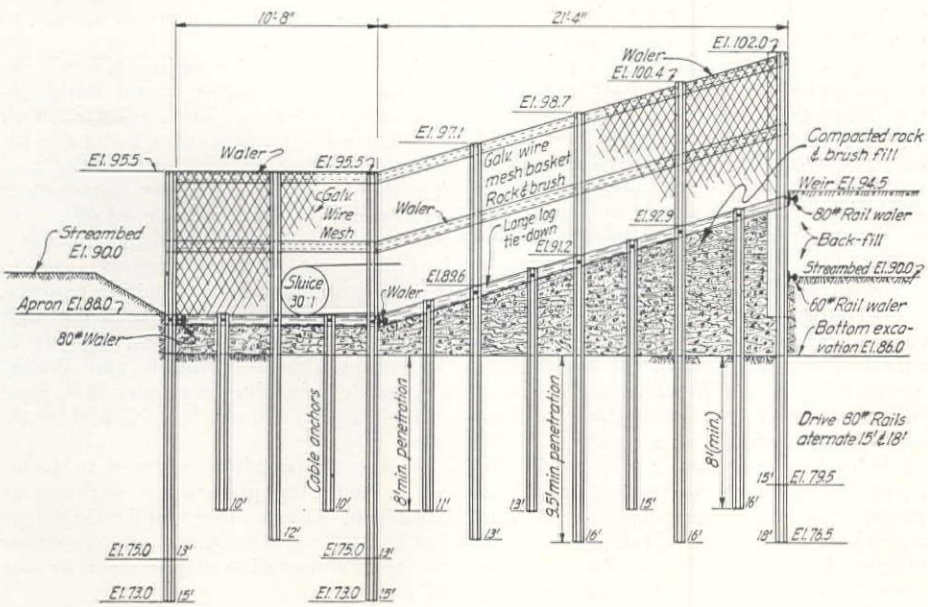
Final design features

Final designs as evolved provide for the establishment of a weir section retained in place by rail piling driven at 5-ft. centers and filled with a heavy rock fill which is supported by a brush mattress at the bottom and covered by a brush mattress on top for the purpose of retaining the rock and preventing its raveling under high flows. The brush blankets in turn are held in place by a close network of steel cable which is clamped to the top of the retaining piles. Wing walls and training walls of similar construction are provided. These walls are faced with heavy mesh wire for the purpose of retaining the rock fill and are anchored back to "dead men" at frequent intervals.

The length of weirs varies from 280 to 810 ft., while the height ranges from 3 to 7½ ft. The width of the weir cross section in direction parallel to the stream is generally 50 ft., which provides a very stable section and permits the installation of a 20-ft. level apron at the downstream end of each structure.

Wing and abutment walls are carried an additional 50 ft. as a minimum before being turned back into the banks. Piling in all cases is composed of used railroad rail of from 50 to 110-lb. section, and is driven by swinging leads on a dragline

TYPICAL SECTION OF A "BRUSH AND ROCK" WEIR



LOOKING UP the Gila River at one of the diversions. Weir crest is across center of picture; canal intake section is to right. Spillway apron is submerged 4 ft. under pool in foreground.

owned and operated by the Gila Valley Soil Conservation District.

Lengths of the rails vary from a maximum of 22 ft. to a minimum of 10 ft. in some protected locations. Wales are welded and clamped as required, while mesh wire for the retention of fill is tied on the inside face of the rails. Additional support is given in many cases by heavy cables that are stretched in place by means of a hoist and tractors. Construction work in general is carried out by force account. This manner of operation was adopted because of the difficulty of breaking the job down to permit ready estimating by contractors. Certain portions of the work were sublet on a contract basis, such as the placing of rock back-fill, etc. But most of the work, including driving of the rail piling, is performed by construction crews supervised by the superintendent of the ditch companies.

Considerable difficulty was encountered in disposing of inflow water, and minor floods in the river caused several interruptions in the work. However, the additional costs imposed by these difficulties were not excessive and permitted the early completion of the project.

The rate of inflow into the excavation varied considerably between the different dams. The minimum inflow was only some 500 gal. per min., while maximum rates were 3,500 gal. per min. In most cases fill pumps were able to handle the inflow in a satisfactory manner. In several instances the river grade was such that a small channel could be excavated in the bottom of the river, downstream from the dam, and this would be adequate to drain off nearly all of the water which flowed in. Since it was not possible to excavate the channel deep enough to reach the bottom of the excavation, there was a certain amount of pumpage required in all cases.

Five dams for $160,000

Complete costs of the various dams have not yet been tabulated. However, they range from a total of approximately $2,200 for the least expensive to approximately $34,000 for the largest. Total construction cost on five of these dams was about $160,000.

Funds for construction of the dams were provided from various sources. The Production and Marketing Administration of the Department of Agriculture participated in the project through the pooling of individual payments which would otherwise have gone directly to the farmers. Total funds obtainable in this manner approximated $80,000, though the exact figure is not yet available. It should be noted that these funds represented almost a direct cash contribution on the part of the individual farmers, as they would have received these payments themselves had they not been pooled and used in the group project.

The Gila Valley Soil Conservation District assisted in all of the projects through the loan of equipment and through making engineering and survey time available on each project. The various ditch companies themselves raised the balance of the necessary money by assessment of their individual water users.

A typical dam with a total cost of some $35,000 would use the following major items: rail and steel sections, 160 tons; heavy mesh wire, 25,000 sq. ft.; excavation including channel structural and new approach canal sections, 32,500 cu. yd.; quarry rock, 4,000 cu. yd.; cable, 24,000 ft.; and other minor materials such as steel strap, iron tie wire, clamps, etc. Materials for such a job would cost approximately $15,000; equipment rental would be approximately $7,500; and labor cost would be approximately $12,500. However, a part of the labor charges would be represented by equipment operation, and probably in a final analysis of the cost would be represented in an increased equipment rental figure.

An interesting note on the job is that the driving of the rail piles began at a cost of approximately $4 apiece, but through organization of the crews this figure was whittled down to slightly over half that figure. A part of the pile driving was contracted at a figure of $3.50 each but the contractor was unable to meet the cost represented. It should be noted also that particularly favorable material prices were obtainable due to efficient local organization. Rock for the back-fill was obtained at prices ranging from $1.50 to $2.50 a yard, dumped in place. Some rehandling was necessary within the structures themselves. Average price for rail on the job was approximately $50 a ton, and it was possible to obtain adequate quantities at this price.

Dams of this type were recently completed for the Brown Canal Co., Union Canal Co., Graham Canal, Smithville, the Dodge-Nevada and St. Thomas Consolidated. M. H. Wallace of the U. S. Soil Conservation Service, District Conservationist, generally supervised the construction of the various projects and coordinated the efforts of the various agencies and individuals concerned. E. W. Scott, District Engineer, was in direct charge of the construction activities. J. David Lee of Safford, Ariz., represented the Production and Marketing Administration, which furnished a material amount of the funds. Maroni Larson was chairman of the board of supervisors of the Gila Valley Soil Conservation District. Details and designs of the projects were prepared under the supervision of the author.

2,175-Mi. Pipeline Planned From Texas to the Northwest

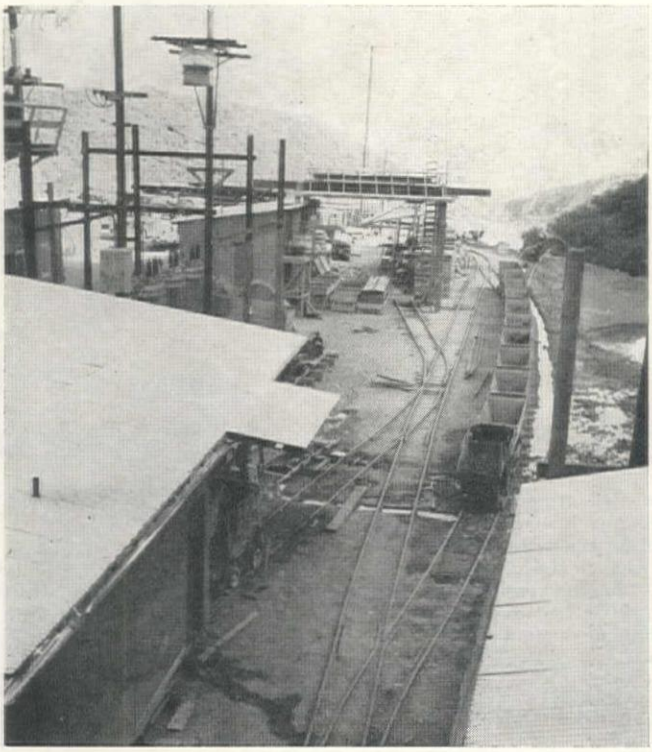
PACIFIC NORTHWEST Pipeline Corp. has applied to the Federal Power Commission for authorization to construct a 2,175-mi. pipeline system from southern Texas to the State of Washington to bring natural gas to the Pacific Northwest for the first time. The proposed project estimated to cost $174,186,602, would link the Texas gas reserve areas with gas fields in Alberta, Canada, to meet the requirements of the Pacific Northwest markets, including Vancouver, British Columbia.

The application says the main 26-in. Texas-to-Washington line would have an initial delivery capacity of 250 million cubic feet per day. The company also proposes to purchase approximately 100 million cubic feet daily at or near the U. S.-Canadian international Boundary between Idaho and Canada through a lateral line extending from a point on the proposed main line northeasterly to Eastport, Idaho.

In addition to the main 2,175-mi., 26-in. line, the company would build approximately 400 mi. of 22-in. and lesser size lateral lines necessary for the gathering, distribution and sale of the gas. Total installed compressor horsepower of the main line would be 83,200, consisting of 13 stations of 6,400 hp. each.

The proposed main pipeline system would originate in the Wharton County, Texas, area and would extend through Texas, Oklahoma, Kansas, Colorado, Wyoming, Idaho, Oregon and Washington, terminating in a sales area near Seattle and Tacoma, Wash., and Portland, Ore.

The company, incorporated in Delaware, lists its president's address as Houston, Texas. The application says the company does not now engage either in the business of transportation or sale of natural gas.



Work Around-the-Clock at Two Headings Puts—

Tecolote Tunnel Ahead of Schedule

TECOLOTE TUNNEL, a major feature of the Cachuma Project near Santa Barbara, Calif., is being constructed by Halvorson Contractors, joint venture firm from Portland and Spokane. A $4,750,455 contract for the 6.4 mi. of boring and lining was let in February, 1950, by the Bureau of Reclamation, and is scheduled for completion at the end of 1953. This article is a review of the field work done to date. An outline of the Santa Barbara water problem and general features of the Cachuma Project was published in *Western Construction*, June 1948, page 105.

Design features

The tunnel is the first large unit started by the Bureau as part of the Cachuma Project and is designed to carry water from Cachuma Reservoir through the Santa Ynez mountains to the heavily populated areas of Santa Barbara County in the south coastal area. The tunnel will have a 7-ft. finished horseshoe cross-section and is to be lined with a 3½-in. minimum thickness of concrete in the hardrock, unsupported bore, and 4 in. minimum in the supported section.

Control valves and a venturi meter are located 850 ft. inside the tunnel from the intake end where they will operate under a 90-ft. head when the reservoir is filled to normal operating level. They are in a gate chamber section adjoining the bottom end of a 120-ft. elevator shaft. A 30-in. gate valve and either a needle or tube regulating valve will be installed under this contract.

The discharge from the south portal will be into a 50-ft. long bend, hatchway and transition section, included under the present contract.

The contractor began preliminary operations on the north portal March 1. By May 10 crews were working around-the-clock at both headings, and the work is proceeding well ahead of schedule. The elevator shaft has been excavated and lined with concrete. At the intake end, waste tunnel muck is being placed in a training dike several hundred feet from the portal. The dike is formed by dumping muck cars from a 16-ft. high timber trestle, and is expected to take half of the 100,000 cu. yd. of waste. The dike is incorporated into the design of the tunnel in order to block the bed load of the Santa Cruz Creek, which enters Santa Ynez River from the north and opposite the intake portal. The creek mouth points directly at the intake portal, and during periods of dry reservoir the dike will prevent debris from being rolled against the intake.

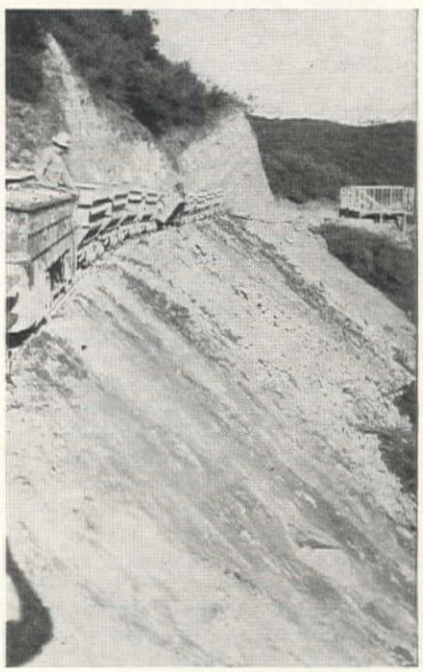
Geology

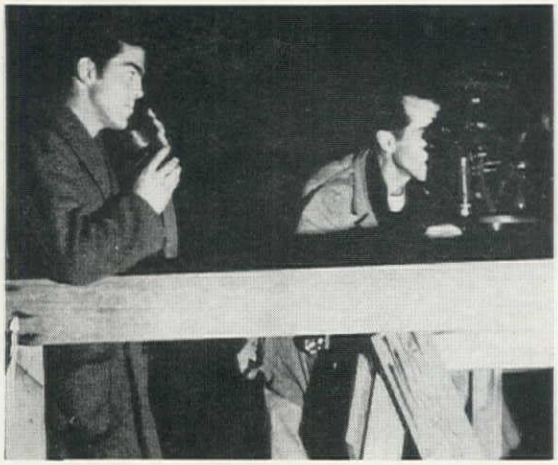
The whole length of the tunnel is in sedimentary formations. At the intake end, from sta. 0 to 27, the material is diatomaceous shale, which is porous and chalky. From sta. 27 to 90, shale; 90 to 190, Anita shale, well cemented and solid; 190 to 210, sandstone; 210 to 300, Cozy Dell shale, very hard; and from 300 to 336 plus 07, the portal, the material is Coldwater and Sespe sandstones, fine grained and tightly cemented. The heading thus far has had to be shot, even in the diatomaceous shale.

Tunnel support consists of 3-in. lagging and 4-in. H-beam ribs on 5-ft. centers, requiring 95,000 lb. of steel. More than 20,000 cu. yd. of concrete will be used for lining, and the contractor anticipates this to be either a Pumpcrete or airgun operation using telescoping steel forms.

With one exception, all operations at the intake end are powered by either

DUMP CARS at the south portal. Tunnel muck will fill a ravine. Field office under construction at right indicates crowded conditions.





LEFT—Survey crews atop lookout tower take night theodolite readings. A walkie-talkie is used for communication. CENTER—Halvor Halvorson of H. Halvorson, Inc.; E. Halvorson of Halvorson Construction Co.; Gordon G. Bawden, project engineer for the contractors. RIGHT—Max T. Hedges, field engineer in charge of construction for the Bureau of Reclamation.

storage battery or compressed air. The muckers use air, and the locomotives use battery power. Only one small power line is available and it is used to power the tunnel blower, a 3,000 cfm. positive displacement blower, to give a constant output at the tunnel face for the 3.2-mi. northern half of the bore.

The south portal is located on the steep slopes of the Santa Ynez range and is reached only by the 1.7-mi. access road included in the contract. About 50,000 cu. yd. of earth was bulldozed from the hillside to make room for operations (see illustration). All power is electric, except the air-powered mucker, and the local electric company established a feeder from a nearby transmission line to the portal. Transformers at the tunnel site reduce the incoming 16,000 voltage to 2,300, 440, 220, and 110 v., all of which are used for light and power.

Because of the small size of the tunnel, the maximum width of cars and locomotives used on the 24-in. track is held to 32 in., where otherwise 40 or 44 in. would be the standard.

Water or oil?

Engineers believe that Tecolote Tunnel will tap underground sources of water that will yield between 500,000 and 5,000,000 gal. per day. From studies of the geology of the area, and the yield of nearby Mission Tunnel, this seems to be a reasonable conclusion. The contractor has tapped no water, however, except nuisance water in the first 30 stations of line. Greater flows are expected to be encountered as boring penetrates farther into the mountain.

Geologists from all over the United States have shown marked interest in the material being mucked from the heading. The tunnel is in part of Southern California's oil producing area, and Western oil companies are greatly interested in finding out the age, condition, porosity, temperature, and other facts about the inside of the mountain. In order to spare both contractor and Bureau of Reclamation personnel from having visiting scientists inside the bore, one of the oil companies has been named spokesman for the industry and is furnished test samples which are shared by all. Rock samples, weighing 25 lb., are taken every shift, or oftener if there is a change in formation.

The Bureau estimates reveal that the holing through will occur approximately in the middle of the tunnel, where line and grade are expected to check within .05 ft. Since accuracy on the 6.4-mi. line is of great importance, a Henry Wild T-3 theodolite, reading seconds of arc directly, is used for precise work. The instrument was used extensively for projecting the tunnel line over the mountain prior to construction. Eight stations were established, up to 1 mi. apart, and sights taken from wooden towers 10 to 20 ft. high for tree clearance. Readings were taken from point to point on successive nights, with an error of closure never exceeding ¼ in. The target used for the Swiss instrument was a lantern box with a ⅛-in. wide light slit.

Daily line and grade for the contractor are given by standard instruments and procedure and checked for accuracy once each month by theodolite readings. The monthly check can be given only on Sunday mornings, on the graveyard shift, when the tunnel crews are not at work.

The survey crews used war surplus "walkie-talkies" for communication when running the first part of the line. These were found to be unsatisfactory for distances over ½ mi., because transmitting power of new batteries was spent after two minutes of broadcasting. The most practical system developed by the crews was a blinker code, using common 2-cell flashlights. Ten sentences were found to be commonly needed during communication. These sentences were each assigned a letter of the alphabet and signaled by Morse code.

The Cachuma Project is a water reclamation program and is the Bureau's first seacoast project. By 1949 estimates it is expected to cost slightly over $34,000,000. The water users will repay the cost of construction within 50 years.

Cachuma Dam, soon to be started, is located on the Santa Ynez River and will be 216 ft. high, built of 6,500,000 cu. yd. of rolled earth and 130,000 cu. yd. of rip-rap. Its reservoir capacity will be 210,000 ac. ft. The South Coast Conduit, fed by Tecolote Tunnel, will be a 28-mi. concrete and steel pipeline, from 24 to 48-in. diam., and with four regulating reservoirs. In addition to the conduit, a lateral distribution system will be repaired to distribute irrigation water to the districts of Goleta and Carpinteria. Local water districts will pay $35 per ac. ft. for municipal water, and $25 per ac. ft. for irrigation water.

Major Equipment at Tecolote Tunnel

- Four 6-ton Atlas locomotives, battery electric
- One 4½-ton Plymouth locomotive, gas
- Two Gardner-Denver 500-cfm. diesel compressors
- Two Chicago Pneumatic 625-cfm. compressors
- Two Sutorbilt 3000-cfm. positive displacement blowers
- One jumbo with two jibs and Ingersoll-Rand 3½-in. drifters and/or Gardner-Denver S-48 sinker drills with downstroke rotation for using augers in soft rock
- One jumbo with two jibs and Chicago Pneumatic 3½-in. drifters
- Six 15-hp. motor-generator battery chargers
- Four Gardner-Denver No. 14 muckers
- Fifty 1½-cu. yd. rocker-type dump cars

Personnel

Emmett R. Crocker is Project Manager for the Bureau of Reclamation at the Cachuma Project Office at Goleta. Richard E. Burnett is Construction Engineer, and Max T. Hedges is Field Engineer in charge of tunnel construction.

Halvorson Contractors is a joint venture firm composed of Carl M. Halvorson, Inc., Portland, and H. Halvorson, Inc., Spokane. Both are sons of E. Halvorson, of the Halvorson Construction Co. of Salem, Ore. Gordon G. Bawden is Project Engineer for the contractor, and Carl R. Post is Office Manager. Carl Nelson is General Superintendent and Jack Stone is Tunnel Superintendent. Walkers are Danny Daggs, Harry Greshuk, John Loveland, and Frank Norton.

A Modern Construction Trend—

Cement Now Arrives in Bulk by Truck

Evolution in the transporting of cement from mill to the mixing plant represents a major development in the construction field during the twenty-five years that the Calaveras Cement Company has been serving this industry

From the pages of *Western Construction* . . . . . Nov. 25, 1929

Construction of Calaveras Flood Control Dam

". . . Cement from the San Andreas plant of the Calaveras Cement Co. is **shipped by freight in cloth sacks** to the nearest railroad point. It is then hauled the remaining 3½ mi. by flatbed trucks which run over the trestle to cement silos directly above the mixers. The sacks are opened as they are removed from the trucks and the cement is dumped through grizzlies into the silos."

THE CURRENT observance of Calaveras Cement Company's 25th anniversary has focused attention upon the many refinements in the production and delivery of cement which have been made during the quarter of a century the company has been in existence.

Of most direct interest to contractors is the marked improvement in delivery techniques. Not so many years ago, contractors specified that their cement be delivered "in cloth sacks in box cars." The above item, clipped from a 1929 issue of *Western Construction*, gives an idea of the complicated procedures involved in getting the product from the mill to the actual construction site.

Today most contractors specify that cement be delivered "in bulk by tank trucks" directly to the job. In many cases the cement is delivered in bulk to a ready-mix plant, and the ready-mix is taken directly to the job. As a result, Calaveras Cement Company now ships nearly 70% of its 7,000-barrel daily output in bulk, and 90% by truck.

Tracing the development

There are many contractors doing business today who remember when cement came only in cloth or paper sacks. The cement packed in cloth was sold under a 10c per sack rebate arrangement provided the bags were returned "in usable condition." In the field these cloth sacks required separate reconditioning, and they were an equal problem when returned to the plant. Cement in non-returnable paper sacks was sold at 20c per barrel less, but as there was no rebate the net cost of cement in paper was actually 20c per barrel more than in cloth.

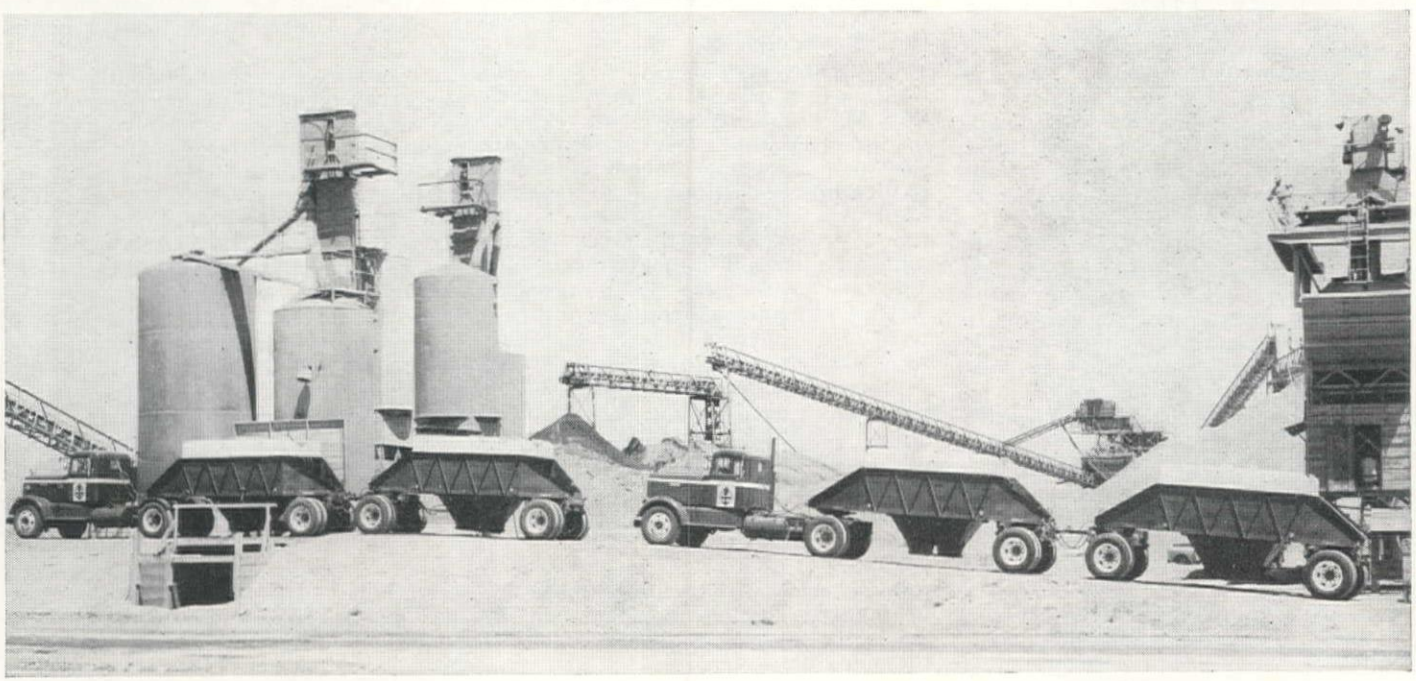
Along about 1933 some of the larger jobs, notably the San Francisco-Oakland Bay Bridge, were set up to take delivery of bulk cement. These jobs required special silos at the batching plant and it was necessary to provide railroad facilities direct to the site. Where these arrangements were made by the contractor, cement then was delivered in paper-lined box cars. Unloading at the point of delivery originally was done by mechanical means, but later was accomplished with pneumatic equipment.

Several years later, some of the smaller off-rail jobs were equipped to take bulk cement. To service them, new transportation facilities were developed. In 1942 Calaveras shipped bulk cement in flat-rack trucks equipped with sideboards; later the company built some sheet metal containers holding from 25 to 30 barrels of cement each. These "tin cans" were open at the top for filling and were provided with a discharge door on the flat bottom. They were loaded four on a truck and trailer, and at the delivery point were lifted by crane and discharged into a bin or silo.

During the war a few railroad hopper-bottom cars, designed in the east for transporting bulk cement, were made available. For a considerable period these were the chief facility for bulk cement delivery.

In 1946 the company ordered two tank trucks built to its specifications for bulk cement. These trucks were designed to haul 60 barrels in the truck body and another 60 barrels in the trailer unit.

Since that time there has been constant evolution in design, and many improvements have been added for loading,



TODAY most contractors specify that cement be delivered by tank trucks directly to the job. Below, Kenworth trucks powered by 200-hp. Cummins diesel engines pull Fruehauf hopper-dump trailers for delivering cement to mixing plant for Delta-Mendota canal construction. Each unit, weighing 30,500 lb. empty, carries 120 bbl. of cement.

THE MILL of Calaveras Cement Co. at San Andreas, Calif. Fleet of side-dump trucks used for quarry work is shown at left. Dual tank-truck units are in center background, and a fleet of the familiar flat-beds is shown at right.

unloading, reduction of weight and lowering of the center of gravity. The latest units, delivered only a few weeks ago, are built with aluminum hoods, butterfly valves and other weight-reducing features which effect a saving of more than 400 lb. for each truck and trailer. This makes room for an additional barrel of cement every trip.

The cumbersome loading operations of the past have been streamlined greatly as a result of the switch to large-scale bulk delivery. It takes only 15 min. to load a dual tank-truck at the Calaveras plant today. On every trip the empty trucks and trailers are spotted on scales for loading. Even the variations in fuel load are recorded before the loading process begins, because a few pounds difference in either direction will have direct bearing on the amount of cement which can be carried as part of the total load. Cement is first loaded in the truck tank and then in the trailer. The truck fleet is serviced and maintained at the plant. Hauling units are all diesel-engine, with a tendency toward larger size engines to provide more constant speed on the mountain grades, greater economy and faster turn-around.

To maintain its record for perfectly scheduled delivery when and as needed on any given job, Calaveras employs the services of several contract carriers in addition to maintaining its own sizeable fleet. Periodic safety meetings are held for the company's drivers, and a year-around accident prevention incentive program is maintained.

Improving cement quality

An equally important development of the past quarter century is the emphasis which has been placed on improving the quality of cement, and the development of special formulas for special uses.

Laboratory control is an all-important feature of cement manufacturing today. The manufacturing process is carefully checked with precision tests and instruments on a constant around-the-clock basis. This assures uniform high quality, and is a guarantee against variation in the product from barrel to barrel or sack to sack.

Every step of the operation is recorded on continuance charts. Temperatures are taken in not one but several parts of the kiln, and the composition of gases is analyzed as they leave the stack. The elaborate system of controls extends to the grinding of the clinker and to the operation of the Cottrell electric precipitator which prevents dust from escaping through the company's stacks.

The Calaveras laboratory organization consists of a dozen men working three shifts a day to make hourly examination of the raw product and regulate the manufacturing process according to their findings. Although the plant laboratory is concerned primarily with product control and the maintenance of uniform quality, it has undertaken some studies of concrete as well. This research helps to bring about a constant advancement in cement technology and results in the development of products suited to the particular needs of those who use them.

The great care used in controlling production reemphasizes the fact that cement is a carefully engineered and scientifically balanced product. Considering the great variation in aggregates, the differences in water and the variations in mix and handling, cement undoubtedly is the most constant ingredient in the finished product specified by the construction engineer.

Steadily increasing control of the manufacturing process has made is possible to develop excellent specialty products in addition to regular Portland cement. Calaveras Cement Company is the only firm in the West with the quarry resources and manufacturing facilities for production of white Portland cement. This product is sold throughout the entire West. Other specialty items carried in regular stock are a plastic cement and an early hardening cement. Still other formulas are developed on special order.

Mill and quarry

The company erected its mill near San Andreas, Calif., 25 years ago, after a thorough study of the quality and quantity of limestone and shale deposits in the quarry area had been made by William Wallace Mein, founder of the company.

Two kilns were installed at the start, and they remained in continuous operation except during a portion of the depression years when one kiln was shut down. Constantly increasing demands for cement led to the purchase of a third kiln in 1945 which brought total capacity up to about 7,500 barrels per day—approximately double the original capacity of something more than 3,000 barrels per day.

The original quarry for the mining of limestone and shale was located only a half-mile from the plant. The company did its own quarrying from the start, but relied on contract carriers to transport the raw material to the mill. About ten years ago, operations shifted to a new quarry about 5½ mi. from the plant. The company purchased a fleet of side-dump trucks, each with 35-ton capacity, and built a private road which provides a down-hill haul to the plant. Loading and hauling is carried out in two shifts per day.

The roadway is mostly in side-hill cut. It is surfaced with crushed rock and has an asphalt penetration treatment. Once a year, when the quarry force takes a two-week vacation, the road is given a complete going-over. This includes filling in worn spots and adding another application of asphalt.

Standard quarrying operations are carried out on two benches. Down-holes are drilled with well-drills for the breaking of a 100-ft. face. Loading is by electric shovel.

The company's quarries contain virtually all of the needed raw materials for the manufacture of cement. Small quantities of gypsum are brought in from Nevada by rail. Much smaller quantities of iron oxide are shipped to the plant from the San Francisco Bay area.

William Wallace Mein has been president of Calaveras Cement Company since its inception. The company's management committee is headed by Vice-President H. C. "Pat" Maginn, and its membership comprises Maginn, Vice-President William Wallace Mein, Jr., and consulting engineer A. A. Hoffman. E. M. Barker is plant manager at San Andreas.

Salt Lake City Firm Will Design AEC Installations

A CONTRACT has been negotiated with the firm of Ashton, Evans and Brazier, Salt Lake City, for architectural and engineering design work for the Idaho operations office of the Atomic Energy Commission. The firm's work will include designing new structures and utilities, the remodeling of others, and master planning of the central facilities area at the reactor testing station in Idaho's Twin Buttes region. The central facilities area includes such installations as security headquarters, warehouse, dispensary, and office buildings.

Ashton, Evans and Brazier was selected after consideration of 21 firms. The contract is on a lump-sum basis. B. E. Brazier, a member of the firm, served during the war years as architectural designer and superintendent of buildings and grounds for the AEC installations at Los Alamos. In that capacity, he was in charge of the master planning of several areas of the operation. He will serve as project manager for the firm at the Idaho reactor testing station.

Korea Reds May "Sabotage" San Francisco Subway Plan

RESTRICTIONS placed on construction as a result of the Korean situation will probably result in eliminating the $50,000,000 subway bond issue from the San Francisco ballot in November.

Plans had been completed for the proposed subway system under Market St., which might reach an ultimate cost of $175,000,000. The initial part of the program was ready for submission to the voters on the November ballot. Advisers to Mayor Robinson have suggested that the issue be dropped unless the international situation changes promptly.

Moving 11,000,000 Cu. Yd. of Earth For San Francisco Housing Project

THE BIGGEST grading job ever done in the West in connection with a housing development has been undertaken by Henry Doelger, Builder, Inc., San Francisco. The firm plans to move 11,000,000 cu. yd. of sand and earth, and work at present involves over 1,000,000 cu. yd. of sand leveling for the Westlake housing tract, just south of San Francisco and within 2 mi. of the Pacific Ocean.

12,000 cu. yd. per shift

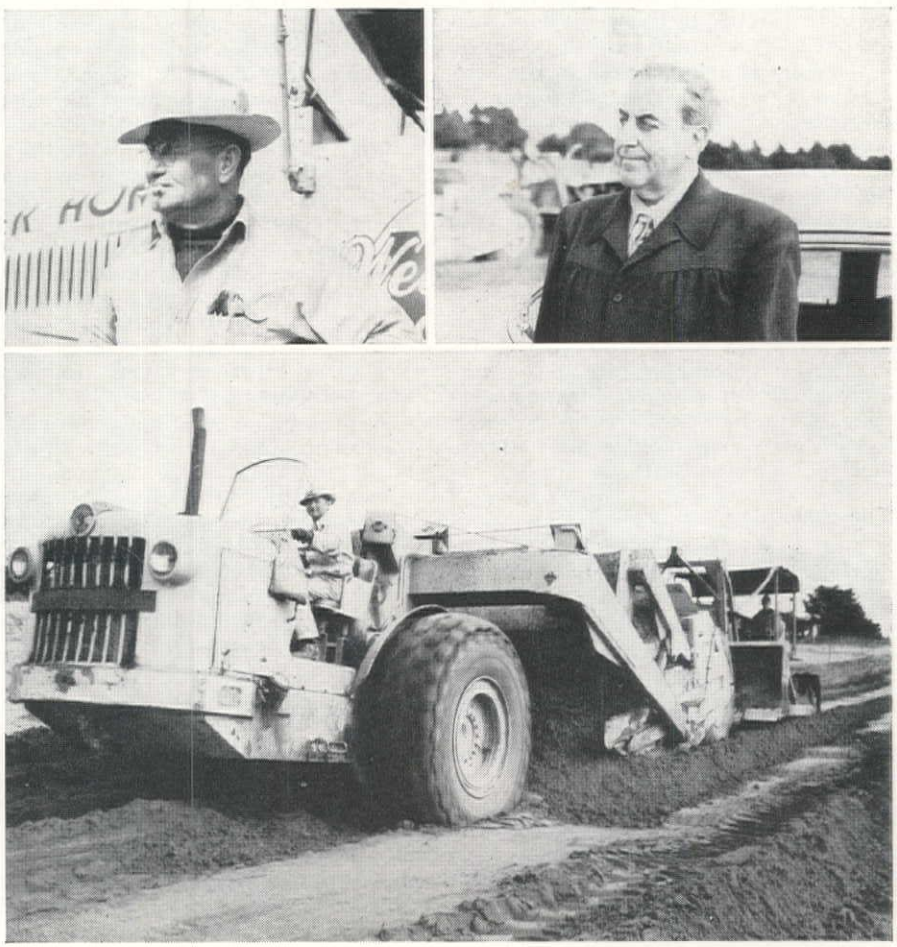
Grading foreman H. E. "Whitey" Stanton is moving sand at an average rate of 12,000 cu. yd. per shift with five LaPlant-Choate TS-300's placed on a 5-min. haul and dump cycle. The rubber-tired rigs fill to a heaped capacity of 18 cu. yd. If the present rate of earth moving is kept up, it will take almost 4 yr. to complete the total yardage. Since the earthwork began early last December, no working time has been lost due to weather, and there were many times when the rains caused heavy engineering contractors plenty of trouble. In a personal interview, the grading foreman stated a heavy preference for rainy construction weather. Nothing is harder to control, he stated, than dry sand. Since the sand normally is dry at Westlake, the five scrapers have some loading problems and need two bulldozers for boosters. Dry sand of this type allows a scraper speed of 16 m.p.h.; however, during and after a rain, operators get a full 20 m.p.h. on the wet surface without fail. Higher hauling speed, combined with the fact that wet sand loads more easily than dry, gives a saving of 1½ minutes on each cycle. Yardage moved in the rain is 15,000 per shift, or a 25% increase over clear weather.

Counteracting slippage

Since dry sand builds up in front of the scraper cutting edge, each additional loading pass of the scraper moves extra sand downhill, until within a short time this unloaded sand has piled up at the end of the run. To counteract this slippage, about one pass in three is made uphill, so that the grade will be even. On tricky sand hauls—hauls that give steel track lugs hard abrasive wear—it is all important for equipment operators to maintain rated pressure in rubber-tired rigs.

Sand leveling on the job must hustle to stay ahead of the carpenter crews, engaged in building the 700-house development. The contractor reports that the cost for leveling each lot, 36 and 44 ft. by 100 ft., averages $200. Houses in the Westlake tract are currently being built at the rate of four per shift.

VETERAN earthmover, H. E. "Whitey" Stanton, left, is supervising the project for Henry Doelger, right. At bottom, one of five La Plant-Choate TS-300's working on the job.



A Preliminary Look at the $73,000,000 Project for—

Solving the Rio Grande Silt Problem

Construction of two dams at the upper end of the Middle Rio Grande Valley in New Mexico will reverse the tendency for aggradation of the riverbed and eliminate flood threats

A $73,000,000 project is under way for the Middle Rio Grande Valley in New Mexico. Covering an area of 19,957 sq. mi., this valley (see map) stretches some 300 mi. through central New Mexico—from the Colorado-New Mexico state line to the backwaters of Elephant Butte Reservoir, northern tip of the 155,000-ac. Rio Grande Project in southern New Mexico and West Texas.

Silt is the cause of the present problem. The river's tributaries in the Middle Valley each year carry some 39,000,000 tons of sediment from the watershed into the Rio Grande waters that flow into New Mexico from Colorado. Breakdown of the watershed is attributed chiefly to overgrazing during the past 75 years. Result of this overload of silt is the aggradation of the riverbed at a rate averaging 0.156 ft. each year. The situation poses a four-headed problem:

1. As the river rises, it pushes the ground-water level upward, ruining valuable farming land. Another 50 years at the present aggradation rate is expected to completely wash out the Middle Valley's agricultural industry.

2. A serious flood threat exists. The many disastrous floods in the Middle Valley's past have done millions of dollars worth of damage. Albuquerque, commercial center of New Mexico, today is threatened by the worst flood hazard due to sedimentation in the nation.

3. Water is being wasted in the Middle Valley, mainly in transpiration losses estimated at 220,000 ac. ft. per year. This makes it difficult for New Mexico to deliver water to Texas under terms of the Rio Grande Compact and largely accounts for New Mexico's water debt to Texas of 280,000 ac. ft. at the start of this year.

4. The life of the cotton-lush Rio Grande Project to the south is threatened. Elephant Butte Reservoir is silting, but at a declining rate as the river increasingly drops delta-forming sediment in the 10,000-ac. area immediately to the north. This reduces the water inflow to Elephant Butte.

The basic plan

The Federally-planned Middle Rio Grande Project is primarily concerned with reversing the tendency for aggradation of the Rio Grande riverbed.

Basically, the plan is to build two or more sediment detention and flood control dams at the high end of the valley. These will store water long enough to allow the sediment to settle, providing clear water needed for regulated releases to scour and degrade the riverbed. This phase of the work will be supplemented by dredging.

The first work on the new project began last May 3rd on the Jemez River Dam Reservoir. Two contracts totalling $1,231,823 have been awarded, one for the access road and the other for the outlet works. Yet to be started is Chamita Dam and Reservoir, the Rio Grande and Bluewater Floodways, and reclamation features of the project.

Local efforts

The only previous attempt to cope with the problem began in 1925 when the Middle Rio Grande Conservancy District was authorized as a political subdivision of the state. The New Mexico Legislature gave the district the job of providing the Middle Valley with a complete and efficient irrigation system and drainage and flood protection works. At the time of organization, the district was recognized as only a stopgap measure to tackle the threatening water problem until a more effective program could be devised.

The district embraces only a small part of the Middle Valley. It starts some 100 mi. south of the Colorado-New Mexico state line, stretches southward along the Rio Grande for 145 mi. and is one to five miles wide on each side of the river. The district financed itself by bond sales, and in the first 10 years of its existence spent some $10,000,000 for capital improvements. It built the key El Vado Dam and Reservoir for irrigation water storage on the Rio Chama, 78 mi. northwest of the river's confluence with the Rio Grande. Other works include four permanent diversion dams, two river canal headings, one canal siphon across the Rio Grande, 787 mi. of canals and laterals, 342 mi. of drains, 180 mi. of riverside levees, and jetties and other flood control works.

A present, as originally anticipated, the district finds itself faced with a costly sediment problem that cannot be solved locally. Hubert Ball, conservancy district engineer, says that although the 84,000 ac. now irrigated will not be completely inundated for another 50 years under present conditions, enough land would be forced out of cultivation in the next 20 years to financially ruin the district.

Federal studies

Federal agencies began to study the problem in 1941. In 1947, the Reclamation Bureau and the Corps of Engineers submitted a joint recommendation for the project. The reclamation work is under the direction of John L. Mutz, area engineer for the Reclamation Bureau, and the flood control phase is under Col. Charles H. McNutt, district engineer for the Corps of Engineers.

The project plan as now authorized has four general parts:

1. Taking over the conservancy district and repairing and extending the present irrigation and drainage system.

2. Construction of two flood control and sediment storage reservoirs and channel rectification and levee improvement works.

3. Provision of installations for possible power development in the future. Although the power potential of the recommended project was 200,000,000 kw.-hr. a year, no recommendation was made for power development.

4. Recognition of the need for a watershed development program to get at the basic sediment problem.

The benefit-to-cost ratio of the overall project is put at 1.2:1.

Progress and plans

Congress approved the project in the 1948 Flood Control Act. But first it struck from the recommended plan the Chiflo Dam and Reservoir, proposed for the Rio Grande 19 mi. south of the Colorado-New Mexico state line. It also reduced the capacity of Chamita Reservoir.

Congress has authorized for the work $42,500,000 for the Corps of Engineers and $30,179,000 for the Reclamation Bureau. Appropriations presently total $887,000, all for the Corps of Engineers. The sum enables the Corps to plan Jemez and Chamita dams and reservoirs and the Engineers' part of the Rio Grande Floodway and to begin work on Jemez Dam.

The project plan is designed on the basis of two assumptions. First is completion of the San Luis Basin Project in Colorado. Dams have been authorized for Wagonwheel Gap, Platoro and Mogote and work has begun at the Platoro site. Second is construction of Chiflo Dam which Congress struck out without prejudice.

The dams and floodway system are based on the flood of maximum record —24,600 sec. ft. in 1941. The dam capacities are designed to handle this peak while allowing controlled flows through the Middle Valley to within 5,000 sec. ft. insofar as possible. To this dam capacity was added 25% as a reasonable factor of safety.

The following gives the main features of the project:

The Bureau of Reclamation plans to

refinance the district by assuming some $7,500,000 in outstanding bond obligations. The Bureau contemplates repair and continued use of the four diversion dams and replacement of the two canal headings with siphons, one of 72-in. diameter and 2,000 ft. long, the other of 90-in. diameter and 1,970 ft. long. The present canals and laterals will be rehabilitated along almost all of their lengths. Concrete turnouts will be installed where needed, one to every 50 ac.

The Bureau expects to increase the irrigated acreage to 84,876. Necessary work on irrigation and drainage systems in the 20,696 ac. of Indian lands in the project will be done by the Office of Indian Affairs on a non-reimbursable basis.

