WESTERN CONSTRUCTION

FEATURED THIS ISSUE

AUGUST 1951

FROM EVERY ENGINE— DEPENDABLE POWER

TEXACO SIMPLIFIED LUBRICATION PLAN — Ask your Texaco Lubrication Engineer for full details on the Texaco Simplified Lubrication Plan which requires *only six lubricants* for all major needs. This remarkable plan simplifies your lubrication setup, saves time, trouble and money. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N.Y.

AT LOWER COST

...when you lubricate with TEXACO URSA OIL X★★

To keep your machinery on the job and out of the repair shop, lubricate all Diesel and heavy-duty gasoline engines with *Texaco Ursa Oil.*★★ Detergent, dispersive *Texaco Ursa Oil X*★★ prevents carbon, gum and sludge . . . stands up under heat and pressure . . . gives bearings full protection against wear and corrosion, even under severest operating conditions. Result — powerful, dependable performance . . . less down time . . . fewer repairs.

Cost-saving *Texaco Ursa Oil X*★★ keeps rings free and ports open for better compression and combustion. Fuel consumption is reduced, parts last longer and maintenance costs drop. Operators everywhere report more reliable and economical engine performance, thanks to *Texaco Ursa Oil X★★!*

☆ ☆ ☆

For savings in chassis lubrication, use *Texaco Marfak.* Its tough, adhesive protecting film assures greater protection for longer periods between overhauls. *More than 400 million pounds of Texaco Marfak have been sold!*

In wheel bearings, use *Texaco Marfak Heavy Duty.* It seals itself in the bearings and seals out dirt and moisture, won't leak onto brakes . . . requires no seasonal change.

Crawler track mechanisms run better, last longer when protected with *Texaco Track Roll Lubricant.* It gives longer lasting protection against moisture, dirt and wear under all operating conditions.

TEXACO REG'T M.

TEXACO Lubricants and Fuels

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PROBABLY no other general class of work calls for more versatility than crane work.

Your *Northwest Crane* is a recognized leader *in all classes of crane work.* It is smooth and fast as a clam; there is a choice of boom hoist equipment to meet any condition; "Feather-Touch" Clutch Control gives ease of operation with the "feel of the load"; engine throttle control is available for operations requiring variable speeds; Northwest crawler design is trouble-free; simplicity of design means ease of upkeep and reduced down time; and, Northwests are convertible to Dragline, Shovel or Pullshovel.

Your Northwest is a proved crane unit—one out of every three Northwests sold is a repeat order to a responsible customer—a guarantee of performance that no other testimonal can equal.

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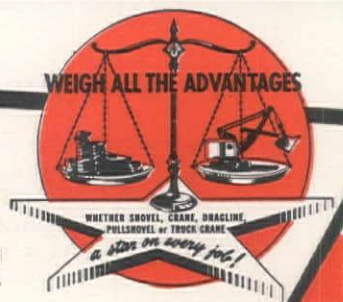

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WESTERN CONSTRUCTION

Volume 26 **AUGUST 1951** Number 8

ARTICLES

DEPARTMENTS

FRONT COVER

SPEED OF ERECTION using a vacuum lifter to tilt up precast reinforced concrete wall panels was a feature during construction of a bakery building in San Fernando, Calif. Over ¼ mi. of wall was placed in 26 working days by Myers Bros., contractors, employing equipment and personnel of C. D. Wailes Corp. For a complete description of the project, see page 84.

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B.F.Goodrich

These tires carry 95 tons over crushed limestone—with ease!

HAULING heavy loads over jagged rock in all kinds of weather calls for tires that can really "take it." Yet this is an everyday occurrence for these B. F. Goodrich Rock tires. The BFG's shown here are used on vehicles that haul limestone and shale from quarry to plant. The total load is 190,000 lbs., of which 88,000 lbs. is pay load.

B. F. Goodrich tires can give this kind of service because they are built to stand up under the most hazardous quarry and construction hauling conditions. For added protection, the patented *nylon shock shield* is built into all B. F. Goodrich tires of 8 or more plies. Extra strong, elastic nylon cords are placed between the tread rubber and the cord body. Under impact, these cords work together, absorbing and distributing the shock evenly. The shock shield protects against bruises and means more recappable tires as well as longer service. Here is a construction advantage which is found only in BFG tires — and at *no additional cost.*

B. F. Goodrich tires are also available in all-nylon construction. For these or any off-the-road tires see your BFG dealer. Or write for additional information on these tires that do a better job at lower cost. *The B.F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

nothing slow about this crawler

"BIG RED" DIGS IN. The International TD-24 dozes through tough going faster, pushes bigger bladefuls farther, moves more pay-dirt per day. It's the "Champ" for sure!