El Vado Dam, $13,000,000

El Vado Dam will be somewhat altered. The rolled-gravel-fill dam is 175 ft. high and 1,400 ft. long, forming a reservoir with a 200,300-ac. ft. capacity. The pool has a surface area of 5,300 ac. extending 5.5 mi. up the Rio Chama Valley. The spillway and outlet works in the right abutment will be modified to allow emergency releases greater than the present 17,000-sec. ft. capacity. The spillway itself will not be altered but an emergency fuse plug will be cut in the 750-ft. rolled earth dike crossing a saddle southwest of the dam.

The outlet works at El Vado Dam consist of a tunnel containing a 78-in. diameter welded steel penstock, and a 12-in. pipeline for use in operating a small hydroelectric unit. The penstock leads from a butterfly valve near the tunnel entrance to a valve house, where it forks into two branches each having a 48-in. service valve. This will be supplemented by an 8-ft. diameter extension to the power tunnel equipped with a 96-in. valve. The dam and reservoir are intended only for water storage.

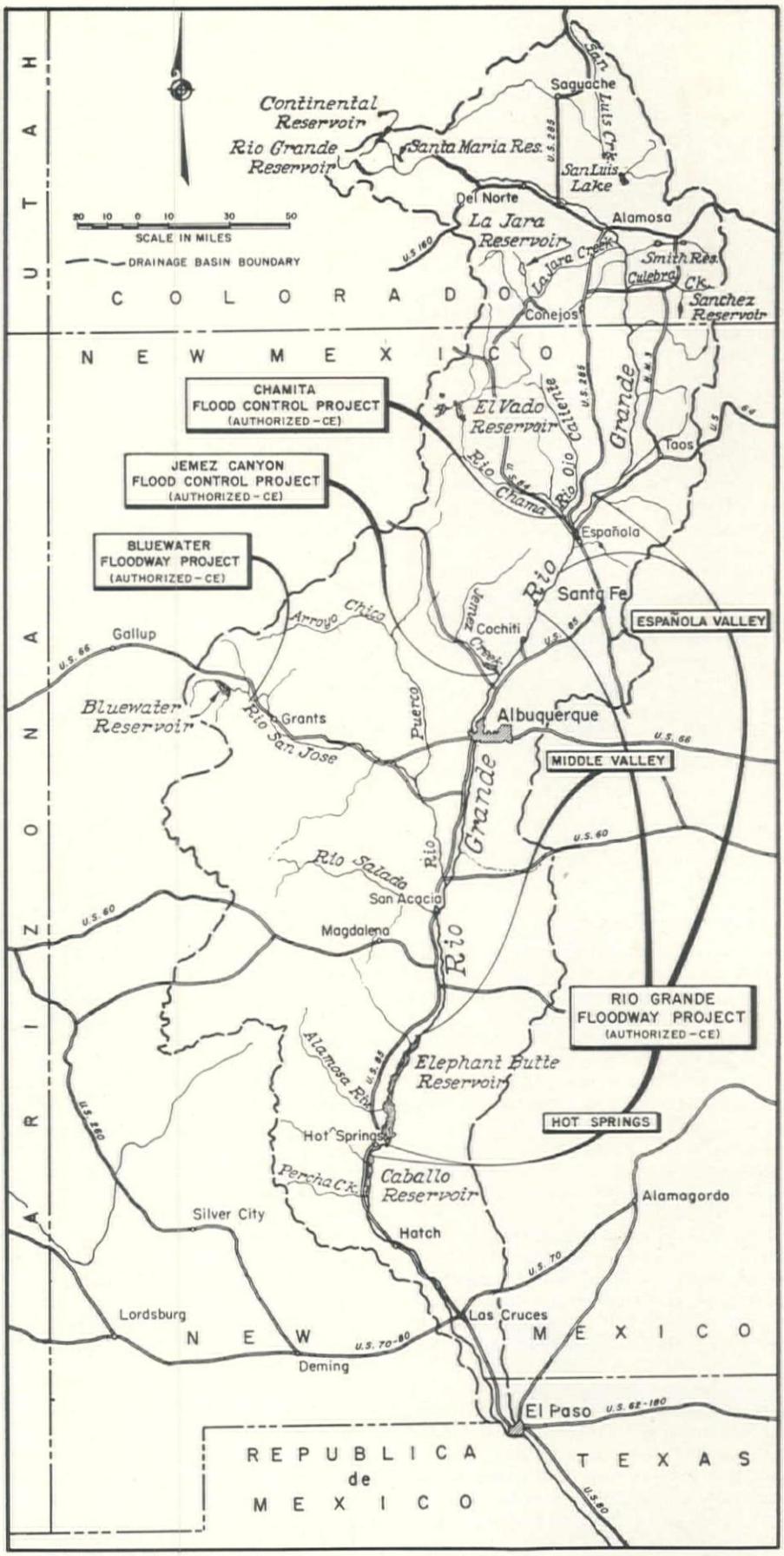
Excluding Indian lands, the cost of this work plus bond acquisition will total about $13,000,000 and will be the only reimbursable expenditure in the project. The combined bond and work cost, plus annual operating and maintenance charges, will be repaid over a 40-yr. period to start when the project is completed.

Jemez River Dam, $7,200,000

Jemez River Dam and Reservoir will be built on the Jemez River, 2.2 mi. above its confluence with the Rio Grande (see map). Estimated cost is $7,200,000. Work on this part of the project began recently. It is the only part of the project now completely planned.

The dam, with a capacity of 120,000 ac. ft., will be used for sediment storage and flood control. Of the total capacity, 90,000 ac. ft. are intended for sediment storage and 30,000 ac. ft. for flood control. The sediment detention features are designed to last 50 to 75 years without impairing efficient use of the dam.

A rolled-earth fill structure, the dam will be 700 ft. long and 127½ ft. high, backing up a lake with a surface area of 3,470 ac. The side channel spillway



FEATURES OF THE MIDDLE RIO GRANDE FLOOD CONTROL PROJECT are indicated on the map. Chamita Dam on the Rio Chama will cost more than $30,000,000. Funds have been authorized but not appropriated for its construction. Work has started on the Jemez River Dam, which will cost about $7,200,000.

will have a capacity of 63,000 sec. ft. with 10 ft. of surcharge.

Morrison-Knudsen Co., Inc., was awarded a $1,113,214 contract early in June to build the outlet works. A $118,-609 contract went to H. C. Jones of Albuquerque to construct a 6-mi. access road to the damsite.

The outlet works are designed to allow a regulated flood water release of 8,100 sec. ft. with the surface water at the spillway crest level of 5,232 ft. elevation. They will consist of an intake tower and a 13-ft. modified circular conduit and stilling basin in the left abutment of the dam. A service bridge will be installed from the abutment to the intake tower.

There will be 2,665,000 cu. yd. of common excavation at the damsite and 581,-000 cu. yd. of rock excavation. A temporary earth cofferdam 1,000 ft. long, 9 ft. high and 8 ft. wide will be built to keep the river from the outlet works construction job.

Because the Jemez canyon is very narrow at the damsite, it will be impossible to begin work on the embankment until the outlet works are completed. Fill for the embankment will total 1,-083,000 cu. yd.

A rolled-earth fill dike 2,600 ft. long and 28 ft. maximum height from the ground will give flood protection to the Santa Ana Indian Pueblo 4.5 mi. to the north. A pumping plant will be placed behind the levee to handle seepage and local runoff.

The damsite is underlain by Santa Fe formation which is considered competent to support the structure.

Chamita Dam, $30,833,000

Chamita Dam and Reservoir will be constructed on the Rio Chama, 5 mi. above its confluence with the Rio Grande (see map). It is on the same river which will be dammed higher up by El Vado Dam.

This $30,833,000 development will have a capacity of 687,700 ac. ft. of which 180,-000 ac. ft. will be used for sediment storage and 507,000 ac. ft. for flood control. Sediment detention features will last 50 to 75 years without impairing efficient use of the dam.

The rolled-earthfill structure will be 4,800 ft. long and will rise 205 ft. above the streambed. There will be 2,888,000 cu. yd. of common excavation at the damsite and 496,000 cu. yd. of rock excavation. The dam will require 19,838,-000 cu. yd. of fill.

The dam as recommended included 25-ft. taintor gates on the spillway, which Congress decided cannot be installed while New Mexico has a water debt. But provisions will be made so the gates can be installed if later authorized. With the gates the reservoir would have had a 945,000-ac. ft. capacity. A 12-mi. reservoir would have been formed with a surface area of 12,550 ac. at maximum water surface of 5,810-ft. elevation. Without the gates, the length of the lake will be substantially reduced and the surface area will be 10,095 ac.

The spillway will cut through the right abutment, discharging into a small side arroyo leading back to the river channel some 3,000 ft. downstream. The spillway will have a concrete-lined chute with a discharge capacity of 170,000 sec. ft. with a 25-ft. surcharge.

The intake tower will be designed to allow concrete bulkheads to be put in the openings and to allow the accumulation of sediment as required. The tower will be gated on three faces to provide selective sediment-free discharges. The outlet works will allow regulated flood storage disposal with a discharge capacity of 5,490 sec. ft. under maximum water surface conditions.

This structure, along with Chiflo Dam, is considered a power source for possible future development. A penstock will be provided. The damsite also is underlain by Santa Fe formation.

Silt control

The construction of Jemez and Chamita Dams in addition to El Vado will increase evaporation losses, but this increase will be made up by a lower overall depletion total in the project.

Chamita and Jemez dams will be located on tributaries that contribute only a small part of the total silt dumped from the Middle Valley; the Rio Chama contributes 13.7% of the total sediment, the Jemez River, 10%. But the proportion of silt they contribute is high in the area of major project concern.

The construction of dams on the heavy silters, such as the Rio Puerco to the south which accounts for 45.4% of the valley's total sediment contribution, was considered. But such structures were not found to be economically feasible. However, they may be considered later to slow down the silting of Elephant Butte Reservoir.

The all-important, $11,526,000 Rio Grande Floodway includes the channel rectification program. The aim is to return to and maintain 1936 river and ground-water conditions. The Reclamation Bureau expects to spend $8,526,000 on channel rectification work, mainly dredging through the delta formation immediately above Elephant Butte Reservoir to reduce the present heavy water losses.

The Corps of Engineers will spend some $3,000,000 to repair and enlarge the present levees, now having an effective height of about 6 ft. This work will be supplemented where needed by pile dikes, sills, revetments, jetties and other flood control works.

Stabilizing the riverbed

Controlled releases of about 5,000 sec.-ft. of clear water will begin when the dams are completed, possibly in six years, but some experimentation may be necessary to determine the optimum release for efficient scouring. Under present conditions, the silt-heavy waters deposit sediment at a flow of 5,000 sec.-ft. But the clear water flows are expected to scour a net average of about 1,400,000 tons of sediment from the riverbed each year. Degradation by this means is not expected to be effective for at least 10 years after it is started, and the full channel-scouring job supplemented by dredging will take about 20 years.

The floodway proper will be 225 mi. long, aimed at creating a stabilized channel of 600 ft. average width with a capacity of at least 5,000 sec. ft. The floodway is designed to handle a flood peak of 20,00 sec. ft. in the Espanola area and 42,000 sec. ft. from there on down the length of the project. The 5,000 sec. ft. normal river capacity was chosen because flows of more than that amount cause the river to meander and chew away at the levees, sharply increasing levee maintenance costs.

Dredging plans

At the southern end of the project, just above Elephant Butte Reservoir, an 18-mi. channel with a bottom width of 500 ft. and a capacity of 8,000 sec. ft. will be dredged to supplement the scouring process. The dredging will continue throughout the life of the improvement. The Bureau of Reclamation has not decided whether this work in the area of dense undergrowth and marsh will be done with standard dredging equipment or with a pontoon-borne dragline.

A 20-mi. stretch of the valley at Espanola will be dredged to provide the required capacity. Dredging also will be done south of the project at Hot Springs, now Truth or Consequences, New Mexico. This will alleviate damage caused in Hot Springs by occasional high discharges from Elephant Butte Dam.

The dredging at the lower end of the project is expected to begin simultaneously with the start of the Chamita Dam construction. Sediment flow would destroy an improved channel dredged sooner. This phase of the work will allow a greater flow of water into Elephant Butte Dam. However, the sediment inflow also will be increased. Silting of the reservoir has decreased from 18,000 ac. ft. in 1935 to about 6,000 ac. ft. at present as the delta lands to the north of the reservoir increased in size.

The plan now is to stabilize the sediment inflow at 15,000 ac. ft. annually and, after the 20-yr. degrading job is done, at 14,000 ac. ft. per year. Possible construction of sediment storage dams at a later date on heavy silting streams near Elephant Butte Reservoir would reduce the presently planned sediment inflow.

Effects on water supply

With the San Luis development completed, a flow averaging 345,200 ac. ft. is expected at the state line. The Middle Valley tributaries will add their 1,120,-800 ac. ft. to this total. At present 535,-873 ac. ft. are consumed annually through the conservancy district, leaving 930,127 ac. ft. for delivery at Elephant Butte. However, with the Middle Valley project completed, this consumption will be reduced considerably. At the same time, an increase in irrigation water from 133,414 to 173,337 ac. ft. is foreseen. The consumption saving will be accomplished by reducing transpira-

Concluded on page 76

First Step Toward Taming San Gabriel River

Construction of Whittier Narrows Dam in Los Angeles County progresses under first contract—"Prepacked concrete" used for spillway foundation slab—Scrapers go wading to obtain material

WHITTIER Narrows Dam, first structure in the Corps of Engineers' long-planned Whittier Narrows Flood Control Project on the San Gabriel River in Southern California, is in the early stages of construction under a $3,022,478 contract to Winston Brothers Co., Azusa, Calif. The contract includes the concrete spillway and east embankment of the earthfill dam. The dam, together with rights-of-way, utility and road relocations, and appurtenances, is estimated to cost $36,000,000.

A total of 1,000,000 cu. yd. of excavation is involved, and 53,000 cu. yd. of concrete will be placed for the spillway. Featuring the spillway construction is the use of an 18,150-cu. yd. slab of "prepacked concrete."

Flood control problems in the San Gabriel River Basin have been studied and re-studied many times since 1916, and the current construction was made possible by a compromise plan agreed upon in 1948 by local communities, the City and County of Los Angeles, Long Beach, and the U. S. Corps of Engineers. (*Western Construction*, April 1948, pg. 114). The plan forms a part of the comprehensive plan for flood control in the Los Angeles County drainage area. The flood control basin has a tributary area of 554 sq. mi. west of the Puente Hills.

Whittier Narrows Dam will cross both the San Gabriel River and the Rio Hondo Channel. The east embankment (San Gabriel River section) will extend 211 ft. along the axis of the spillway, upstream on a 911-ft. arc and then straight for a distance of 5,400 ft. toward the Rio Hondo Channel. This embankment will have a 32-ft. crest and a predominantly 1:2½ upstream slope faced with a 2-ft. stone blanket. It will be about 38 ft. high at the spillway, tapering to 15-ft. height at the east end. The concrete spillway will be 530 ft. long and contain nine radial gates, each 50 ft. wide and with a radius of 36½ ft. The second Whittier Narrows Dam contract, for additional earth embankment work, will be awarded during 1951.

Prepacked concrete

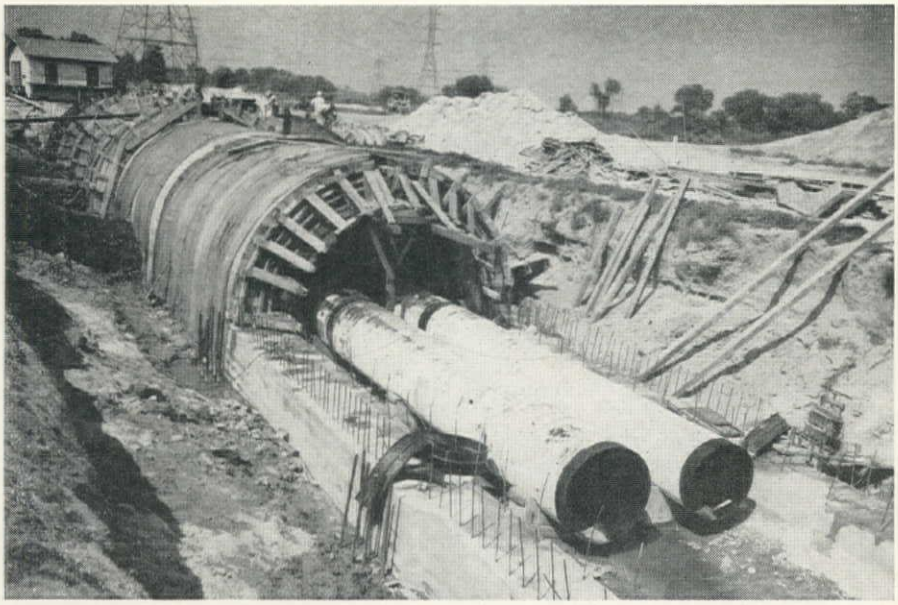
As previously mentioned, "prepacked concrete" will be used in the spillway structure. This is a method whereby concrete aggregates, graded and already in place, are grouted to form the concrete structure. The method was used for the recent re-construction of Barker Dam in Colorado. Its advantages are (1) relative freedom from the effects of heat of generation, (2) no shrinkage, (3) elimination of a great proportion of construction joints resulting in greater monolithic strength. The Whittier Narrows spillway foundation slab, 8 ft. thick, will be built in 3 monoliths, each with 3 pours, 182 x 37 ft. The stability of the structure will be adequate to prevent any movement that would affect control of the radial gates.

Coarse aggregates for the prepacked concrete are graded from 6 to ½ in., and the fine aggregates for the grout between meshes 16 and 200. They will be placed in lifts not to exceed 24 in. The pre-packed concrete slab will have two bottom horizontal mats of reinforcing steel on 6 and 12-in. centers. There will be three mats on most of the top of the slab, also on 6 and 12-in. centers. The aggregate surrounding the steel will be limited to a maximum size of 1½ in. Aggregates, steel, and the grout pipes will be placed together. All aggregates must be kept wet for 24 hr. prior to intrusion.

Intrusion grout will consist of type II Portland cement, finely divided mineral filler, intrusion aid, fine aggregate, and water, designed to fill all voids. Each of the nine monoliths will be grouted in two stages: (1) grout will be placed to within 6 in. of final grade (2) final 6 in. of grout will be placed through top forms to fill remaining section. First stage grout will be pumped through pipes on not greater than 7-ft. centers, and pumping will proceed on consecutive rows of grout pipe at about 1-hr. intervals. The rate of rise will be about 2 ft. per hour. The outlet will be raised with the grout, but must extend 6 in. into the grout.

Second stage grouting aggregates will be graded between ⅜ and ¾ in. Grout will be pumped through top forms on 5-ft. centers, not to exceed ½ cfm. per

EXCAVATING RIVER CHANNEL at the toe of the dam's downstream slope, scraper-tractor teams work toward an earth ramp which is also part of the preload fill, top. Bottom view is from the preload fill along the ramp with San Gabriel River channel to the left.



MUNICIPAL water lines, 30- and 36-in. steel pipes, are being relocated through the dam in an 11-ft. modified circular reinforced concrete conduit with walls 2 ft. thick.

intrusion point. The top forms will remain in place for a minimum of 3 hr. and maximum of 7 hr. Finish tolerance is ¼ in. in 10 ft. to el. 200.0.

Final plans and drawings of the prepacked concrete equipment and plant layout, as well as anticipated field procedure, will be submitted for final approval to the Corps of Engineers. An estimated 1,815 tons of mineral filler and 90,600 lb. of intrusion aid will be used. Concrete pours are tentatively scheduled for April 1951.

Preload fill

In order to consolidate the spillway foundation, a 40-ft. high "preload" fill of earth is being placed directly over the spillway foundation site. This preload fill, amounting to 241,000 cu. yd., will be completely removed by November 1950 and placed in the east embankment. The preload fill measures 595 by 140 ft. on top, with all side slopes 1:2. This material, plus additional select borrow, will involve the handling of about 1,000,000 cu. yd., when each move is counted. Earth ramps for the earthmoving equipment are built up on a 1:10 slope at right angles on the downstream side, and are incorporated into the preload fill in order to consolidate the foundation for the downstream spillway walls.

Earthmoving began April 15, two weeks after the arrival of a skeleton crew. Six scrapers are loading random pervious borrow from the river channel near the toe of the downstream slope and dumping directly on the preload fill. Another two scrapers from the downstream toe are dumping on the ramps, for a constant slope, and in the excessively wet spots. The material being loaded from the downstream river bed is principally sand and gravel, a portion of which is obtained from wet excavation.

Four push tractors boost loading downstream, sometimes in shallow water. The sand in general is not as abrasive on the earthmovers as would be expected from beach sand. When working in the river bed, water is the hardest problem to solve during the loading schedules. With more water at the site, the preload fill operation would probably become a dragline and dump truck operation. There is an excess of saturated material in the loading area. It is barely dry enough to work, and as much as possible is loaded together with all the dry material available.

Settlement of the fill is checked daily by running levels from a bench mark to a series of 2-in. galvanized settlement pipes, embedded in the preload fill. Before placing the preload fill, 24-in. casing was driven down from the stripping line to el. 192. Soil was drilled from the casing, and an 18-in. tremie concrete pour made to encase the pipe. The casing is then withdrawn and the hole backfilled and compacted around the pipe. As the fill progresses, 3-ft. sections were added to the pipe.

All utility pipes in the area that must be located through the dam are to be placed in an 11-ft. modified circular reinforced concrete conduit. The conduit has walls 2-ft. thick. Municipal water lines in the area, 30 and 36-in. steel pipes, are both being relocated through the conduit. They rest on concrete saddles, and will have dresser couplings.

Colonel W. D. Luplow is Los Angeles District Engineer for the Corps of Engineers, and James G. Morgan is Resident Engineer. Ben Richards is Superintendent for Winston Brothers Co.

Equipment at Whittier Narrows

Ten 12-cu. yd. Euclid dump trucks.

Two Northwest 80-D 3-cu. yd. draglines.

One Lorain 82 2-cu. yd. dragline.

Twelve Caterpillar D-8 tractors.

Six LeTourneau W Carryalls, with aprons built up 14 in., used on main fill.

Two LeTourneau FP Carryalls, used on earth ramps.

Rio Grande Project

. . . Continued from page 74

tion losses and also by cutting losses totalling some 50,000 ac. ft. annually in idle lands and in the river bed and canals.

The bosque control is particularly important. There are 48,000 ac. of bosque (mainly salt cedar and cottonwood) in the project, each acre consuming an average of 4.5 ac. ft. annually. The total consumption is almost 220,000 ac. ft. a year.

Clearing to save water

Clearing at least part of the 10,000 ac. of the dense bosque at the southern end of the project is expected to result in water savings of from 60,000 to 100,000 ac. ft. annually, depending on the amount of control. An additional saving of some 20,000 ac. ft. will result from control of the growth that will appear between the river banks and the stabilized channel.

So a total water saving of 120,000 ac. ft. a year is seen as possible while increasing the irrigation supply by some 40,000 ac. ft.

Miscellaneous features

The $200,000 Bluewater Floodway at the extreme western end of the project is intended to provide flood protection for the farming lands in Bluewater Valley that comprise the Bluewater-Toltec irrigation district.

A small diversion dam in Bluewater Creek will divert the flow into the new floodway channel. The floodway will be an earthfill structure 8 ft. high and 8,300 ft. long, formed by levees and an excavated channel. Included will be a multiple concrete box culvert under U. S. Highway 66 and the Santa Fe Railway tracks to the north.

The downstream end of the floodway will discharge into adjacent lava beds northwest of the railroad tracks.

Both the Bureau of Land Management and the Soil Conservation Service have been conducting watershed restoration programs since the mid-30's in the battle against sedimentation.

The programs include such items as building check structures on many small tributaries, contour furrowing, reseeding and revegetation, control of grazing and restocking rates, fencing and provision of water facilities, rodent and predatory animal control, fire prevention and suppression, and introduction of other sound land management practices.

Chiflo Dam postponed

The recommended Chiflo Dam and Reservoir was removed from the project proposal by Congress without prejudice and so may be authorized at a later time. The $30,000,000 gravity-type dam would have created a reservoir with a capacity of 816,000 ac. ft. at maximum surface elevation of 7,494 ft. Of the total capacity, only 30,000 ac. ft. were contemplated for sediment storage and the balance for flood control. The dam would be 393 ft. high and have a spillway capacity of 64,000 sec. ft.

Horizontal Drains—A Cheaper Method for Stabilizing Slopes

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MODERN highway alignment standards usually require excavation of large cuts and placing of heavy embankment in the construction of primary routes through mountainous regions. Such earthwork frequently alters natural drainage courses, disturbs dormant landslides and potentially unstable earth masses, and may induce the development of extensive landslides and roadway slipouts during or following construction.

Since most mass ground movements are caused or seriously aggravated by the presence of ground water, adequate subdrainage to lower the ground water table is of primary importance in any slide stablization program. Lowering of the ground-water table eliminates saturation in critical portions of the soil mass and thereby increases its shear strength and resistance to lateral flow.

Since 1939, the California Division of Highways has stabilized numerous landslides and roadway slipouts by the installation of horizontal drains. The term "horizontal drains" is here loosely used to define drains installed in horizontal or slightly inclined holes which have been drilled into cut or fill slopes. In addition to drawing down the water table in an unstable area, the horizontal drains are also effective in reducing the driving force tending to produce sliding by tapping impounded ground-water and eliminating the contributing effect of hydrostatic pressure. Ordinarily the drains are installed to depths of 100 to 200 ft., but with ideal conditions they have been installed to depths ranging to 300 ft.

Used for economy

The drainage method was adopted primarily as an economical means of correcting failures in existing embankments and cut slopes. Previous experience had shown that construction of deep drainage trenches in slipout areas was quite costly, and that unloading, slope flattening and improving surface drainage facilities in slides above the roadway was often ineffective.

Recently, however, horizontal drainage work has also been employed to advantage in stabilizing cut slopes in unstable areas on new construction. This has permitted a reduction in excavation quantities and provides insurance against excessive maintenance costs in the future. This method of drainage has not been utilized during construction of embankments, as the foundation may usually be satisfactorily stabilized with various types of drainage trenches and pervious blankets during construction when the need for such treatment has been recognized. Many roadway slides and slipouts can be attributed to inadequate drainage treatment during construction, usually the result of insufficient knowledge of the soil formations and ground-water conditions prior to construction.

When a thorough investigation of an unstable area or active land slide reveals that correction of unfavorable ground-water conditions is not feasible by the usual methods, the installation of a horizontal drainage system is often recommended. The tentative locations, lengths, and number of drains required to subdrain the area are determined from data secured during the preliminary investigation. This investigation often includes a geological survey, as well as a study of the ground-water, permeability and other characteristics of the soil formations with the aid of vertical test borings.

Drilling the holes

The installation of drains is accomplished by jacking 2-in. perforated metal pipe into 3½ to 4-in. holes that have been drilled into the unstable area on horizontal or slightly inclined grades. Holes are drilled with a unit consisting of a rotary drill mounted on a racked frame (see illustration) in such a manner that a revolving drill bit may be advanced into the earth with the ratchet lever while water is being pumped through the drill rod to cool the bit and flush the cuttings from the hole. Additional drill rods in 5-ft. lengths are added as the drilling proceeds.

INSTALLATION of drains is accomplished by jacking perforated pipe into holes drilled into the unstable slope. "Hydrauger" equipment in use is especially designed for this work.

As the unit was designed to be compact and portable, compressed air engines are utilized for operating the drill and pumping water. An air compressor and water storage facilities are placed at convenient locations near the roadway with air and water lines leading to the drilling unit. This simplifies moving from hole to hole as no heavy equipment need be moved off the roadway level.

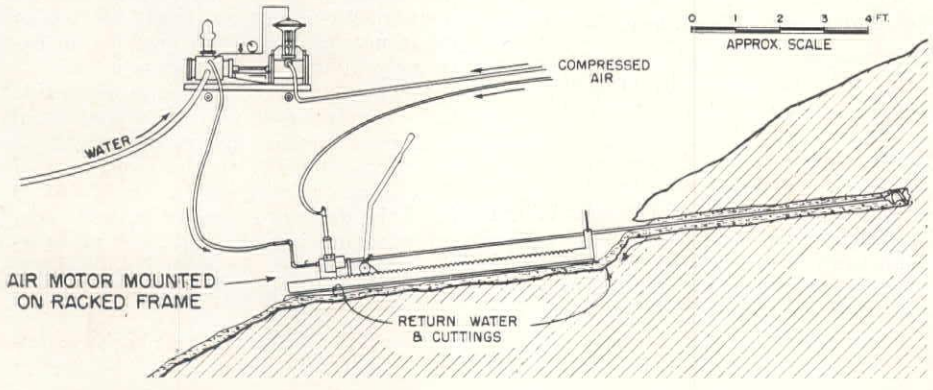
Using the correct bit

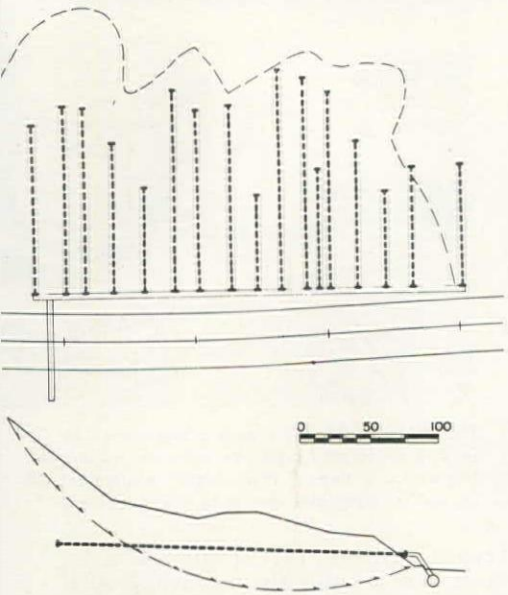
Various types of drill bits have been tried during the last ten years and three have proven most satisfactory. An auger type bit in the center with Tungsten carbide inserts brazed into machined slots in the cutting edges has proven satisfactory for boring through clayey soils, shales and soft sandstone. A rotary rock bit of the type commonly used in the oil fields is very useful in sandstones, shales and in the harder rock formations, and appears to be our best general purpose bit. A retractable or folding type bit was designed for use in soft formations that readily cave. With this bit and a tandem track arrangement it is often possible to drill and case the holes in one operation. The drill rod is run inside of the 2-in. casing with the 4-in. retractable bit immediately ahead of the casing. The drill bit and casing are simultaneously advanced to the required depth of the hole. The drill rod is then backed out, collapsing the bit for retraction through the casing.

The greatest problems arise while attempting to install drains in formations of badly fractured rock that continually caves. Directional control is difficult to maintain, and drilling and casing the hole in one operation is not easily accomplished, as the retractable bits will not drill the harder rock. A new type of retractable bit should be developed to overcome this handicap.

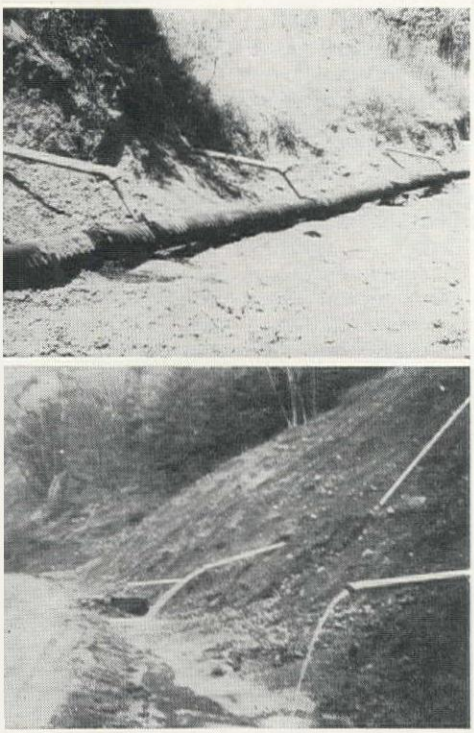
The 2-in. pipe drain generally in-

TYPICAL SET-UP FOR DRILLING HORIZONTAL DRAINS—Revolving drill bit is advanced into slope with ratchet lever while water is pumped through drill rod to cool the bit and flush cuttings from the hole. An air compressor and water storage facilities are stationed nearby with lines leading to the drilling unit. Additional drill rod lengths are added as drilling progresses.





PLAN and typical cross-section of a slide area stabilized by the installation of horizontal drains (see discussion in text).



COMPLETED installation, top, with individual drains tied to collecting pipe. Collecting pipe is not needed when drains discharge into gutters which provide suitable disposal, bottom.

stalled in the holes has ⅜-in. holes drilled on longitudinal lines through three of the quarter points. The pipe is vertically dipped in asphalt after perforating. Perforations are longitudinally spaced at 2⅔ in. center to center, and the pipe is furnished in random lengths of 16 to 22 ft. The pipe is usually installed with the perforations turned up, to carry seepage water past the cracks and fissures prevalent in slide areas, and the joints are butt welded as the casing operation proceeds to form a continuous drain for the entire length of the hole.

In California the horizontal drainage work is usually accomplished by traveling drill crews assisted by men from local maintenance stations. All of the equipment and supplies normally required on the work are carried by the traveling crews with the exception of the perforated metal pipe which is stockpiled at convenient locations throughout the State.

In addition to the complete drilling units and bits, the equipment required on the average job includes a portable air compressor, one or more water pumps, a 1,000-gal. water storage tank, a supply of pipe and hose for the water and air lines, a complete oxy-acetylene welding and cutting outfit, a 2½-ton truck for transporting the equipment and a station wagon for transporting the crew. The size of the air compressor required, which varies with the number of units in operation and drilling conditions, is estimated on the basis of 120 cfm. per drill and pump.

Some projects may also require the services of a tank truck to haul water for the drilling operations, but whenever possible, a water supply system is developed from springs or small streams convenient to the job site. Man power requirements are variable and depend principally on the number of drilling units worked and the method of supplying water to the units. To install a horizontal drainage system using 2 drilling units, and with water available at the job site, usually requires the services of 4 men: 1 field engineer, 1 equipment operator and 2 laborers.

Factors affecting costs

Cost of drilling the holes and installing the drains at the present time is usually between $3.00 and $7.00 per lin. ft. Variation in drilling conditions on the different projects is largely responsible for the wide range in unit costs. Crews have submitted occasional boring logs recording approximately 200 lin. ft. of hole drilled per shift per machine in stiff clays and clay shales, with averages of 150 lin. ft. per shift not unusual in this type of material.

The time required to install the 2-in. pipe drains in such holes may vary from 2 to 8 hrs., depending upon the stability of the material and the effects of possible constriction of the hole. Conversely, while drilling holes through shattered shale and sandstone formations or in saturated mud containing float rock or heavy gravel, it has often been difficult for a single drill to maintain an average of 30 lin. ft. drilled per shift.

In addition to the variable drilling conditions and cost of developing a water supply, other factors influencing the unit cost of installing the drains are:

1—Traffic hazards on the project—controlling traffic may increase daily costs 10%.

2—Size of project and local conditions governing efficient operations of more than one drilling unit. When sufficient water is economically available on large projects, labor and equipment costs per drilling unit can be reduced considerably by operating 2 or more drills.

3—Location of the work. When the drilling crews must be transported a considerable distance on a portal to portal basis or be maintained near the job site, costs increase rapidly.

A plan and typical cross-section of a slide area which has been stabilized by the installation of drains is shown in the accompanying sketch. At this location a small slide occurred during construction of the roadway. The slide did not appear to be of great extent, but as it caused considerable heaving at the edge of the traveled way, a timber bulkhead was constructed, but showed almost immediate distress, which became progressively worse until the bulkhead and 4,600 cu. yd. of slide material was removed the following year.

The behavior of the slide clearly indicated that the slope flattening alone was inadequate and that further steps would have to be taken to obtain stability. The slide movement had extended up the hill and on the sides, and the toe was constantly encroaching upon the traveled way. The slide mass was continuously saturated by subsurface seepage, and by the flow from two springs in the upper portion.

Two years later the 2,200 lin. ft. of horizontal drain was installed as shown, and a surface drain was constructed to carry the spring flows to existing culverts. Average length of the 18 drains was 127 ft., slopes varied from 2 to 9%, and the drains were spaced at about 20-ft. intervals. The drains were tied into an 8-in. collecting pipe, which was installed to facilitate disposal of the drain water outside of the slide area.

An initial flow rate of 30,000 gal. per day was developed. The flow rapidly diminished to a fairly constant rate of about 9,000 gal. per day after the initial hydrostatic pressure had been released. At the same time, flow from the surface springs continued at a uniform rate of about 3,100 gal. per day. The total cost of the drainage project was $5,000 with the unit cost of the horizontal drains averaging about $2.00 per lin. ft.

Frequent inspections of this area indicate that there has been no appreciable movement in the 7-yr. period since the drains were installed and that the slide has apparently been stabilized.

Since the first horizontal drain treatment of a slide area, by the California Division of Highways in 1939, a total of 70 unstable areas in the state highway system have been treated in this manner. In a few cases where the treatment was not completely effective, the source of the subsurface water responsible for instability was not positively located or could not be intercepted because of extremely difficult drilling conditions.

More than 1,350 horizontal drains have been installed with six state-owned machines, for an aggregate length of over 155,000 ft. With the exception of occasional cleaning of the first 15 to 20 ft. of the drains to remove matted root-growth entering through the perforations on some of the older installations, very little maintenance has been required.

George T. McCoy is state highway engineer of California.

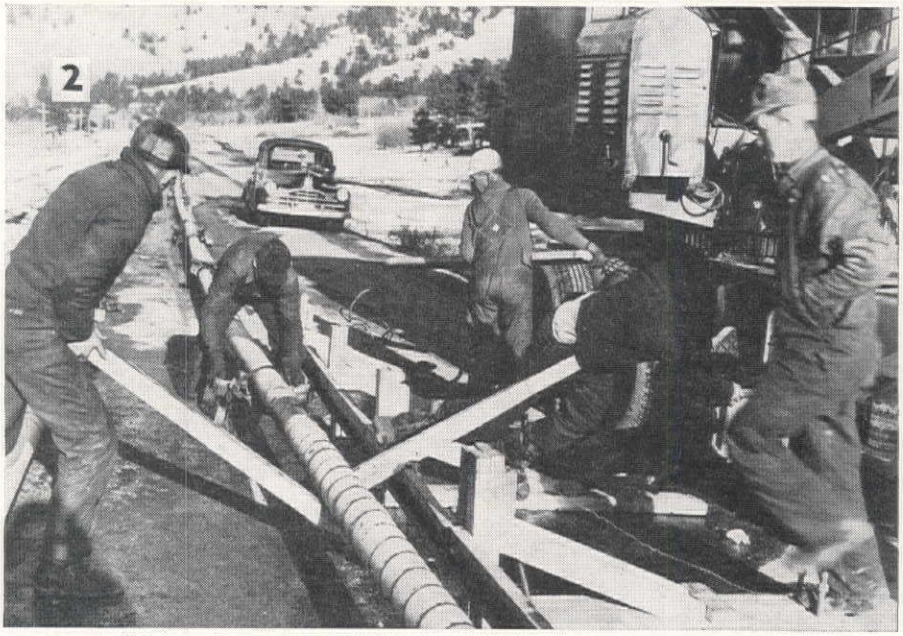
Tunnel Cable Installed in Half-Mile Lengths

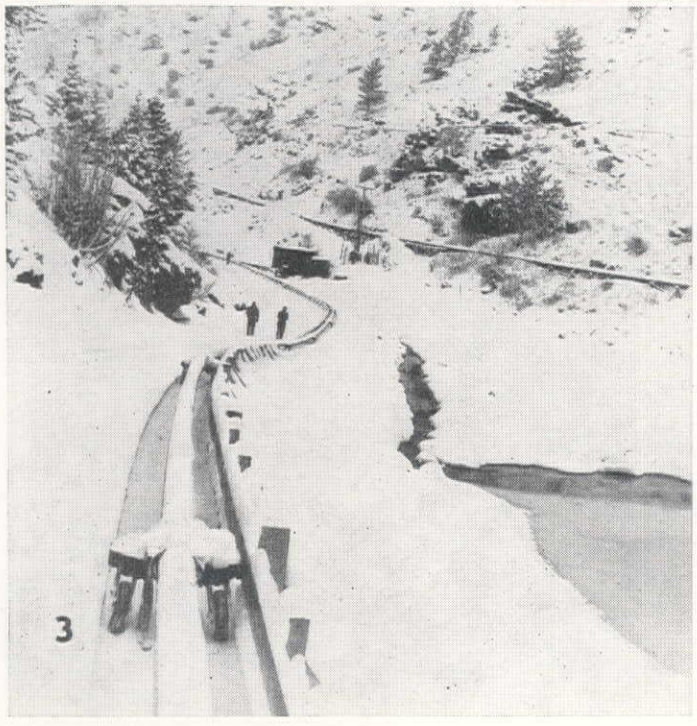
THE DIFFICULT JOB of installing a 69,000-volt electric power transmission line in the Bureau of Reclamation's 13½-mi. Alva B. Adams irrigation tunnel of the Colorado-Big Thompson Project has been completed by Electrical Constructors, Inc., and C. M. Elliott. The pipe was welded into half-mile sections outside the tunnel and three cables pulled into each section. The half-mile sections were pulled into the tunnel using 2-wheeled dollies on a wooden track, and were then raised to the ceiling to be joined to preceding lengths.

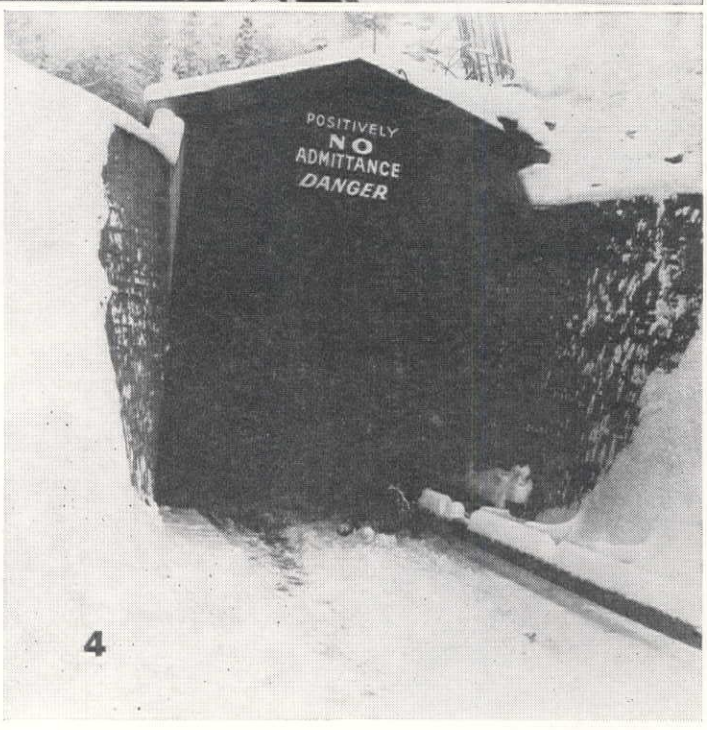
Complexity of the cable installation resulted from the fact that it was necessary to bring all material and workmen into the 9-ft. 9-in. diameter tunnel from one end only since no other access points are available. The cable line utilizes the tunnel as an economical route for electric power transfer between two generating plants on two sides of the Continental Divide. Primary purpose of the Alva B. Adams tunnel is to carry irrigation water.

The 69,000-volt cable is General Electric high-pressure gas-filled type which utilizes a 5-9/16-in. diameter steel pipe as a container. The entire steel pipe is welded together to form effectively one continuous pipe which is hung from the tunnel ceiling where it will be just above the normal water level. In operation, the pipe is filled with nitrogen gas at 200-lb. pressure. This gas improves the electrical strength of the oil-impregnated paper insulation of the copper conductors and also prevents air and water from entering the pipe in case of leaks.

Illustrations show the procedure as follows: (1) cable being pulled into pipe, (2) half-mile sections being moved toward tunnel, (3) proceeding around bends in roadway toward tunnel portal, and (4) pipe being pulled into the tunnel.







First Phase of Construction Near Completion for—

$30,000,000 Point Mugu Test Center

Western contractors have worked without fanfare during the past two years building installations for the big Navy Air Missile Test Center on the Pacific Coast in Southern California

CONSTRUCTION at the U. S. Naval Air Missile Test Center at Point Mugu, Calif., halfway between Santa Barbara and Los Angeles, is nearing completion. Work began in August, 1948, immediately after Congress appropriated $14,000,000 of a total authorized $30,000,000. Upon completion of present contracts the remainder of the funds is expected to be appropriated for additional construction.

The initial series of construction contracts, most of which have been completed, got off to a big start with the hydraulic dredging of 3,000,000 cu. yd. of sandy material placed out from the shore at the Point Mugu site.

Ground level raised

Unstable sea-level soil is the problem common to all work now under way at the base, and before contracts could be advertised for new roads, utilities, or buildings, the ground level of much of the base was raised to el. 10. High tide is about el. 7 and the water table is at el. 5, with a potential serious water problem. The natural ground at most of the base is from an alluvial deposited swamp, which left layers of alternating sand and clay. Drainage comes from Calleguas Creek and is guided past the installation sites by deep, unlined channels. In the natural sand, foundation design pressure is 8,000 psf., and 2,000 psf. when clay is present. For most of the small one-story buildings at the base, a 2-ft. footing is used, and for the airfield hangar and other smaller buildings, wooden piles were driven for bearing power on the sand. The piles, all creosoted, were driven to depths of 30 to 32 ft.

Hangar and runways

A standard double hangar—actually war surplus—with 110,000 sq. ft. of area was completed in May 1950. The light gauge steel hangar was fabricated prior to the war, and was in transit to an overseas base at the outbreak of hostilities. Nine years later it was erected, on a 4-ft. concrete foundation wall. The existing runway was enlarged to 5,500 ft. and 200-ft. width, and taxiways and parking aprons were added to total 350,000 sq. yd. paving. At one time, part of the runway consisted of Marston pierced steel planking, and in some cases the new base and pavement were placed directly over the planking. All base material for the runway is dredged sand, built up to a height of 2 ft. or higher on the planking, and stabilized to a depth of 6 in. with emulsified asphalt at the rate of ½-gal. per sq. yd. to an inch depth. A 3-in. pavement of asphaltic concrete—a dense mix with no seal coat—was then placed.

Differing from the runway, on the plane parking areas the base was stabilized to a depth of 8 in., paved with a 2½-in. compacted bottom lift of asphaltic concrete, and then paved with a 1½-in. wearing course of tar concrete so that spilled aircraft fuel would not cut the pavement. The contractor's field operations on the pavement were identical, and little difference was noted by the crew except that the tar set somewhat more rapidly, and was darker in color. On the taxiway the base was stabilized to a depth of 8 in. and paved with 4 in. of asphaltic concrete. A hot-mix plan was erected at the site for all paving operations. Five small buildings for airfield operations were erected and include ready rooms for the line crew, ammunition storage, and paint and pyrotechnic storage.

Santa Cruz Island facilities

Construction of facilities at Santa Cruz Island, lying 30 mi. offshore, was

DOUBLE HANGAR is shown at right; missile test building, one of major contracts, is shown under construction in foreground; operations area is in background. Dark sections in operations area are tar concrete for protection against fuel.

completed during March, 1950. The contractor purchased two war surplus LCM's (Landing Craft Mechanized) and made two round trips a day carrying supplies, equipment, and personnel during construction. Work consisted of rebuilding a wooden pier, a new pontoon landing ramp, 6.5 mi. of roads, a 3,000-sq. ft. transmitter building, 5,500-sq. ft. of barracks and mess hall, a 2,600-sq. ft. receiver building and a 680-sq. ft. powerhouse.

Test buildings

A test and evaluation building, 60,000 sq. ft., is of steel frame construction with V-groove asphalt-protected siding. This building and the 25,000-sq. ft. instrumentation building will be equipped with shielded rooms for isolation of electronic equipment. There will be four shielded rooms, built of copper-clad plywood and mounted on skids. The instrumentation building will be of one-story steel frame construction, with a radar tower three stories high, and will include equipment repair shops, rooms for data reduction, teletype machines, printing, viewing, and other operations connected with the gathering and dissemination of data from missiles in flight.

A high pressure air and inert gas facility is being built to give 3,000-psi. service to the hangar, test and evaluation building and small missiles project building. All underground piping is steel, coated with coal tar enamel and lined with cement if carrying liquids. All heavy compressor equipment is supported on independent footings, separated from the floor slab by an expansion joint, to prevent strain on piping from settlement.

Construction has been completed on a 1,588-ft. deep well, now producing at a tested capacity of 2 mgd. Tested at 1,800 gpm. on a 72-hr. drawdown test, the water dropped 34 ft. A new water supply booster station, distribution system, and storage reservoirs have been completed. This gives 1,000,000 gal. of storage on nearby Laguna Peak, and results in 85-psi. distribution pressure in the combined system.

Wind test facility

In addition to the $14,000,000 appropriated for present work, the Bureau of Aeronautics has allocated $1,332,000 for the erection of an Air Blast Facility to be operated in conjunction with the Naval Research Laboratory. This facility will include a 25,000-hp. power plant, containing boilers and turbines, to drive an air blower. The boilers, turbines, and much of the piping have been salvaged from the Carrier U. S. S. Independence, which took part in the Bikini atomic bomb tests. Units in the Air Blast Facility will include a three-nozzle wind tunnel section—two nozzles for supersonic tests and one for transonic tests—and a single combustion test cell and free flight test pad in another building.

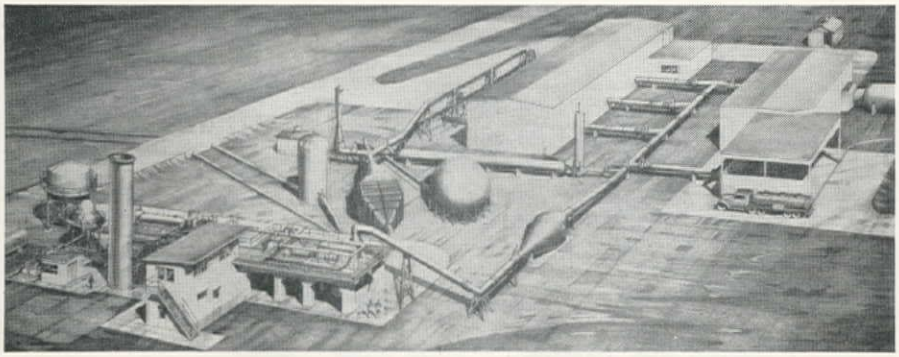
Construction plans

Plans and specifications are nearing completion for a new fuel tank farm, a sewage treatment plant, and a boundary

FACILITIES at Santa Cruz Island, 30 mi. offshore, were completed earlier this year. The contractors used war surplus LCM's to carry equipment, supplies and personnel to the island.

Contracts for Permanent Facilities at Point Mugu and Status of Work

Description	Date or % Complete	Estimated Cost	Contractor
Architect-engineering services	April 1950	$1,615,000	Parsons-Aerojet Co.
Hydraulic dredging	May 1949	1,132,000	Standard Dredging Corp., Los Angeles, & San Francisco Bridge Co., San Francisco
Airfield hangar	May 1950	755,000	
Enlisted men's barracks, four	Oct. 1949	500,000	
Family quarters, sixteen	Sept. 1949	225,000	Robert E. McKee,
Sewer systems	Aug. 1949	70,000	Los Angeles
Telephone building	Aug. 1949	50,000	
Administration building	Aug. 1949	371,000	
Mess hall and galley	Nov. 1949	273,000	Al-Co Co., L. A.
Instrumentation building	25%	500,000	
Electrical and telephone distribution system	June 1950	222,000	Malone-Campbell Electric Co.
Water and gas systems	April 1950	666,000	Ventura Pipeline Const. Co., Ventura
Test and evaluation building	80%	650,000	
Small missiles building	80%	350,000	
Transmitter bldg. (main base)	June 1950	85,000	Alliance Construction
Transmitter bldg. (Laguna Peak)	June 1950	50,000	Co., Pasadena
Receiving bldg. (Laguna Peak)	June 1950	50,000	
High pressure air system	90%	100,000	
Laguna Peak access road	Nov. 1949	157,000	Fred McKinley, Clearwater
Santa Cruz Island facilities	Feb. 1950	442,000	Edward R. Siple Co., Los Angeles
Main base roads and drainage	Jan. 1950	271,000	Gridley Construction
Recreational facilities	65%	260,000	Co., Oxnard
Airfield runway and taxiways	Feb. 1950	1,040,000	Griffith Co., L. A.
Security building	June 1950	130,000	Robert E. McKee, Los Angeles
Misc. operations buildings	May 1950	36,000	Roy Kashner Co., Inglewood
		$10,600,000	



ERECTION of the Air Blast Facility at Point Mugu will cost $1,332,000. This will include a 25,000-hp. power plant, containing boilers and turbine, to drive an air blower.

fence with a perimeter road. These projects will exhaust the remaining funds for the first increment of construction.

The second increment of construction, depending upon the appropriation of $16,000,000, will consist of 34 separate projects devoted mainly to missile launching and other technical facilities. Upon the completion of the entire construction program the U. S. Naval Air Missile Test Center will be the most modern and complete Missile Testing Station in the world.

Construction at Point Mugu is under the direction of Comdr. Ray Lamoreaux. Robert E. McMeen is Resident Officer in charge of construction, and A. J. Foreman is Contract Superintendent.

Contractor Competition Forces Bids Lower While Prices Have Increased

WHILE carrying out the largest volume of construction in peace-time history, strong competition continues to prevail in the general contracting industry in the construction of industrial, commercial and institutional buildings; highways, airports and railroads; public utilities, pipelines, dams and other engineering projects.

One effect of the competition has been to continue to hold down construction costs to owners while prices to general contractors have increased.

Such a tremendous volume of construction is being carried on that shortages of manpower and materials have appeared in a number of communities. Wage rates and materials prices have shown increases in recent months.

Although some increases in prices to owners may result on projects to be awarded, no major increases in construction costs for the larger types of construction projects are expected.

The majority of general contractors expect the volume of construction to continue at a high level.

These are the major conclusions reached in a survey of conditions in the general contracting industry announced today by The Associated General Contractors of America. The survey was taken as the peak of the year's construction activity was approaching. The survey was conducted among the association's 112 local affiliated organizations and among its directors throughout the United States and Alaska, representing more than 5,500 firms which annually perform an estimated 80% of the nation's contract construction.

Competition was characterized by 97% as "strong," "very strong," "fierce," "rugged," etc., with only 3% reporting "normal" or "slightly diminishing."

Labor and material prices were reported up somewhat by 58%, with 30% reporting them as stabilized. The remaining 12%, all highway contractors, reported costs down. Many of those replying to the study's questions noted that bids were down while prices were up.

In the field of labor, 59% reported no shortages. Trowel trades represented 63% of the 41% announcing labor shortages.

Slightly over half of the answers claimed shortages of materials, the principal ones being steel 25%, cement 25%, lumber 19%, brick 8% and gypsum 4%. Forty-seven per cent found supplies adequate.

The survey shows that highway construction is not at its peak with 75% reporting current volume "good" to "excellent" and 25% "fair" to "poor." In this group, 69% saw prospects for the balance of 1950 as "good" to "excellent" and 31% "fair" to "poor." Competition was rated "strong" by 100%. Costs were up in 27% of the replies, stabilized in 30% and down in 43%. Shortages of materials were reported by 47% and shortages of labor by 16%.

The breakdown of replies from heavy engineering contractors indicates a healthy condition. In response to the query on current volume, 90% replied "good" to "excellent" and 10% "fair" to "poor." In this group, 81% saw prospects for the balance of 1950 as "good" to "excellent" and 19% from "fair" to "poor." Competition was rated as "strong" by 96% and "normal" by 4%. Costs on this contracting division were reported up by 64% and stabilized by 32%. Shortages of materials were reported by 47% and shortages of labor by 36%.

Work Units Grouped in New Quantity Surveys

QUANTITY SURVEYS, or "materials estimates," have been made available by the publishers of *"Builders Directory and Guide,"* Portland, Ore. While there has always been an industry-wide and eager market for competent quantity surveys —there was also general dissatisfaction with the old-type, unsupported, arbitrarily summarized surveys long produced by free-lance "quantity surveyors." Details of the new system were developed by Paul DeHuff, a construction-production engineer who had headed the large estimating staffs for several war-time construction projects. After a review of the situation, DeHuff produced a completely supported document which has won repeat-order acceptance from many Oregon contractors.

Reproduced for distribution as blackline prints, these surveys carry, compactly and readily usable, such data as job name and location, segregated work locations and material identities. Also, specification assumptions and requirements, complete quantity and dimension requirements for each material, mathematical extensions of work-units and logical price-grouping or category totals are provided. Because these surveys are made directly on transparent worksheets by experienced estimators, every work-grouping is instantly traceable directly to its origin and location, providing the user with as complete and comprehensive a service as if the work were done in his own establishment with his own personnel.

Costs of these surveys, which will soon be made available in the San Francisco Bay Area by "Quantity Surveys, Inc.," are pre-determined by the time consumed in their production, prorated over the number of "subscribers" to any one job-survey. This arrangement has been found by contractors to provide competent results at much less than their normal costs for such information. Used as a "check" against the contractor's own developed material requirements, the surveys have proved a modest-priced investment in "bid-insurance."

First Plant to Handle Bulk Cement Operating in Alaska

FIRST PLANT for handling shipments of bulk cement has recently been placed in operation by Permanente Cement Co. at Anchorage, Alaska. The plant includes two 15,000-bbl. steel silos with equipment for handling this cement either in bulk or by packing in bags. The bulk cement is delivered by railroad or ship from the plant.

Deliveries will be made from the Seattle distribution center of Permanente in 15,000-bbl. steel barges which are towed from Seattle by tug. Pneumatic equipment is used for unloading the barges into the silos. The Anchorage facilities are estimated to have cost about $600,000 and make bulk cement available for the first time in Alaska.

"Advance Planning Program" Makes Small Community Projects Possible

WHEN A COMMUNITY needs a new school building, to be financed by a bond issue, what happens when there is no money available for engaging an architect to draw plans and specifications? This is usually the case with small-sized cities, which cannot pay an architect's fee until the bond issue has been sold. To combat this difficulty, the Advance Planning Program, a service of the Federal Government, is authorized specifically to advance money to communities so that architects and engineers may be engaged before the voting or sale of bonds.

The Federal Government's first Advance Planning Program, a part of the Community Facilities Service, came to a close on June 30, 1947, when funds were exhausted and authority expired by law. For two years, no new advances were made, and the C.F.S. confined its planning work to finishing jobs and receiving payments of the previous advances. The second A.P.P., now in full-scale operation, was authorized by Public Law 352, approved Oct. 13, 1949. Activities under this program have been well received by the public.

Each division office of the C.F.S. has its division engineer, who is in charge of a staff of qualified engineers, lawyers, and finance analysts. Each state usually has a district engineer, in charge of the district office. Close contacts are maintained with state and local officials, and with architects and engineers, by both the district engineers and division offices. When a community is considering a program of public works or a single public project, its officials are contacted to determine if an advance is desired under the A.P.P. The money is an advance in the strictest terms. It is in no sense a loan, since there is neither interest nor security involved.

Making an application

Application forms for the advances are not complicated, are only two pages long, and contain only those questions which must be considered in determining the merits of the proposed work. For example, it must be shown that the applicant is a legally constituted public body—city, county, school-fire-sanitary district, for instance—and that it has the basic legal authority to plan, finance, and construct the proposed project. From the engineering viewpoint, data must be submitted to permit a reasonable check on the estimated cost, usefulness, and economics of the proposed project and of its conformity to any overall plan. From the financial angle, data are required as to how the applicant intends to finance the cost of construction and its ability to do so.

District engineers make every effort to assist a community in filling out the short applications. The engineering staff is always willing to answer questions concerning the proposed work, or to consult with an applicant's architect or engineer on technical matters. Frequently, the community asks advice as to the most appropriate method of financing.

After an application is received in the division offices, it is reviewed as to legal, engineering, and financial matters, and additional information is obtained if needed. When the application is complete, it is recommended to the Central (Washington, D. C.) Office for final action. The applicant makes all decisions about when such projects shall be designed and when they are advertised for bids. Applications are normally approved by the C.F.S. within 15 to 30 days.

Obtaining the advance

Plans and specifications are reviewed by the C.F.S. expressly to check their form and content. The C.F.S. determines only if the plans are complete, and does not check against local building codes, etc. Plans and specifications must be complete enough to advertise for bids. Technical and structural design details and calculations are not reviewed by C.F.S. The applicant is always free to do its own design work with its permanent engineering staffs.

Under the A.P.P. the initial payment is 25% of the approved advance. This is paid after the offer has been accepted and a copy of the applicant's contract with the architect or engineer and the latter's notice to proceed has been received. When final drawings and specifications are completed, and bear the approvals of local and required State authorities, they are submitted to the division office for review. If found satisfactory and complete, payment of the remainder of the advance is made.

The advance fund does not become repayable until construction is undertaken. At intervals an applicant will be asked to report on whether or not construction has been undertaken, and to estimate when it will be started. When construction has begun, the applicant receives a bill for repayment of the advance without interest.

A sample case

Assume a community decides it needs a new school. The school board consults informally with architects to find the approximate cost of the project, which in this case is assumed at $100,000. In California, the customary fee is 8%, or 6% for design and 2% for field supervision during construction. The community takes 6% of the estimated cost, or $6,000, and applies to the C.F.S. for this amount. Assume the application is approved, and a check is mailed for 25% of the $6,000 for the city to retain an architect.

Assume the architect completes plans and specifications, and these in turn are approved by the C.F.S. field and central offices. The architect's estimate, assume, confirms the rough preliminary estimate of $100,000. A check is mailed to the community for the remaining 75% of the advance, and the advance funds now total $6,000. The community votes bonds to cover the cost of its new school. The bonds are passed and sold, construction begins, and the C.F.S. is repaid the $6,000. The $2,000 architect's field supervision fee is paid by the community from the bond issue funds. In the event that the final cost of the school is not the same as the first rough estimate, as is usually the case, the exact architect's fee for design is first paid from the advance A.P.P. money. If the fee is more than expected, the additional cost is paid by the school district from the bond issue. If the fee is less, the A.P.P. has already been reimbursed the full amount of the advance anyway, and thus has no concern in the exact fee.

Development of the program

The first Advance Planning Program was approved by Congress under Title V of the War Mobilization and Reconversion Act of 1944. It was established as a means of encouraging the creation of a reservoir of fully planned public works to be ready for later construction. Under this legislation the Federal Works Administrator was authorized to advance funds to States and their agencies and political subdivisions to aid in financing the cost of architectural, engineering, and economic investigations and studies, surveys, designs, plans, and specifications, preliminary to their construction.

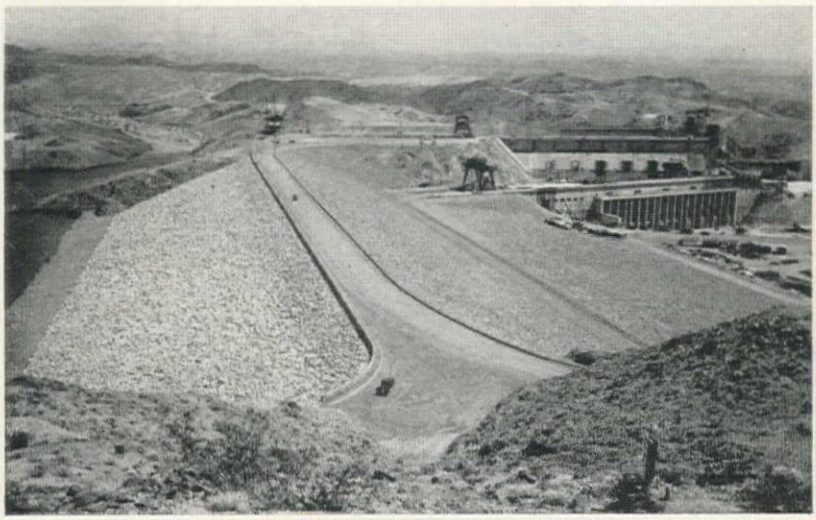
Responsibility for administering the program was assigned to the Community Facilities Service, which was a part of the Federal Works Agency by administrative order on January 1, 1945. The Bureau of Community Facilities, since re-named the Community Facilities Service, was formerly named the War Public Works Division of the Federal Works Agency prior to 1945, and the Defense Public Works Division prior to 1941.

The second Advance Planning Program, now under way, is being administered by the Community Facilities Service, a part of the Housing and Home Finance Agency since May, 1950. Formerly it was under the jurisdiction of the General Services Administration, which succeeded the Federal Works Agency. This second program has an authorization of $100,000,000. There were appropriated $8,000,000 for its program, and in addition, C.F.S. has been given $17,000,000 in contracting authority, which in this case is the equivalent of a post-dated check. In addition to the above, there is now included in a bill being discussed by the Congress $60,000,000 as appropriation and contracting authority.

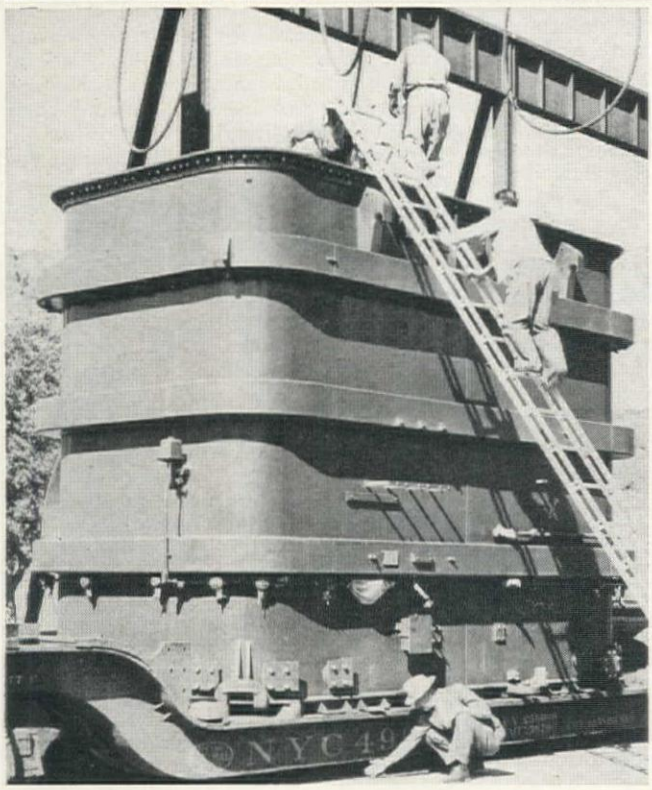
Western offices

Early in 1946, the Western States under the former jurisdiction of Division 7 were reapportioned into three divisions. Division 7, with headquarters in San Francisco, includes Arizona, California, Nevada, and Hawaii. Division 8, with headquarters in Seattle, includes Washington, Idaho, Montana, and Oregon. Division 9 headquarters in Denver, and includes Colorado, New Mexico, Utah, and Wyoming. District offices are in principal cities.

Applying the Finishing Touches at Davis Dam



GENERAL VIEW of Davis Dam and power plant as the big Colorado River structure nears completion. The earth and rock-fill embankment in foreground is completed and contractors are adding the finishing touches to the spillway and intake structures in right background. Utah Construction Co., main contractor for the dam and power plant, started work in March 1946, placed first embankment material during September 1948 and completed the dam embankment to its full height in April 1949 (see *Western Construction*, December 1949, pg. 51). H. E. Williams is project manager for Utah Construction Co., T. L. Terry general superintendent.



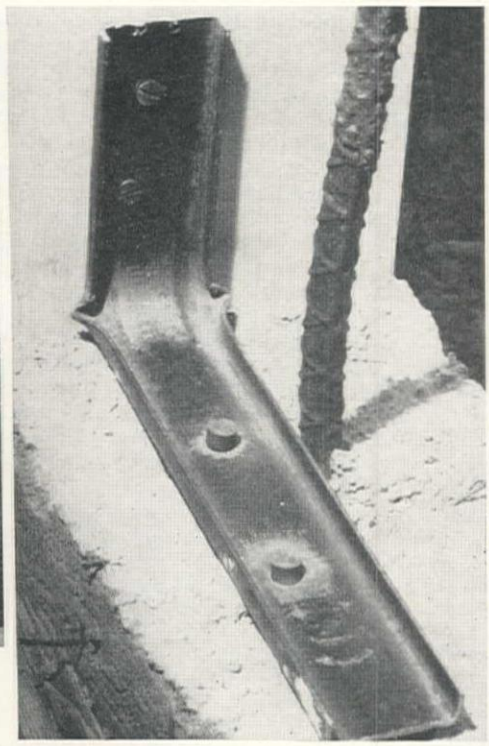
WORKMEN prepare to unload the first Davis Dam power plant transformer from a flatcar on which it was transported to a warehouse near Hoover Dam from the General Electric Company plant at Pittsfield, Mass. Late this year the transformer will be taken by highway on a 100-ton trailer to the power plant for installation. First power is expected to be generated in the Davis power plant in the spring of next year. This transformer (45,000/60,000 kva.), is one of the five that will be installed to give the power plant a total rated capacity of 225,000 kva. Water will be delivered from the forebay to the power plant through five 22-ft. diameter penstocks with a maximum head of 138 ft. Davis Dam is designed primarily for power storage, but will also store water for irrigation uses.

THE FOURTH GIRDER for the highway bridge across the diversion, forebay and spillway channel at Davis Dam is swung into place from the cableway. This bridge abuts the Arizona end of the dam across which a two-lane roadway runs (see top view). The highway across the dam and bridge will be opened next year to form a connecting link between U. S. Highways 95 on the Nevada side of the river and 93 and 466 on the Arizona side.

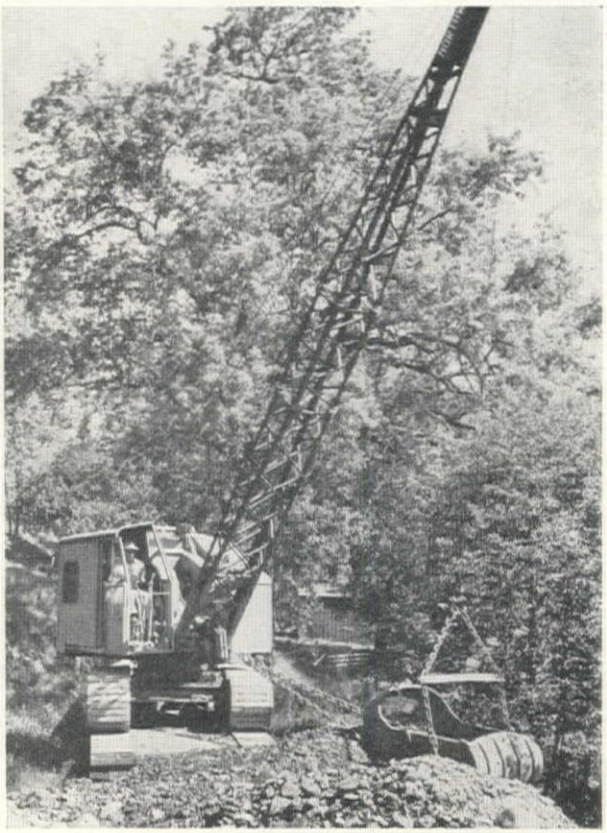
Truck Cavalcade to Alaska Airport Job Actually a Work Camp on Wheels

A FLEET of trucks, from light pickups to heavy-duty units, recently moved as a caravan from Des Moines, Iowa, to the site of the $5,000,000 International Express Airport at Anchorage, Alaska, making the 4,200-mi. trip in 15 days. Included in the entourage were eight Ford F-8 tractors pulling four 11.3-cu. yd. dump box semi-trailers and four 35-ft. van type semi-trailers. Two of the van trailers were fitted out as machine shops, with such built-in items as work benches, a drill press, air compressor and parts bin. The trailers have 16-ft. double doors in one side and when set up at the construction camp, the doors open into a small areaway connecting the trailer with a canvas tent. The other two van trailers were fitted out as a kitchen and bathhouse (see illustration). The kitchen has all modern cooking facilities and at the construction camp has a tented dining room to adjoin to the trailer. The bathhouse includes such luxuries as six separate showers with a heater for hot water. Starting construction at the airport (see illustration at left) the dump trailers which made the long trip are used for hauling crushed gravel from a pit about 3 mi. from the airport. The trucks also deliver crushed gravel directly into tractor-propelled spreaders for the sub-grade of the airport's runways. C. F. Lytle Co. and Green Construction Co., Des Moines, are the contractors.

A BALLOON combined with a kite (and called the "Kytoon") is a new and novel aid in surveying and aerial mapping. In surveying, it is suggested for use in lifting and suspending the surveyor's targets. In aerial mapping, it can be used for establishing horizontal tie-points on the ground, and has been used for third order triangulation work. Manufactured by Dewey & Almy Chemical Co., Cambridge, Mass.

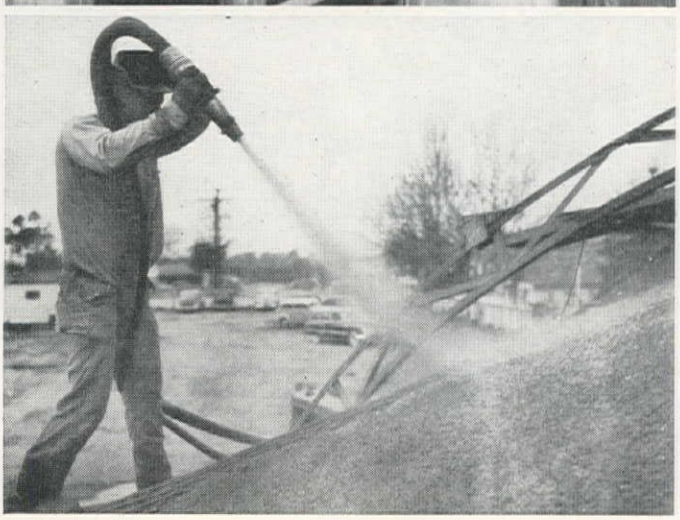


A NEW METHOD of placing door jambs for concrete block walls, with less labor involved, has been developed by Austin Ayers, in charge of the Los Angeles City jail construction for Zoss Construction Co. Twelve-inch lengths of plasterer's 1½-in. carrying channel are bent 90 deg. so that a 4-in. length will attach vertically to the jamb. The remaining 8 in. fits against the concrete floor. Two holes in the shorter part are provided to screw-fasten the channel to the jamb. The 8-in. section is fastened with a Powder Power gun.



"STREETS PAVED WITH GOLD" are becoming a reality at Amador City, Calif., where small rock and gravel from abandoned placer mining operations are being used as paving material. To obtain this material it is necessary to plant a dragline crane atop the piles of rock from where it loads on trucks. Joe Vicini, contractor of Placerville, Calif., maneuvered his Peterbilt truck and low-bed Reliance trailer next to the piles while his Northwest crane cleared a ramp so it could crawl onto the pile off the trailer.

All-Concrete House Can Be Completed in Twelve Hours



AN ALL-CONCRETE house for mass production on housing developments has been designed and the first unit constructed by Conair Sales, Inc., of North Hollywood, Calif. According to A. Ludlow Kramer, president of the firm, the Conair house, with two bedrooms and two baths, is designed to sell to the individual home owner at about $3,600, or about $5 per sq. ft., and it can be built in a period of twelve hours.

The unit has all-concrete walls, floor, roof and foundations, with steel door and window placements. The method of construction consists of applying liquid concrete pneumatically under high pressure over a Fiberglas rectangular balloon, reinforced by steel mesh throughout.

The illustrations, top to bottom at left, are sequence views of construction of the first housing unit.

At top—L. E. Town, Conair's chief engineer, an assistant, and Conair president, A. Ludlow Kramer, help raise one section of the vertical steel forms which provide the walls for the unit.

Second from top—Inside view showing installation of steel window and door placements, which can be placed in any position without altering original architectural design or floor plan.

Second from bottom—Rectangular Fiberglas balloon which acts as roof form being secured in place.

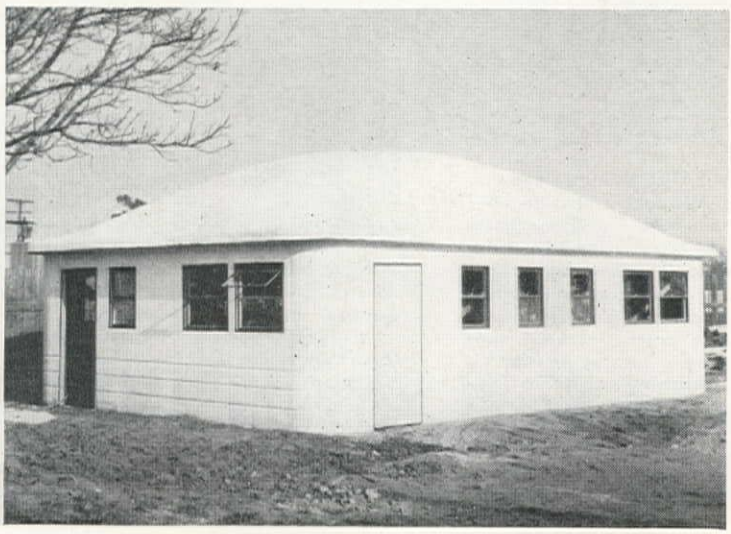
Bottom left—Applying pneumatically projected controlled concrete mix on Fiberglas Balloon roof form to complete the roof.

Bottom right—The completed Conair unit. This first unit was built as a motel unit with four equal-size rooms and with four baths, one entrance being placed on each side of the building.

Conair Sales is now building a series of models of the new-type house in Los Angeles, Palm Springs and other resort areas. The firm is franchising its patented equipment to licensed contractors in various sections of the West.

Used to apply the concrete mix is the Conair gun, described as a combination of both mixer and pneumatic gun. This is a mobile unit which is an improvement on a former model known by the same name. It incorporates a feed for the sand and cement directly into the air line, which is held at constant pressure to insure that the material flows evenly into the hose at all times. Also now perfected is a system for adding the proper amount of water through a metering device which is coupled with the speed of flow of the material so that the amount of water per sack of cement can be determined. A crew of three operates the unit. The entire gun can be dismantled and re-assembled in about 30 min. Pressure in the hose shuts off automatically if there is any serious deviation.

Conair Sales is also experimenting with some other types of low-cost housing. One experiment has been with a sectional all-steel roof frame as an alternate to the Fiberglas balloon roof. The steel forms, fabricated to form an arch, are supported on vertical poles of steel pipe while the Conair gun applies concrete and insulation mix. George Dobson Realty Co. is building a large housing project in Lancaster, Calif., using the new Conair system for all-concrete houses.



Construction Design Chart

CXXII . . . Reinforced Concrete Slabs

By

JAMES R. GRIFFITH
Dean of Engineering
University of Portland
Portland, Ore.

IN ORDER to obtain the full economical advantage of high strength concrete, the allowable stresses in the reinforcing steel should have a corresponding increase. Under certain conditions such an increase is possible: The 1941 A.C.I. Building Code,[1] par. 306-b, states

> "Tension in one-way slabs of not more than 12-ft. span: For the main reinforcement, ⅜ in. or less in diameter, in one-way slabs, 50 per cent of the minimum yield specified in the Standard Specifications of the American Society for Testing Materials for the particular kind and grade of reinforcement used, but in no case to exceed 30,000 p.s.i."

The 1946 Uniform Building Code,[2] sec. 2613, contains an almost identical clause except that it states "Wire mesh or other steel reinforcement, not exceeding ⅜ in. in diameter . . . "

The selection, by the designer, of small size bars for slab reinforcement has its advantages as well as disadvantages. In slab and joist construction, reinforcing mesh or small bars are of distinct value from the standpoint of design. When forced to use larger bars, the maximum allowable spacing will frequently result in an excess of reinforcement as compared to that dictated by theoretical stresses. On the other hand, smaller bars are more difficult to hold in place while pouring the concrete.

The accompanying chart has been designed to take advantage of the high unit stresses permissible under certain conditions. Bar spacings are shown for 6-gage and 4-gage wire which covers the usual mesh reinforcing available. A solution on this chart, as on others of the same type, requires a single straight line from the span through the live load, to the A_s scale. Horizontally opposite the A_s scale intersection, will be found the various bar spacings applicable. In order to illustrate the use and comparative accuracy, I have drawn a solution line on the chart for an 8-ft. simple span with a live load plus protective covering of 70 p.s.f. It will be noted that an effective depth of slightly over 2 in. is necessary and that a 2-in. spacing of 6-gage wire mesh is satisfactory. The load scale includes the dead-load of the slab for the effective depth d, but not for the protective covering. A covering of 1 in. would probably be satisfactory, resulting in an overall depth of 3 in. The allowable live-load on the slab would then be $70 - 12.5 = 57.5$ p.s.f. We would then have

Total D.L. + L.L. $= 57.5 + 37.5 = 95$ p.s.f.

Bending moment, $M = \dfrac{W\,L}{8}$

$$= \frac{95 \times 8^2 \times 12}{8}$$

$= 9{,}120$ in. lb.

For the assumed allowable stresses

$K = 188, \quad p = 0.0070$

$M = K\,b\,d^2$

$$d = \sqrt{\frac{M}{K\,b}} = \sqrt{\frac{9{,}120}{188 \times 12}} = 2.012 \text{ in.}$$

$A_s = p\,b\,d = 0.0070 \times 12 \times 2.012$

$= 0.1690$ sq. in. per ft.

Wire mesh tables give, for 6-gage wire at 2-in. spacing, a value of $A_s = 0.174$ sq. in. per ft. of slab width.

In the August 1949 issue, a similar chart was given for the allowable unit stresses of $f'_c = 3{,}000$ p.s.i., and $f_s = 20{,}000$ p.s.i. If a solution line is drawn on that chart for the same assumed conditions as used above, the following requirements will be noted:

Effective depth of slab, $d = 1.8$ in., which would probably be made 2 in.

Reinforcing, $A_s = 0.29$ sq. in. per ft.

Thus, under those stress limits, it would be necessary to increase the reinforcing to ¼-in. round bars at 3½-in. spacing.

I would personally be rather hesitant to utilize such high unit steel stresses in a structure of uncertain live loads. On the other hand, there are many instances where such an increase would be entirely justified.

[1] *Building Regulations for Reinforced Concrete*, American Concrete Institute.

[2] Pacific Coast Building Officials Conference.

NEWS OF WESTERN CONSTRUCTION

AUGUST 1950

Start of Construction on $31,000,000 Albeni Falls Dam Scheduled for 1951

PRELIMINARY investigation work is now under way at Albeni Falls Dam, according to Colonel E. C. Itschner, District Engineer of the Seattle District, Corps of Engineers. The dam site is located on the Pend Oreille River 2 mi. east of the Idaho-Washington state line and 4 mi. west of the city of Priest River, Idaho. A survey crew is now working in the area and two drilling crews are doing subsurface exploration work, taking samples of the foundation materials at the site.

The dam will be founded on a granite reef which crosses the river. It will serve the multiple purposes of power, flood control, navigation, recreation, and fish and wildlife conservation. Cost of the project is estimated at $31,070,000. The structure will have a total length of about 1,100 ft. with the spillway section occupying the channel to the left of an island at the site and the powerhouse occupying the channel to the right. The structure will be a concrete gravity-type dam with a submerged spillway 90 ft. high and 700 ft. long. The powerhouse structure will be 380 ft. long and serve as a non-over-flow abutment. The plant has a normal gross head of 22 ft. The hydroelectric installation will consist of three Kaplan turbines with combined rating of 58,800 hp., driving generators with a total rating of 42,600 kw.

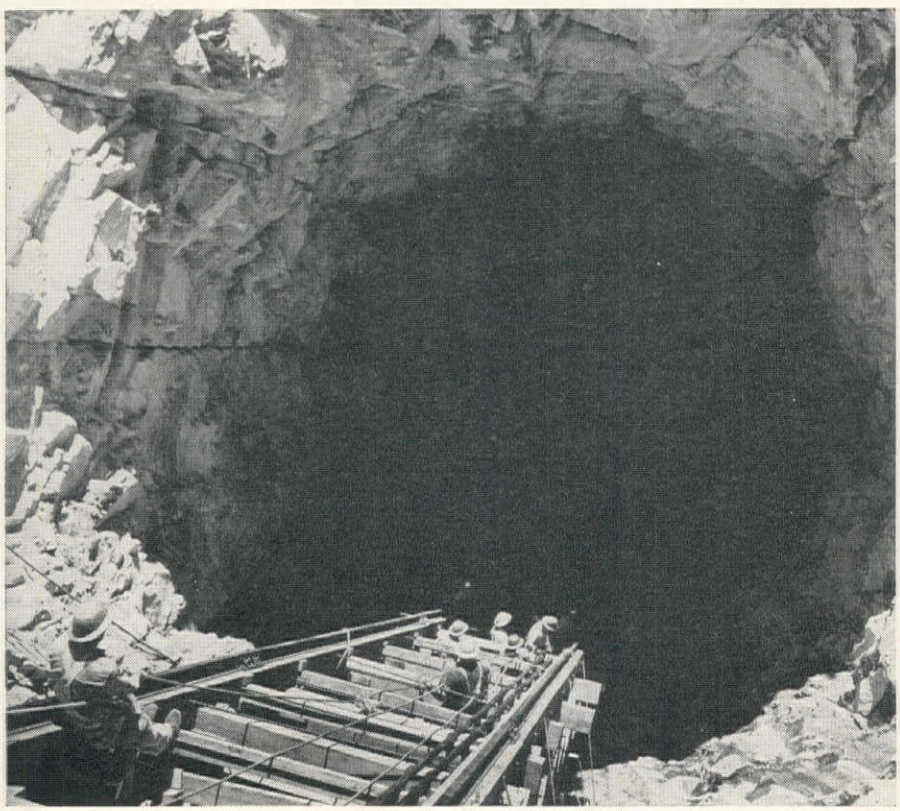
Albeni Falls Dam was authorized by Congress in the 1950 Flood Control Act. Approximately $40,000 has been made available by the Chief of Engineers to begin the preliminary investigation work. No construction funds have been appropriated by Congress. Work tentatively planned for the fiscal year 1951 includes preparation of engineering plans and specifications; acquisition of rights-of-way; construction of access roads, power line and field office; placement of spillway cofferdams; beginning construction of spillway and abutments, and construction of levees at Sandpoint, Idaho.

The construction program is planned to provide 1,140,000 ac. ft. of storage in Pend Oreille Lake by August 1952. The project will reduce flood damages around Pend Oreille Lake by lowering the flood heights up to 1.5 ft. for the highest recorded floods. Substantial recreation and conservation benefits will be provided by stabilizing the level of Pend Oreille Lake during the summer season.

Construction is proposed in order to place two generating units "on the line" in 1954 and the third early in 1955.

VERTICAL RAILWAY INTO HUNGRY HORSE SPILLWAY SHAFT

WORKMEN at the Hungry Horse Project in Montana have built a vertical railway down into the world's highest glory hole spillway. The railway will be used to lower men and material into the spillway shaft during installation of a 2½-ft. thick reinforced concrete lining. Overflow water from the Hungry Horse reservoir will drop a maximum of 490 ft.



Dredge "Colorado" Back At Work After Repairs

THE BUREAU of Reclamation's Colorado River dredge, which sank last November 4 three miles below Needles, Calif., is back in service. The dredge was raised by Government forces last February from a channel 19 ft. deep into which it sank (*Western Construction*, June 1950, page 96). It was returned to the Office of River Control Yard at Needles where it was completely reconditioned. It is now back at work cutting and sucking out a new channel for the Colorado River through the swamp between Needles and Topock. In operation since January 31, 1949, the dredge had excavated approximately 3,000,000 cu. yd. of sand and silt and had completed about 3 mi. of the distance of 12 mi. when it sank.