Read what makes International's TD-24—the Big Red "Champ"—finish ahead of the field!

Man or machine, it takes speed and strength and stamina to take on all comers and leave 'em trailing behind. It takes guts and power to spare to be the "Champ."

In a human, it means running a faster race, hitting a harder ball, fighting a tougher fight. In the TD-24, it means doing more work in less time than any other crawler on the market.

More speed—8 forward and 8 reverse speeds up to 7.8 mph for faster time cycles on the job.

More power—148 maximum drawbar horsepower—to take a bigger load on the scraper, a bigger bite on the blade and move dirt faster, easier, cheaper.

More flexibility—synchromesh shifting "on the go"—instant change up or down one speed without declutching—Planet Power steering for pivot turns, feathered turns, turns with power on both tracks.

The TD-24 gets in and out and back in again faster—moves more dirt each time—makes more money for its owner every working day.

It's the Big Red "Champ" any way you look at it.

Come in and look. Ask your International Industrial Distributor for the low-down. Find out about his fast-moving parts and service setup, which will keep your International power on the job for years to come. You'll be a TD-24 man from then on in!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

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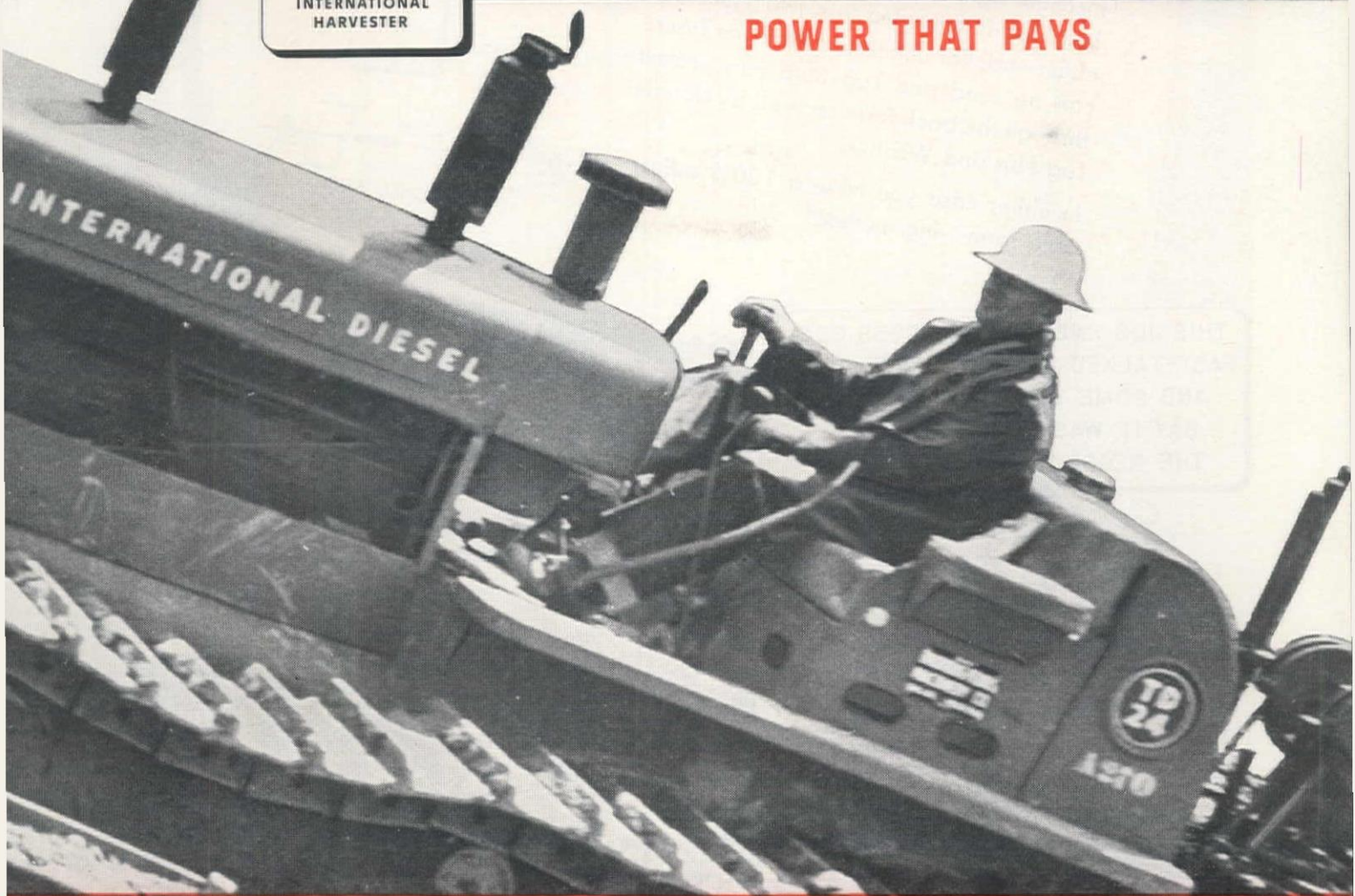
POWER THAT PAYS