Several deficiencies in the design and mechanism of the dredge, which are believed to have contributed to the sinking, have been corrected. A special board of technical experts which was appointed by the Bureau's Chief Engineer to review the rehabilitation and present seaworthiness of the dredge, and which has subjected it to a series of gruelling tests, has certified that sufficient stability and free-board are available, that the structure is sound and sturdy, compart-

mentation adequate, pontoons watertight, and that the dredge is satisfactory for service.

The river between Needles and Topock has deteriorated so that instead of a confined river channel there is now an inundated swamp with dense growth of willows, tamarisks, cattails, and similar swamp vegetation. The increased water surface elevations, due to the formation of the swamp, have threatened Needles and the Santa Fe Railroad, located adjacent to the river.

The new channel cut by the dredge is designed ultimately to be 300 ft. wide and approximately 17 ft. deep. Approximately 9,000,000 cu. yd. will have been removed from the channel when the dredge reaches Topock early next year.

Upon completion of the Needles-Topock cut, the dredge will be disassembled and taken to the Cibola Valley, located approximately 145 river miles below Needles, for a similar job there.

A. G. C. Assured Utah Force Account Work Curtailment

INTERMOUNTAIN Chapter of A.G.C. recently met with Governor Lee of Utah to protest against alleged increase in work carried out by the maintenance forces of the State Highway Department. Following extensive discussion of this situation the Governor assured the contractors that this type of construction operation would be kept to a minimum.

In answer to the contractors' complaint, the Governor reminded them that it was necessary and economical for the State to maintain an adequate force for highway maintenance work. During the slack season, this force either had to be disbanded, or maintained by carrying out other phases of highway work which sometimes entailed operations classed as "construction" by the members of the A.G.C. In the opinion of the Governor, it was more logical to maintain the maintenance force than to have it disbanded and subject to the problems of reorganization. He also contended that contractors would not be interested in moving their equipment to most of the jobs handled by the State crews.

Cachuma Dam Contract Awarded Mittry Bros.

CONTRACT for construction of the Cachuma Dam on the Santa Ynez River near Santa Barbara, Calif., has been awarded by the Bureau of Reclamation to Mittry Bros. Construction Co. The bid of $6,722,520 was the low of 11 bidders.

The dam will impound water as part of a project which will provide a supplemental supply to Santa Barbara, several adjacent communities and area under irrigation.

Work is already under way on the project with the driving of the Tecolote tunnel by Halvorson Contractors. The work on this tunnel is reviewed on page 67 of this issue.

DEPRESSED TRAINWAY IN DOWNTOWN EL PASO NEAR COMPLETION

EL PASO'S "Big Ditch," a $5,500,000 project which will eliminate ten street level railroad crossings in the downtown business district, is nearly completed. The low-level trainway, 2,600 ft. long, 25 ft. deep and 45 ft. wide, accommodates three sets of tracks. The railroad companies joined with the city and state to pay for the project. A complete description appeared in *Western Construction*, June 1949, pg. 75.

Columbia River Flood Crests Reduced By Coordinated Control at Reservoirs

POTENTIAL DAMAGES totalling an estimated $5,600,000 were averted on the Columbia River and tributaries during the recent flood crest, by the control of flood waters at thirteen Bureau of Reclamation reservoirs. This estimate is exclusive of damages averted by levees, for which figures are not yet available. Announcement of damages averted was made in a joint statement by Colonel O. E. Walsh, North Pacific Division Engineer of the Corps of Engineers, Portland, and H. T. Nelson, Regional Director of the Bureau of Reclamation, Boise.

The total represents damages averted by control of flood waters at Grand Coulee Dam on the Columbia River, at three reservoirs in the Upper Snake River sub-basin, at two reservoirs in each of the Boise and Payette River sub-basins, and at five reservoirs in the Yakima River sub-basin. The Reclamation reservoirs constitute the bulk of storage space now available for flood control use in the Pacific Northwest.

Grand Coulee Dam controlling Franklin D. Roosevelt Lake was operated by the Bureau on daily requests made by the Corps of Engineers in accord with a three-way agreement by the Bureau of Reclamation, Bonneville Power Administration and the Corps of Engineers, while the twelve tributary reservoirs were operated by the Bureau of Reclamation after daily consultation with the Corps of Engineers.

Except in the case of Anderson Ranch Reservoir now being built on the Boise River, the tributary reservoirs were not built for the control of floods. Consequently their operation for flood control necessarily considered storage for irrigation as the primary objective. Inci-

dental flood control benefits were recognized at the time construction of Grand Coulee Dam was authorized by the Congress, but further legislation is needed to permit full-scale operation of that structure for flood control. Power production at Grand Coulee Dam was not a consideration in limiting the drawdown of the pool in May in advance of the flood crest, although some slight sacrifice of generation was felt. No appreciable adverse effect on the overall power supply in the Pacific Northwest was suffered.

Director Nelson and Colonel Walsh announced approximate reduction in crest stages due to reservoir control as follows:

Columbia River points:	
Vancouver, Wash.	1.9 ft.
Celilo, Ore.	2.0 ft.
Umatilla, Ore.	1.9 ft.
Pasco, Wash.	2.4 ft.
Snake River points:	
Weiser, Ida	1.6 ft.
Milner Dam, Idaho	3.5 ft.
Heise, Idaho	0.9 ft.
Wilson, Wyo.	0.5 ft.
Boise River at Boise, Idaho	1.2 ft.
Yakima River at Parker, Wash.	1.8 ft.

$32,000,00 Sultan River Project Declared Feasible

THE $32,000,000 Sultan River Dam project in Washington has been declared feasible by the Harza Engineering Co. in a report to the Snohomish County Public Utility District. The consulting firm declared the project to be practicable from engineering, geological and financial considerations.

The survey was sponsored by the District to determine the feasibility of building the dam to provide both water and power. The structure would be a concrete arch about 300 ft. high and would involve a 5-mi. tunnel to deliver the stored water to the power plant. The Board recommended that the project be built to provide for an ultimate raise in the dam.

Two Bids for Underground Garage at Pershing Square

TWO BIDS were received for the construction of a garage under Pershing Square in Los Angeles when bids were opened by the City Recreation and Park Commission. The estimated cost of the project is about $5,000,000, and Consolidated Hotels of California, Inc., presented an offer to build the parking station and pay the city annual rental of $15,000. Another bid of City Park Garages, Inc., proposed a rental of $25,000 a year, or 25% of the net income, subject to certain conditions.

This underground garage, which has been discussed in Los Angeles for many years, would tend to relieve down-town parking congestion. It would involve a 3-level underground garage accommodating 1,800 cars, and the contractor would be required to restore the park area after construction.

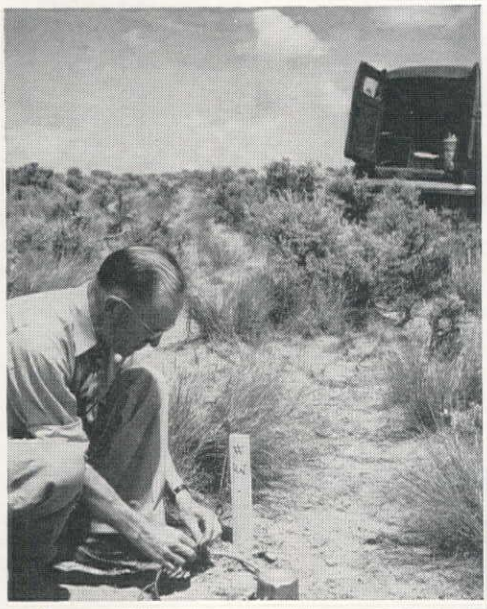
Trucks Carry Hungry Horse Cement During Rail Strike

DELAY in construction of the Hungry Horse dam and power plant was recently averted with completion of arrangements for delivery of cement by truck during the railroad strike.

Construction work on the big multiple-purpose dam and power plant, Bureau of Reclamation officials reported, continued at full speed as a result of emergency arrangements made with the Northern Pacific Railroad, which was not affected by the strike, for delivery of 18 carloads of sack cement daily at Polson, Montana. The cement was transported from Polson to the dam by a fleet of large flatbed trucks. Cement was supplied by the Ideal Cement Co., Trident, Mont., the Spokane-Portland Cement Co., Irvin, Wash., and the Lehigh Cement Co., Metaline Falls, Wash. Truck deliveries direct from Spokane were also continued.

With placement of mass concrete in the dam averaging nearly 5,000 cu. yd. each day, the dam is growing in height nearly a foot a day. The highest blocks in the dam now are 144 ft. above bedrock. When Hungry Horse dam is completed late in 1953 it will tower 564 ft. above bedrock, making it the third highest concrete dam in the world.

Employment at the big Bureau of Reclamation project has passed the 2,200 mark, and probably will increase slightly during the next few weeks as work on the powerhouse and in the reservoir area reaches a peak.



MAN-MADE EARTHQUAKES ON COLUMBIA RIVER PROJECT

EXPLORING foundation material to determine the best tunnel site through the Frenchman Hills south of Quincy, Wash., the Bureau of Reclamation is using portable seismographic equipment. At left, Dart Wantland, geophysicist from Denver, connects up one of 6 geophones (seismic wave detectors). At lower left, a dynamite blast is set off to create seismic waves which are picked up by the geophones. Below, Wantland looks at a seismogram, a record of the seismic waves which will be analyzed to determine depth to bedrock.

Begging Bear Delays M-K

A CINNAMON BEAR and her two cubs are causing delays in a construction project being carried out by Morrison-Knudsen Co., Inc. along a highway in Glacier National Park. The begging bear causes traffic blockades by tourists along the park highway, which result in delays in the hauling of highway materials by the M-K trucks.

RESTORATION to the public domain of some 10,000 ac. of land in Arizona, Wyoming and New Mexico has been announced by the Bureau of Land Management. The land restored had previously been withdrawn for reclamation projects and a power site. The lands are suitable for grazing, but not agriculture.

PERSONALLY SPEAKING

Walter A. Schwarz, until recently resident engineer at Dorena Dam on the Row River in Oregon and an employee of the Construction-Operations Division of the Portland District, Corps of Engineers, for the past 16 years, retired June 30. With an extensive background in construction, he started work with the Corps in 1935. For a year he was director of operations for the Works Progress Administration for the State of Washington. From 1942 to 1943 he was area engineer for the Corps with headquarters at McMinnville, and from 1943 to 1946 he was area engineer at Eugene.

Appointment of **A. Norman Murray** as Regional Planning Engineer for Region 2 (Sacramento, Calif.) of the Bureau of Reclamation has been announced by the region's director, Richard L. Boke. Murray replaces **Stanley A. Kerr** who resigned recently after occupying the post for the past nine years. Murray will head the regional Branch of Project Planning which has the responsibility of investigating and reporting the physical and economic feasibility of water resource development in northern and central California and southern Oregon. Since 1949, Murray has been in charge of engineering phases of the Bureau's water rights investigations in the Central Valley.

H. Gossweiler, engineer for Morrison-Knudsen Co., Inc., is now working on plant layout at Lookout Point Dam near Lowell, Ore.

John S. Mead, formerly chief-of-party for the U. S. Forest Service at Missoula, Mont., has been named forest engineer of the St. Joe National Forest with headquarters at St. Maries, Idaho, where he will be in charge of construction and maintenance engineering.

Fred S. Thomas, consulting engineer of Salt Lake City, Utah, has been named first president of the recently-organized Utah Engineering Council. The council is made up of four engineering organizations (including the American Society of Civil Engineers) and is set up chiefly to provide a medium for cooperative action by its member societies on matters beyond the scope of the individual organizations.

Maurice D. Glessner, formerly office engineer for the Corps of Engineers at Isabella Dam, on the Kern River in California, is now chief of the contract modification and shop drawing section for the Corps at Pine Flat Dam on the Kings River east of Fresno, Calif.

George T. McLean, city engineer of Astoria, Ore., retired July 1. He has been city engineer at Astoria intermittently since 1915. He will continue to live in Astoria and will be available to the city for consulting engineering advice. **Harold Olsvick,** assistant city engineer for several years, succeeds McLean.

Roy V. Sprague, Regional Power Manager for the Bureau of Reclamation at Boulder City, Nevada, retired July 1 after 15 years as a Bureau engineer. Sprague joined the construction department of the Bureau in 1935 on the Boulder Canyon Project and subsequently

SPRAGUE

DOUGLASS

supervised hydroelectric installations in the Hoover power plant. Sprague's duties have been taken over by **Wade H. Taylor,** who has been acting regional power manager since the spring of 1945. **L. R. Douglass,** Assistant Regional Director of the Bureau's Region 3 (Boulder City) since 1944 has been named Acting Director of Power of the Boulder Canyon Project. The position has been vacant since the death of **Carlo P. Christensen** on June 15. **Lloyd J. Hudlow** has been Acting Director of Power since the first of the year when Christensen's final illnes forced him to take a leave of absence.

W. J. Leary of Butte, Mont., has been named construction engineer of the Montana State Highway Department. Leary worked with the department from 1928 to 1940, when he was division engineer at Butte. Since then, he has worked with various engineering organizations at many locations. **E. B. Artin,** former construction engineer for the department becomes state highway maintenance engineer. He replaces **Ray Percy,** who was transferred to Missoula as division engineer.

Gerald B. Miller Co., engineering representatives, announce the removal of offices to 1540 North Highland Ave., Suite 105, Hollywood 28, Calif.

M. E. Bunder, formerly chief of the Missouri Basin Report Staff for the Secretary of Interior at Billings, Mont., is now consulting engineer with Ford, Bacon and Davis., Inc., New York City. He is working with the firm on a contract with the Corps of Engineers for a nation-wide survey on synthetic fuel production from coal, natural gas and oil shale which involves making an extensive survey of the raw material available in the 48 States and Alaska.

Col. L. J. Lincoln, district engineer at Denver, Colo., for the Corps of Engineers, left July 24 to become district engineer at Kansas City., Mo. In the future, work of the Denver area office will be supervised by the Corps' district office at Omaha, Nebr. The number of personnel working for the Corps at Denver is being reduced since there is not enough work in the area to justify maintaining a large staff.

Harold E. Miller, engineer for the Bureau of Reclamation at Denver, Colo., has gone to Athens, Greece, where he is employed by the ECA on design and construction of irrigation works.

OBITUARIES . . .

Frank William Bilger, 81, former principal in many construction firms at Oakland, Calif., including the Oakland Paving Co., died July 9.

Alex C. Fletcher, formerly Superintendent of Roads for Orange County, Calif., for 31 years, died recently. He retired in 1946.

Albert Leighton, 62, president of the Aldon Construction Co., Los Angeles, building contractors, died June 21.

Dewey Shields of Kennewick, Wash., mechanic for contractor Neil F. Lampson, died recently.

Homer C. Hurst, 84, building superintendent for many of the structures erected in San Francisco following the 1906 earthquake, died June 21 after an automobile accident.

Thomas H. Soames, 71, pioneer bridge builder of Vancouver, B. C., died recently. He worked on the erection of Marpole and Lions Gate bridges.

Ted B. Hodges, 44, employee of the Fisher Contracting Co., Phoenix, Ariz., died June 27 of injuries received in a collision of heavy equipment on construction of the Wellton-Mohawk Canal near Yuma, Ariz.

F. D. Sheffield, bridge engineer for King County, Wash., died recently.

SUPERVISING THE JOBS

J. G. Brown is superintendent and **W. A. Ross** is project manager for Fred J. Early, Jr., Co., Inc., contractor for the construction of the $1,567,126 waste disposal facilities at the Hanford, Wash., works, an Atomic Energy Commission project.

* * *

T. E. Irving is superintendent for Ball, Simpson & Irving on a $284,877 California Forest Development highway project in the Sierra National Forest, Madera County, Calif. Other key men are **Dave Montgomery,** labor foreman; **Floyd Anderson,** master mechanic; **Lemuel Jackson,** grade foreman; and **R. W. Bissett,** office manager.

* * *

Howard J. White, contractor of Palo Alto, Calif., has named **George R. Moore** as superintendent for the $1,331,550 tuberculosis hospital to be constructed at Redwood City. Project manager is **Chalmer Mills**; expediting engineer, **Edward J. Lynne,** and foreman in charge of concrete, **Charles Rhamy.**

Left to right—George Moore, Edward Lynne and Charles Rhamy (see accompanying item).

* * *

Glenn "Tex" Morin is superintendent for Colorado Constructors, Inc., for bridge and road realignment at Estes Park, Colo., a $113,000 project.

* * *

Nearing completion is a road grade-raising job on U. S. Highway 34, Grand Lake, Colo., a $135,000 project under contract to Colorado Constructors, Inc. **Max K. Berry** is superintendent.

* * *

Working on the new Veterans Administration Hospital at Salt Lake City for Wunderlich-Curlett-Tomkins, contractors, are: **James Cullen,** project manager; **M. J. Kinsey,** assistant project manager; **N. M. Ninteman,** superintendent; **J. R. Conley,** project engineer, and **Vaden Glenn,** office manager.

* * *

Jack Schwalier is superintendent and **V. G. Harriman** is engineer on the $980,000 gymnasium at Idaho State College, Pocatello. C. H. Elle Construction Co. is the contractor.

* * *

Carl Fonnesbeck is superintendent for L. T. Johnson Construction Co. on the $500,000 Ogden-Uinta highway project at the outskirts of Ogden, Utah.

* * *

Jerry Larkin is supervising construction of the $550,000 Central School building at Brigham, Utah, for M. Morrin & Son.

* * *

Supervising construction of the Holy Cross Hospital at Salt Lake City is **N. B. Jensen.** Talboe & Harlin is contractor on the $1,250,000 job.

* * *

A. E. Flanders is superintendent for Gibbons & Reed Co. on construction of the Jordan River Bridge at Salt Lake City.

* * *

K. J. Young is superintendent for F. E. Young, contractor, on a $279,744 contract for grading and surfacing part of U. S. Hwy. 50 between Spooners and Glenbrook, Nev. Office manager is **H. R. Tucker**; foreman, **I. G. Wiley.**

* * *

Berle Grounds is superintendent on the grading and surfacing of 5 mi. of state highway near Corona, Orange County, a $444,857 project for Peter Kiewit Sons' Co. **"Brad" Lockwood** is job engineer and **Jim Fuller** is office manager.

* * *

John C. Lea is superintendent and **J. E. Jackson** general manager for Broderick & Gibbons Co. for 3 mi. of road work on U. S. Hwy 85-87, a $114,516 project on the north entrance to the Pueblo Freeway, Colo.

* * *

Don Weaver is job superintendent for Ben C. Gerwick, Inc., on construction of a wharf connecting Piers 30 and 32 on the San Francisco waterfront Embarcadero. **Dick Vlach** is engineer and **Howard Harris** is general superintendent on the $1,050,000 project.

* * *

Lester Davis is superintendent and **Edwin Vandervort** is branch manager of the Denver office of Northwestern Engineering Co. for 11 mi. of highway construction on the Midwest-Casper road in Natrona Co., Wyo., a $185,923 project.

* * *

R. W. "Bob" Williamson is superintendent and **Carl Bunderson** assistant superintedent for Jamieson Construction Co., Ltd., on the $484,428 project of clearing and grading right-of-way of the Pacific Great Eastern Railway from Quesnel to Prince George, Canada.

* * *

Working on the $1,392,744 highway project near Los Gatos, Santa Clara County, Calif., for Guy F. Atkinson Co. are: **E. V. McClure,** project manager; **Ernest G. Gressot,** excavation foreman, and **R. D. Alexander,** superintendent.

* * *

Roy Johnson is project manager and **Frank Lindloff** is superintendent on a $10,000,000 housing project under construction at Fort Richardson, Alaska, by Lewis Construction Co., Seattle.

* * *

Leonard Thomas is project manager for the construction of a $330,000 theater at Anchorage, Alaska, under contract to J. B. Warrack Co.

* * *

Harry Walker is superintendent of all operations and **Russell Cuillard** is master mechanic on work in the Salt Lake area for Utah Construction Co.

* * *

I. W. Breunsbach is project manager and **H. C. Washburn** superintendent for Peter Kiewit Sons' Co. on construction of bridge piers now nearing completion on the Cowlitz River near Kelso, Wash., a $200,000 project.

* * *

George F. Spiegelberg is project manager on the $320,000 addition to the Ivinson Memorial Hospital, Laramie, Wyo., now nearing completion. **Hans H. Vogt** is general foreman and **T. E. Tolly** is masonry foreman for the Spiegelberg Lumber and Building Co.

* * *

Arnold Dehn is superintendent and **H. A. Voges** is office manager for Sharp and Fellows Contracting Co., constructing a $230,428 bridge across the Rio Grande at San Antonio, N. M.

* * *

Joe Thomas is superintendent and **J. Lindsey** is timekeeper on the construction of the $1,500,000 Sears, Roebuck & Co. store at Van Nuys, Calif., for Haddock Engineers, Ltd.

* * *

Frank Kitsman is superintendent for American Pile Driving Co., Everett, Wash., for construction of a $105,990 bridge and highway grading and surfacing near Patterson Lake, Thurston County, Wash.

* * *

Dean Skinner is project manager and **J. C. McMillan** is general superintendent for the contract firm of T. C. Cage and

Dean Skinner on a $959,290 Texas highway job. **James Brown** is assistant superintendent on the Travis County project. **Dean Skinner** is also project manager on the $2,000,000 dam to supplement Dallas' water supply at Lake Dallas, Texas; **Herbert Skinner** is general superintendent.

* * *

S. Sarmento is supervising interior and exterior remodeling of a San Francisco plant into a Trade and Industrial Institute for the city, being contracted by S. J. Amoroso Construction Co. Others working on the $1,062,742 project are: **B. McAntire,** assistant superintendent; **A. Sarmento** and **M. Morgan,** foremen.

* * *

C. C. Baldwin is superintendent for the joint-venture project of Baldwin Straub Corp. and Industrial Construction and Maintenance Division of California Steel Products Co., constructing a water treatment plant in Eureka, Calif. **R. Roberts** is pipe foreman; **A. McClellan,** general carpenter foreman, and **F. Carr** the master mechanic on the $434,705 plant.

* * *

A. O. Strandberg is project manager and **R. H. Madsen** is assistant project manager for Morrison-Knudsen Co., Inc., and Peter Kiewit Sons' Co. (a joint venture) on the construction of a $1,487,043 industrial project at Coulee Dam, Wash.

* * *

N. D. Robinson is superintendent for Union Construction Co. on a $165,161 highway project in Glacier County, Mont. **E. A. Taylor** and **R. D. Buckingham** are foremen for the project, which is located on the Birch Creek-Browning highway.

* * *

Working on a $1,352,381 dormitory, to house 400 co-eds at Washington State College, Pullman, for the Sound Construction & Engineering Co., are **Charles Zeigler,** superintendent; **Cliff Robinson, Harold Scott,** and **Dale Rothfus,** assistants, and **Tom Watkins** and **H. Russell,** engineers.

* * *

Working as superintendents for the same contractors, J. R. Canion Construction Co. and Rex D. Kitchens Construction Co. (joint venturers), are **L. E. Meredith** and **J. Ross Canion** on two different Texas highway projects contracted at $125,000 and $68,000, respectively.

* * *

Ken Ethridge is job superintendent for Pioneer Constructors, Inc., for widening and resurfacing existing pavement on the Tucson-Nogales highway in Arizona, a $241,965 project. **T. E. Moore** is vice-president and general superintendent of all operation for the firm.

* * *

Fred Singleton is general superintendent, **Cecil Rahn** is crushing superintendent, and **Robert E. Lepley** field clerk for Northwestern Engineering Co. for road work on State Hwy. 10 in Mineral County, Colo., a $272,760 project.

* * *

Kenneth Baird is superintendent on the $375,000 grading and surfacing project on the Moran-Yellowstone Approach road in Teton County, Wyo., for J. J. Dooling, contractor.

* * *

William N. Woodall is job superintendent for Morrison-Knudsen Co., Inc., for a $297,494 highway construction project on the Boise-Stanley highway in Idaho. **John Pollock** is office manager; **Jim Larney,** engineer; **Sonny Welsh** and **Harry Woodall,** shift superintendents.

* * *

For Morrison-Knudsen Co., Inc., on a $378,741 road widening project in Glacier Park, Mont., **George Rothwell** is job superintendent; **W. B. Aronow** is assistant superintendent, and **Paul Moehlenpah,** office manager.

* * *

David Persson has been named superintendent for the construction of two concrete abutments and five piers for a steel railway bridge on the Middle Fork of Willamette River at Jasper, Ore. Others working on the $204,005 project for F. W. Case Co., Van Nuys, Calif., are **F. W. Case,** as project manager, and **Robert E. Benson,** chief engineer.

* * *

Jess Dockery is superintendent for Wylie Bros. on a $181,433 grading and paving project near Lovington in Lea County, N. M. **Marvin Galloway** is foreman and **Tom Wethehust** is project clerk on the 16-mi. job.

* * *

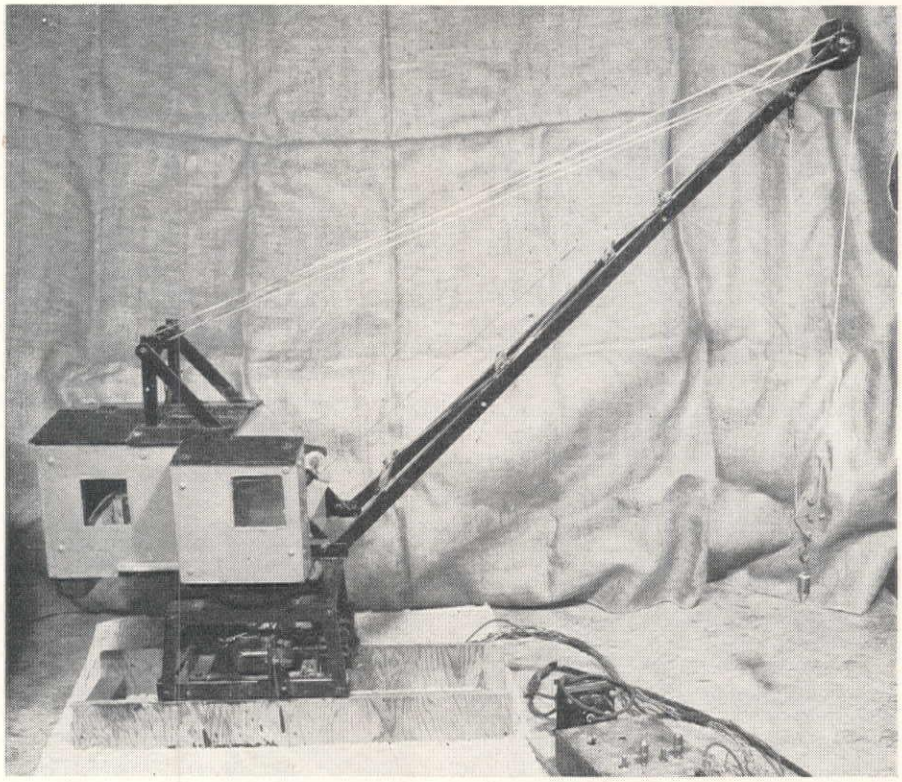
Emmett R. Steeples is superintendent and **Wallace L. Hunt** is engineer for Utah Construction Co. on a $242,079 contract for constructing two railroad and two highway bridges along the Columbia River in Washington.

* * *

Hubert T. Myers is superintendent and **Joe Townley** is office manager for Nomellini Construction Co. on construction of a $450,000 Reno high school, nearing completion.

* * *

Western Contracting Corp., Sioux City, Ia., has named **L. Garland Everist** as project manager, **Carl Collins** as general superintendent, and **M. E. Setzekorn** as project engineer for the $7,208,-



MECHANIC AT DAVIS DAM BUILDS WORKING MODEL OF GANTRY CRANE

JAMES DELL, heavy-duty mechanic for Utah Construction Co. at Davis Dam, has built a model gantry crane that makes all the movements of a real crane. Although it is not an exact reproduction of a standard crane, the cab of scrap Masonite is patterned after that of a Clyde Whirley. Dell had planned to build such a model for many years, and finally succeeded in picking up necessary materials when he worked for Aircraft Conversion Corp. on the junking of obsolete war planes. He collected four surplus 24-volt reversible electric motors, numerous pulleys, wheels and scrap aluminum. Most expensive item used in the model is a transformer which cost $10. Movements of the crane are controlled from a remote-control switch box on ordinary AC current through the transformer. Dimensions of the model are: house, 9 x 14 in. x 8 in. high; boom, 3 ft. The model is mounted on an 8-in. circle and travels to and fro on 2-ft. wooden tracks. Overall height to top of gantry is 19 in. Dell says that any mechanic with a little knack and a few common tools can build one for a few dollars.

896 Fort Randall Dam project, located near Lake Andes, S. D. Fort Randall Dam is being built for the Corps of Engineers.

* * *

J. A. Troxell is superintendent for Lee Hoffman, contractor, for construction of five piers on the Marion Street Bridge over the Willamette River, Marion and Polk Counties, Ore. Other key men on the $246,570 project are: **O. J. Brown,** assistant superintendent; **W. P. Siler,** framing superintendent, and **J. R. Merrill,** timekeeper.

* * *

F. F. Prendergast is acting as project manager for Shannahan, Inc., Los Angeles, reconstructing the Santa Fe railway bridge at the San Diego River channel crossing in San Diego. **Barney Bissett** is job superintendent on the $329,762 project.

* * *

Fred G. Peterson is project manager for Winston Bros. Co. for its $2,389,350 Carter Lake Reservoir project near Berthoud, Colo. **Glenn G. McAfee** is general superintendent and **Ray L. Wahl** is office manager on this project which is part of the Colorado-Big Thompson Project for the Bureau of Reclamation.

* * *

R. W. Blanchard is superintendent for Blanchard Bros. Construction Co. on a road construction job on U. S. Hwys. 6 and 24 near Wolcott, Colo.

* * *

Floyd Baker is superintendent for Baker & Burgwin Construction Co. on a $150,000 road realignment state highway project between Grand Junction and Fruita, Colo., subcontracted from Northwestern Engineering Co.

* * *

Jack Cook is superintendent and **Emil J. Herzog** is office manager for Schmidt Construction Co. on its $356,000 road construction job on State Hwy. 13 near Rifle, Colo.

* * *

W. C. Rhoads is general superintendent for Horner & Switzer, concrete subcontractors under Utah Construction Co., for the $10,000,000 Bonny Dam near Hale, Colo. Other key men on this Bureau of Reclamation project are: **C. W. Boulden,** assistant superintedent; **C. R. Skidmore,** master mechanic, and **R. R. Carr,** office manager.

* * *

Sam Gillotti is general superintendent and **Bob Read** is general foreman for Read Construction Co., Inc., for its concrete paving project on U. S. Hwy. 85, Greeley, Colo.

* * *

Knox Pharis is general superintendent on construction of the Memorial Hospital in Loveland, Colo., by the Johns Engineering Co.

* * *

Vern Troy is project manager and **Selmer Rue** is general superintendent for the Roy E. Thompson Construction Co. constructing an addition to a school gymnasium at Belfry, Mont.

* * *

C. C. Daniels is general superintendent for Daley Construction-Acme Materials Co., Inc., on a $140,446 contract for improvements on the Ashfork-Flagstaff highway near Williams, Ariz., now nearing completion.

* * *

Roy Chinnici is superintendent for United Concrete Pipe Corp., working on its $1,577,900 Bureau of Reclamation contract for constructing the Wellton-Mohawk Pumping Plants Nos. 1, 2, and 3, Wellton-Mohawk Division, Gila Project, near Yuma, Ariz.

* * *

ERB

Marlin L. Erb is job superintendent on the $3,500,000 housing project at Moses Lake Air Force Base, Washington, for Nelse Mortenson, Seattle. **Frank V. Henderson** is general superintendent and **J. J. Reynolds** is engineer on the 400-home project.

* * *

For the $737,153 award for construction of sedimentation basins and appurtenances and installing machinery near 34th and Wood Streets in Oakland, **Al Cantor** is job superintendent; **B. Howell,** office manager; **John Ford, Jr.,** and **P. Lally,** engineers. Ben C. Gerwick Co., San Francisco, and George Pollock, Sacramento, are the contractors.

* * *

J. L. Johnston is the job superintendent and **A. F. Jackson** the grade foreman for a $438,024 highway project in Latah County, Utah. Max J. Kuney, Spokane, Wash., is the contractor.

* * *

Hall-Atwater Co., Seattle, has appointed **Frank Floyd** as job superintendent and **Harold Cox** as job engineer for a military project in Clallam County, Wash., a $870,501 project.

* * *

J. A. Webb is job superintendent and **Sig Mahlum** construction foreman for the construction of a concrete and steel bridge in Sweet Grass County on the McLeod-Big Timber state highway, Montana, a $46,507 contract held by McLaughlin Construction Co., Livingston, Mont.

* * *

Ruben Bailey is job superintendent for Robert E. McKee Co., Los Angeles, for the $1,735,700 building construction project at Chino State Prison, Chino, Calif. **Ray Smith** is engineer for the project and **O. L. Wylie** is project manager.

* * *

E. Frost has been named superintendent for N. M. Ball Sons for construction of a reinforced concrete bridge and highway paving, located south of Fort Tejon in Los Angeles and Kern Counties, Calif. Foremen on the $1,662,724 project are: **H. Davidson, George Welton, H. Bambower,** and **L. Ferdig.**

* * *

Grant Connor is job superintendent and **Albert J. Baer** is office manager for Hansen & Parr Construction Co. on construction of a $392,604 steel and concrete bridge over the Clark Fork River in Sanders County, Mont.

* * *

Bernie Prentiss is superintendent on the construction of $1,073,000 state office building at Cheyenne, being contracted by Riedesel and Lowe Construction Co. **Robert Reiman** is general superintendent and **Claude Weisner** is steel superintendent.

* * *

Frank E. Peters is general superintendent for Wunderlich Construction Co. on the $4,000,000 Colorado-Big Thompson Project tunnel, being built near Loveland, Colo., for the Bureau of Reclamation.

* * *

Ray Spangler is project superintendent, and **R. A. Russell** and **Carl Jacobson** are assistant superintendents for Fisher Contracting Co. on construction of the Wellton-Mohawk and Gila Canals, Gila Project, Yuma, Ariz. **C. F. Morris** is master mechanic and **Art Talbot** is office manager on the $1,385,463 project.

* * *

Les Borene is job superintendent on the $1,000,000 gymnasium nearing completion on the Flagstaff College campus, Flagstaff, Ariz. W. S. Ford, Kingman, Ariz., is contractor.

* * *

Carl Edwards is superintendent and **Robert Weyher** is engineer for Vincent-Peterson Construction Co., Salt Lake City, for the construction of the $1,200,000 Charleston Apartments in Salt Lake City, Utah.

* * *

Working for Peter Kiewit Sons' Co., Sheridan, Wyo., on the grading, draining and surfacing highway project in Big Horn County, Wyo., a $238,509 contract, are: **Wendell Fredrick,** job superintendent; **William Fraser** and **Ben Oshell,** grading foremen; **Don Smith,** labor foreman; **Don Armstrong,** master mechanic; and **Leonard Lane,** office manager.

* * *

Philip N. Richey is job superintendent for Richey Construction Co., St. Johns, Ariz., for road construction costing $108,460 on the Eagar Highway in Alpine County, Ariz. **Morgan Harper** is in charge of all trucks and drivers on the project.

* * *

Dick Gardner is superintendent for Gardner Construction Co. on construction of a $70,000 bridge on U. S. Hwy. 40 near Watkins, Colo., a steel bridge to replace the old wooden structure.

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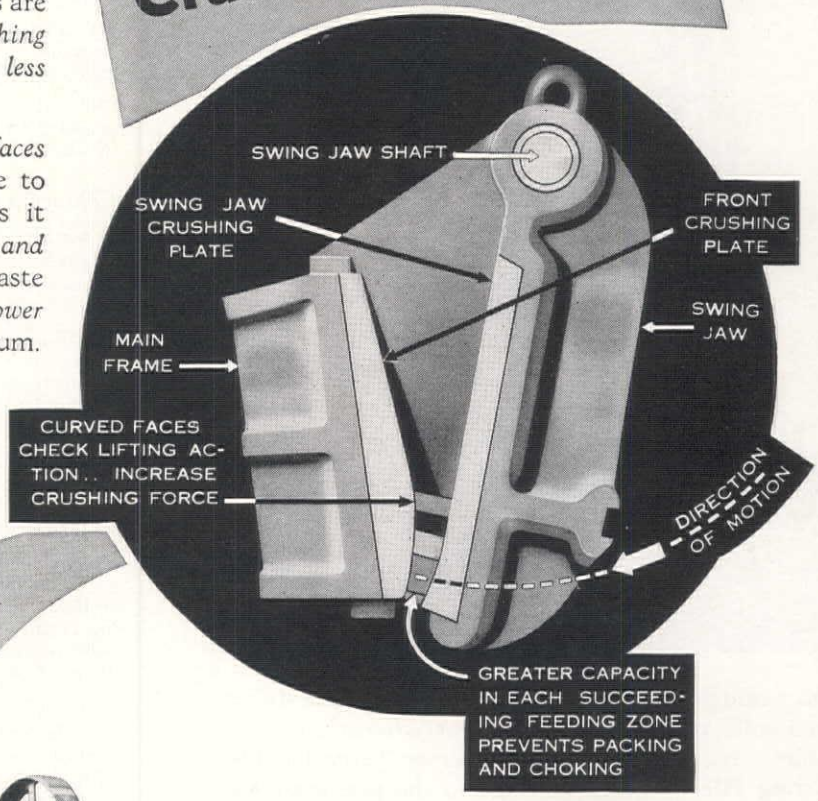

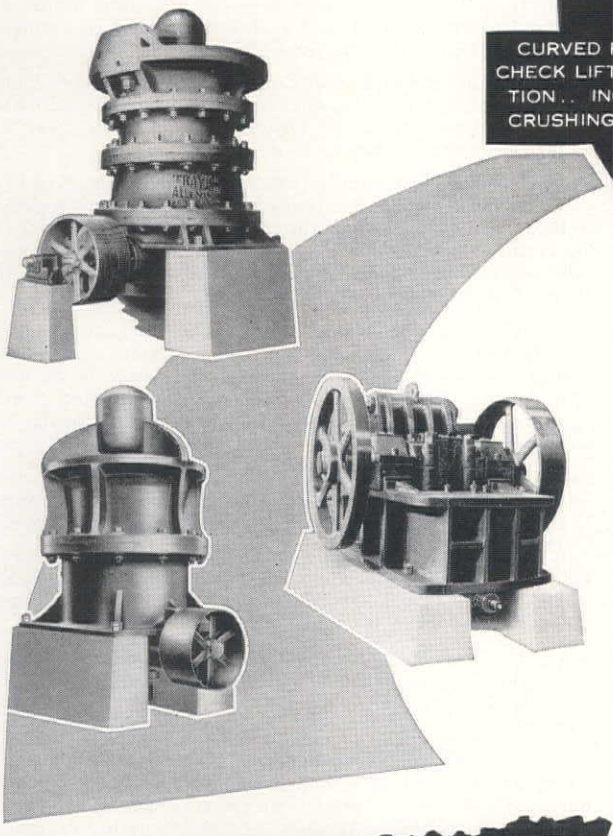

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Contracts . . .

A Summary of Bids and Awards For Major Projects in the West

Arizona

$242,652——**Howard P. Foley Co.,** Box 2435, Salt Lake City——Low bid for structural and electrical work on Tucson substation, Davis Dam Project; by Bureau of Reclamation.

$189,931——**Packard Contracting Co.,** 601 Luhrs Tower, Phoenix——Low bid for grading and draining 1⅔ mi. over a new alignment near Rose Peak in Greenlee County.

$624,000——**Riverside Cement Co.,** 621 S. Hope St., Los Angeles——Contract for furnishing Portland cement for construction on Wellton-Mohawk Division, Gila Project; by Bureau of Reclamation.

$192,199——**San Xavier Construction Co.,** Box 1031, Tucson——Low bid for realigning and surfacing 1.8 mi. on Phoenix-Tucson highway, Pima County.

$489,631——**Vinnell Co., Inc.,** Box 6064, Phoenix——Low bid for grading and draining over a new alignment, approx. 8.2 mi. on Wickenburg-Kingman highway.

California

$1,000,000 approx.——**Cahill Bros., Inc.,** 206 Sansome St., San Francisco——Contract for building a 5-story reinforced concrete and structural steel office building at Kearny and California Sts., San Francisco; for Home Insurance Co. of New York.

$7,258,177——**Clinton Construction Co.,** 923 Folsom St., San Francisco——Contract for construction of a 12-story reinforced concrete and structural steel hospital teaching building at the Medical Center of University of California, San Francisco; by the Regents of University of California.

$969,662—**Concrete Conduit Co.,** 899 La Cadena Ave., Colton——Contract for construction of earthwork, pipe lines, and structures for the Friant-Kern Canal Distribution Systems, near Lindsay, Tulare County; by Bureau of Reclamation.

$327,987——**T. E. Connolly, Inc.,** 461 Market St., San Francisco——Low bid for construction of an earthfill dam, together with spillway, outlet works and appurtenances, and relocation of existing county road around the dam; located on Novato Creek 4 mi. west of Novato, Marin County; by District Board of Northern Marin County Water District.

$450,000——**Dinwiddie Construction Co., Inc.,** 210 Crocker Bldg., San Francisco——Low bid for construction of a steel frame building, covered with protective metal siding, to be used for a new Atomic Energy Commission research project; on site of former Naval Air Station, Livermore; by California Research and Development Co.

$340,711——**Eaton and Smith,** 715 Ocean Ave., San Francisco——Contract for removing streetcar tracks in San Francisco, on Lincoln Way from Arguello Blvd. to 48th Ave.; by City and County of San Francisco.

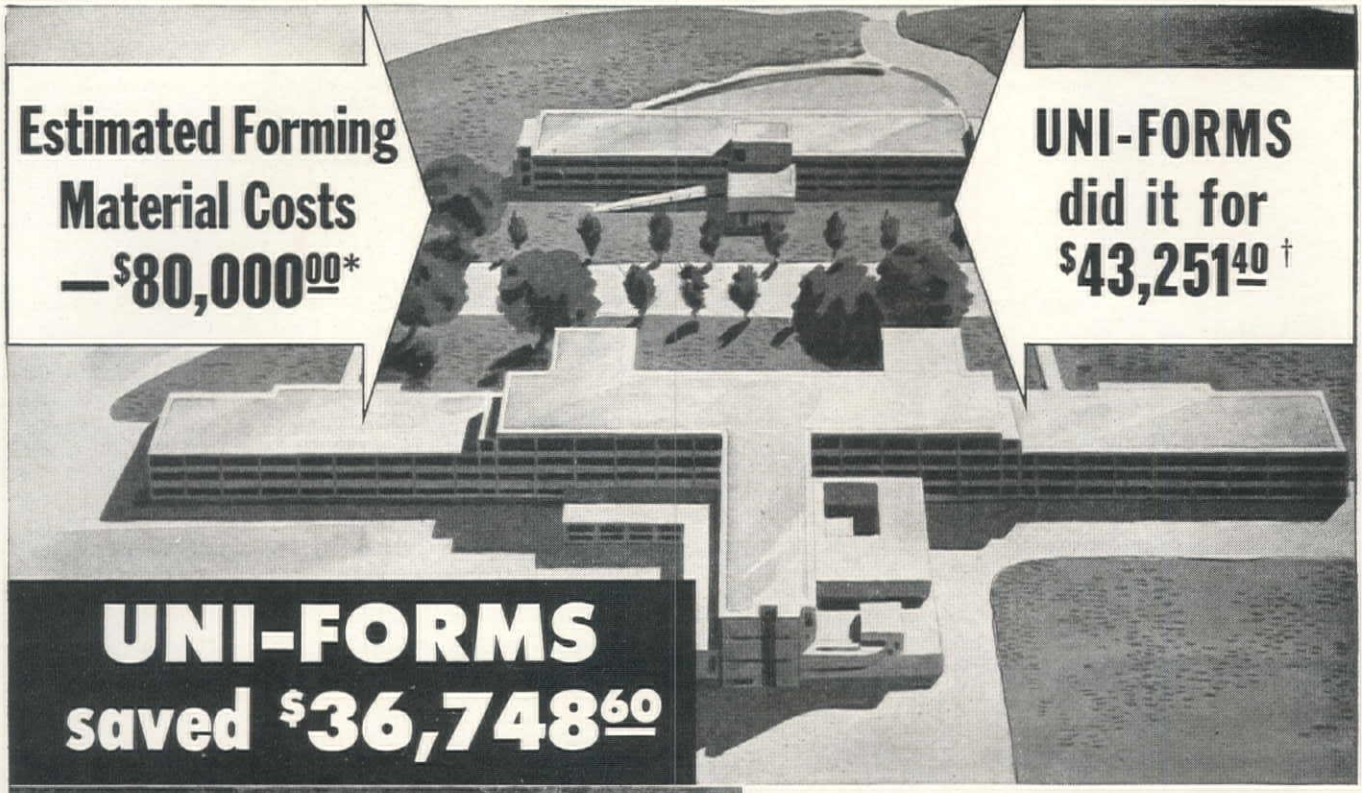
$286,925——**S. C. Giles and Co.,** 3501 N. Commerce St., Stockton——Contract for construction of permanent vista house at Shasta Dam; by Bureau of Reclamation.

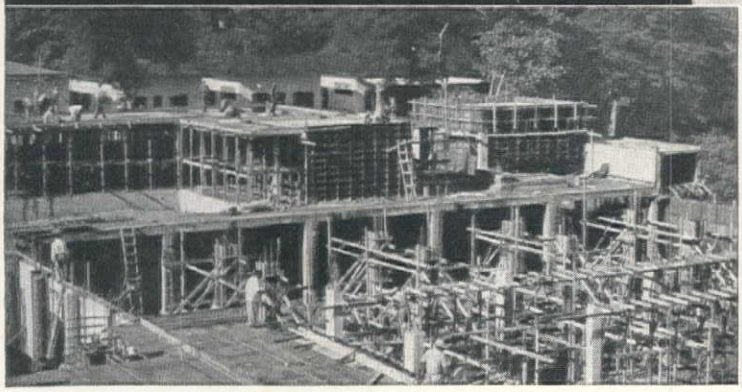
$691,205——**Griffith Co.,** 1060 So. Broadway, Los Angeles——Low bid for construction of 4-lane divided highway between Cabrillo Freeway and Fairmount Ave. extension, San Diego County.

$731,827——**Griffith Co.,** 1060 So. Broadway, Los Angeles——Contract for building a reinforced concrete bridge, grading and paving 5.8 mi. with Portland cement concrete, applying plantmix surfacing to existing pavement, and constructing drainage structures; all in Kern County between Famosa Underpass and McFarland.

$1,110,000——**Herman Co.,** 417 S. Hill St., Los Angeles——**R. M. Price Co.** and **O. B. Pierson,** 2285 Pinecrest Drive, Altadena——Both companies bid low at the same price for constructing a reinforced concrete bridge and steel girder timber deck bridge over Los Angeles River at Rosecrans Ave.; contract to be awarded by Board of Supervisors of Los Angeles County.

$758,790——**Hoagland-Findlay Engineering Co.,** 3254 Cherry Ave., Long Beach——Low bid for construction of three sewage





TUBERCULOSIS HOSPITAL, Rio Piedras, Puerto Rico
ARCHITECT: Isador Rosenfield
CONTRACTORS: Mendez, Grillasca, Nolla, Galib and Marquez, Inc.

UNI-FORMS built this 800 bed hospital in record time . . . formed walls, slabs, beams, columns, tunnels, retaining walls . . . and saved $36,748.60 in forming material costs alone!

UNI-FORMS reached the job ready to use . . . provided faster, smoother forming cycles . . . labor costs were ½ the estimate . . . possible only with UNI-FORMS!

You can use UNI-FORMS . . . to form *any* type of concrete . . . to save time, labor and material . . . to assure more profit on every yard of concrete you pour.

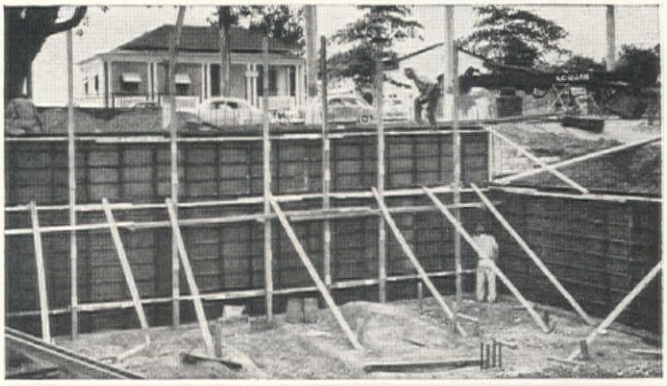
BILL OF MATERIAL FOR FORMING CONCRETE ON TUBERCULOSIS HOSPITAL, RIO PIEDRAS, PUERTO RICO

***ESTIMATED:**

1,000,000 Bd. ft. of lumber required for forms, walers, alignment, etc., @ $ .10 per Bd. ft.	$100,000.00
LESS 20% lumber salvage	20,000.00
TOTAL ESTIMATED COST	$ 80,000.00

†UNI-FORM COSTS:

22,500 sq. ft. of UNI-FORMS	$ 37,256.80
400,000 bd. ft. alignment and bracing lumber actually used	40,000.00
SHIPPING UNI-FORMS TO JOB	3,800.00
	$ 81,056.80
Less Contractor's valuation of UNI-FORMS at end of job. 80%	$ 29,805.40
LESS 20% LUMBER SALVAGE	8,000.00
TOTAL ACTUAL MATERIAL COST	$ 43,251.40



UNIVERSAL
Form Clamp Company
Founded 1912
1238 N. KOSTNER • CHICAGO 51, ILL.

treatment plants, in Eureka, Humboldt County; by City of Eureka.

$3,333,156——**Peter Kiewit Sons' Co.**, Box 965, Delano, Calif. ——Low bid for construction of earthwork, concrete lining, and structures on the Friant-Kern Canal, Central Valley Project; by Bureau of Reclamation.

$253,314——**Charles MacClosky Co.**, 112 Market St., San Francisco, and **Harms Bros.**, joint venturers——Low bid for building a section of graded highway, applying plantmix surfacing to crushed rock base, 2 grade separation structures, excavating a drainage ditch; for freeway of State Hwy. 6 over U. S. Hwy. 99, in Yolo County.

$1,931,343——**Theodore G. Meyer**, 200 Quint St., San Francisco ——Low bid for building the Ping Yuen Housing Project, to include three 6-story elevator-type structures containing 234 dwelling units, in San Francisco on Pacific Ave., between Kearny and Powell Sts.

$6,717,660——**Mittry Construction Corp.**, 4801 San Fernando Rd., W., Los Angeles——Low bid for construction of the Cachuma Dam on Santa Ynez River in Santa Barbara County; by Bureau of Reclamation.

$302,374——**George W. Peterson**, 6314 Santa Monica Blvd., Los Angeles, and **Jack W. Baker**, 4110 Fountain Ave., Los Angeles, a joint venture——Low bid for building a reinforced concrete box girder bridge, grading and paving road connections, over Hollywood Freeway at Wilton Place, Los Angeles.

$702,986——**Piombo Construction Co.**, 1571 Turk St., San Francisco——Contract for channel improvement and levee construction, 8.7 mi., along Butte Creek, southeast of Chico in Butte and Glenn Counties; by Corps of Engineers.

$245,889——**Piombo Construction Co.**, 1571 Turk St., San Francisco——Contract for 3.4 mi. of highway improvement on Sonora Pass Highway in Tuolumne County; by Bureau of Public Roads.

$1,518,225——**San Francisco Bridge Co.**, 503 Market St., San Francisco——Contract for deep water channel dredging and levee setbacks along Cache Slough in the Egbert Tract, near Rio Vista, Solano County; by Corps of Engineers.

$196,183——**Westbrook and Pope**, Box 841, Sacramento——Contract for grading and surfacing 1.3 mi. with plantmix surfacing on imported base material, near Lobitos in San Mateo County.

$1,192,078——**Western Contracting Corp.**, Newman——Contract for building earthwork and structures on San Luis Wasteway and reservoir dike, final large contract on the Delta-Mendota canal unit, near Volta; by Bureau of Reclamation.

$420,316——**Clyde W. Wood, Inc.**, Box 620, North Hollywood ——Low bid for grading and paving with Portland cement concrete pavement on bituminous treated subgrade approximately 3.9 mi. of state highway east of The Willows, San Diego County.

Colorado

$242,000——**Platt Rogers, Inc.**, Box 153, Pueblo——Low bid for grading and draining 2.1 mi. of the Boulder-Idaho Springs highway, Boulder County; by Bureau of Public Roads.

Montana

$204,548——**Stanley H. Arkwright, Inc.**, 208 Securities Bldg., Billings——Contract for 5.7 mi. of grading, bituminous surface treatment, and small drainage structures, east of Saco in Valley County.

$236,820——**Birch & Sons**, 314 Ford Bldg., Great Falls——Low bid for constructing 4.8 mi. of the Yellowstone-Glacier-Banff highway, Cascade County.

$184,234——**Elliott Construction Co.**, Omaha, Neb.——Contract for construction of substation and switchyard, including control and protective facilities, and relocating power plant at Fort Peck; by Corps of Engineers.

$287,050——**F. & S. Contracting Co.**, Box 4, Butte——Contract for 7.7 mi. of grading, bituminous surface treatment, roadmix oiling, and small drainage structures on the Philipsburg-Anaconda highway in Deer Lodge County.

$358,649——**McKinnon-Decker Co.** and **O'Neil Construction Co.**, 1520 Hauser Blvd., Helena, a joint venture——Contract for 10.5 mi. of grading, surfacing, and draining on the Babb-Piegan highway in Glacier County.

$187,483——**Nilson-Smith Construction Co.**, Box 1147, Great Falls——Contract for 10.6 mi. of grading, surfacing, and draining on the highway west and east of Kevin, Toole County; by

Bureau of Public Roads and Montana State Highway Commission.

$1,800,000——**Spokane-Portland Cement Co.,** Old National Bank Bldg.——Contract for furnishing 625,000 bbl. cement for Hungry Horse Dam.

Nebraska

$4,726,557——**Vinnell Co., Inc.,** 1145 Westminster Ave., Alhambra, Calif., **Ralph A. Bell,** and **United Concrete Pipe Corp.,** a joint venture——Low bid for constructing Trenton Dam, Frenchman-Cambridge Division of Missouri River Basin Project; by Bureau of Reclamation.

Nevada

$147,781——**Dodge Construction Co., Inc.,** Fallon——Contract for 15.1 mi. of grading, draining, and surfacing on the Garden Pass-Alpha highway in Eureka County.

New Mexico

$700,000 approx.——**ABC Construction Co.,** 14346 S. Lakewood Blvd., Paramount, Calif., and **Armex Construction Co.,** Box 689, Los Alamos——Contract for constructing water supply main for Guaje Water System at Los Alamos; by Atomic Energy Commission.

$1,000,000——**O. G. Bradbury,** Box 1628, Albuquerque——Contract for construction of 60-bed addition to the Presbyterian Hospital, Albuquerque; by Board of Directors of Presbyterian Hospital.

$366,219——**G. I. Martin Construction Co.,** 520 So. Tulane, Albuquerque——Contract for earthwork, pneumatically applied mortar lining and structures for the high line canal; earthwork and structures for the main canal of the Fort Sumner Project; by Bureau of Reclamation.

$232,542——**G. I. Martin Construction Co.,** 520 So. Tulane, Albuquerque——Contract for 11.8 mi. of reconstruction of State Hwy. 20, including grading and draining, between Fort Sumner and Roswell in De Baca County.

$1,157,200——**Robert E. McKee, Inc.,** Box 2848, Dallas, Tex.——Low bid for construction of two large specialized warehouses of one-story reinforced concrete structure, in the South Mesa technical area; by Atomic Energy Commission.

$658,350——**E. C. Pritchett Co.,** Houston, Tex.——Low bid for constructing a steam plant in the technical area at Los Alamos; by Atomic Energy Commission.

$11,209,290——**Utah Construction Co.,** Box 341, Los Alamos, and **C. H. Leavell & Co., Ltd.,** 1900 Wyoming St., El Paso, Tex., a joint venture——Low bid for constructing a two-story and basement chemical laboratory building of monolithic concrete, with structural steel roof framing, insulated steel roof deck, and built-up roof; in the South Mesa technical area; by Atomic Energy Commission.

$1,325,982——**Utah Construction Co.,** Box 341, Los Alamos, and **C. H. Leavell & Co.,** 1900 Wyoming St., El Paso, Tex., a joint venture——Low bid for constructing 22 apartment buildings at Los Alamos; by Atomic Energy Commission.

North Dakota

$921,932——**American Bridge Co.,** First National Bank Bldg., Denver, Colo.——Award for building the 60-mi. Garrison-Washburn-Bismarck 230-kv. transmission line, a part of the Missouri River Basin Project; by Bureau of Reclamation.

$1,222,390——**Continental Co.,** Dayton, Ohio, and **Hallett Construction Co.,** Crosby, Minn., a joint venture——Award for construction of a 230-kv. transmission line linking Bismarck, Dawson, and Jamestown; by Bureau of Reclamation.

Oregon

$379,324——**E. L. Gates & Co., Inc.,** 449 E. 2nd Ave., So., Roseburg——Low bid for 2.1 mi. of grading and paving on the Chrome Plant-Cedar Point section of the Oregon Coast Highway, Coos County.

$1,500,000——**Lane Tower, Inc.,** Eugene——An 11-story apartment building is being built by the owner, in Eugene.

$333,457——**Rogers Construction Co.,** 11760 N. E. Glisan, Portland 16——Award for surfacing and oiling 18 mi. on the Ochoco Highway and on U. S. Hwy. 28; by Bureau of Public Roads.

$292,812——**Rogers Construction Co.,** 11760 N. E. Glisan, Portland 16, and **Babler Bros., Inc.,** 4617 S. E. Milwaukie Ave., Port-

land 2, a joint venture——Award for 11.4 mi. of grade widening and paving between Ontario and Nyssa on the Old Oregon Trail Highway, Malheur County.

$220,932——**T. W. Thomas, Contractor,** Portland——Award for grading and oiling of 3½ mi. on U. S. Hwy. 395 between John Day and Pendleton; by Bureau of Public Roads.

$215,048——**Warren Northwest, Inc.,** Box 5072, Portland 13——Award for grading and paving 2.2 mi. on Pine, Commercial, and Liberty Sts. in Salem, Marion County.

Utah

$141,679——**Carl E. Nelson Co.,** Box 397, Logan——Low bid for 2.4 mi. of plantmix bituminous surfacing on U. S. Hwy. 91 in Logan, Cache County.

$195,314——**Olof Nelson Construction Co.,** Box 413, Logan——Award for 5.9 mi. of plantmix bituminous surfacing and construction of drainage structures on the highway between Richmond and Idaho state line.

Washington

$388,236——**Guy F. Atkinson Co.,** 806 Cascade Bldg., Portland 4, Ore.——Low bid for construction of Soda Lake Dike, 47 ft. high and about 1700 ft. long, southeast of the site of O'Sullivan Dam in the Columbia Basin; by Bureau of Reclamation.

$345,561——**J. N. & M. J. Conley,** 4332 N. E. Royal Ct., Portland, Ore——Low bid for 12 mi. of bituminous surfacing on the Randle-Yakima highway; by Bureau of Public Roads.

$195,061——**N. A. Degerstrom,** 15 E. 32nd Ave., Spokane——Award for 3 mi. of grading, asphaltic concrete pavement, and miscellaneous structures on State Hwy. 11 in the Four Lakes vicinity, Spokane County.

$997,268——**W. B. Edmiston & Sons,** Yakima——Low bid for completing the Yakima Community Hotel at Yakima.

$409,167——**Erickson Paving Co.,** 1550 No. 34th St., Seattle 3——Award for construction of two bridges, grading and draining of 3.6 mi. on State Hwy. 1 in Snohomish County.

$1,450,361——**General Construction Co.,** Box 3244, Seattle 14——Low bid for constructing additions to St. Joseph's Hospital in Aberdeen.

$233,340——**Goodfellow Bros., Inc.,** Wenatchee——Award for grading, light bituminous surface treatment, and asphaltic concrete pavement on the west and east approaches to the Columbia River Bridge at Wenatchee, in Chelan and Douglas Counties.

$272,576——**M. P. & W. J. Halleran,** 416 Virginia St., Seattle 1——Award for 3.5 mi. of grading, draining, and reinforced concrete bridge on the highway between Cowlitz County line and Cedar Creek, in Lewis County.

$199,400——**Heavy Hauling Co.,** Box 327, Astoria, Ore.——Award for 2.4 mi. of clearing, grading, bituminous penetration macadam, and draining on the highway near North Cove in Pacific County.

$250,970——**Intermountain Plumbing Co.,** Box 1652, Boise, Ida., and **Henry L. Horn,** 216 E. Logan St., Caldwell, Ida., a joint venture——Low bid for constructing a water lateral system extending from a point near Adrian to the southern tip of Franklin County; by Bureau of Reclamation.

$167,684——**Peter Kiewit Sons' Co.,** Box 491, Longview——Award for grading, draining, and surfacing 7.1 mi. of the White Pass-Clear Lake highway in Yakima County.

$2,572,544——**Peter Kiewit Sons' Co.,** Box 491, Longview——Award for constructing the first stage of Chief Joseph Dam, located near Bridgeport, Douglas County; by Corps of Engineers.

$654,218——**Larsen Bros.,** 466 Colman Bldg., Seattle 4——Award for rehabilitation of Piers 36 and 37 at Seattle Port of Embarkation; by Corps of Engineers.

$170,682——**Materne Bros.,** 227 Longfellow St., Spokane——Low bid for surfacing and oiling on the Loup Loup Forest Highway near Okanogan; by Bureau of Public Roads.

$180,710——**Tom McCorkle Construction Co.,** Box 2578, Boise, Ida.——Award for placing asphaltic concrete pavement on 15.6 mi. of the Odair-Basin City highway in Grant County.

$217,996——**Tom McCorkle Construction Co.,** Box 2578, Boise, Ida——Award for applying light bituminous surface treatment and asphaltic concrete pavement to 22.7 mi. of highway between Coulee City, Basin City, and Grand Coulee.

$2,000,844——**Morrison-Knudsen Co., Inc.,** 603 Hoge Bldg., Seattle 4——Award for grouting, spillway extensions, and other work on Seattle's Diablo Dam on the Skagit River; by Seattle Board of Public Works.

$225,402——**Northwest Construction Co.,** 3950 Sixth, N. W., Seattle 7——Award for 4.1 mi. of grading, bituminous penetration macadam, and placing of drainage structures, on highway between Buckley and Enumclaw, in King and Pierce Counties.

$242,088——**C. E. Oneal Co., Inc.,** Box 268, Ellensburg——Low bid for grading a section of the Republic-Kettle Falls highway in the northeast section of the state; by Bureau of Public Roads.

$522,261——**Riverman & Sons,** Portland——Award for construction of a new high school building in Coulee Dam; by Bureau of Reclamation.

$382,058——**Scheumann and Johnson,** 1101 Lloyd Bldg., Seattle 1——Low bid for building the O'Sullivan Dam headworks and canal structures, a section of the Columbia Basin Project near Othello.

$512,247——**J. A. Terteling & Sons,** Box 1428, Boise, Ida.——Award for construction of East Canal laterals, including earthwork, asphaltic membrane, lining, pipeline, and structures near Moses Lake; by Bureau of Reclamation.

$878,717——**J. A. Terteling & Sons,** Box 1428, Boise, Ida.——Award for constructing a 17-mi. irrigation canal, known as the second section of Potholes East Canal, and North Scooteney Dike; by Bureau of Reclamation.

$818,089——**J. A. Terteling & Sons,** Box 1428, Boise, Ida——Award for construction of laterals and sub-laterals, including earthwork, asphaltic membrane lining, pipe lines, and structures, in Area W-4 of the Columbia Basin Project; by Bureau of Reclamation.

$547,621——**United Concrete Pipe Corp.,** Box 425, Baldwin Park, Calif.——Award for completing a lateral distribution system, including earthwork, asphaltic membrane lining, pipe lines; and structures, for Irrigation Block 71 of Columbia Basin Project near Ephrata; by Bureau of Reclamation.

Wyoming

$404,927——**Big Horn Construction Co.,** Box 875, Sheridan——Low bid on five jobs (out of six announced), including approximately 70 mi. of state highway construction on the following locations: Green River-Linwood road; Star Valley-Cokeville road, Evanston-Fort Bridger road, Jackson-Pinedale road, and Etna-Alpine road.

$434,071——**W. W. Clyde Construction Co.,** Springville, Utah——Award for grading, draining, base course surfacing, bituminous preservative treatment, and culverts on 10.6 mi. of roadway between Cokeville and Kemmerer in Lincoln County.

$1,011,772——**S. J. Groves and Sons Co.,** 509 Wesley Temple Bldg., Minneapolis 4, Minn.——Award for constructing Big Sandy Dam and dike, an earthfill 70 ft. high, 2,300 ft. long, across Big Sandy Creek near Eden; by Bureau of Reclamation.

$187,000——**Taggart Construction Co.,** Box 560, Cody——Low bid for grading and draining 3 mi. of the Wind River route, Teton County; by Bureau of Public Roads.

Alaska

$3,175,500——**J. C. Boespflug Construction Co.,** 1912 - 4th Ave., Seattle, and **S. Birch & Sons Construction Co.,** Central Bldg., Seattle, a joint venture——Award for constructing 33 eight-family row-type houses at Fort Richardson; by Corps of Engineers.

$8,835,000——**Gaasland Co., Inc.,** 1155 Ellis St., Bellingham, Wash.——Low bid for constructing military installation at Cape Romanzof, Cape Prince of Wales, and Cape Lisburne.

$3,080,000——**Nelse Mortensen & Co.,** 1021 Westlake Avenue North, Seattle 9——Award for constructing the Fairview Manor Apartments at Fairbanks.

$1,530,400——**Sealand Construction Co.** and **Olav Boen Construction Co.,** 3647 Stoneway, Seattle 3, a joint venture——Award for constructing 14 eight-family row-type houses at Eilson Air Force Base, Anchorage.

British Columbia

$738,737——**Jamieson Construction Co., Ltd.,** 914 East Hastings St., Vancouver, B. C.——Award for constructing new track on the P. G. E. railroad extension from Canyon Creek to Prince George.

NEWS of DISTRIBUTORS AND FACTORY BRANCHES

C. W. (MIKE) CRONEY has been appointed regional supervisor for the *Construction Equipment Division of Worthington Pump & Machinery Co.*, to cover the Seattle territory and the Pacific Northwest. He comes to the Northwest from Chicago, where he was on the sales staff of Thomas Hoist Co., Worthington Blue Brute distributor there. Previously, he had had four years experience in the civil engineering field, with the California State Highway Department, with the Corps of Engineers, and in private engineering firms. In his new position, he will cover Oregon, Washington, Idaho, Montana, Utah, as well as Alaska, making his headquarters at Worthington's Seattle office.

☆ ☆ ☆

JIM WOODFORD, manager of the bearing department of the Oakland, Calif., branch of *George M. Philpott & Co.*, recently announced the appointment of ED THEOBALD to cover the northern portion of the San Francisco Bay territory, specializing on bearing sales. JIM MEEHAN, who formerly worked exclusively on equipment sales for George M. Philpott Co. is now handling bearing sales in his territory along with his equipment lines. Meehan works out of the San Francisco office.

☆ ☆ ☆

In line with the increase in the company's business in the San Diego, Calif., area, and to serve customer needs better, *Edward D. Maltby Co.*, manufacturers' engineering and sales representatives for bearings, oil seals, and power transmission equipment, has moved to larger and more centrally located quarters at 745 Fifteenth St. The firm has also substantially increased its San Diego stocks, which include the Durkee Atwood fractional horsepower and multiple V-Belts, and a complete stock of the Fort Worth Steel & Machinery line of sheaves. A recent appointment announced by the San Diego office was that of PAUL A. DENES as a sales engineer. In addition to the San Diego office, the Maltby company maintains headquarters in Los Angeles and branches in Phoenix, Ariz., and in Honolulu.

☆ ☆ ☆

WILLIAM N. ROGERS was recently appointed Western representative of *Chain Belt Co.* of Milwaukee, Wisc., manufacturer of Pumpcrete. He will make his headquarters at the Los Angeles office of the company, maintained at 3838 Santa Fe Ave. In his new position, he will work with distributors of Chain Belt (Rex) construction machinery and lend assistance to users and prospective users of Pumpcrete.

☆ ☆ ☆

Air Reduction Sales Co., a division of *Air Reduction Co., Inc.*, New York, N. Y., has been appointed national distributor for the welding industry of the recently introduced Prepo torch. According to Airco, the Prepo torch gives an instant heat at 2200 deg. F. and permits immediate application of a hot flame for soldering joints, loosening nuts, sweating cable and many other operations. No pre-heating, pumping or priming is required.

☆ ☆ ☆

Several equipment dealers on the West Coast have been appointed as exclusive district distributors for *Vibro-Plus Products, Inc.*, Woodside, L. I., N. Y. These dealers include *Air-Mack Equipment Co.*, Seattle, Wash.; *P. L. Crooks & Co., Inc.*, Portland, Ore.; and *Coast Equipment Co.*, San Francisco. These appointments are made in accordance with the policy of obtaining coast-to-coast representation by reputable distributors for the Vibro-Plus products. Vibro-Plus equipment includes gasoline, electric and pneumatic powered internal vibrators, electrically operated external vibrators, and all types of vibratory equipment including soil compactors, vibratory troughs, etc. Several territories are still available for distributors, and inquiries are invited by the Vibro-Plus company.

☆ ☆ ☆

Contractors Equipment Corp., Portland, Ore., was recently named distributor for *Schramm, Inc.*, covering the Oregon territory. OLIVER JESSUP, president of Contractors Equipment, announced the appointment of ROD MCMILLEN as resident salesman at Pendleton, Ore. He will represent the entire line and will cover Pendleton and vicinity. R. F. BEALS has joined the sales staff in Portland. He will cover the Portland area on industrial equipment.

☆ ☆ ☆

GEORGE W. FLATT, for many years with *Balzer Machinery Co.*, Portland, Ore., is now general credit manager of *Loggers & Contractors Machinery Co.* of Portland.

☆ ☆ ☆

Enterprise Sales Co., Burbank, Calif., manufacturers of Trafficones, has appointed *Cramer Machinery Co.* as distributor for its products in Portland, Ore.

☆ ☆ ☆

JERRY GUTHRIE, formerly of the *Howard-Cooper Co.*, recently joined the sales staff of *Cramer Machinery Co.*, Portland, Ore. His territory for all Cramer lines embraces the state of Oregon. Another recent appointment was that of DAVE HADDEN as parts and service manager. He was formerly with the *Nelson Equipment Co.* of Portland.

☆ ☆ ☆

Cramer Machinery Co., Portland, Ore., was recently appointed distributor for *Byers Machine Co.* of Ravenna, Ohio, for the entire state of Oregon and some adjacent territory.

☆ ☆ ☆

Additional manufacturing equipment and expanded schedules for the production of larger off-the-road tires at its Los Angeles plant have been announced by *The B. F. Goodrich Co.* Among the larger sizes now in production are 14.00 x 24 Rock Logger tires being produced by Goodrich for the first time on the West Coast, according to L. R. KELTNER, plant manager. "Our expansion into larger off-the-road tire sizes at this plant is prompted by a growing demand for such tires from Western construction, mining and logging industries," Keltner reported. Prior to this time, larger size off-road tires for Western use have been manufactured at other B. F. Goodrich plants.

☆ ☆ ☆

Appointment of two new district sales managers is announced by *Turco Products, Inc.*, manufacturers of industrial chemical cleaning compounds. J. "DOUG" CHARTERS, district sales manager of the company's Houston, Tex., division, has been transferred to the Northern California sales dis-

MOORE EQUIPMENT CO., Stockton, Calif., now has a well established branch office and shops at Reno, Nev. (see cut). E. P. Condrey is manager of the branch; Val. Galleron is sales representative; Frank Kern is parts manager, and Bud Ruonavaara is service manager. Among lines handled by the Moore firm are Allis-Chalmers, Baker, Detroit Diesel, Drott, General Motors trucks, Ingersoll-Rand, Koehring, Kwik-Mix, Quick-Way, Tractomotive and Universal Engineering.

WICKWIRE ROPE

A PRODUCT OF CF&I

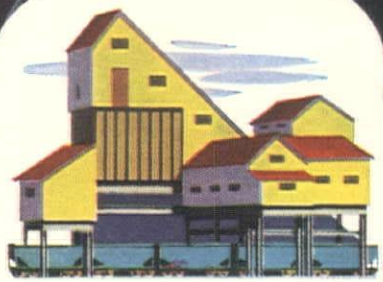
Ask any user . . . you'll find them everywhere

In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's WISSCOLAY® *Pre*formed. It lasts longer — is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope Sales Office and Plant — Palmer, Mass.

IN THE EAST—Wickwire Spencer Steel Div. of C. F. &I.
500 Fifth Ave., New York 18, N. Y.
IN THE ROCKIES—The Colorado Fuel and Iron Corp.
Continental Oil Bldg., Denver, Colo.
ON THE WEST COAST—The California Wire Cloth Corp.
1080—19th Ave., Oakland 6, Cal.

LOGGING

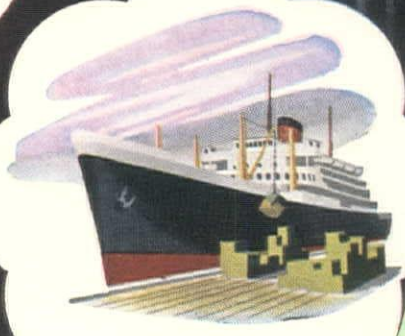
TRANSPORTATION



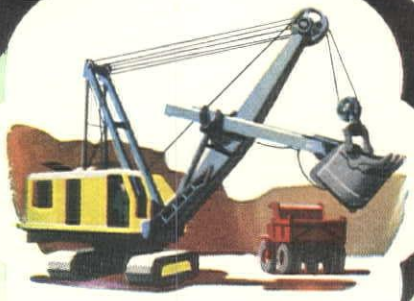
MINING

PETROLEUM

MANUFACTURING



MARINE



CONSTRUCTION

A. E. Brotman

Bitumuls

REG. U. S. PAT. OFF.

has pioneered
MANY PRODUCTS
2. Sand Mix
with Bitumuls
Emulsified Asphalt

An Aleutian transport lands during runway construction. Bitumuls Sand-Mix although only partially cured — supports heavy loads.

"One-man" pavement construction in California with modern mixers. Note Bitumuls non-stop "refueling" from transport.

Florida builds low cost county roads by blade mixing existing sands with Bitumuls.

LOW COST PAVEMENTS from Native Material

Here was an Army Assignment:

"Build 6 big Airports in the Aleutians — in cold, wet weather — and fast. **No** access roads, and sound aggregate not available."

BITUMULS was the **answer.** It mixed easily with the wet existing sand, and cured in record time — Vital factors in repulsing Jap bombers.

Here was a Navy Assignment:

"Pave 1,700,000 sq. yds. of parking area for carrier planes. No local crushed aggregate available. The cost must be **low.**"

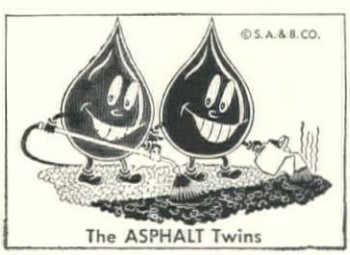
BITUMULS was again the answer. Nine Million Gallons stabilized 350 Acres of local sand—6" Deep. Conventional pavement would have required over **600 trainloads** of imported aggregate—at about three times the cost.

State and County Highway Engineers in the "Sandy" South appreciate the stability and low cost of **BITUMULS SAND MIX PAVEMENT.** In the U. S., there are over 25 million sq. yds. of this type of pavement in use. More is being constructed every year—the reasons:

1—Very Low Cost
2—Use of Existing Road Material
3—Ease of Construction
4—Trouble-Free Maintenance

Ask for our BITUMULS BOOKLETS. They are factual, illustrated, and helpful — a valuable addition to your engineering library.

- Bitumuls Penetration Macadam . . . ☐
- Bitumuls for Maintenance . . . . . ☐
- Bitumuls Sand-Mix . . . . . ☐
- Bitumuls Handbook . . . . . ☐
- Hydropel—Admix for concrete . . . ☐
- Tennis Courts—Laykold & Grasstex . . ☐
- Fibrecoat—roof and metal coating . . ☐



The ASPHALT Twins

Buy Bitumuls & Build Better Pavements

In the West

STANCAL ASPHALT & BITUMULS COMPANY
200 BUSH STREET • SAN FRANCISCO 4, CALIF.
Los Angeles 14, Calif. • Oakland 1, Calif. • Portland 7, Ore. • Tucson, Ariz.

In the East

AMERICAN BITUMULS COMPANY
200 BUSH STREET • SAN FRANCISCO 4, CALIF.
Washington 6, D. C. • Baltimore 3, Md. • Perth Amboy, N. J.
Columbus 15, O. • St. Louis 17, Mo. • Baton Rouge 2, La.
E. Providence 14, R. I. • San Juan 23, P. R. • Mobile, Ala.

trict, with headquarters in San Francisco. He assumes this important post to fill the vacancy resulting from the death of District Manager AL MARTINEZ early in June. "CHRIS" WILLIAMS, who has been assistant district manager in Houston for the past six years, moves into the spot left vacant by Charters' transfer.

☆ ☆ ☆

RAY RODOLF has been named by *Le Roi Company* of Milwaukee, Wis., as its special sales representative in construction and mining equipment. Located in Arcadia, Calif., he will carry out his services to major contractors and other engaged in mining operations all over the United States. Rodolf started in the construction and mining equipment field in Vancouver, B. C., in 1918. He has been active in the field as sales representative ever since, joining the Le Roi Company in March of this year. The firm manufactures "Airmaster" portable compressors, the self-propelled 105 Tractair compressor, Le Roi-Cleveland rock drills, engine and generator sets.

☆ ☆ ☆

L. B. MILLAR, sales manager for *Lee & Thatro Equipment Co., Inc.*, of Los Angeles, recently announced that JOHN SUNDAHL, formerly West Coast representative of the *Mall Tool Co.* and later a field director for War Assets Administration, and R. E. "DICK" SOMMERS, whose background includes fourteen years with the *Harnischfeger Corporation* in New Jersey and later considerable experience in the construction machinery business in Minnesota, have been appointed sales engineers for Lee & Thatro.

☆ ☆ ☆

PAUL S. IRVIN has been appointed service engineer for the *Independent Pneumatic Tool Co.*, of Seattle, headquartering in Portland, Ore., and covering the entire state of Oregon and the five lower counties of Washington bordering on the Columbia River. Irvin was formerly employed by Howard-Cooper Co. in their Seattle branch office.

☆ ☆ ☆

NEWS of MANUFACTURERS

HINE

CLYDE W. WOOD recently announced the appointment of CHARLES R. HINE as general sales manager for *Wood Manufacturing Co.*, manufacturers of Wood roadmixing equipment. Hine has 30 years of experience in the sales and merchandising of heavy construction equipment, including sales direction for the *H. W. Moore Equipment Co.* of Denver and more recently as vice president and sales manager for *Le Roi-Rix Machinery Co.*, Los Angeles. Sales activity will center on Wood mix-in-place equipment, including three traveling roadmixer models, windrow proportioners, spreader boxes and supply tanks, as well as the new Wood Preparizer. Sales will continue to be directed out of the Wood Manufacturing Co.'s main office at 6900 Tujunga Ave., North Hollywood, Calif.

☆ ☆ ☆

V. L. SNOW, domestic sales manager of *The Euclid Road Machinery Co.*, Cleveland, Ohio, has announced the appointment of ALAN S. MCCLIMON as manager of sales development. Prior to joining Euclid as special representative, McClimon was associated with *Mack Trucks, Inc.*, as a special representative for off-highway truck sales. In his new position he will supervise the activities of Euclid field engineers and will assist Euclid distributors and owners with operating data, special designs and applications of Euclid equipment and the development of new markets and models.

☆ ☆ ☆

CHARLES I. DAY, president of *W. & L. E. Gurley*, Troy N. Y., surveying and scientific instrument makers, died June 22 after a long illness. He had been associated with Gurley since 1919, serving as general manager and later as president and director of the company.

☆ ☆ ☆

Appointment of F. F. ROEHLL as national sales manager, *Eutectic Welding Alloys Corp.*, New York, N. Y., has been an-

Continued on page 106

NEWS of MANUFACTURERS

Continued from page 105

nounced by RENE D. WASSERMAN, president. The company manufactures a complete line of welding rods, electrodes and fluxes. Roehll entered the service of Eutectic shortly after the war as a local district engineer in California. After several years of service in the West, he was transferred to the New York office where he served as sales supervisor.

☆ ☆ ☆

PAUL DAVEY, JR.

Election of PAUL H. DAVEY, JR., as vice president in charge of production of the *Davey Compressor Co.*, Kent, Ohio, was announced recently by PAUL H. DAVEY, SR., president. Paul Davey, Jr., has been production manager of the Davey plant for the past two years. Previously he had held a number of other positions in the Davey organization, as he has virtually "grown up" in the compressor business.

☆ ☆ ☆

The election of E. M. PLATTS, sales vice president, to the status of executive vice president of *Joy Manufacturing Co.* of Pittsburgh, Pa., was recently announced. He succeeds to the position left vacant by the death of ARTHUR S. KNOIZEN.

☆ ☆ ☆

Integration of *Boeing Airplane Co.*'s Seattle and Wichita engineering divisions into a single engineering unit was announced recently by President WILLIAM M. ALLEN. Assistant chief engineer N. D. SHOWALTER has been placed in charge of Wichita engineering. While retaining his present position as assistant chief of overall engineering organization, he will become a part of the Wichita management organization and will reside in Wichita. On matters of engineering and technical policy Showalter will report to Seattle engineering management. Under the revised organization, HAROLD W. ZIPP becomes executive engineer of the Wichita Division. GEORGE O. MARTIN becomes chief of the combined B-47 Stratojet engineering projects in Seattle and Wichita. JOHN J. CLARK has been assigned as senior project engineer for the B-47 projects in Wichita.

☆ ☆ ☆

Dedication ceremonies were held on June 22 in Salt Lake City at *General Electric Co.'s* new $500,000 service shop and warehouse. The 40,000-sq. ft. modernistic structure, completed in May, more than doubles the company's former capacity for service and repair of motors, generators, transformers, control devices and assembly of special switchgear, according to L.

Continued on page 107

UNIT BID SUMMARY

Bridge and Grade Separation . . .

Oregon—Lane County—Corps of Engineers—Railroad Bridge

F. W. Case Co., Van Nuys, Calif., with a bid of $204,005, was low before the Portland District, Corps of Engineers, for construction of two concrete abutments and five piers for a steel railroad bridge at the upper crossing, middle fork, Willamette River. The work is part of the relocation of the Southern Pacific Co. Cascade Line at the site of Lookout Point Dam Reservoir. Unit bids were submitted as follows:

(1) F. W. Case Co. $204,005
(2) Guy F. Atkinson Co. 238,263
(3) M. P. Butler 266,340
(4) Lee Hoffman 269,450
(5) Natt McDougall Co. 297,344
— Bates & Rogers Construction Co. $301,944
— General Construction Co. 308,710
— C. J. Montag & Sons 355,690
(6) Engineer's estimate 220,001

	(1)	(2)	(3)	(4)	(5)	(6)
6,000 cu. yd. common excav.	3.50	2.65	7.00	5.00	8.00	1.10
1,600 cu. yd. foundation rock excav.	12.00	5.00	12.00	8.00	15.00	8.40
100 cu. yd. select backfill	6.40	6.00	6.00	9.00	7.50	6.00
7,650 bbl. cement, Portland, Type I	5.50	4.70	6.00	5.00	5.45	4.98
220,000 lb. steel reinforcement, in place	.09	.093	.11	.10	.105	.10
5,100 cu. yd. concrete	19.50	30.60	26.00	32.00	31.00	27.00
4,600 lb. anchor bolts, in place	.40	.28	.40	.50	.37	.34

Washington—Whatcom County—State—Steel and Concrete

C. B. Croy, Bellingham, Wash., with a bid of $19,627, was awarded the contract by the Washington Department of Highways for construction of the California Creek Bridge on the Whatcom County and Drayton Harbor roads. Precast concrete piling will be used. Unit bids were submitted as follows:

(1) C. B. Croy $19,627
(2) Tower Construction Co., Inc. $21,878

	(1)	(2)
137 cu. yd. concrete Class A in place	55.00	65.00
29,743 lb. steel reinforcing bars in place	.11	.105
200 lin. ft. beam guardrail in place	5.00	3.00
8 only bridge drains complete in place	15.00	50.00
1,050 lin. ft. furn. precast concrete piling	4.00	5.00
30 only driving precast conc. piles in place	70.00	75.00
1 only furn. and driv. precast conc. test pile	600.00	550.00
Lump sum, removing existing structure	800.00	800.00

Oregon—Marion-Polk Counties—State—Piers

State Construction Co., Seattle, Wash., with a bid of $228,282, was low before the Oregon State Highway Department for construction of concrete bridge piers on the Marion Street section on the Salem-Dallas Highway. Unit bids were submitted as follows:

(1) State Construction Co. $228,282
(2) Lee Hoffman 246,570
(3) General Construction Co. $250,320

	(1)	(2)	(3)
Lump sum, shoring, cribbing, etc.	$82,000	$110,000	$100,000
2,600 cu. yd. structural excav.	6.50	4.00	5.00
40 cu. yd. struct. excav. below elevations shown	10.00	5.00	10.00
9,700 lin. ft. furn. foundation piling	.65	.90	1.00
298 only drive piles	36.50	80.00	40.00
1,840 cu. yd. Class "A" concrete	50.00	40.00	52.50
220,000 lb. metal reinforcement	.09	.09	.085

Dam . . .

Wyoming—Crook County—U.S.B.R.—Earth and Rockfill

Knisely-Moore Co., Douglas, Wyo., with a bid of $1,667,724, over $400,000 under the engineer's estimate, was low before the Bureau of Reclamation for construction of the earth and rockfill Keyhole Dam, on the Belle Fourche River in northeastern Wyoming. Unit bids were submitted as follows:

(1) Knisely-Moore Co. $1,667,724
(2) Gibbons & Reed Co. 1,904,990
(3) Stolte, Inc. & Ralph A. Bell 1,972,959
(4) Vinnell Company, Inc. 1,983,044
(5) Adler Construction Co. 2,020,593
— Otto B. Ashbach & Sons, Inc. 2,079,027
— Guy H. James Construction Co. 2,092,790
— McLaughlin, Inc. 2,169,832
— C. F. Lytle Co., & Amis Construction Co. 2,184,188
— Northwestern Engineering Co. & Albert Lalonde Co. 2,194,358
— Foley Brothers, Inc. & Edward Peterson Co. 2,235,018
— Malcom Long & Associates $2,360,428
— Utah Construction Co. 2,368,247
— Hinman Brothers Construction Co. 2,599,256
— S. J. Groves & Sons Co. 2,603,785
— Inland Construction Co. & S. Birch & Sons Construction Co., and F. & S. Contracting Co. 2,656,896
— Peter Kiewit Sons' Co. 2,726,157
— J. H. & N. M. Monaghan & Associated Companies 2,840,040
— Grafe-Callahan Construction Co. 3,333,915
(6) Engineer's estimate 2,147,251

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, diversion and care of river during const. and unwatering foundations	$30,000	146,000	$70,000	$85,000	$77,000	$75,000
11,300 cu. yd. excav., all cl. in open cut for outlet wks.	1.25	2.60	1.30	.80	1.00	1.00
3,800 cu. yd. excav., all classes, in tunned and gate chamber	25.50	35.00	26.00	20.00	15.00	27.00
150 cu. yd. excav., all classes, in access shaft	51.00	40.00	40.00	50.00	20.00	40.00
50,000 lb. furn. and placing perm. struct'l.-steel tunnel supports, steel tunnel-liner plates, and steel lagging	.18	.24	.16	.18	.17	.18
25,000 cu. yd. excav., all classes, for dam foundtn. above elev. 4,035 ft., first 25,000 cu. yd.	.43	.75	.40	.75	1.00	.60
71,000 cu. yd. excav., all classes, for dam foundtn. above elev. 4,035, over 25,000 cu. yd.	.30	.50	.25	.70	.30	.50
20,000 cu. yd. excav., all classes, for dam foundtn. below elev. 4,035, first 20,000 cu. yd.	.43	.50	1.00	.70	1.20	.54
67,000 cu. yd. excav., all classes, for dam foundtn. below elev. 4,035, over 20,000 cu. yd.	.32	.42	.90	.65	.50	.55

(Continued on next page)

NEWS of MANUFACTURERS

Continued from page 106

M. STAUFFER, manager of G-E's apparatus department in Salt Lake. The expanded facilities will be used by varied industrial concerns in the Intermountain area of Utah, Idaho, Montana and Nevada. J. A. MCDONALD is superintendent of the service shop and J. C. DAVIS is warehouse supervisor.