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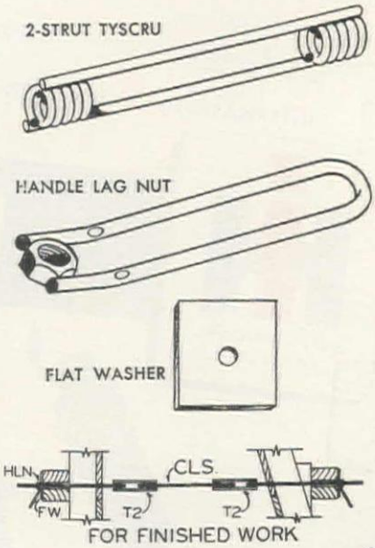
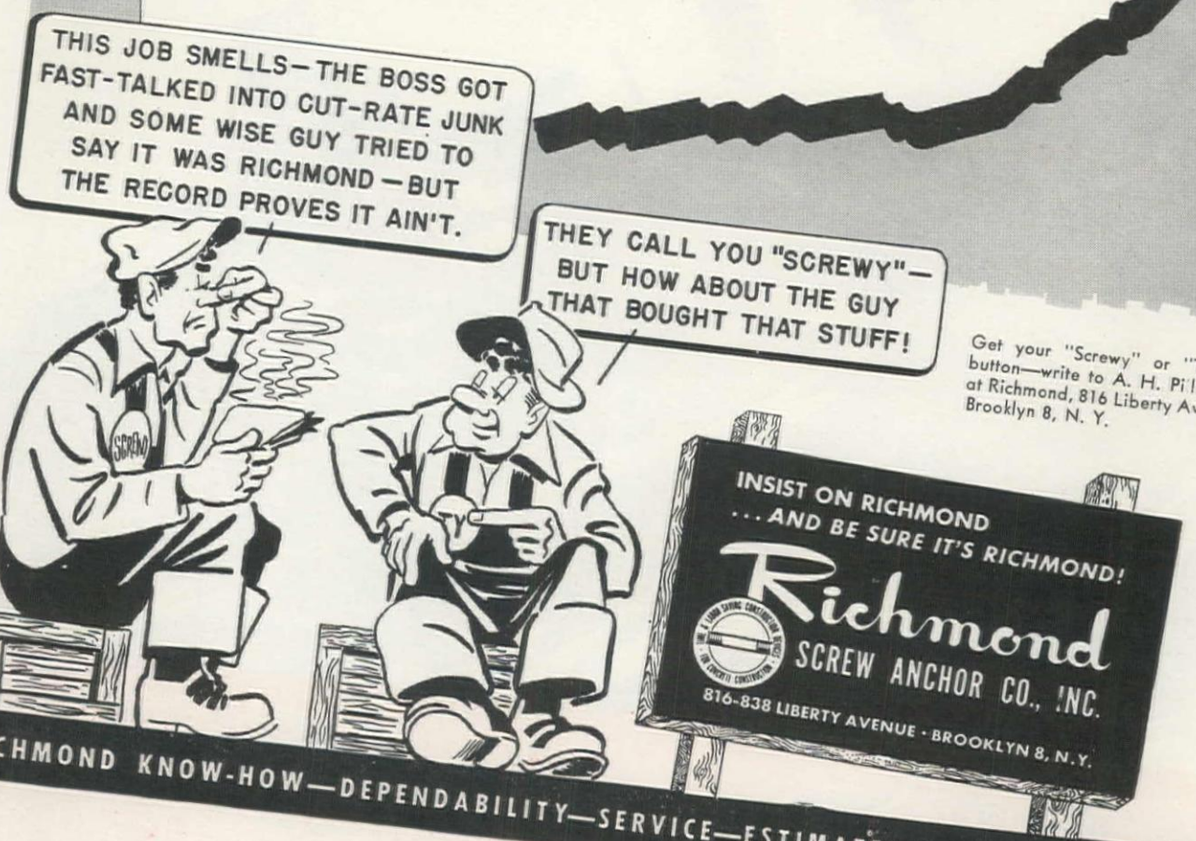
RICHMOND CONTINUOUS THREADED LAG STUD