☆ ☆ ☆

Minneapolis-Honeywell Regulator Co. will start construction immediately on a new building in Minneapolis to house its aeronautical engineering department. The new engineering building will adjoin the company's aeronautical production plant on Stinson Blvd., according to ALFRED M. WILSON, aeronautical division vice president. It will be a two-story reinforced concrete and brick structure of 80,000 sq. ft. Occupancy is expected Nov. 1, 1950.

☆ ☆ ☆

The election of PAUL C. VAN CLEAVE as vice president—sales, of the *United States Steel Supply Co.*, is announced by L. B. WORTHINGTON, president. Van Cleave also has been elected a director of this warehousing subsidiary of U. S. Steel. For the past year and a half he has been district manager of the Los Angeles warehouse of the Supply Company, and assumed his new duties on July 1, succeeding MARCUS J. AURELIUS, whose election as vice president—sales, *Columbia Steel Co.*, another U. S. Steel subsidiary, was recently announced.

☆ ☆ ☆

Trackson Company of Milwaukee, Wis., announces the appointment of GEORGE M. GRAETZ as works manager, responsible for the manufacturing activities at Trackson's two Milwaukee plants. Graetz was recently works manager for Line Material Co. of South Milwaukee, and previously had been works industrial engineer at the Duluth, Minn., plant of American Steel & Wire Co.

☆ ☆ ☆

DONALD L. HARWOOD has been appointed purchasing agent of *Fairbanks, Morse & Co.*, Chicago manufacturers, according to a recent announcement by FREDERICK J. HEASLIP, vice president in charge of purchases and traffic. He has been in the employ of Fairbanks, Morse since 1926.

☆ ☆ ☆

CHARLES WILKIE has joined the sales engineering staff of *Sika Chemical Corp.*, with headquarters in Passaic, N. J. He will be available to serve important engineering and construction projects throughout the United States. For the past several years Wilkie has been associated with the H. K. Ferguson Co., Inc., as project engineer in its Atomic Energy Division, and previous activities include private practice as a consulting engineer and employment by some of the leading engineers and constructors in various parts of the country. Wilkie is a member of the Structural Engineers As-

Continued on page 108

NEWS of MANUFACTURERS

Continued from page 107

sociation of Northern California, the American Society of Civil Engineers, and is a licensed professional engineer in California, Nevada and Texas. Sika Chemical Corp. manufactures Plastiment and Sika compounds for concrete and masonry.

☆ ☆ ☆

Appointment of RICHARD E. HOAGLAND as vice president and assistant general manager of *Utah Fuel Co.* was recently announced by JACK L. ASHBY, vice president of the parent company, *Kaiser Steel Corp.* Prior to this appointment, Hoagland served as manager of by-products for Kaiser Steel Corp., with headquarters in Los Angeles, and directed marketing of the great variety of coal by-products produced at the Kaiser steel mill at Fontana. In his new position, he will headquarter at the Utah Fuel Co. in the Judge Building in Salt Lake City.

☆ ☆ ☆

According to a recent announcement by ROBERT L. CORNISH, advertising manager of *Great Lakes Carbon Corp.*, Building Products Division, Los Angeles, all Permalite products are being packaged in new, distinctive and modern two colored bags, aiding greatly to the identification of Permalite aggregates in the field.

☆ ☆ ☆

EVERETT D. GRAFF, president of *Joseph T. Ryerson & Son, Inc.*, Chicago, recently announced changes in executive personnel. HAROLD B. RESSLER has been elected first vice president. He was vice president and general manager of sales since 1932. C. L. HARDY, former assistant vice president, has been appointed assistant to the president. THOMAS Z. HAYWARD has been named general manager of sales for the group of thirteen Ryerson steel service plants.

☆ ☆ ☆

The appointment of SIDNEY J. SMITH as product manager of wallboard and accessory sales of the *Kaiser Gypsum Division of Kaiser Industries, Inc.*, Oakland, Calif., was recently announced by general sales manager GIL RICHARDS.

☆ ☆ ☆

Two U. S. Steel Corporation subsidiaries—*American Bridge Co.* and *Consolidated Western Steel Corp.*—have been awarded the job of fabricating and erecting the steel for the new Statler Center, a combination hotel, office building and garage to be erected in downtown Los Angeles. According to officials of Consolidated Western Steel in Los Angeles, American Bridge Co. will erect the lower levels of the building, which will include a 500-car garage and a large ballroom. The remainder of the height limit building, into which will go 7,200 tons of steel, will be erected by Consolidated Western Steel Corp. Under terms of the contract, Consolidated will fabricate one-half of the steel,

Continued on page 109

1,100	cu. yd. excav., all classes, for grout cap	12.50	12.00	8.00	22.00	15.00	20.00
14,800	cu. yd. excav., all classes, for spillway	1.20	.27	1.00	.70	.90	1.00
142,000	cu. yd. excav., stripping borrow areas	.20	.22	.20	.17	.25	.30
300,000	cu. yd. excav. in borow areas and transp. to dam emb., Zone 1, first 300,000 cu. yd.	.365	.24	.40	.40	.50	.46
870,000	cu. yd. excav. in borrow areas and transp. to dam emb. Zone 1, over 300,000 cu. yd.	.23	.22	.25	.32	.34	.31
65,000	cu. yd. excav. sand and gravel in borrow areas and transp. to dam emb., Zone 2, first 65,000 cu. yd.	.43	.45	.40	.41	.52	.50
186,000	cu. yd. excav., sand and gravel in borrow areas and transp. to dam emb., Zone 2, over 65,000 cu. yd.	.295	.44	.25	.39	.45	.35
250,000	cu. yd. earth fill in dam emb., Zone 1, first 250,000 cu. yd.	.16	.11	.17	.17	.35	.16
745,000	cu. yd. earth fill in dam emb., Zone 1, over 250,000 cu. yd.	.107	.11	.11	.15	.17	.15
272,000	cu. yd. sand and gravel fill in dam emb., Zone 2	.104	.14	.13	.15	.10	.12
12,300	cu. yd. special compaction of earth fill in emb.	2.15	2.40	2.70	2.50	4.00	3.50
2,700	cu. yd. backfill	.60	.60	.80	.40	.50	.80
10,000	cu. yd. gravel blanket on upstream slope of dam emb.	2.75	2.50	4.00	3.80	2.20	6.75
10,000	cu. yd. riprap on upstream slope of dam emb., first 10,000 cu. yd.	5.25	5.50	10.00	5.50	9.00	13.50
35,000	cu. yd. riprap on upstream slope of dam emb. over 10,000 cu. yd.	5.25	5.50	7.00	4.50	4.25	6.90
1,500	cu. yd. dumped riprap	5.25	5.50	8.00	5.50	5.00	7.50
18,000	cu. yd. topsoil for seeding	.50	.72	.60	.55	.50	.80
1,200	M. gal. water for seeded areas	4.10	5.00	3.00	4.00	3.00	5.00
54,000	sq. yd. seeding	.04	.02	.04	.07	.05	.05
580	lin. ft. furn. 4-in. diam. sewer pipe and const. drains with uncemented joints	1.60	2.10	2.50	2.30	1.20	1.70
260	lin. ft. furn. 6-in. diam. sewer pipe and const. drains with uncemented joints	2.00	2.20	3.00	2.40	1.60	2.00
3,000	lin. ft. furn. 8-in. diam. sewer pipe and const. embankment toe drains with uncem. joints	2.75	2.25	4.00	3.00	3.50	2.50
1,100	lin. ft. furn. 12-in. diam. sewer pipe and const. embankment toe drains with uncem. joints	4.00	2.90	5.00	3.60	4.50	3.50
50	lin. ft. furn. and lay. 4-in. diam. sewer pipe with cemented joints	1.60	2.20	2.00	2.40	2.00	1.60
80	lin. ft. furn. and lay. 6-in. diam. sewer pipe with cemented joints	2.00	2.40	3.00	2.50	2.50	1.80
600	lin. ft. drilling drainage holes not more than 25 ft. deep	2.25	1.50	2.50	6.50	3.00	5.00
50	cu. yd. continuous gravel drains	12.00	5.50	11.00	9.00	7.50	7.00
9,500	lin. ft. drilling grout holes in stage between depths of 0 ft. and 35 ft.	.95	1.50	2.50	2.50	1.90	2.25
3,200	lin. ft. drilling grout holes in stage between depths of 35 ft. and 60 ft.	1.05	1.50	3.50	2.50	2.70	2.50
1,500	lin. ft. drilling grout holes in stage between depths of 60 ft. and 110 ft.	1.15	1.50	4.50	2.60	3.30	2.75
700	lin. ft. drilling grout holes in stage between depths of 110 ft. and 160 ft.	1.40	1.50	5.50	2.60	4.00	3.00
5,600	lb. furn. and placing std. black pipe and fittings for foundation grouting	.75	.50	1.00	.45	.60	.70
840	lb. furn. and placing std. zinc-coated pipe and fittings, and special grout outlets	1.00	.50	1.30	.85	1.00	1.00
13,400	cu. ft. pressure grouting	1.90	.50	2.00	2.50	1.90	2.00
8,200	cu. ft. pressure grouting with packers	2.05	.50	2.50	2.80	2.30	2.50
3,400	lin. ft. drilling holes for anchor bars and grouting bars in place	1.50	2.00	2.50	3.00	2.00	2.00
1,100	cu. yd. concrete in grout cap	18.00	21.00	24.00	34.00	20.00	25.00
1,700	cu. yd. concrete in outlet tunnel	42.00	37.00	40.00	49.00	34.00	40.00
240	cu. yd. concrete in inlet structure	45.00	90.00	70.00	50.00	54.00	65.00
180	cu. yd. concrete in gate chamber	62.00	140.00	55.00	75.00	60.00	75.00
120	cu. yd. concrete in access shaft	57.00	50.00	75.00	90.00	65.00	60.00
30	cu. yd. concrete in hoist house	57.00	88.00	100.00	120.00	125.00	90.00
160	cu. yd. concrete in diversion and gate chamber plugs	57.00	75.00	25.00	40.00	40.00	40.00
330	cu. yd. concrete in outlet works stilling basin floor	23.00	28.00	32.00	27.00	34.00	30.00
290	cu. yd. concrete in outlet works stilling basin walls	50.00	63.00	55.00	40.00	51.00	50.00
200	cu. yd. concrete in spillway crest structure	25.00	27.00	33.00	30.00	31.00	30.00
1,700	cu. yd. concrete in spillway floors	25.00	28.00	30.00	31.00	32.00	25.00
1,600	cu. yd. concrete in spillway walls	48.00	71.00	63.00	52.00	55.00	45.00
25	cu. yd. concrete in spillway bridge	55.00	66.00	90.00	70.00	45.00	70.00
1,000,000	lb. furn. and placing reinforcement bars	.13	.13	.10	.11	.115	.12
60	sq. ft. furn. and placing bituminous-type jt. filler	1.00	1.00	2.00	2.60	1.00	1.50
50	sq. ft. furn. and placing resilient-type jt. filler	2.00	1.25	2.00	2.60	2.00	2.00
35	lin. ft. placing rubber water stop	1.50	1.25	2.00	2.60	2.00	2.00
1,060	lin. ft. furn. and placing metal seals, type "N-1"	1.50	1.15	2.50	.80	1.30	1.75
500	lin. ft. furn. and placing metal seals, type "M-1"	2.50	1.50	2.50	1.30	2.00	2.00
100,000	lb. installing high pressure gates and conduit liners	.10	.18	.04	.15	.10	.08
3,500	lb. installing control apparatus for high-pressure gates	.50	.25	.50	.50	.20	.30
750	lb. installing metal pipe, fittings, and valves less than 6 in. in diam.	.50	.32	1.00	.60	.40	.30
3,750	lb. installing metal pipe, fittings, and valves 6 in. and larger in diam.	.50	.30	.40	.50	.20	.20
2,700	lb. installing reservoir level gage piping	.50	1.90	.40	.40	.40	.40
6,400	lb. installing air-inlet pipe	.30	.13	.40	.25	.20	.20
1,000	lb. installing ventilating system	.50	.25	.40	.30	.40	.40
21,000	lb. installing trash-rack metalwork	.18	.07	.05	.08	.12	.10
900	lb. installing pipe handrails	.25	.65	.50	.30	.50	.25
3,800	lb. installing ladders and platforms	.20	.15	.30	.25	.20	.25
300	lin. ft. erecting wire fences	1.50	1.00	.70	.70	1.00	1.00
200	lb. installing miscl. metalwork	1.50	.70	.70	.60	1.00	.30
550	lb. furn. and install. spillway bridge bearing plates, anchors, anchor bolts, and floor drains	.60	1.00	1.00	.50	.30	.50
25	sq. ft. furn. and install. metal door	10.00	12.00	6.00	12.00	2.00	10.00
52	sq. ft. furn. and install. metal-sash windows	3.00	4.00	6.00	6.00	2.50	6.00
230	sq. ft. furn. and placing roofing	1.00	1.00	1.00	1.20	.60	.80
190	lin. ft. furn. and install. elect. metal conduit 1 in. and less in diam.	2.00	1.25	4.00	1.80	1.00	1.50
20	lin. ft. furn. and install. elect. metal conduits 1½ in. in diam.	3.00	1.50	10.00	3.50	2.00	2.00
100	lb. furn. and install. elect. conductors and ground wires	4.00	2.00	4.00	1.80	2.00	2.00
500	lin. ft. drilling 1½-in. min. diam. holes for piezometer apparatus	2.00	3.00	5.00	4.00	2.50	3.00
15	lin. ft. drilling 4-in. min. diam. holes for settlement apparatus	5.00	6.00	15.00	4.00	6.00	4.00
550	cu. yd. trenches for test apparatus	5.00	6.00	5.00	7.50	8.00	8.00

(Continued on next page)

NEWS of MANUFACTURERS

Continued from page 108

and American Bridge the other half. Part of the steel will be rolled at the *Geneva Steel Co.* in Utah, which is also a subsidiary of U. S. Steel Corporation.

☆ ☆ ☆

Mack Trucks, Inc., has inaugurated three new departments for the dissemination of factual information about trucking in the public interest, it was recently announced by E. D. BRANSOME, president of Mack Trucks. One department, Trucking Information Service, will supply information to the press, radio and television editors. A second department, Trucking Service Bureau, will assist the entire trucking industry "to better its relations with the public," Bransome said. The third department is called Better Living Through Increased Highway Transportation. Its purpose is to serve the public by supplying factual material to the general public on the "vital role trucking plays as one of the social forces making up American life today, and thereby help to better inform public opinion as to the national transportation problem and its solution."

☆ ☆ ☆

American Lumber & Treating Co. recently moved its Portland district sales headquarters to 370 Pittock Block.

☆ ☆ ☆

Protection Products Mfg. Co., Kalamazoo, Mich., has announced the promotion of H. C. KENNEDY to assistant general sales manager. Kennedy, who joined the organization in 1943 as a salesman, has for the past three years been Middlewest district manager. By this move, Protection Products, manufacturer of Woodlife and other preservatives and water repellents for wood, fabrics and masonry, has greatly strengthened its service to users and distributors of its products.

☆ ☆ ☆

Among recent promotions at the *Caterpillar Tractor Co.,* San Leandro, Calif., were those of JOHN E. JASS and THOMAS M. LOGAN. Jass, a member of the Caterpillar organization since 1923, has been named assistant chief engineer of the company, according to an announcement by G. E. BURKS, chief engineer. Under Jass' direction will come bulldozers, allied equipment, special attachments for tractors, hydraulic controls, cable controls and tool bars. Logan has been promoted from the engineering department to the post of service development manager where he will continue his contribution toward engineering design as it is influenced by field service conditions.

☆ ☆ ☆

Forty years of service in the manufacturing of tires and other rubber products will be climaxed next September 1, with the retirement of FRANK A. STEELE, plant manager of the Los Angeles factory of *The Goodyear Tire & Rubber Co.* Accord-

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NEWS of MANUFACTURERS

Continued from page 109

ing to announcement made at Akron, Ohio, by S. W. WOLFE, manager of Goodyear's domestic factory operations, ROBERT W. MANEY of Akron will succeed Steele.

☆ ☆ ☆

At the last meeting, in Los Angeles, the Board of Directors of *Pacific Clay Products,* San Francisco, elected GEORGE D. CLARK, JR., to the chairmanship. Clark is a prominent San Francisco business executive, and was formerly president of *N. Clark & Sons,* which became a part of Pacific Clay Products in 1945. The directors also named JOHN D. FREDERICKS, Los Angeles, as the new president of the organization. Both men succeed the late ROY LACY, who held the dual positions at the time of his death.

☆ ☆ ☆

JOHN FORSTER has been added to the Chicago office sales staff of *Keystone Asphalt Products Co., Division of American-Marietta Co.,* according to an announcement recently made by J. E. POOLE, general sales manager.

☆ ☆ ☆

The 1950 convention of the Structural Clay Products Industry will be held at Colorado Springs, Colo., next fall, it was announced by W. J. GOODWIN, JR., president of *Structural Clay Products Institute,* Washington, D. C. The meeting will be held at Broadmoor Hotel, Oct. 23-26.

☆ ☆ ☆

Construction has begun on a 35,000-sq. ft. addition to *Skilsaw, Inc.,* Chicago manufacturers of the SKIL line of portable electric and pneumatic tools. Current expansion is the eleventh addition to the Skilsaw building since 1938 when the company moved into its present modern plant. This will increase total space to approximately 200,000 sq. ft. The new addition is scheduled for completion by Sept. 1.

☆ ☆ ☆

A major expansion in the facilities of *The Baker Mfg. Co.* of Springfield, Ill., involving an expenditure of more than $150,000, has been announced by W. CONVERSE STALEY, president. With the addition of this new brick and steel building, the second major expansion within the last year, capacity of the Baker plant will be more than doubled. Baker manufactures bulldozers, gradebuilders, root rippers, road rippers, sheepsfoot rollers and other earth moving equipment, together with a complete line of snow plows, principally for use on Allis-Chalmers tractors.

☆ ☆ ☆

CHARLES H. GODDARD will assume responsibility for national accounts sales in the Lighting Division of *Sylvania Electric Products, Inc.,* it was recently announced in New York by B. K. WICKSTRUM, general sales manager. Goddard will also continue in his present capacity as manager of utility sales.

23,000 lin. ft. installing piezometer tubing in dam embankment	.12	.12	.40	.12	.06	.20
1,650 lb. installing settlement apparatus in dam	1.50	2.50	1.00	.85	1.40	.20
13 cu. yd. conc. in terminal well	90.00	75.00	130.00	90.00	140.00	80.00
Lump sum, installing test apparatus in terminal well	500.00	$1,500	420.00	360.00	360.00	500.00
60 points installing surface settlement points	10.00	23.00	7.00	6.00	6.00	10.00

South Dakota—Fall River County—Corps of Engineers—Earthfill and Outlet Works

Northwestern Engineering Co., Rapid City, South Dakota, with a bid of $1,092,509, was low before the Corps of Engineers for construction of the earthfill Cold Brook Dam and outlet works in the Fall River Basin, 2 mi. north of Hot Springs. Unit bids were submitted as follows:

(1) Northwestern Engineering Co. $1,092,509
(2) K. S. Mittry Construction Co. 1,114,216
(3) Otto B. Ashbach & Sons, Inc. 1,303,026
(4) Peter Kiewit Sons' Co. 1,380,846
(5) Condon-Cunningham Co. 1,398,727
— S. J. Groves & Sons Co. 1,399,010
— Donovan and James Construction Cos. 1,446,734
— Rhoades-Shofner Construction Co., Inc. $1,461,786
— Albert Lalonde Co. 1,478,213
— The Utah Construction Co. 1,694,702
— Inland Construction Co. 1,960,254
(6) Engineer's estimate 1,238,920

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, random clearing	$5,000	$11,650	$7,200	$3,000	$14,000	$6,000
46 acre clearing and grubbing	400.00	200.00	180.00	200.00	450.00	105.00
Lump sum, water diversion and drainage	$30,000	$24,000	$36,990	$121,000	$70,000	$21,850
1,450,000 cu. yd. unclassified excavation	.19	.275	.35	.35	.32	.26
170 cu. yd. trench excav.	4.00	2.00	2.40	2.50	4.00	3.00
23,240 cu. yd. common rock excav.	1.10	1.50	4.20	2.00	2.95	2.00
1,000 cu. yd. structural rock excav.	12.00	14.00	6.60	12.50	20.00	6.90
Lump sum, mobilization and demobilization of drilling and grouting equip.	$6,000	$3,025	$3,600	$2,000	$7,000	520.00
200 ea. moving and setting drilling equipment	40.00	18.40	24.00	10.00	12.75	15.00
4,500 lin. ft. drilling pressure grout holes	3.00	2.50	2.40	3.00	2.80	2.40
300 ea. connecting and disconnecting grouting equipment	15.00	18.40	12.00	5.00	5.65	5.40
5,000 cu. ft. pressure grouting	2.25	2.75	1.56	4.00	6.30	2.60
6,980 sq. (100 s. f.) prep. of emb. foundation	.31	.08	.12	.25	.20	.30
Compacted embankment—						
450,000 cu. yd. (a) impervious	.16	.10	.10	.17	.14	.16
665,000 cu. yd. (b) pervious and random	.14	.10	.07	.17	.12	.14
28,000 M (1000 gal.) water for moistening	1.60	1.30	1.80	.50	1.20	1.95
Additional rolling—						
1,000 r.hr. (a) by sheepsfoot roller	5.00	9.60	9.60	8.00	11.00	7.00
10 tr. hr. (b) by crawler-type tractor	8.00	8.00	18.00	10.00	11.00	9.40
200 r.hr. (c) by power roller	7.00	8.00	12.00	8.00	11.00	7.40
2,000 sq. ft. topsoiling	15.00	1.11	1.80	10.00	3.00	4.40
225,000 sq. ft. seeding	.35	.70	.26	1.30	.50	.34
13,550 cu. yd. rock riprap	3.80	3.50	4.80	4.00	3.80	2.30
12,200 cu. yd. rock spalls	2.25	4.25	3.28	2.00	3.75	2.80
Concrete—						
2,872 cu. yd. (a) concrete in conduit	38.00	23.25	32.40	28.25	33.00	51.50
68 cu. yd. (b) concrete in recorder well	75.00	60.00	45.60	80.00	90.00	69.50
1,550 cu. yd. (c) conc. in spillway struct.	35.00					37.00
4 cu. yd. (d) conc. in water sup. stilling box	70.00	60.00	80.80	100.00	118.00	80.00
408 cu. yd. (e) conc. in inlet structure	88.00	70.00	48.00	75.00	85.00	72.50
713 cu. yd. (f) conc. in stilling basin	35.00	26.00	34.77	26.00	33.00	43.00
8,800 bbl. Portland cement	4.20	4.35	4.95	4.00	5.50	4.40
600,000 lb. steel reinforcement	.125	.12	.12	.13	.13	.16
1,345 lin. ft. rubber seals	1.25	2.00	6.00	7.00	4.40	3.00
Lump sum, miscellaneous metal work	900.00	700.00	$1,933	$1,000	800.00	550.00
132 ea. stilling basin slab drains and anchor drilling	2.00	8.00	1.80	4.25	22.00	9.25
280 lin. ft. pipe hand railing	4.00	2.50	9.00	7.50	5.00	4.00
Lump sum, 8-inch water supply piping		$10,000	$5,090	$15,000	$10,500	
Lump sum, stilling basin wall dr. piping and filter	900.00	$6,000	$1,219	$1,200	$1,600	510.00
Lump sum, inlet struct. conservation pool drains	$2,000	$3,500	$1,975	$5,000	$3,400	$1,774
Lump sum, water level recorder piping	$1,200	$4,000	$2,412	$3,500	$3,800	$2,580
Culvert pipe—						
278 lin. ft. (a) 18-in.	3.20	3.45	4.20	6.00	4.50	4.00
40 lin. ft. (b) 30-in.	6.00	6.00	8.40	12.00	8.00	8.00
104 lin. ft. (c) 36-in.	8.50	9.10	12.60	15.00	12.00	12.25
50 lin. ft. (d) 24-in.	6.00	5.10	6.60	8.00	6.50	7.20
22,000 sq. yd. gravel surfacing	.45	.63	.66	.35	.80	.60
11,900 lin. ft. fence	.20	.35	.17	.25	.30	.25
2,500 cu. yd. gravel filter bed	5.00	4.00	1.20	3.00	6.00	1.90

Building . . .

Washington—Grant County—U.S.B.R.—Machine Shop, Warehouses

Morrison-Knudsen Co., Inc., and Peter Kiewit Sons' Co., Seattle, Wash., with a joint bid of $1,487,043, were low before the Bureau of Reclamation for construction of a machine shop, completion of warehouses "A" and "B" and construction and installation of utilities in the industrial area at Grand Coulee Dam. Unit bids were submitted as follows:

(1) Morrison-Knudsen Co., Inc., and Peter Kiewit Sons' Co. $1,487,043
(2) Puget Sound Bridge & Dredging Co. 1,680,129
(3) Engineer's estimate 1,118,941

	(1)	(2)	(3)
150 cu. yd. excav., common, for miscl. structs.	10.00	5.00	3.00
55 cu. yd. excav., rock, for miscl. structs.	10.00	20.00	10.00
7,100 cu. yd. excav., common, for machine shop	5.00	2.50	1.00
3,000 cu. yd. excav., rock, for machine shop	5.00	7.50	5.00
670 cu. yd. excav., all classes, for roadway and utility structs.	20.00	15.00	4.00
2,000 cu. yd. excav., common, for trenches	4.00	3.00	1.50
40 cu. yd. excav., rock, for trenches	4.00	20.00	10.00
1,500 cu. yd. excav., all classes, for roadways and service and parking areas	5.00	4.50	1.25
320 cu. yd. excav., common, from borrow pits	3.00	1.50	1.00
50 M gal. watering for embank. and for rdwys. and serv. and prkg. areas	6.00	5.00	2.50
6,500 cu. yd. backfill	3.00	3.50	1.00
6,500 cu. yd. compacting backfill	3.75	4.00	3.00

(Continued on next page)

500	cu. yd. placing gravel fill	15.00	13.00	5.00
1,250	sq. yd. gravel surfacing	.24	.30	.35
130	cu. ft. excavation of concrete	15.00	30.00	2.00
30	cu. yd. removal of concrete	34.00	25.00	75.00
200	lin. ft. drilling holes in conc. and grouting dowel bars in place	6.00	5.00	2.00
7,000	ton placing crushed-rock ballast	1.00	1.25	2.00
3,800	ton placing crushed-rock top course and keystone	1.50	2.00	2.50
7,800	sq. yd. aphaltic-conc. paving for floors in warehouses "A" and "B"	2.10	2.25	1.50
30,000	sq. yd. asphaltic-concrete paving type "B"	1.20	1.50	.75
38,500	sq. yd. asphaltic-concrete paving type "C"	1.15	1.40	.60
480	ton furn. asphalt for asphaltic-concrete paving	50.00	60.00	35.00
260	lin. ft. furn. 8-in. diam. conc. pipe and constr. drains with uncem. jts.	1.70	2.00	2.00
1,130	lin. ft. furn. and laying 12-in. diam. conc. pipe with cem. jts.	3.00	3.50	3.00
190	lin. ft. furn. and laying 8-in. diam. conc. pipe with cem. jts.	2.00	2.50	2.20
480	lin. ft. furn. and laying 6-in. diam. conc. pipe with cem. jts.	1.60	2.00	2.00
431,000	lb. furn. and placing reinf. bars 1-in. diam. and larger	.115	.12	.10
122,000	lb. furn. and placing reinf. bars ⅝-in. to ⅞-in. diam. inclusive	.115	.12	.11
215,000	lb. furn. and placing reinf. bars ½-in. diam. and smaller	.125	.14	.12
1,300	cu. yd. conc. in machine shop footings	28.00	35.00	40.00
200	cu. yd. conc. in machine shop foundations	37.00	42.50	50.00
550	cu. yd. conc. in machine shop floor slabs	26.00	35.00	30.00
300	cu. yd. conc. in machine shop utility tunnels	65.00	70.00	40.00
3,000	cu. yd. conc. in machine shop superstruct.	111.00	125.00	70.00
130	cu. yd. conc. in central heating plant and fire station	94.00	90.00	60.00
200	cu. yd. concrete around pipe and conduit	31.00	30.00	35.00
130	cu. yd. concrete in warehouses "A" and "B"	70.00	77.00	70.00
260	cu. yd. concrete in minor structures	117.00	120.00	75.00
80	cu. ft. drypack mortar in concrete in recesses	29.00	32.00	2.00
300	lin. ft. constructing type "A" control joints	4.00	5.00	3.00
130	lin. ft. constructing type "B" control joints	3.50	5.00	3.00
1,300	sq. ft. furn. and placing 1-in. corkboard joint filler	2.20	2.00	1.00
2,500	sq. ft. furn and placing ⅜-in. and ½-in. preformed bitum-fiber joint filler	.55	.50	.80
670	lin. ft. furn. and placing type V metal seals	2.00	3.00	2.00
1,260	lin. ft. furn. and placing type "N" metal seals	1.75	2.50	1.50
50	lin. ft. installing rubber joint strips	2.00	2.25	1.50
21,300	sq. ft. placing 1-in. thick insulating board on steel roof decks	.06	.07	.40
7,000	sq. ft. placing 1-in. thick insulating board on conc. roof decks	.06	.07	.40
28,300	sq. ft. placing coal-tar saturated-felt roofing	.085	.08	.40
700	sq. yd. applying 2-coat asphalt-emulsion dampproofing	.55	.50	.50
3,200	sq. yd. bonded-concrete finish on floors	7.50	7.00	4.00
340	lin. ft. concrete wall bases	1.85	2.00	1.50
3,100	sq. ft. furn. and installing asphalt tile	.50	.45	.50
480	lin. ft. furn. and installing asphalt cove bases	.60	.55	.70
2,100	sq. ft. furn. and installing wood-block floor	.75	1.00	1.00
2,660	sq. ft. installing glass-block panels	1.80	2.00	2.50
550	sq. ft. furn. and installing metal room partitions	4.85	5.00	4.00
50	sq. ft. furn. and installing metal room ceiling	4.85	5.00	1.50
60	lin. ft. furn. and installing metal toilet-stall partns. and urinal partns.	18.00	20.00	20.00
2,000	lb. steel framework for partitions	.44	.40	.40
600	sq. yd. metal lath and 3 coat plaster on partitions	10.90	11.00	5.00
425	sq. yd. suspended metal lath and 3-coat plaster ceilings	11.50	12.00	7.00
375	sq. ft. furn. and installing large steel swinging doors	9.85	10.00	20.00
275	sq. ft. furn. and installing std. steel swinging doors in conc. walls	6.20	6.00	10.00
200	sq. ft. furn. and installing std. steel swinging doors in plaster partns.	6.20	6.25	10.00
450	sq. ft. furn. and installing steel rolling doors	5.25	5.50	18.00
280	sq. ft. furn. and installing steel sliding doors	6.20	6.25	15.00
1,850	sq. ft. installing steel sash windows	.63	.60	1.50
200	sq. ft. installing steel stationary louvers	.74	.75	1.25
Lump sum,	completing warehouse "A"	$98,500	$145,000	$65,000
Lump sum,	completing warehouse "B"	$126,500	$175,500	$110,000
Lump sum,	furn. and erecting fire station	$16,750	$20,000	$12,000
18,500	lb. furn. steel and wrought-iron pipe, fittings, and valves with a nominal diam. of 2½ in. and smaller	.48	.50	.40
37,000	lb. furn. steel and wrought-iron pipe, fittings and valves, with a nominal diam. of 3 to 5 in. inclusive	.48	.50	.35
44,000	lb. furn. steel and wrought-iron pipe, fittings, and valves with a nominal diam. of 6 in. and larger	.37	.40	.30
47,500	lb. installing steel and wrought-iron pipe fittings, and valves with a nominal diam. of 2½ in. and smaller	.55	.50	.30
41,500	lb. installing steel and wrought-iron pipe, fittings and valves with a nominal diam. of 3 to 5 in., inclusive	.27	.30	.25
51,000	lb. installing steel and wrought-iron pipe, fitting and valves with a nominal diam. of 6 in. and larger	.27	.30	.20
1,200	lb. furn. and installing chromium-plated pipe couplings, supports, and escutcheon plates	3.00	3.25	1.75
5,000	lb. furn. and installing cast-iron bell-and-spigot pipe, fittings, and valves	.35	.40	.35
8,000	lb. installing cast-iron soil pipe and fittings	.35	.40	.30
1,400	lb. installing circulating pumps	.90	1.00	.30
10,000	lb. installing hot-water unit heaters	.35	.25	.25
8,500	lb. installing steel tanks	.18	.20	.20
2	ea. removing and relocating fire hydrants	210.00	250.00	200.00
6,300	lb. removing and salvaging pipe	.15	.20	.20
1,000	lb. installing roof and floor drains and roof-stack flashing sleeves	.27	.30	.20
2,500	lb. furn. and installing steel pipe hangers and supports	2.70	3.00	.75
5	cabinets install. indoor fire-hose cabinets and equip. contained therein	59.00	65.00	35.00
60	cu. yd. insulating concrete around heating pipe lines	165.00	175.00	70.00
250	sq. yd. placing 2-ply waterproofing for heating pipe lines	2.30	2.50	3.00
1,600	lb. furn. and installing molded-type pipe covering	.85	.90	.75
250,000	lb. erecting structural steel in machine shop	.05	.055	.08
800	lb. erecting structural steel in central heating plant	.08	.07	.08
21,350	sq. ft. installing steel roof decks	.25	.30	.15
225,000	lb. installing crane	.04	.05	.05
30,000	lb. installing track rails	.05	.06	.07
2,000	lb. installing embedded metal frames for openings in floors, walls, and roofs	.30	.30	.15
3,000	lb. installing metal hatch covers	.20	.25	.20
6,200	lb. installing metal railings	.40	.35	.20
300	lin. ft. furn. and install. metal safety treads	4.50	4.00	.45
10,000	lb. installing miscellaneous metal work	.32	.30	.25
11	fixtures furnishing and installing lavatories	135.00	140.00	90.00
1	fixture furnishing and installing kitchen sink	120.00	115.00	175.00
16	fixtures furnishing and installing water closets	106.00	110.00	105.00
11	fixtures furnishing and installing urinals	130.00	140.00	125.00
3	fixtures furnishing and installing service sinks	150.00	125.00	110.00
1	fixture furnishing and installing wash fountain	470.00	500.00	250.00
1	fixture furnishing and installing shower cabinet	385.00	400.00	125.00
6	heaters installing storage water heaters	60.00	50.00	50.00
8	coolers installing electric drinking water coolers	75.00	80.00	45.00
16	accessories furnishing and installing toilet-paper holders	18.00	20.00	10.00
10	accessories furnishing and installing cabinets for folded paper towels	20.00	20.00	10.00
10,000	sq. ft. furn. and install. sheet metal air ducts for heating and ventilating systems	1.30	1.25	2.00

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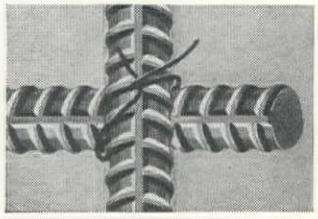
These reversed double-helical ribs give Kaiser Hi-Bond bars the most effective mechanical grip with concrete ever developed . . .

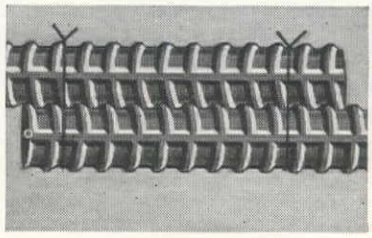
Yet you pay no more for Kaiser Hi-Bond bars than for ordinary reinforcing bars!

As a matter of fact, Kaiser Hi-Bond bars actually *lower* your construction costs. Here's how:



YOU MAKE MORE EFFICIENT USE OF LABOR, because the gear-like contact of Kaiser Hi-Bond bars makes them hold more firmly with the simplest tie when crossed and wired.

BETTER CONSTRUCTION WITH KAISER HI-BOND



Kaiser Hi-Bond bars give you more efficient transfer of stress at splices — with shorter overlap.

Need for hook anchorage is reduced. Columnar deformations and beam deflections are cut. And the proved bonding efficiency of Kaiser Hi-Bond bars helps keep concrete strong, smooth and free of tensile cracks!

Make sure your next job gets all the advantages of Kaiser Hi-Bond bars!

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet • alloy bars carbon bars • structural shapes • cold rolled strip • cold rolled sheet • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

4,500 lb.	installing motor-driven supply fans, exhaust fans, and circulating tap for heating and ventilating systems	.16	.15	.25
800 lb.	installing grilles, registers, ventilating panels, roof ventilators, air difusers and multiple-louvre dampers for heating and vent. sys.	.34	.30	.45
150 lb.	installing air filters for heating and ventilating systems	.23	.25	.50
15,000 lb.	installing heating equipment	.26	.25	.25
Lump sum,	installing controls for heating and ventilating sys. in machine shop	$3,250	$3,000	$8,000
Lump sum,	furn. and installing automatic fire-detector sys. in machine shop	$3,400	$4,000	$5,000
2,310 lin. ft.	furn. and install. embedded elect. metal conduit ¾-in. diam.	1.67	1.70	.70
7,600 lin. ft.	furn. and install. embedded elect. metal conduit, 1-in. diam.	2.00	1.75	.90
2,380 lin. ft.	furn. and install. embedded elect. metal conduit 1¼-in. diam.	2.35	2.25	1.00
1,050 lin. ft.	furn. and install. embedded elect. metal conduit 1½-in. diam.	2.40	2.50	1.10
1,270 lin. ft.	furn. and install. embedded elect. metal conduit 2-in. diam.	2.50	3.00	1.50
600 lin. ft.	furn. and install. embedded elect. metal conduit 2½-in. diam.	3.40	3.50	2.00
800 lin. ft.	furn. and install. embedded elect. metal conduit 3-in. diam.	4.90	5.00	3.00
4,350 lin. ft.	furn. and install. exposed elect. metal conduit ½-in. diam.	1.60	1.75	.65
8,900 lin. ft.	furn. and install. exposed elect. metal conduit ¾-in. diam.	2.00	1.90	.80
1,050 lin. ft.	furn. and install. exposed elect. metal conduit 1-in. diam.	2.00	1.90	1.05
600 lin. ft.	furn. and install. exposed elect. metal conduit 1¼-in. diam.	2.40	2.50	1.15
50 lin. ft.	furn. and install. exposed elect. metal conduit 1½-in. diam.	5.00	4.00	1.30
20 lin. ft.	furn. and install. exposed elect. metal conduit 2-in. diam.	5.40	5.00	1.75
150 lin. ft.	furn. and install. exposed elect. metal conduit 2½-in. diam.	5.90	6.00	2.50
5,500 lin. ft.	furn. and install. embedded elect. non-metallic conduit 2-in. diam.	1.50	1.75	1.25
4,000 lin. ft.	furn. and install. embedded elect. non-metallic conduit 3-in. diam.	1.60	1.50	1.50
4,275 lb.	furn. and install. electrical conductors	2.50	2.30	1.00
2,550 lb.	furn. and install. grounding materials	2.50	2.40	1.50
2,000 lb.	installing crane runway conductors	.15	.16	.25
516	fixtures installing incandescent lamp-type lighting fixtures	10.00	10.50	6.00
113	fixtures installing fluorescent lamp lighting fixtures	18.00	19.00	15.00
108	fixtures installing combination incandescent mercury vapor-type lighting fixtures	35.00	30.00	15.00
18,850 lb.	installing lighting transformers	.20	.25	.20
10,000 lb.	installing electrical equipment and apparatus	1.40	1.50	.50
360 lin. ft.	constructing guardrails	2.75	3.00	3.00
80 lin. ft.	furn. and erecting chain-link fence around substation yard	7.00	6.50	4.00
500 tons	transporting materials between the railhead at Odair, Wash., and the work site	11.50	10.00	8.00

Irrigation . . .

New Mexico—De Baca County—U.S.B.R.—Earthwork and Lining

G. I. Martin, Albuquerque, New Mexico, with a bid of $366,219, was low before the Bureau of Reclamation for construction of earthwork, pneumatically-applied mortar lining and structures on the High Line Canal of the Fort Sumner Project in New Mexico. Unit bids were submitted as follows:

(1) G. I. Martin $366,219
(2) Bowen and McLaughlin 369,105
(3) Northwestern Engineering Co. 386,302
(4) F. W. Case Co. 408,463
(5) United Engineers, Inc. 409,652
— Macco Corp. $419,390
— Osage Construction Co. 437,218
— D. D. Skousen 453,467
(6) Engineer's estimate 395,584

		(1)	(2)	(3)	(4)	(5)	(6)
13,700 cu. yd.	excav., common, for canal	.30	.25	.43	.325	.28	.40
140 cu. yd.	excav., rock, for canal	2.00	3.00	.43	.50	2.00	2.00
242,000 cu. yd.	excav., common, for upper, middle, and lower drains	.24	.25	.34	.23	.28	.25
74,000 cu. yd.	excav., common, for intercepting drains A and B	.20	.25	.30	.26	.28	.25
700 cu. yd.	excav., rock, for intercepting drains A & B	1.50	2.50	.50	.50	1.00	2.00
250 cu. yd.	excav., common, for drainage channels and dikes	.40	1.00	1.00	.75	1.00	.50
15,000 cu. yd.	excav., common, for structures	.90	1.00	.80	1.50	2.00	1.25
150 cu. yd.	excav., rock, for structures	3.00	5.00	1.00	1.50	4.00	3.00
8,000 cu. yd.	excav., com., and backfill of pipe trenches beginning at stas. 0/13.5 and 43/00, High Line Canal	.80	1.10	1.00	1.50	1.00	1.00
80 cu. yd.	excav., rock, and backfill of pipe trenches beginning at Stas. 0/13.5 and 43/00 High Line Canal	4.00	5.00	5.00	1.50	4.00	2.50
300 cu. yd.	excav., borrow	.30	1.00	.80	.60	1.00	.75
60,200 sq. yd.	trimming foundations for pneumatically applied mortar lining	.42	.50	.30	.60	.50	.40
12,500 cu. yd.	backfill about structures	.60	.30	.40	.60	.50	.55
7,400 cu. yd.	compacting backfill about structs.	1.00	2.00	.80	2.25	2.00	2.00
860 cu. yd.	compacting backfill about pipe lines	1.50	3.00	.80	2.00	2.00	1.50
8,500 cu. yd.	compacting embankments	.90	1.00	.50	.60	.50	.50
1,600 mi. cu. yd.	overhaul	.40	.30	.25	.10	.20	.30
120 sq. yd.	dry-rock paving	4.00	10.00	3.00	6.00	12.00	8.00
300 cu. yd.	riprap	9.00	10.00	3.50	4.00	7.00	6.00
100 cu. yd.	gravel bedding for riprap	5.00	5.00	1.50	4.00	7.00	4.00
150 cu. yd.	gravel blanket on inside slope of drain	4.00	6.00	2.50	4.00	7.00	2.50
10 cu. yd.	furn. matl. and const. reverse filters	10.00	25.00	50.00	10.00	20.00	10.00
Lump sum,	removing existing structs.	$12,000	$8,000	$20,000	$4,000	$6,000	$12,000
60,200 sq. yd.	pneumatically applied mortar in canal lin'g	.95	.93	1.43	1.20	1.00	1.50
400 cu. yd.	concrete in structs.	90.00	85.00	45.50	100.00	85.00	60.00
5,400 bbl.	furnishing and handling cement	6.00	5.06	6.00	5.00	6.50	6.00
32,000 lb.	furn. and placing reinf. bars in structs.	.14	.14	.13	.14	.14	.14
230 sq. ft.	furn. and placing elastic filler matl. in joints	2.00	1.50	1.00	2.00	3.00	2.00
90 lin. ft.	placing rubber water stops in joints	1.00	2.50	1.50	2.00	2.00	1.50
3 M.b.m.	furn. and erecting untr. timber in structs.	300.00	420.00	225.00	250.00	300.00	250.00
40 M.b.m.	furn. and erecting tr. timber in structs.	300.00	285.00	275.00	350.00	300.00	300.00
736 lin. ft.	furn. and lay. 15-in. diam. conc. irrigation pipe	3.00	2.10	2.00	3.50	3.00	1.95
100 lin. ft.	furn. and lay. 18-in. diam. std. str. conc. culvert pipe	5.00	4.15	3.50	6.00	5.00	4.75
244 lin. ft.	furn. and lay. 24-in. diam. std. str. conc. culvert pipe	7.00	6.40	5.25	7.35	7.00	6.65
3,068 lin. ft.	furn. and lay. 30-in. diam. std. str. conc. culvert pipe	10.00	9.70	7.80	9.25	10.00	8.70
1,079 lin. ft.	furn. and lay. 30-in. diam. extra str. conc. culvert pipe	10.50	10.50	8.50	11.30	11.00	9.15
108 lin. ft.	laying 60-in. diam. extra str. conc. culv. pipe	10.00	8.00	8.00	20.00	15.00	9.00
1,440 lin. ft.	laying 24-in. diam. galv. corr. metal pipe	1.50	.60	.40	2.50	2.50	1.75
52 lin. ft.	laying 30-in. diam. galv. corr. metal pipe	1.75	.65	.50	3.00	3.00	2.00
56 lin. ft.	laying 54-in. diam. galv. corr. metal pipe	7.00	1.00	1.50	4.00	7.00	4.00
70 lin. ft.	laying 60-in. diam. galv. corr. metal pipe	7.50	1.50	4.00	5.00	8.00	4.50

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488 lin. ft. laying 30-in. diam. asbestos-bonded asphalt-coated corr. metal pipe	2.00	.75	.60	4.00	3.00	2.25
58 lin. ft. laying 36-in. diam. asbestos-bonded asphalt-coated corr. metal pipe	2.50	.85	1.00	5.00	4.00	2.50
366 lin. ft. laying 42-in. diam. asbestos-bonded asphalt-coated corr. metal pipe	3.00	.95	1.50	5.00	5.00	3.00
154 lin. ft. laying 48-in. diam. asbestos-bonded asphalt-coated corr. metal pipe	5.00	1.10	2.50	5.50	6.00	3.25
170 lin. ft. laying 54-in. diam. asbestos-bonded asphalt-coated corr. metal pipe	8.00	1.25	3.00	6.00	7.00	4.25
8,180 lb. installing metal slide gates	.25	.20	.50	.20	.12	.20
1,230 lb. installing miscl. metalwork	.25	.50	.75	.40	.40	.25

California—Sacramento County—U.S.B.R.—Floodgate

George Pollock Co., Sacramento, Calif., with a bid of $644,190, was low before the Bureau of Reclamation for construction of earthwork and structures and floodgate structure, station 0+00 to 9+50, Delta Cross Channel, Central Valley Project, near Walnut Grove, Calif. Unit bids were received as follows:

(1) George Pollock Co. $644,190
(2) Peter Kiewit Sons' Co. 685,662
(3) MacDonald, Young and Nelson and Morrison-Knudsen Co., Inc. 769,817
(4) C. M. Elliott and John C. Gist, joint venture 784,543
(5) Haas and Rothschild $810,039
— The Duncanson-Harrelson Co., and Stolte, Inc. 846,138
— Healy Tibbitts Construction Co. 862,782
(6) Engineer's estimate 786,730

	(1)	(2)	(3)	(4)	(5)	(6)
181,500 cu. yd. excavation	.37	.38	.75	.74	1.20	.25
17,000 cu. yd. compacting embankments	.12	.30	.50	.20	.15	.15
11,000 cu. yd. backfill	.15	.70	.60	.50	.50	.40
7,700 cu. yd. compacting backfill	1.00	2.50	3.40	2.50	2.75	2.00
7,100 cu. yd. 36-in. riprap	6.50	5.30	7.50	7.00	8.00	9.00
10,000 cu. yd. 24-in. riprap	6.50	5.30	7.40	7.50	8.50	9.00
7,500 cu. yd. gravel or cr. rk. bedding for riprap	3.25	3.00	3.50	4.50	4.20	5.00
165 cu. yd. constructing reverse filter	10.00	10.00	6.00	8.00	5.00	10.00
1,000 sq. yd. furn. matls. and const. 3-in. thick asphaltic compound surfacing	2.50	3.00	1.50	2.00	1.80	1.75
1,780 sq. yd. furn. matls. and const. 6-in. thick crusher run rock base	.90	1.00	1.00	1.75	1.25	1.35
1,330 sq. yd. furn. matls. and const. 4-in. thick asphaltic compound surfacing	3.50	2.50	2.00	2.70	2.00	2.00
8,165 cu. yd. concrete in structures	30.40	38.00	33.00	32.50	25.70	40.00
12,250 bbl. furnishing and handling cement	4.20	3.20	3.20	3.70	3.80	3.75
814,000 lb. placing reinf. bars	.035	.04	.035	.04	.033	.04
1,310 sq. ft. furn. and placing ½-in. elastic filler matl. in joints	1.50	1.50	2.00	.50	1.40	1.60
1,710 sq. ft. furn. and placing 1-in. elastic filler matl. in joints	2.00	2.00	2.50	1.00	2.30	2.00
585 lin. ft. placing rubber water stops in joints	2.00	2.00	2.00	2.00	1.00	1.40
168 lin. ft. furn. and placing 6-in. diam. pipe in reverse filter and outlets	.60	2.00	1.00	1.50	1.00	2.00
9,220 lin. ft. furn. and driving untreated timber piles	1.50	1.50	1.50	1.50	1.40	2.00
90 sq. yd. water proofing deck of railroad bridge	2.50	2.00	2.00	1.50	4.00	1.50
95,500 lb. furn. and driving steel sheet piling	.13	.08	.10	.08	.15	.10
600,000 lb. erecting structural steel for bridges	.035	.04	.023	.03	.028	.05
479,380 lb. installing radial gates	.04	.03	.07	.10	.053	.06
110,000 lb. installing radial gate hoists	.065	.05	.04	.03	.025	.07
15,000 lb. furn. and erect. special metal railings for highway bridge	.28	.18	.33	.40	.40	.30
13,000 lb. furn. and erecting pipe railings	.22	.07	.30	.40	.65	.35
6,600 lb. furn. and installing miscl. metalwork	.40	.40	.43	.50	.60	.40
280 lin. ft. furn. and install. elect. metal conduit ¾-in. and less in diam.	1.10	1.00	2.00	1.00	1.60	1.00
80 lin. ft. furn. and install. elect. metal conduit 1-in. in diam.	1.65	1.50	2.50	1.25	1.90	1.20
220 lin. ft. furn. and install. elect. metal conduit 1½-in. in diam.	2.25	2.00	3.00	2.00	2.10	1.50
10 lin. ft. furn. and install. elect. metal conduit 2½-in. in diam.	5.50	3.00	4.00	4.00	4.00	2.00
185 lb. furn. and install. elect. conductors and ground wires	2.25	1.00	1.00	2.00	2.00	2.00

Highway and Street . . .

California—Solano County—State—Structures and Surf.

Parish Bros., Benicia, Calif., was low bidder at $1,035,424.05 to the California Division of Highways for about 6 mi. of grading, surfacing, and the construction of five bridges between Cordelia Underpass and Ledgewood Creek. Unit bids were submitted as follows:

(1) Parish Bros. $1,035,424
(2) Fredrickson Bros. 1,113,995
(3) Harms Bros. & Charles MacCloskey Co. $1,199,139
(4) Guy F. Atkinson Co. 1,246,867

	(1)	(2)	(3)	(4)
Lump sum, remov. exist. struct. (Dan Wilson Creek)	500.00	900.00	$1,800	$2,500
2,370 cu. yd. remov. conc.	2.50	4.00	5.40	5.00
184 lin. ft. remov. timber railing (Suisun Creek)	1.00	1.65	2.50	1.00
311 sta. clearing and grubbing	25.00	20.00	30.00	40.00
191,900 cu. yd. rdwy. excav.	.30	.44	.52	.45
9,000 cu. yd. rdwy. excav. (remov. shoofly)	.30	.30	.40	.40
1,600 cu. yd. struct. excav. (bridges)	2.00	1.00	2.50	2.00
2,420 cu. yd. struct. backfill (bridges)	2.25	2.50	2.00	3.00
8,900 cu. yd. struct. excav.	1.75	2.15	3.40	2.25
3,270 cu. yd. ditch and channel excav.	.72	.90	.95	1.00
1.22 mi. border trench	300.00	275.00	350.00	500.00
4,315,000 sta. yd. overhaul	.003	.003	.003	.004
70,200 sq. yd. compacting orig. ground	.05	.05	.05	.04
59,000 ton imp. base material	.82	.98	1.25	1.00
Lump sum, dev. wat. supply and furn. wat. equip.	$4,300	$6,500	$4,000	$7,000
17,200 M. gal. applying water	1.20	1.30	1.00	1.30
311 sta. finishing roadway	15.00	16.50	10.00	15.00
65,180 ton untr. rock base	1.95	2.00	2.20	2.50
80,000 sq. yd. mix. and compact. (C.T.S.)	.17	.19	.25	.20
4,500 sq. yd. placing and compact. (rock base borders)	.35	.25	.30	.60
2,450 bbl. Portland cem. (C.T.S. and rock base borders)	3.60	4.10	3.90	3.50
179 ton liq. asph. SC-2 (pr. ct.)	20.75	22.00	24.00	22.00
190 ton asph. emuls. (cur. sl., pt. bdr. and sl. cts.)	37.00	28.00	38.00	31.00
660 ton screenings (sl. ct.)	4.75	4.50	5.50	6.00

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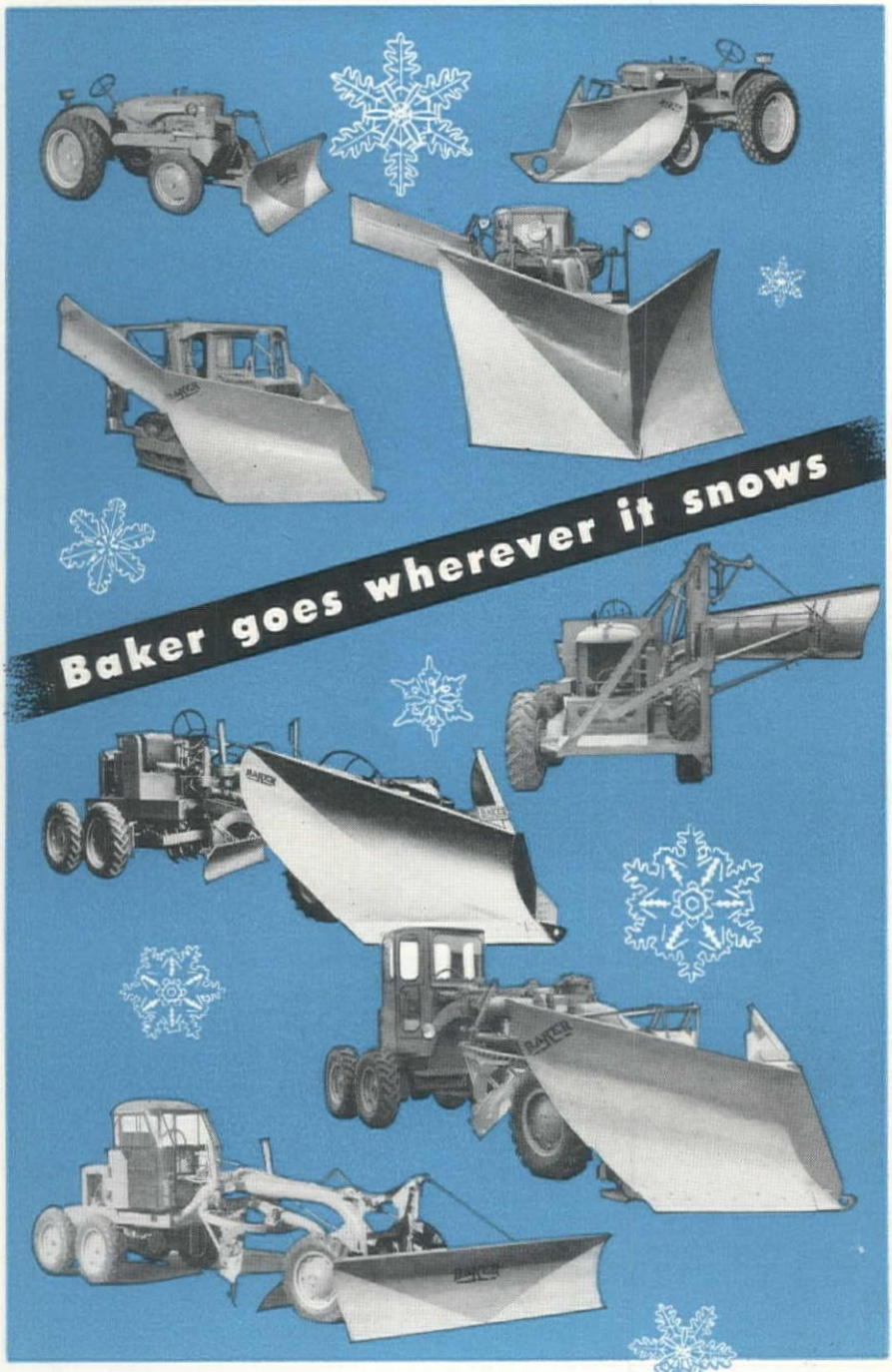

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You can choose the best Snow Plow for your job from the complete Baker line, in which each model is specially designed to *work together* with a specific A-C tractor or motor grader.

For complete specifications and information, see your Baker-Allis-Chalmers dealer—or write direct. THE BAKER MANUFACTURING COMPANY, Springfield, Illinois.

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Tacoma, Washington

Northern Harris
Walla Walla, Washington

Yukon Equipment, Inc.
Seattle, Washington

Fred M. Viles & Company, Inc.
Spokane, Washington

•

Studer Tractor & Equipment Co.
Casper, Wyoming

332	ton sand (pr. ct. and sl. ct.)	4.25	4.00	5.00	4.50
21,590	ton min. aggr. (dense graded P.M.S.)	3.28	3.70	4.00	5.00
1,710	ton min. aggr. (open graded P.M.S.)	3.28	4.20	4.30	5.00
1,193	ton paving asph. (P.M.S.)	20.50	19.00	17.00	18.50
2,500	lin. ft. placing P.M.S. (dikes)	.15	.09	.20	.15
400	lin. ft. raised traffic bars	1.50	1.25	1.50	1.20
18,000	cu. yd. Class "B" P.C.C. (pavement)	12.00	12.85	13.50	12.50
12,200	ea. pavement tie bolt assemblies	.50	.45	.50	.50
3,730	cu. yd. Class "A" P.C.C. (structures)	38.00	40.00	41.50	50.00
16	cu. yd. Class "A" P.C.C. (soffit slab)	130.00	65.00	125.00	80.00
462,600	lb. structural steel	.115	.11	.105	.11
Lump sum,	cleaning and painting structural steel	$4,230	$4,450	$4,000	$6,000
8,360	lin. ft. furn. conc. piling	2.81	2.50	2.50	3.00
224	ea. driving conc. piles	65.00	68.00	61.00	70.00
68	cu. yd. broken conc. riprap	14.00	17.00	14.00	8.50
241	cu. yd. Cl. "A" P.C.C. (curbs)	40.00	33.50	32.00	48.00
152	ea. right-of-way mon.	5.00	5.00	6.00	5.50
170	ea. conc. barrier posts	6.00	4.50	5.00	5.50
630	lin. ft. timber barrier railing	1.40	1.00	1.50	1.50
924	lin. ft. corrugated metal bridge railing	4.25	4.20	6.00	3.25
519	lin. ft. steel railing	6.45	6.75	6.20	7.00
200	lin. ft. salv. exist. guard railing	1.50	1.00	2.00	1.25
200	lin. ft. reconstr. salvaged guard railing	2.00	2.50	2.00	1.50
335	ea. culv. mkrs. and guide posts	5.00	4.50	4.50	6.00
48	ea. Code W23R signs	7.50	8.40	7.50	7.50
6.8	mi. new property fence	$1,475	$1,700	$1,600	$1,800
1,750	lin. ft. chain link fence	.80	.80	.85	.85
0.06	mi. salv. exist. property fence	500.00	560.00	600.00	700.00
0.06	mi. reconstruct. salv. property fence	$1,000	$1,200	500.00	800.00
29	ea. drive gates	45.00	55.00	55.00	50.00
28	lin. ft. 6-in. C.M.P. (18 ga.)	1.40	1.10	1.50	1.50
490	lin. ft. 8-in. C.M.P. (16 ga.)	1.40	1.40	1.75	1.50
130	lin. ft. 12-in. C.M.P. (16 ga.)	2.00	2.05	2.25	2.00
2,251	lin. ft. 18-in. C.M.P. (16 ga.)	2.65	2.80	3.00	3.00
573	lin. ft. 24-in. C.M.P. (14 ga.)	4.15	4.25	4.25	4.00
1,450	lin. ft. 18-in. C.M.P. siphons (16 ga.)	4.00	4.60	4.75	4.25
83	ea. field joints for 18-in. C.M.P. siphons	17.50	17.00	24.00	25.00
440	lin. ft. 8-in. perforated metal pipe underdrains	1.45	2.00	1.75	1.50
110	cu. yd. filter material	4.50	4.50	5.00	4.50
10	ea. spillway assemblies	30.00	28.00	30.00	40.00
107	lin. ft. 8-in. C.M.P. down drains (16 ga.)	1.75	1.40	2.00	1.50
1,250	lin. ft. salv. exist. pipe culv.	.75	1.20	1.25	1.00
500	lin. ft. relay salv. C.M.P. culv.	1.00	1.20	1.25	1.00
396,000	lb. bar reinf. steel	.088	.08	.08	.085
70	sq. ft. open steel floor	2.00	3.00	8.00	4.00
Lump sum,	jacking operations	800.00	850.00	$1,800	$2,500
Lump sum,	finishing pier (Cordelia Underpass)	250.00	560.00	$1,500	$1,200
51	M.f.b.m. placing timber (shoofly trestle)	75.00	100.00	100.00	125.00
116,400	lb. erecting wide flange beam (shoofly trestle)	.023	.025	.025	.015
4,000	lb. steel bracing pile caps (shoofly trestle)	.45	.25	.30	.28
70	ea. driving timber piles (shoofly trestle)	43.00	44.00	45.00	45.00
28	ea. driving steel piles (shoofly trestle)	45.00	44.00	54.00	45.00
3	ea. steel pile splices (shoofly trestle)	25.00	45.00	30.00	20.00
Lump sum,	remov. shoofly trestle	$2,500	$5,000	$2,400	$5,500
900	lin. ft. metal plate guard railing	3.15	3.20	3.30	3.00

Washington—Cowlitz County—State—Grade and Surf.

Fiorito Bros., Seattle, Washington, with a bid of $678,874, was awarded the contract by the Washington Department of Highways for 10 mi. of grading and asphaltic concrete pavement on sections of the Kalama River-Longview Wye and Ostrander-Castle Rock routes. Unit bids were submitted as follows:

(1) Fiorito Bros. $678,874
(2) N. Fiorito Co. 691,636
(3) Peter Kiewit Sons' Co. 697,669
(4) Natt McDougall Co. and K. F. Jacobsen & Co. $724,446
(5) Porter W. Yett 774,886
(6) Guy F. Atkinson Co. 793,953

		(1)	(2)	(3)	(4)	(5)	(6)
Lump sum,	clearing and grubbing	$3,900	$10,800	$1,000	$7,000	$1,900	$2,000
2,520.00	cu. yd. unclass. excav. incl. haul of 600 ft.	1.00	.55	.90	1.25	.75	.70
560	cu. yd. com. trench excav. incl. haul of 600 ft.	2.50	2.00	1.00	2.00	1.50	1.20
500	sta. yd. overhaul	.05	.02	.03	.05	.01	.02
76.70	M sta. yd. overhaul	10.00	5.00	10.00	7.00	5.00	7.20
11,600	cu. yd. common excav. incl. all haul	.75	.40	.35	.75	.75	.85
2,000	cu. yd. channel change excav. incl. all haul	.50	.50	.35	.65	1.00	.75
3,840	cu. yd. special borrow incl. all haul	.60	.45	.60	.85	1.00	.85
10,000	cu. yd. strip. borrow and surf. pits, incl. all haul	.20	.13	.20	.18	.20	.20
2,405	cu. yd. structure excav.	2.00	2.25	1.40	2.75	5.00	1.80
3	days tamping roller	60.00	50.00	35.00	75.00	100.00	96.00
21	days mechanical tamper	40.00	35.00	25.00	45.00	40.00	48.00
623.1	sta. (100 ft.) finishing roadway	12.00	10.00	10.00	12.50	7.00	10.00
4,450	M gal. water in place	2.00	1.75	2.00	2.05	1.75	2.50
2,095	cu. yd. gravel backfill for drains, in place	4.50	4.00	4.00	5.00	3.75	4.20
50	cu. yd. gravel backfill for foundtns. in place	4.50	4.00	2.00	5.00	3.75	4.20
148,140	ton selected roadway borrow in place	.50	.60	.68	.55	.78	.47
18,460	cu. yd. sel. rdwy. borrow in place from stkpl.	.50	.58	.74	.60	.80	.94
16,950	tons cr. stone surf. top course, in place	2.20	2.00	1.90	2.75	2.35	3.00
7,370	cu. yd. spec. cr. stone surf. top crse. in pl. from stockpile	.50	.74	.75	.70	.85	1.00
165.9	sta. (100 ft.) preparation of subgrade	8.00	9.00	12.00	22.00	16.00	40.00
	TYPE I-1 ASPHALTIC CONCRETE PAVEMENT						
3,441	ton Class C wearing course in place	8.50	8.40	8.60	8.25	9.00	10.80
6,822	ton Class L leveling course in place	8.50	8.40	9.00	8.25	8.00	10.30
	OTHER ITEMS						
105,632	sq. yd. cem. conc. pavt. std. 14-da. mix 6-in. sec. in place	3.33	3.40	3.45	3.56	3.68	4.00
3,192	only dowel bars with rubber caps in place	.33	.35	.35	.38	.40	.58
26	only temp. br. across pavt. takedown type in pl.	100.00	100.00	25.00	85.00	200.00	150.00
1,830	sq. yd. remov. exist. cement conc. pavt.	1.00	.50	.30	.70	.50	.60
715	sq. yd. remov. exist. asphaltic conc. pavt.	1.00	.25	.30	.35	.30	.35
2,494	lin. ft. pavt. headers in place	1.00	.65	.60	.90	2.00	.80
3,570	lin. ft. Type A precast white reflecting curb in pl.	2.75	2.60	1.70	2.25	2.80	2.20
842	lin. ft. Type C precast white reflecting curb in pl.	3.00	3.10	2.50	3.00	3.00	2.80
190	lin. ft. remov. Type A precast white reflect. curb	.50	.50	.45	.75	1.00	.60
126	lin. ft. remov. Type C precast white reflect. curb	.50	.50	.70	1.00	1.00	.60
180	lin. ft. reset. Type A precast white reflect. curb	1.00	1.35	.55	1.00	1.50	.60
126	lin. ft. reset. Type C precast white reflect. curb	1.00	1.35	.80	1.15	1.80	.60
20	only precast white reflect. traffic buttons in place	3.00	2.50	2.75	2.30	2.50	2.30
140	lin. ft. asphaltic conc. traffic bars, in place	1.80	1.50	1.50	1.65	2.00	1.70
827.5	lin. ft. furn. and place perforated conc. drain pipe 10-in. diam.	1.25	1.25	.85	1.00	1.30	.90

(Continued on next page)

3,267.5 lin. ft. pl. perforated conc. dr. pipe 10-in. diam. in place	1.00	.80	.40	.50	1.00	.36
300 lin. ft. pl. conc. or V.C. sewer pipe 8-in. dia. in pl.	1.15	1.00	.70	.75	1.00	.80
129 lin. ft. pl. conc. or V.C. sewer pipe 10-in. dia. in pl.	1.20	1.10	1.00	1.00	1.30	.90
60 lin. ft. bit. coat. corr. metal pipe Type No. 2 No. 16 ga. 8-in. diam. in place	2.50	3.00	3.00	1.60	2.00	2.40
126 lin. ft. place conc. culv. pipe 12-in. diam. in pl.	1.50	1.75	1.50	1.60	1.90	1.35
582 lin. ft. std. reinf. conc. culv. pipe 12-in. dia. in pl.	1.90	2.00	1.75	1.70	2.10	1.80
267 lin. ft. std. reinf. conc. culv. pipe 18-in. dia. in pl.	4.00	4.00	2.75	2.90	3.00	2.80
87 lin. ft. std. reinf. conc. culv. pipe 24-in. dia. in pl.	7.00	7.00	4.00	4.20	5.50	6.40
12 lin. ft. std. reinf. conc. culv. pipe 30-in. dia. in pl.	9.00	12.00	6.25	6.00	7.00	8.50
18 lin. ft. std. reinf. conc. culv. pipe 36-in. dia. in pl.	11.00	15.00	10.00	9.00	12.50	12.00
66 lin. ft. relay. conc. culv. pipe 12-in. diam.	1.50	1.75	1.00	1.00	2.10	.60
77 lin. ft. galv. iron water pipe 1-in. diam. in pl.	.50	1.00	.75	1.15	1.00	1.20
43 lin. ft. galv. iron water pipe 2-in. diam. in pl.	2.00	1.50	1.25	1.65	1.50	1.80
260 lin. ft. wood gutter des. No. 1 complete in pl.	2.00	2.00	1.00	1.25	.40	2.40
5 only catch basins in place	150.00	100.00	80.00	105.00	100.00	180.00
6,700 lin. ft. std. beam guard rail in place	2.50	2.35	2.50	2.60	3.00	3.00
700 lin. ft. temporary beam guard rail in place	2.00	2.00	2.50	2.35	2.50	3.00
855 lin. ft. remov. std. beam guard rail	.75	.50	.50	.65	1.00	.60
150 lin. ft. remov. temporary beam guard rail	.50	.50	.50	.45	1.00	.60
50 lin. ft. removing wood guard rail	.50	.50	.50	.40	1.00	1.20
600 lin. ft. reset. std. beam guard rail	1.75	1.00	1.00	.80	1.50	1.10
150 lin. ft. reset. temporary beam guard rail	1.00	1.00	1.00	.70	1.25	.80
212 only reinf. conc. spot posts in place	10.00	9.00	10.75	9.00	7.00	9.00
2 cu. yd. hand placed riprap in place	30.00	35.00	20.00	25.00	15.00	20.00

Miscellaneous . . .

Idaho—Butte County—A.E.C.—Production and Delivery of Concrete

Central Pre-Mix Concrete Co., Spokane, Wash., with a bid of $64,720, was low before the U. S. Atomic Energy Commission for the production and delivery of concrete to be used in structures of the atomic energy installation near Arco, Idaho. Unit bids were submitted as follows:

(1) Central Pre-Mix Concrete Co. $64,720
(2) D. W. Falls Ready-Mix Co. 69,070
(3) Colorado Pre-Mix Concrete Co. 85,349
(4) United Engineers, Inc. 90,260
(5) J. Kenneth Thayn Construction Co. 95,473
(6) Erland & Blickle 98,100
— Jones Construction Co. $106,999
— Buhl Concrete & Construction Co. 116,589
— C. A. Brockett Cement Co. and Kansas City Quarries Co. 127,230
— C. R. Hartman 133,550

FURNISHING LABOR, EQUIPMENT, ETC., NECESSARY TO OPERATE, MAINTAIN, AND REPAIR CONCRETE BATCH PLANT

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum for 1st 10 working days (or fraction thereof)	$8,622	$4,320	$10,257	$3,000	$2,592	$7,200
Unit price per 8-hr. working day, for next 55 working days	78.75	162.00	260.00	225.00	209.24	27.00
For total of 55 working days	4,331	8,910	14,300	12,375	11,508	1,485
Unit price per 8-hr. working day, for next 55 working days	75.25	162.00	255.00	225.00	209.24	27.00
For total of 55 working days	4,138	8,910	14,025	12,375	11,508	1,485

FOR EACH CU. YD. OF CONCRETE PRODUCED AT PLANT

Lump sum for first 2,000 cu. yd. (or any fraction thereof)	4,116	520.00	1,000	2,000	3,000	10,100
Unit price per cu. yd. for next 9,000 cu. yd.	.19	.26	.10	1.00	1.20	.97
For total of 9,000 cu. yd.	1,710	2,340	900.00	9,000	10,800	8,730
Unit price per cu. yd. for next 9,000 cu. yd.	.185	.26	.05	1.00	1.00	.54
For total of 9,000 cu. yd.	1,665	2,340	450.00	9,000	9,000	4,860
Unit price per yd. for next 20,000 cu. yd.	.18	.26	.02	1.00	.80	.28
For total of 20,000 cu. yd.	3,600	5,200	400.00	20,000	16,000	5,600

FOR DELIVERY OF EACH CU. YD. OF CONCRETE TO DESIGNATED SITE WITHIN 15-MI. RADIUS OF PLANT

Lump sum for 1st 7,000 cu. yd. miles (or fraction thereof)	7,810	840.00	1,750	500.00	1,400	2,800
Unit price for next 66,500 cu. yd. miles	.10	.12	.18	.07	.11	.20
For total of 66,500 cu. yd. miles	6,650	7,980	11,970	4,655	7,315	13,300
Unit price for next 66,500 cu. yd. miles	.095	.12	.15	.07	.10	.20
For total of 66,500 cu. yd. miles	6,317	7,980	9,975	4,655	6,650	13,300
Unit price for next 100,000 cu. yd. miles	.0925	.12	.14	.07	.09	.20
For total of 100,000 cu. yd. miles	9,250	12,000	14,000	7,000	9,000	20,000
Operation of boiler plant, etc. (24-hr. day)	69.00	75.00	67.47	60.00	70.00	100.00
For total of 90 24-hr. days	6,210	6,750	6,072	5,400	6,300	9,000
For waiting time of trucks, etc. (per 5 min.)	.30	.98	.25	.30	.40	.24
For total of 1,000 five-min. periods	300.00	980.00	250.00	300.00	400.00	240.00

Oregon—Columbia River—Corps of Engineers—Stone Dike

General Construction Co., Portland, Ore., with a bid of $196,080, was low before the Portland District, Corps of Engineers, for placing revetment and constructing a stone dike at the westerly end of the upper portion of Sand Island, Columbia River, Oregon. Unit bids were submitted as follows:

(1) General Construction Co. $196,080
(2) Portland Tug & Barge Co. 201,400
(3) Larson Construction Co. $206,340
(4) Engineer's estimate 182,400

	(1)	(2)	(3)	(4)
38,000 cu. yd. stone, in place	$5.16	$5.30	$5.43	$4.80

Montana—Valley County—Corps of Engineers—Outlet

McLaughlin Construction Co., Livingston, Montana, with a bids of $450,845, was low before the Fort Peck District, Corps of Engineers, for construction of tunnel outlet protection works, Fort Peck Dam, Fort Peck, Mont. Unit bids were submitted as follows:

(1) McLaughlin Construction Co. $450,845
(2) E. V. Lane Co. 473,147
(3) Long Construction Co. 489,444
(4) S. J. Groves & Sons Co. $1,166,483
(5) Engineer's estimate 406,430

	(1)	(2)	(3)	(4)	(5)
Lump sum, const. of cofferdams and unwatering work areas	$236,000	$290,000	$100,000	$755,538	$195,000
96 cu. yd. removal of existing concrete	100.00	50.00	200.00	88.50	46.00
3,350 cu. yd. concrete	50.00	40.00	100.00	112.50	52.00
112,500 lb. steel reinforcement	.17	.20	.20	.15	.18
112 lin. ft. metal water stops	10.00	6.00	2.00	7.90	5.50
3,150 ea. drilling dowel holes	2.00	4.50	3.00	1.50	2.60
Lump sum, furn. and install. pipe handrail, chain-link fencing and 1½-in. steel conduit	$11,200	$7,000	$3,070	$3,090	$3,758

NEW EQUIPMENT

MORE COMPLETE INFORMATION about any of the new equipment or products briefly described on the following pages may be obtained at no charge. Send your request to Equipment Service, Western Construction, 609 Mission St., San Francisco 5, Calif. For quicker service, designate items by number.

★★★

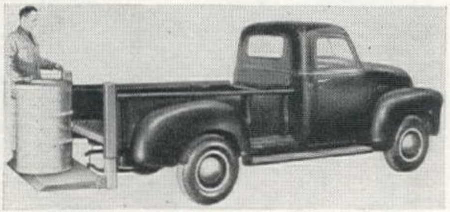
801

Pickup Truck Loader

Manufacturer: National Lift Co., Waukesha, Wis.

Equipment: Hydraulically powered tailgate loader with 1000-lb. lifting capacity.

Features claimed: The Lift-O-Matic's hydraulic power is provided by a fan-belt



driven hydraulic pump with a self-contained clutch. The pump operates only when lifting power is needed. One handy control, installed on the Lift-O-Matic, is used for either raising, holding or lowering the tailgate. The operator can operate the unit while riding up or down with the load. When it is not being used to load or unload the truck, it can be level-locked at the truck body floor level, or it can be swung up and securely locked, acting as a regular tailgate.

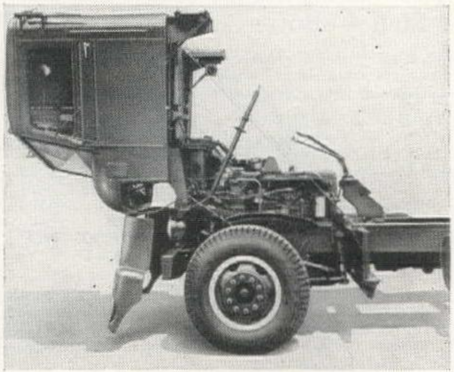
802

Weight-Saving Motor Truck

Manufacturer: Peterbilt Motors Co., Oakland, Calif.

Equipment: Cab-Over-Engine motor truck, available in both single and dual drive models with choice of steel or aluminum construction, and choice of diesel, gasoline or butane engine.

Features claimed: Without increasing over-all length the COE design truck provides up to five additional feet of truck or semi-trailer bed; more payload area is available, while still conforming to highway length regulations of many states. Through use of extruded, heat-treated aluminum alloy, instead of steel, in the construction of the large heavy duty frame of the aluminum model, substantial savings in weight are effected. The frame castings, rear axle housing, hubs, brake shoes, wheels and entire cab are of aluminum in that model. In the COE design the engine is completely below the floor, greatly reducing heat trans-



ferred into the cab, and facilitating the driver's entrance and exit. The cab front, hinged at the top, is raised by unhooking two large hood fasteners. This exposes the entire front end of the truck, and a mechanic can stand on the floor while repairing the engine. The front fenders are mounted on heavy duty hinges and can be swung aside to expose the fan belts, footbrake valve, steering gear mounted on both sides of the engine. To completely remove the engine, the entire cab can be tilted forward 90 deg. by removing the steering wheel, driver's seat and floor boards and disconnecting the flanged connection in the exhaust line.

803

Balanced Hammer Heads

Manufacturer: Palmer Welloct Tool Corp., Meadville, Pa.

Equipment: Nail hammer heads designed so that center of gravity is in a position to permit perfect balance with the weight distributed directly in the line of drive.

Features claimed: The balanced design permits truer, easier and faster driving for a given amount of energy. The complete line of heads is of forged chromium alloy steel, scientifically heat treated to maximum hardness and toughness.

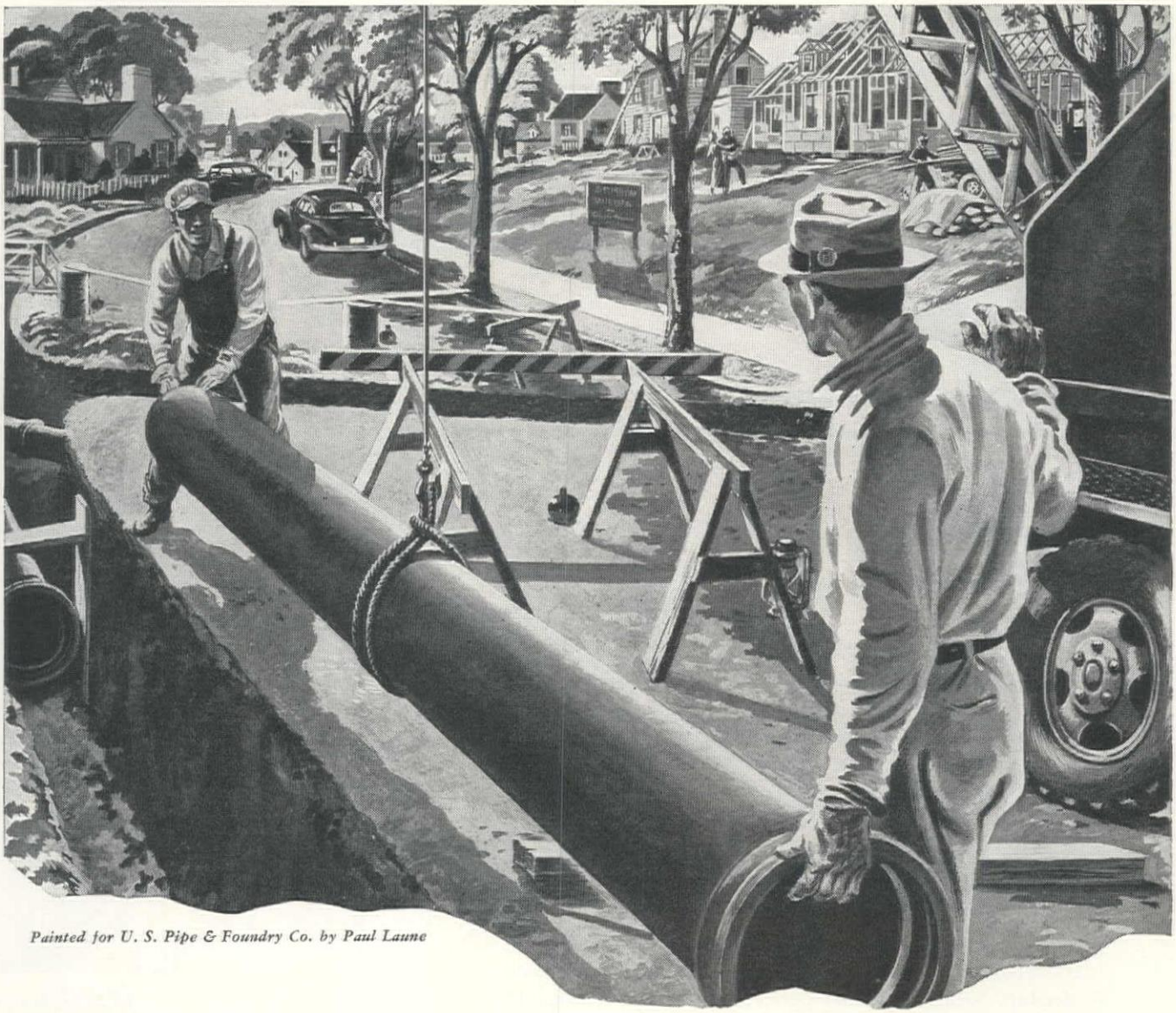
804

Scaffold Support

Manufacturer: Superior Scaffolding Co., Culver City, Calif.

Equipment: Superior Waler Bracket, a scaffold support equipped with a slot for guard rail uprights.

Features claimed: All joints of this waler bracket are welded and a double hook and angle bearer eliminates the swaying ten-



Painted for U. S. Pipe & Foundry Co. by Paul Laune

There's a solid satisfaction in specifying cast iron pipe. You know that your choice coincides with the judgment of leaders of your profession the world over. And when the line is backfilled, you are confident that it will serve throughout a long life at a low annual maintenance cost. This has been true of cast iron pipe for centuries; yet in the fifty-one years since our Company was founded, notable advances in manufacturing methods and controls have been made, resulting in a finer, more uniform pipe. United States Pipe and Foundry Company, General Offices: Burlington, N. J. Plants and Sales Offices Throughout U. S. A.

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

dency common to many brackets. A 2 x 4-in. extension pad may be slipped into the bottom pocket so the unit can be attached to the bottom waler.

805

Plaster and Mortar Mixer

Manufacturer: Ransome Construction Equipment Division of Worthington Pump and Machinery Corp., Dunellen, N. J.

Equipment: Six-cu. ft. mixer.

Features claimed: Designed for high speed output, this machine can be handled by the plasterer or mason on the job. It will handle enough material to keep 30 men working on larger jobs. To speed up the charging operation, the protective grill over the mixer is equipped with a bag cutter. The operator can break the bag over the cutter and simply lift up the ends to empty material into the mixing bowl. The platform's 20-deg. angle prevents spillage. Wide blades insure a fast and thorough mixing action. A bowl lock prevents the machine from dumping the batch while it is in operation.

806

Rough Terrain Compressor

Manufacturer: Worthington Pump and Machinery Corp., Holyoke, Mass.

Equipment: 500-ft. pipe line model Blue Brute portable air compressor.

Features claimed: With a standard engine and compressor unit mounted on pneumatic tires, this compressor is designed to operate in rough terrain and on unusually steep inclines. It is built to give continuous performance under unfavorable dusty conditions. The unit is equipped with a special oil bath air cleaner, a steep angle oil sump, and a readily accessible heavy-duty replaceable cartridge oil filter.

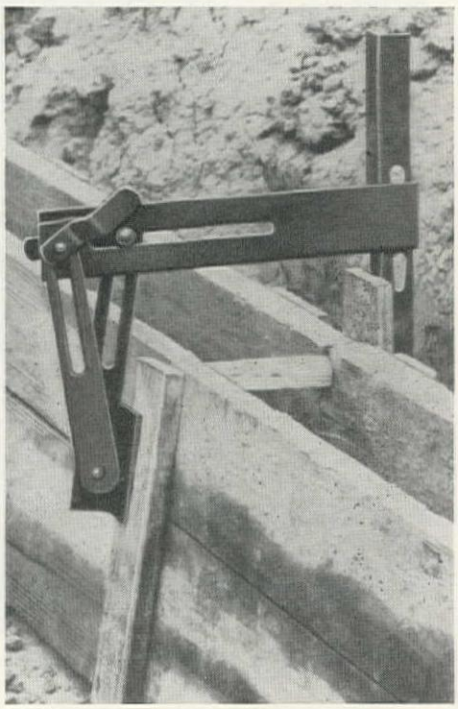
807

Steel Form Clamps

Manufacturer: Pacific Engineering Sales Co., Los Angeles, Calif.

Equipment: Pacific Boult Clamp, adjustable, for setting up wood forms for curbs, curbs and gutters, and building foundations.