5 FEET

The Continuous Threaded Lag Stud—with the Tyscru and other parts shown above—greatly expands the usefulness and functions of the Richmond Tyscru System. Tough, coarse-threaded, this Lag Stud comes in 5 ft. lengths and can be cut to measure right on the job. For *finished* work Lag Stud is threaded into two Tyscrus at either end. For *unfinished* work one Tyscru can be used and Lag Stud can project through the back form secured by Handle Lag Nut and Washer.

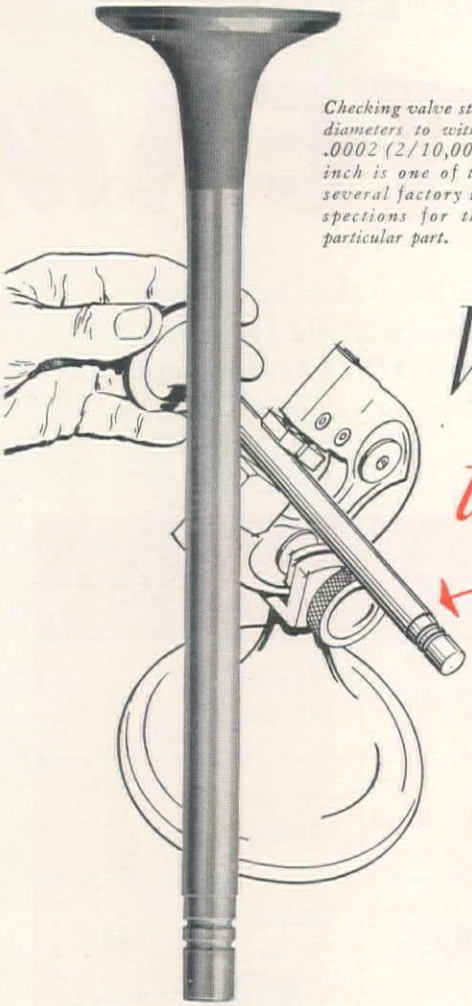
In either case you have a 100% adjustable form-tying method!



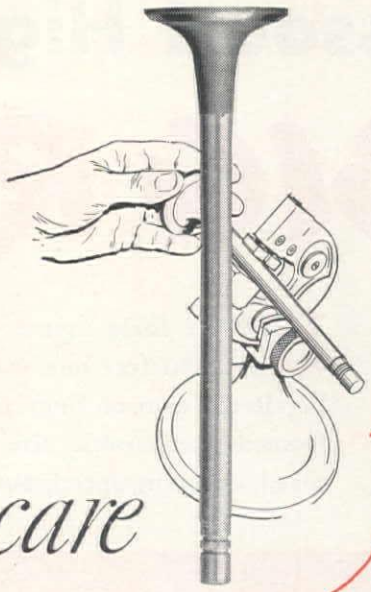


Get your "Screwy" or "TY" button—write to A. H. Pi'ling at Richmond, 816 Liberty Ave., Brooklyn 8, N. Y.

RICHMOND KNOW-HOW—DEPENDABILITY—SERVICE—ESTIMATES & JOB PLANNING



Checking valve stem diameters to within .0002 (2/10,000) inch is one of the several factory inspections for this particular part.



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2 Cummins' own laboratory tests metal samples—and often every individual piece—from each shipment, to make sure that all parts meet highest metallurgical standards. And to make *twice-certain*, each part must pass a final quality inspection before it is offered for sale to you. It's this kind of *extra* care that insures more miles and more years of service from Genuine Cummins Parts.