Features claimed: Comprised of stake and cross piece, this Pacific Boult Clamp is completely adjustable to any curb and gutter cross section in general use throughout the country, can be set for widths from



4 to 8 in., for heights up to 24 in., and for batter from vertical to any angle. Standard steel stakes are used, which prevent kicking out of the forms at the bottom. No special or patented spreaders or wall ties are required. The forms are held rigidly in place without the need of additional bracing except in extremely soft ground conditions. According to the manufacturer, few nails are required and the salvage of lumber is large. No tools are required to adjust the clamps because a locking lever is a part of each clamp; this locking lever holds the form true to line, grade, and shape. The face form is supported without stakes and can be removed without jarring or disturbing the fresh concrete. A new adjustable crossbar can be used with the regular stakes to set up any building foundation up to 36-in. height and to 10-in. width.

808

Tractor Excavating Attachment

Manufacturer: Hyster Company, Portland, Ore.

Equipment: Hoe Front, equipment available with the Hyster D6 Hystaway.

Features claimed: The Hoe Front, which was previously available only for D7 and D8 Hystaways, can be installed on either new or used Hystaways. Utility use of a dozer blade on the front of the tractor is still possible, and it takes less than one hour to dismount the Hystaway unit to permit full production bulldozer use. The

machine is currently employed by construction contractors for such jobs as pipe line trenching, excavation for bridge approaches, gravel pit operations, and other excavating projects requiring equipment to operate over rough, steep or difficult terrain. The Hoe can reach farther into the excavation than other machines of the same size because the center of its swing is beyond the crawlers.

809

Traffic Line Marker

Manufacturer: Gledhill Road Machinery Co., Galion, Ohio.

Equipment: A complete self-propelled large capacity marker for 2-man operation.

Features claimed: This tractor-mounted machine gives 3 to 8-in. solid or broken pattern. The unit is equipped with standard

nationally-known paint guns, tanks, valves, gauges and air compressors. Patented adjustable bead dispensers give uniform distribution. Specially designed paint guards control the width of the traffic line and, being suspended, insure clean line edges and uniform point distribution. Overall width is 5½ ft. The tractor is equipped with a governor which insures constant speed at all times and under all road conditions.

810

High Speed Tractor-Dozer

Manufacturer: R. G. LeTourneau, Inc., Peoria, Ill.

Equipment: Model Super D Tournadozer, to meet need for speedy, rubber-tired tractor-dozer to handle jobs which do not demand the use of larger, standard size Tournadozer.

Features claimed: About 3,500 lb. lighter and equipped with a smaller capacity bowl

than the Super C, the D model is powered by a 122-hp. diesel engine and has a bowl capacity of 1.8 cu. yd., as compared to the 2.5-cu. yd. bowl of the Super C. The new,

small model has four forward speeds up to 19 mph., with two reverse speeds. Specifications are: wheelbase, 5 ft. 11.6 in.; length, 15 ft. 2 in.; height, 8 ft. 1 in.; blade width, 11 ft. 3 in.; height of bowl, 36 in.; height that blade can be raised above ground, 44 in.; distance blade can be lowered, unlimited. Attachments available for Super D are the snow plow, root rake, side boom crane, overhead winch, and drawbar for cable-operated scrapers.

811

Airfield Runway Surfacing

Manufacturer: United States Rubber Co., Akron, Ohio.

Equipment: Aero-Sealz, a solvent-resistant rubber compound for protecting airfield runways from damaging effects of fuel spilled by jet planes.

Features claimed: When mixed with tar, Aero-Sealz produces a tough, durable surface that resists the dissolving effects of kerosene-type fuel used by jet planes. Besides protecting pavement surfaces, Aero-Sealz shows promise used as a filler to seal joints between concrete slabs in highways and runways.

812

Truck Warning System

Manufacturer: B. F. McDonald Co., Los Angeles, Calif.

Equipment: Reversalarm, a warning system to alert possible victims in the path of backing trucks.

Features claimed: Accidents caused by trucks backing up can be eliminated with the installation of this audible alarm, which mounts on any truck chassis near the rear of the vehicle. A single-stroke, weatherproof gong sounds within the first 8 in. of the truck's backward motion. The alarm is loud enough to be effective under all working conditions, and operates automatically even if the truck's motor is not running. Using a special automatic interrupter switch that connects on the transmission speedometer cable take-off, the Reversalarm can be quickly installed on either a 6 or 12-volt system.

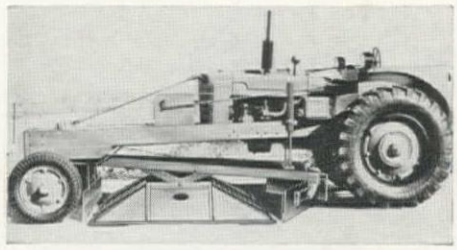
813

Asphalt Road Planer

Manufacturer: Asphalt Maintenance Co., New York, N. Y.

Equipment: Clarkmoore Asphalt Road Planer Model 31 to improve resurfacing and renovation of old asphalt road pavements.

Features claimed: One Clarkmoore fuel oil burner is used to supply intense heat to



the heating hood area. It throws a flat, horizontal flame into the heating hood, eliminating the "blow torch" effect. The even intense heat makes possible the planing action of the two-section planing blades which cut and remove the rough and corrugated asphalt pavement to any desired depth without tearing or gouging, leaving a table-smooth surface ready for seal coating. The depth of the cut is controlled hydraulically. Fuel oil consumption is about 6 gal. per hour. The unit features an International Harvester gasoline engine and Roots-Connersville high pressure blower. The moldboard is flat ¾-in. by 12-in., made in two sections and arranged to deliver the removed material centrally between the rear wheels. The cutting edge is ⅜-in. by 6 in. grader blade stock, especially heat treated.

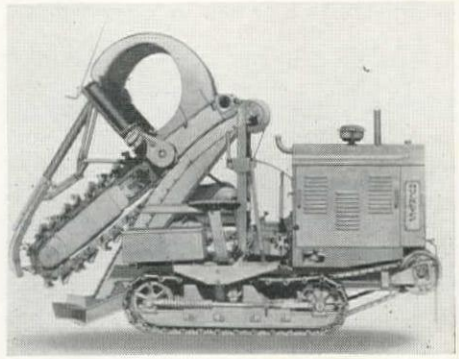
814

Ditching Machine

Manufacturer: Findlay Division of Gar Wood Industries, Inc., Findlay, O.

Equipment: Ditcher with adjustable left-hand crawler for working on hillsides, or with one crawler in the gutter and the other in the parkway.

Features claimed: The Buckeye Model 402 service utility ditcher has a maximum



depth of 4 ft. and maximum cutting width of 8 in. Designed for miscellaneous work in a variety of weather and topographic condi-

tions, the ditcher is powered by a gasoline engine having 47 h.p. at 1600 r.p.m. It has a top digging speed of 1308 ft. per hour. A heavy-duty 10-in. over-center type clutch enables the operator to disengage the clutch, leave the machine in gear and remove his hand from the clutch lever and still keep the motor running. The machine is completely mounted on non-clogging self-cleaning crawlers, which are provided with a spring release to prevent damage.

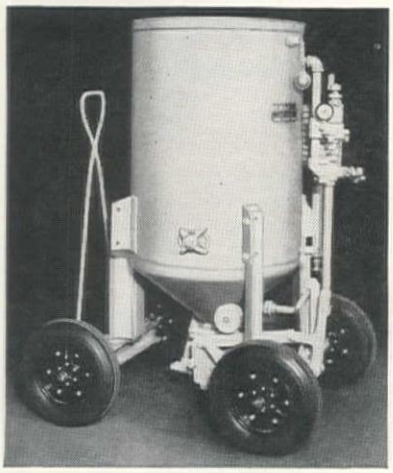
815

Sand Blast Generator

Manufacturer: Ruemelin Mfg. Co., Milwaukee, Wisc.

Equipment: Sand blast generator for bridge maintenance work.

Features claimed: The high speed blast nozzle quickly removes rust, scale, and old



paint, providing a metal surface for application of primer or finish coats of paint. The generator is mounted on four pneumatic-tired wheels with front wheels on swivel axle, equipped with drawbar handle. Maximum capacity is 1,000 lb.

816

Road-Marking Machine

Manufacturer: Beaver Tractor Co., Inc., Stratford, Conn.

Equipment: Apparatus propelled by small riding-type tractor, with special equipment and attachments for all types of road markings.

Features claimed: The 6-hp. riding tractor operates at 6 mph. as the scientifically

determined speed for best results regarding consistency of paint and economy of use.

Equally efficient for straightway road work, or "in town" work on cross walks, safety zones and parking areas. It is low in first cost (under a thousand dollars), has low operating maintenance cost and is economical in use of paints. Tank attached to the rear carries paint as desired. Paint is fed through a spray gun under pressure. Five gallons of paint will mark up to one mile of road. Machine can easily be transported to new working locations.

817

Small Crusher

Manufacturer: Universal Engineering Corp., Cedar Rapids, Iowa.

Equipment: Model 880 Junior "B" Gravelmaster crushing, screening and loading plant.

Features claimed: The over-all height of the improved Junior "B" has been lowered and the screening area increased with a 2 ft. x 8 ft. 2½-deck screen. The Junior "B" also has provisions for the removal of chips. A 10 x 16-in. roller bearing jaw crusher and an 18 x 16-in. star gear roll crusher is used in the Junior "B," and power is mounted on the plant. It is a low cost plant, meeting all road limitations and producing specification material.

818

Electric Power Drives

Manufacturer: Sterling Electric Motors, Inc., Los Angeles, Calif.

Equipment: Slo-Speed Geared Electric Power Drives in "Splash-Proof" design for horizontal floor mounting.

Features claimed: These motors, designed for positive protection against splashing liquids, are built with single or double reduction gears, providing speeds from 780 r.p.m. down to 20 r.p.m., in ratings ½ hp. to 15 hp., inclusive. Sterling one-piece cast iron stator frames and one-piece cast end bells with integrally cast baffles —(no loose shields or deflectors) provides protection in all kinds of industrial plants and especially for creameries, canneries and chemical processing.

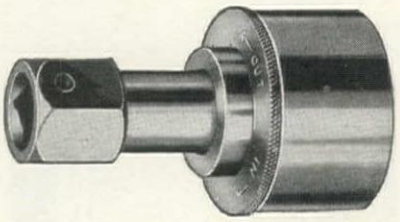
819

Time-saving Stud Wrench

Manufacturer: Owatonna Tool Co., Owatonna, Minn.

Equipment: Stud wrench for removing or installing cylinder studs.

Features claimed: This tool requires less room in which to operate because it turns



on its own center and is not eccentric. It is a quick-acting, positive-gripping wrench which tightens as pressure is applied. The wrench is released simply by turning the knurled collar. Its maximum diameter is 2 in., and can be operated with either a ½-in. drive socket handle or a 1-in. open end box wrench. Jaw teeth are built of special alloy steel milled for either right or left hand turns. New jaws are easily installed when needed.

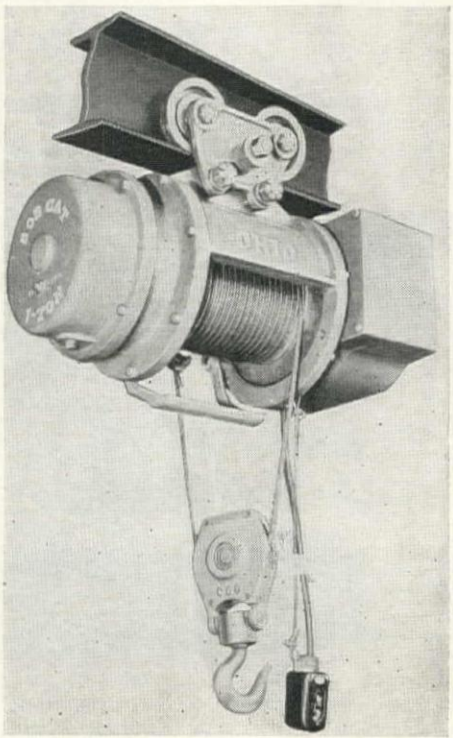
820

Enclosed Motor Hoist

Manufacturer: Ohio Electric Mfg. Co., Cleveland, Ohio.

Equipment: Electric cable Bob-Cat hoists, in capacities of ½ to 5 tons, featuring motor totally enclosed within cable drum.

Features claimed: Hoists have substantial weight and overall dimension reduction by enclosing motor totally within the



cable drum. Load sustaining parts are steel forged and cast, and gear reduction is accomplished by double internal gear train with two Weston-type load brakes. Motor brake is equalizing solenoid type connected to an up-limit cut-off switch. Designed for operation on 220, 380, 440, or 550-volt 3-phase, 60-cycle current, the Bob-Cat hoist is furnished with either pendant rope control or push-button control on pendant cable.

821

Concrete Saw

Manufacturer: Martin Fireproofing Corp., Buffalo, N. Y.

Equipment: Saw with an electric motor, guide rails and a choice of either wet or dry cutting.

Features claimed: The electric motor on the saw assures a smooth constant flow of

power and guide rails guarantee a straight clean cut and eliminate cutting blade breakage. All working parts are shielded by sheet steel welded into a single unit. So balanced that all weight rests forward on semi-pneumatic tires the "creeper" can easily be rolled to the job, Operation and moving about is a one-man job. Excellent for trimming precast concrete slabs.

822

Aluminum Nails

Manufacturer: Nichols Wire & Aluminum Co., Davenport, Iowa.

Equipment: Non-stain non-corrosive finish nails.

Features claimed. Economical, non-rusting aluminum nails are being specified for all exposed applications to eliminate the need for repainting stained wood siding. Aluminum nails need not be puttied or countersunk, are considerably less expensive than stainless steel or copper alloys, and for wood siding on the average 5-room house the cost over conventional nails is about $2.50. In accordance with F.H.A. requirements, aluminum nails are etched, to remove dirt, grease, and roughen surface.

823

Gas Powered Dirt Rammer

Manufacturer: Barco Mfg. Co., New York, N. Y.

Equipment: Barco Pegson Rammer for compaction adjacent to structures, pipes, and confined areas.

Features claimed: Completely self-contained and portable, the rammer eliminates ganging of individual tampers into cumbersome units and needs no auxiliary equipment or supply lines. High penetration makes loose lifts of 12 to 20 in. possible. The rammer may be used on sand or granular soils with complete efficiency, tamping between 10 and 24 cu. yd. per hr. Job reports show that it can be operated 20 hr. per day, week after week, without suffering from heat or vibration problems common to conventional combustion equipment. The unit has a magneto ignition system and operates by jumping upwards from the thrust of the power cylinder against the foot, and then dropping by its own weight. It operates over 2 hr. on the 2-qt. tank of gasoline.

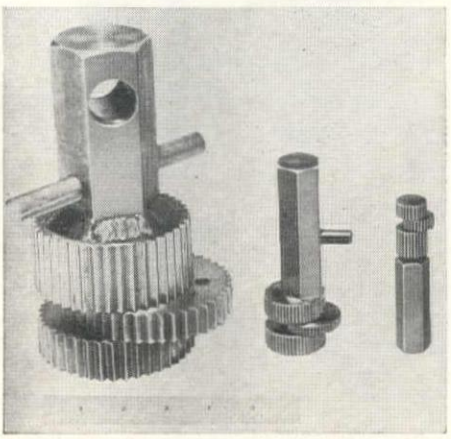
824

Internal Pipe Wrenches

Manufacturer: Roddick Tool Co., Costa Mesa, Calif.

Equipment: Wrenches of ⅛, 2½, 3 and 4-in. sizes, bringing to twelve the total number of sizes in the line.

Features claimed: The entire line, including the new sizes, fills the need for a wrench



which can be used either for the installation or extraction of fittings in close quar-

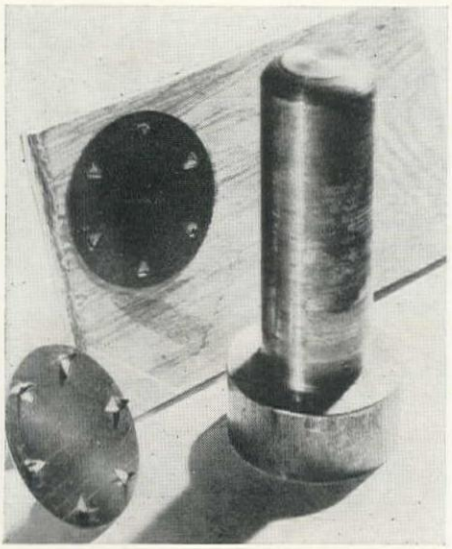
ters where conventional wrenches cannot be used. Should be used where exterior of pipe cannot be marred or scratched. With only one simple moving part, there is nothing to get out of order or maintain.

825

Plywood Hole Patch

Manufacturer: Troiel Companies, Inc., Berkeley, Calif.

Equipment: Ply Hole Cover invention for covering holes in plywood concrete form work.



Features claimed: Time spent in hunting for right size cork to cover plywood holes is eliminated by using simple metal disk lined with barbs. Disk is placed over unwanted hole and driven flush with plywood surface with one hammer blow on a magnetic setting tool. Disks come in 1¾, 2¼, and 2¾-in. diameters.

826

Core-Type Drill

Manufacturer: Tilden Tool Manufacturing Co., Pasadena, Calif.

Equipment: Tilden "Konkrete Kore" drill, with side exhaust slot through which pulverized core particles can escape.

Features claimed: The design principle of the Tilden drill eliminates the slow-moving center of ordinary pointed drills and makes possible the penetration of concrete at speeds of up to 6 in. per minute. Up to 30 ft. of concrete can be drilled before resharpening is necessary, and drill cutters can be resharpened as much as 5 to 7 times.

827

Tilting Mixer

Manufacturer: Ransome Construction Equipment Division of Worthington Pump and Machinery Corp., Dunellen, N. J.

Equipment: Lightweight 3½-S End Discharge Tilting Mixer.

Features claimed: Weighing less than 800 lb., the new tilter can be easily handled and spotted by one man. It has a 48-in. loading height for faster charging and less operator fatigue. To make daily maintenance easier, the mixing drum will make a complete revolution so that quick, thorough drainage of the bowl can be accomplished after washing out. Mechanical features include: independently sprung wheels to eliminate road shock; access door located on vertical side of engine housing so engine will not get wet if machine is operated with door off; and fingertip control drum lock.

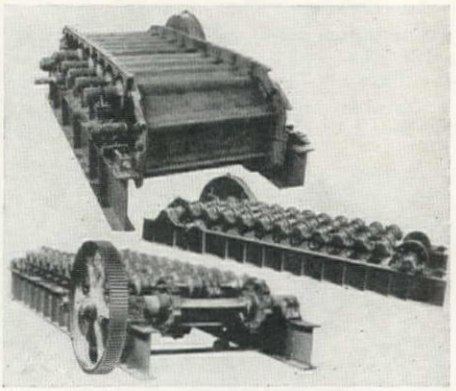
828

Primary Feeder

Manufacturer: Pioneer Engineering Works, Minneapolis.

Equipment: Pioneer-Oro Jumbo feeder now available in 72-in. width and in lengths up to 60 ft., with feeder pans, and all other wearing parts such as drive sprocket and supporting rollers, of cast manganese steel.

Features claimed: Patented features of the Pioneer-Oro jumbo primary extra



heavy-duty feeder include interlocking support points on the pans proper, and clean out wedges in the pans links to remove dirt on the return side. An outstanding patented feature is the design of the pan which casts the drive links integral with the pan to eliminate bolts and rivets. Pans are cast with upturned lugs at the ends to form an interlocking continuous lip

for reducing spillage. These pans, which are corrugated and overlapping, are spaced at 15-in. pitch, are 1 in. thick at the smallest section, and weigh close to 1000 lb. each.

829

Welding Plates

Manufacturer: General Scientific Equipment Co., Philadelphia, Pa.

Equipment: G-S Welders' Filter Lens; standard size, 2 x 4¼ in; available in 2 x 4⅛ in.

Features claimed: G-S plates are chemically compounded to screen out both infra-red and ultra violet rays. They offer extra visibility and are guaranteed to absorb 99.5% infra-red and 99.75% ultra-violet. They are accurately graded for density of shade and thickness as set forth in the U. S. Federal Specifications GGG-H-211 for welding helmets and shields. They are priced at $.90 each.

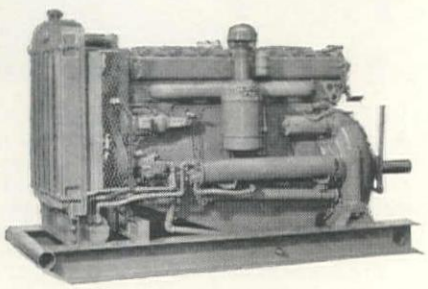
830

Design Refinement in Diesel Engine

Manufacturer: Murphy Diesel Co., Milwaukee, Wisc.

Equipment: Five 4-cylinder and six 6-cylinder models, ranging in output from 90 to 200 hp., are now available with advances in design that provide more power, economy, dependability, and longer life.

Features claimed: The Murphy principles of diesel operation—plain open combustion chamber, four valves per cylinder, and hydraulic servo-type governor—remain as the basis of the design of the engines, and the additional power output results from improvements in the application of these principles.



831

Aluminum Hard Hat

Manufacturer: E. D. Bullard Co., San Francisco.

Equipment: A 12-oz. aircraft grade aluminum alloy hot with high impact resistance.

Features claimed: Distinctive ribbed design, laboratory drop tests demonstrate, furnishes ample structural strength while the crown remains resilient to absorb much of the impact of a falling object. A second impact-absorbing feature is the inner hat assembly, with its full-floating, 6-point suspension hammock.

832

Electric Vibrator

Manufacturer: Stow Manfacturing Co., Binghampton, N. Y.

Equipment: Vibrator equipped with trouble-free Stow flexible shaft and a sealed-in-oil vibrator head.

Features claimed: The motor on this unit, which delivers up to 9500 rpm., is protected by a special skid-mounting and has double handles for lifting in either horizontal or vertical positions. The vibrator is

designed to eliminate hand puddling, place stiffer mixes more rapidly, and increase the density and water-tightness of the concrete for greater flexural and compression strength.

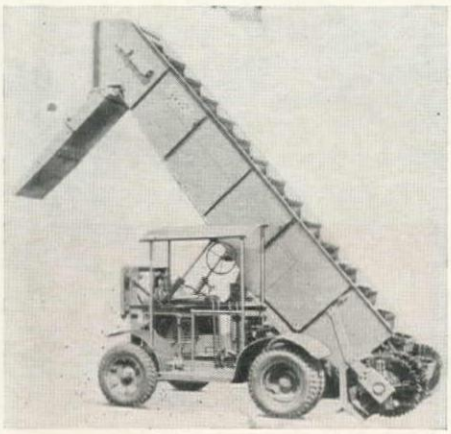
833

Bucket Loaders

Manufacturer: N. P. Nelson Iron Works, Clifton, N. J.

Equipment: Two heavy-duty loaders, the Model P-11 mounted on wheels and the Model Q-11 mounted on crawlers.

Features claimed: Both machines handle any loose material up to 3-in. cube, either from stock piles or bank run sand and gravel pits. Rated loading capacity is 3 to 4 cu. yd. per min. Many of the features



pioneered by Nelson, such as hydraulic boom control, Timken bearing elevator, 3-point mounted spiral feed shaft, etc., are supplemented in the "11" series by wear-resistant manganese steel bucket chains, sprockets, bucket edges and spiral feeder edges; more powerful engine, and larger Twin-Disc clutches with double roller chain transmission drive.

834

Ball Bearing Swivels

Manufacturer: General Machine & Welding Works, Pomona, Calif.

Equipment: Miller ball bearing, angular thrust swivels for eliminating wire line twist and kinking.

Features claimed: General Machine's new swivel line consists of 15 different types of end connections and 9 swivel capacities ranging from the AA Model rated at 250-lb. working load to the H Model at 46,200-lb. working load. All Miller Swivels have a safety factor of 5 to 1. They turn freely under maximum stress, removing all the kink and twist usually present when a wire line is heavily loaded. This eliminates spinning of the load, gives the hoisting crane operator greater control and adds to wire line life.

835

Dual-Fuel Engines

Manufacturer: Murphy Diesel Co., Milwaukee, Wis.

Equipment: Heavy-duty line of engines, power units and generator sets capable of burning either natural gas or diesel fuel.

Features claimed: With no other adjustments than the positioning of a simple lever, either fuel can be used by the Murphy engines. The Murphy engine utilizes the economical advantages of high compression combustion, which is reflected by substantially reduced fuel consumption and longer engine life. The gas system is one of the simplest ever developed. Three models, ranging from 135 to 180 hp., are now available.

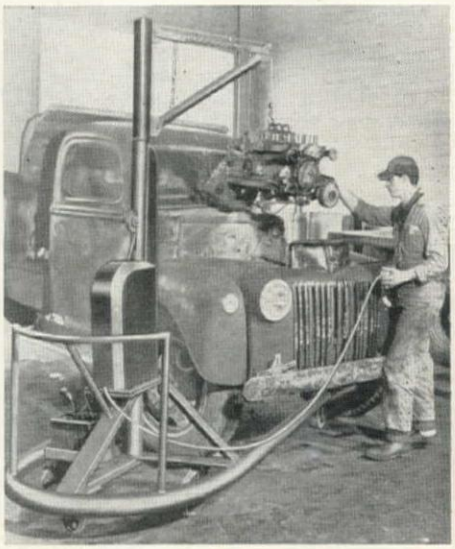
836

Electric Hoist

Manufacturer: Lift-All Equipment Co., Portland, Ore.

Equipment: Hoist with push-button control, designed for one-man operation.

Features claimed: The Lift-All will hoist, lower, stop and hold weights up to 2,000



lb. It operates on its own shop dolly, or from any desired position on a truck bed, and can be quickly shifted from one mount to another by one person. The boom, easily adjustable for height, swings completely around with its load. The Lift-All is powered by a 6-volt reversible motor. An ordinary 6-volt car battery is used on the dolly, and the truck battery supplies ample power when the hoist is truck-mounted.

837

Plastic Mask

Manufacturer: American Optical Co., Southbridge, Mass.

Equipment: Goggles Nos. 305 and 306 supplied with vinyl plastic masks.

Features claimed: The plastic mask, standard on the two foundry goggles, can be sterilized by spraying, wiping or dipping, and will retain its shape and properties, attributes which the leather face masks did not have. When wet, it will not shrink or curl. Perspiration will not make it hard; exposed to any moisture it remains flexible and soft.

838

Self-Clinching Nail

Manufacturer: Elastic Stop Nut Corp. of America, Union, N. J.

Equipment: Self-clinching stainless steel ES-nail, used for face-nailing asbestos shingles directly to either ½-in. or 25/32-in. sheathing.

Features claimed: The point of the improved nail is sharper, and the body design is stronger due to a tighter V-channel section. The ES-nail can now be used at nailing points where the sheathing material is backed up by wood, such as studs and corner posts. The nail has two legs, one enclosing the other, hinged near the end and forming a triangular loop at the top. When the nail is driven into the material,

the last blow of the hammer flattens the head of the fastener which, by automatic lever action, causes the locking foot to be drawn up behind the sheathing material.

839

New Trench Hoe Design

Manufacturer: Harnischfeger Corp., Milwaukee, Wisc.

Equipment: Gooseneck boom hoe attachment for the P&H 255A Excavator to give higher speeds, greater digging depth, and better handling characteristics.

Features claimed: Operation of the new P&H trench hoe is 50% faster due to use

of 2-part hoist line. It has a power operated auxiliary gantry for raising and lowering the boom. A greater amount of power is made available by the low gear transmission. The machine can cut vertical ends at start of trench and also trim vertical walls. There is a chopping action due to the special hoe stick linkage.

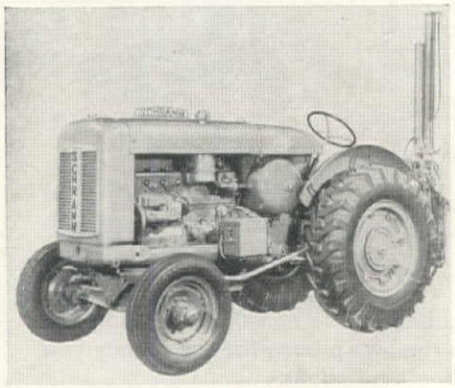
840

Tractor-Mounted Air Tools

Manufacturer: Schramm Inc., West Chester, Penn.

Equipment: Pneumajack, pneumatic cylinder mounted on rubber-tired Pneumatractor, with D-55 or D-45 Schramm rock drill.

Features claimed: Drill has 36-in. movement, making 24-in. drill changes simple.



Recommended for drilling holes in pavements, for mudjacking, setting parking meters, quarry production, and grouting. Can also be furnished with two BT-32 backfill tampers or a B-80 paving breaker, mounted on air feed and lift.

841

Giant Supercharger

Manufacturer: Cooper-Bessemer Corp., Mt. Vernon, Ohio.

Equipment: Largest capacity engine supercharger ever built in the United States.

Features claimed: Designed specifically for Cooper-Bessemer type LS and LSV engines, the new superchargers are of such size and design as to handle the requirements of any gas or diesel engine from 1,200 hp. to 2,500 hp.

842

Grade Stake Markers

Manufacturer: W. D. Hargus, Brawley, Calif.

Equipment: A unique marking method for indicating grade on surveyors stakes.

Features claimed: The marker is a sleeve made of heavy durable paper which can be stapled to the guard stake and which incorporates a scale in hundredths or tenths of a foot depending on desired precision. Advantages are: it makes stake marking an office job where normal checks can be used at lower rates; makes grade stakes visible for more than 600 ft; eliminates the need for remarking due to fading from the weather, and definitely indicates amounts of cut and fill by direct indication on the sleeve thus allowing men of lesser skill to carry out the job satisfactorily.

843

Paint Removing Burner

Manufacturer: National Cylinder Gas Co., Chicago.

Equipment: Oxy-acetylene flame supplemented by a low-velocity flow of pure oxygen, resulting in rapid oxidation of the heated paint.

Features claimed: Designed to be attached to NCG's Torchweld 75 hand cutting torch, the burner removes scale and rust and dehydrates the metal surface, leaving a clean surface for repainting.

NEW LITERATURE

YOU MAY OBTAIN any of the publications reviewed below. Send your request to Western Construction, 609 Mission St., San Francisco 5, Calif. The literature is free, unless otherwise indicated. Please designate the desired items by number.

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844

BELT CONVEYORS—The Redi-Fab series of belt conveyors is uniquely presented in a 40-pg. catalog by the **Barber-Greene Co.**, Aurora, Ill. Without requiring technical knowledge on the part of the user, the new catalog lets him select the conveyor for his own particular needs. The user can make his own layout right down to the location and selection of supports, through use of the catalog's Redi-Fab Conveyor Layout Sheet. The correct horsepower of the motor and horsepower of the drive is easily obtained without any calculation. The Redi-Fab series covers the range most frequently required in permanent belt conveyors, being available in 49 lengths, 3 widths, and with numerous variables and accessories. The series includes 5 new drives, designed to give the greatest flexibility, and 3 new feeders: reciprocating, apron, and belt.

845

CONCRETE CUTTING MACHINE —**Felker Manufacturing Co.**, Torrance, Calif., has published an informative 8-pg. treatise on cutting concrete with diamond abrasive wheels. The diamond abrasive wheel cutting method has the following advantages over usual methods: (1) a partial cutting is sufficient to insure a straight, unmarred edge at the surface level; (2) by pre-cutting, considerably more trench can be opened per day than by breaking out alone; (3) the break below the cut remains jagged and rough, aiding sealing, and insuring positive grout of the replacement; (4) a trench only as wide as necessary is easily produced with even, straight borders, thus making easier an accurate estimate of the quantity of replacement concrete. In addition, the pamphlet covers many other advantages concerned with greater efficiency, neater work, and more economical operation.

846

LIGHTING UNITS—**RLM Standards Institute**, Chicago, has issued a revised edition of "RLM Standard Specifications for Industrial Lighting Units," containing detailed specifications for 18 different fluorescent and incandescent industrial lighting units which carry the RLM label. Containing important revisions of existing specifications, the 44-pg. booklet offers valuable help in the proper planning of lighting for industry, business, schools and institutions.

847

INDUSTRIAL TRACTORS — **Allis-Chalmers Manufacturing Co.**, Milwaukee, Wis., has published a 20-pg. booklet featuring its complete industrial tractor line. The 3½ x 6-in., 2-color catalog contains specifications and a brief description of each Allis-Chalmers power unit, wheel tractor and crawler tractor. This pocket-size catalog emphasizes wise use of equipment. It discusses the importance of buying the right equipment to fit each job.

848

WELDING EQUIPMENT—In order to provide up-to-date operating data on its new line of welding equipment, **Eutectic Welding Alloys Corp.**, New York City, has published a pocket-sized equipment folder. Full design specifications are given for both EutecTorch No. 1, used for light and general work, and for EutecTorch No. 2, for heavier work. EutecArc, the double-duty AC arc welding machine, which is capable of handling both extra-light and extra-heavy work, is covered in the folder. One section gives a complete listing of additional accessories for gas and arc welding offered by Eutectic Welding Alloys Corp.

849

INDUSTRIAL MAINTENANCE TOOLS—This 20-page bulletin, published by **Owatonna Tool Co.**, Owatonna, Minn., illustrates and describes new tools skillfully designed to accomplish difficult removing and replacing operations efficiently without ruining costly, irreplaceable parts. The OTC pulling system, which consists of the OTC Grip-o-Matic Pullers and OTC Push-Pullers, with various adaptors and attachments is featured, and the illustrations show typical puller jobs made easy with these time and labor saving tools.

850

ADVANCE IN AC WELDING—**Lincoln Electric Co.**, Cleveland, has published a loose leaf insert which gives complete information on the company's 200 amp. Fleetwelder. The Fleetwelder is said to

simplify AC arc welding in the following ways: eliminates electrode sticking; produces higher quality welds; arc-booster selector gives correct starting current; increases safety factor because the open circuit voltage never exceeds 62 volts; takes less power to operate because it draws less idle current from the line than do most AC welders.

851

MECHANIZATION PROGRAM FOR HEAVY CONSTRUCTION AND MAINTENANCE WORK—A pamphlet has been made available by **Gradall Division** of **Warner & Swasey Co.**, Cleveland, to show how contractors, utilities and municipalities can save thousands of dollars annually by reducing maintenance and capital investment costs through an intensified mechanization program. Dealing first with the problem of pavement removal, the pamphlet pictures and tells how a machine such as the Gradall easily strips previously perforated pavement, picks up and loads slabs of pavement, and makes a light job of pile and shore pulling. According to the pamphlet the cost of pavement removal is reduced about 85% with use of this machine.

852

COMPUTING IMPACT BY ELECTRONIC CALCULATION — **International Business Machines Corp.**, New York City, is offering a 20-page booklet on the Fundamentals of Electronic Calculation. Of interest to the construction industry is a calculation providing a complete numerical analysis of the behavior of a pile when struck by a pile-driving hammer. The results indicated exactly what stresses occurred within the pile and cap block, as well as the penetration of the pile into the earth. The booklet describes how the IBM electronic calculating machines make it possible to study the behavior of numerous pile types, instead of the partial study of a few isolated cases conducted previously with the use of key driven calculators.

853

DIESEL OIL WITH ACID NEUTRALIZER — **D-A Lublicant Co., Inc.**, Indianapolis, Ind., is offering a circular on its new D-A Diesel Oil. It describes how and why D-A Diesel Oil reduces engine deposits and neutralizes destructive combustion chamber acids. For example, the circular discusses the recently identified problems encountered with the appearance of fuels having a high sulphur content.

854

ECONOMIES OF HARD-FACING—"Haynes Alloys—Hard-Facing Manual," a 40-page lithographed manual telling the complete story of hard-facing, has been published by the **Haynes Stellite Division, Union Carbide and Carbon Corp.** It describes how to select the right alloy; which welding process to use; and gives simple, step-by-step instructions for applying the various rods by both the oxy-acetylene and metallic-arc welding processes. Information is given on the properties and available sizes of 12 Haynes hard-facing materials. The booklet should be a helpful guide for welding engineers, master mechanics, maintenance superintendents, and plant foremen.

855

HEAVY EQUIPMENT MAINTENANCE CATALOG—This 32-page brochure, published by **McNally Pittsburg,** Pittsburg, Kan., carefully itemizes babbitted journal boxes, roller bearing pillow blocks, centrifugal slurry pumps, water valves, conveyor takeups, roller holdbacks, and perforated steel screen plates. Also included is specification information on conveyor and drive pulleys, V-belt sheaves, gears, sprockets, shafts, and keys. All equipment listed is for heavy duty service. Complete descriptions are given, supplemented with photographs, dimension drawings, data tables, and specifications. Where dimensions are to be given by the purchaser, explicit listings of data needed are shown.

856

FORMS, CLAMPS, SUPPORTS, ALIGNERS—**Williams Form Engineering Corp.**, Grand Rapids, Mich., has made available its revised 53-page catalog on Form Engineering. The catalog includes several new items, such as the Hex-Lock Clamp, Snap-on Spacer Clamp, form aligners, and reversible Waler supports recently developed by the company. In careful detail the catalog illustrates through specifications, photographs, and graphs how the various Williams products have been used in such mammoth projects as Keswick Dam, the Pentagon, San Francisco Bay Bridge, Housatania River Bridge, McNary Dam, and the Stewartville hydro development at Ontario, Canada.

857

HEAVY-DUTY BUCKET LOADERS—A catalog has been issued by the **N. P. Nelson Iron Works, Inc.**, of Clifton, N. J., describing the two new heavy-duty bucket loaders now in production. Complete descriptions of the machines, model P-11, mounted on wheels, and the Q-11, mounted on crawlers, with detailed specifications are given. A graphic presentation of the features considered most important by the

manufacturer is shown together with a series of mechanical views. The center spread of the catalog is devoted to on-the-job photographs of the two machines showing their application to specific loading operations in various types of material.

858

VERTICAL PUMP DRIVES—**Western Gear Works,** Lynwood, Calif., has announced a bulletin on Pacific-Western Right Angle Vertical Pump Drives. This 8-pg. booklet in color gives full specifications and illustrates several applications of the vertical pump drives. The pump drives are designed for a wide range of power and speed requirements, including all sizes larger than 200 rated hp. at 1:1 ratio and 720 r.p.m.

859

HIGHWAY TRANSPORTATION INFORMATION — **National Highway Users Conference, Inc.,** Washington, D. C., has prepared a 32-page booklet of factual information for the thousands of associations and businesses active in the highway transportation field. This booklet gives detailed figures for the degree of highway usage by such groups as the farmer, worker, consumer, traveler, family, and various public bureaus and private industries.

860

STEEL SCAFFOLD — **Beaver Art Metal Corp., Advance Scaffold Division,** Ellwood City, Pa., illustrates and describes the Advance tubular steel scaffold in its two-color folder. Included in the folder are descriptions of the patented self-contained cam locks for instantly attaching cross braces to panels and the stack lock (patent pending) for locking panels together vertically. Various types of standard panels are illustrated.

861

USES OF TUBING—A golden anniversary catalog with appropriate gold cover has been issued by **Wallace Supplies Mfg. Co.,** Chicago, which pertains entirely to bending, warehousing and fabricating of pipe and tubing. The 60-page booklet illustrates the value of the bending equipment in the radiant heating industry, among others.

862

CONCRETE BLOCK MACHINE—A bulletin published by **Ledeen Manufacturing Co.,** Los Angeles, describes the application of hydraulic cylinders in a concrete block machine. In this bulletin the machine is illustrated, and details and operation of the cylinders discussed.

863

GE RECORDING TURBIDIMETER —**General Electric Co.,** Schenectady, N. Y., has available a publication describing its new recording turbidimeter, a photoelectric instrument which automatically measures and records the amount of suspended particles in a liquid. The instrument provides a means for monitoring and controlling processes in water treatment plants or wherever turbidity is a significant condition of the process.

864

BITUMULS PAVING HANDBOOK —Now available is the 80-page pocket-sized edition of the Bitumuls Paving Handbook, published by the **Stancal Asphalt & Bitumuls Co.** and the **American Bitumuls Co.,** San Francisco. The book covers all aspects of paving techniques with Bitumuls Emul-

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sified Asphalt and also with other types of bituminous binders. Also included are data on Laykold compounded asphalts for flooring, tennis courts, protective coatings, adhesives, and waterproofing. Major divisions of this handbook cover the following: (1) Information on paving methods and materials, including data on tank cars, distributors, drag brooms, and hand-pumps. (2) Specifications on road and airport paving, including base, wearing surface, and seal. Also covered are detailed types of construction such as macadam, retread, sand-mix, armorcoat, and non-skid seal. (3) Complete tabular data on rates of application of asphaltic binders and quantities of aggregate required for various types of construction. (4) Condensed Asphalt Institute specifications on asphalt cement and cutbacks. (5) Listing of an engineering library of free booklets covering individual types of construction. (Requests for this handbook should be written on business letterhead.)

865

TRAYLOR FEEDERS — **Traylor Engineering and Manufacturing Co.**, Allentown, Pa., has issued a 20-page, two-color bulletin on its complete line of apron, grizzly, table, and slurry feeders. Cutaway views of each type of feeder show interior construction and many exclusive Traylor features. Traylor feeders are shown working with all types of crushers, rotary kilns, and grinding mills in pictures of various installations.

866

ENGINEERING PROPERTIES OF NICKEL ALLOYS—Two new technical bulletins on the properties of high nickel alloys have been issued by **The International Nickel Co., Inc.**, New York City. Both contain 24 pages of charts, tables on compositions and properties, working instructions, and other information of a technical nature, all completely revised from previous editions to make them new presentations. One bulletin, "Engineering Properties of Inconel," contains material on Inconel X, one of the newer age-hardenable Inco nickel alloys. The other publication deals with the engineering properties of K Monel and KR Monel.

867

CABLE HOISTS—**Ohio Electric Mfg. Co.**, Cleveland, has announced an 8-page folder covering the company's new line of Bob-Cat heavy-duty electric cable hoists. Featuring large cutaway drawings of the equipment, the 3-color bulletin gives photographs, diagrams and line drawings, full descriptions, specifications, prices and ordering data on the hoists.

868

SERVICE TOOLS FOR MINNEAPOLIS-MOLINE TRACTORS—This bulletin, published by the **Owatonna Tool Co.**, Owatonna, Minn., illustrates and describes a set of tools engineered and developed in cooperation with the Minneapolis-Moline Co. service department for use on MM tractors and farm implements. This set is made up of basic universal tools which are adaptable to many service operations on all makes and models. This makes it possible to service and overhaul other tractors that may be taken in on trade. The pullers in this set will not become obsolete as new tractor models come out, and the set is mounted on a sturdy service board designed as a permanent storage place.

869

EXHIBITING AND CONTROLLING INSTRUMENTS — **Fischer & Porter Co.**, Hatboro, Pa., has published a 28-page illustrated catalog which describes the latest developments in exhibiting and controlling instruments for use with flow rate meters. This catalog, which is punched to fit any size binder, discusses the basic Fischer & Porter devices for coupling a primary metering element to a secondary or exhibiting instrument. Also discussed are the Magnabond magnetic clutch and the electric impedance bridge transmitting systems. The exhibiting instruments illustrated and described are: flow indicators, recorders, integrators, and a new pneumatic controller unit.

870

CATERPILLAR VETERANS—"Built To Live," a 16-page publication issued by **Caterpillar Tractor Co.**, Peoria, Ill., features veteran Caterpillar diesel tractors, motor graders, and engines that are still at work making profits for their owners. Many of these veterans are shown in action photos, performing in a wide variety of fields, including road building and road maintenance. The first three Caterpillar diesel tractors ever built are depicted, still hard at work.

871

LARCH AND DOUGLAS FIR FACTS—**Western Pine Assn.**, Portland, Ore., has published the final two in a series of Ten Facts Folders on Western Pines and associated woods. The publications describe the botanical history and classification, growth range, properties and uses of Larch and Douglas Fir in of the Western Pine region. Folders are available on Idaho White Pine, Ponderosa Pine, Sugar Pine, White Fir, Engelmann Spruce, Incense Cedar, Western Red Cedar, and Lodgepole Pine, as well as Douglas Fir and Larch.

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