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Missouri Highway Job Proves

BIG RED TEAM

LOOK at these figures on a big Missouri highway job with a haul distance of 2350 feet one way. Just as on similar jobs throughout the country, the Big Red Team of Bucyrus-Erie Scraper and International TD-24 Tractor outperformed comparable size competitive units on every count — yardage, loading speed, dumping speed, overall cycle time.

Equipment	Struck Capacity (cu. yd.)	Average Load* (cu. yd.)	Average Loading Time	Average Dumping Time	Average Cycle Time	Cu. yd. per hr.
Big Red Team Of B-250 Scraper and TD-24 Tractor	22	19.9	75 sec.	33 sec.	12 min. 46 sec.	87
Tractor-Scraper Combination X	18.7	13.9	77 sec.	65 sec.	16 min. 30 sec.	51
Tractor-Scraper Combination X^1	18.7	13.9	80 sec.	70 sec.	15 min. 11 sec.	55

*Determined by weighing scrapers before and after loading.

Note: Both scraper X and X^1 were identical make scrapers pulled by identical make tractors. In figuring cycle time and hourly production, actual operating time was used — unproductive time was not considered.

Here the Big Red Team piles up yardage on the Missouri highway job noted above. It's big, rugged and ready to prove its ability on your job.

WINS ON EVERY COUNT

Here's What Those Facts Really Show!

1 The B-250 with 3.3 yd. greater capacity than either competitive scraper averaged 6 yd. larger loads — carried 32 and 36 more yards per hour respectively than the competitive units.

2 The B-250, even with a payload 6 yd. greater, loaded faster and dumped in **half** the time of the competitive units.

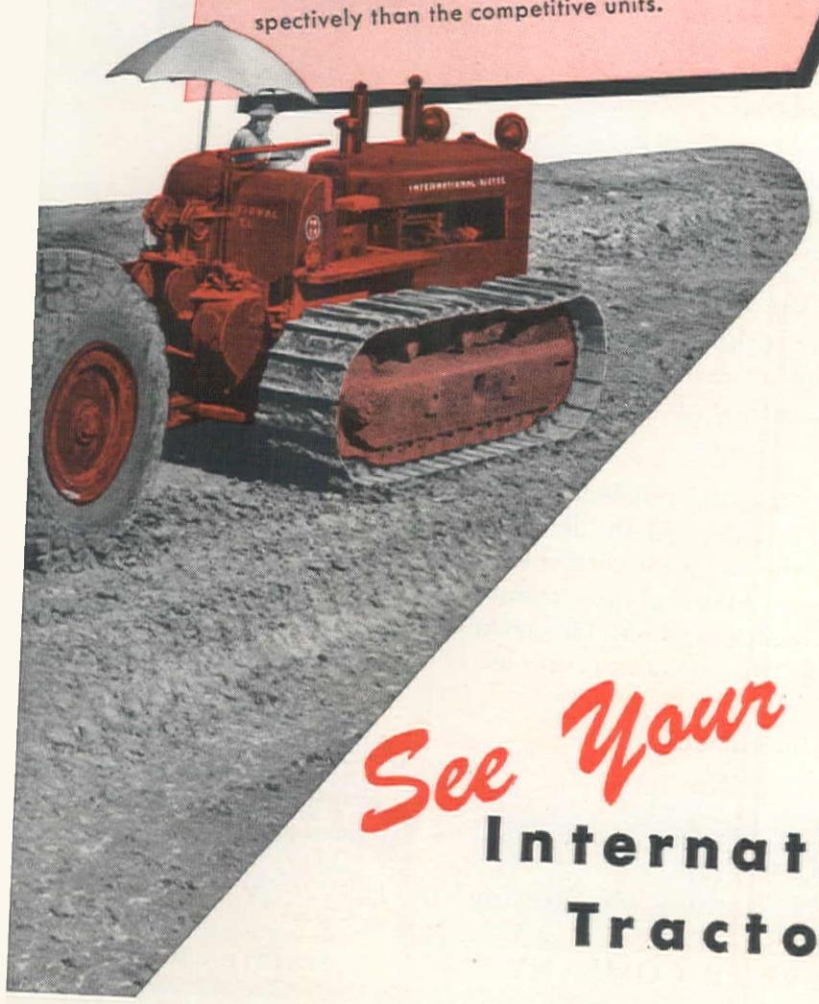
3 The B-250 covering the same 2350-ft. one way haul distance as the two competitive outfits, completed the load-travel-dump-return cycle in an average of 23% and 16% less time respectively than the competitive units.

Dumps Faster

Loads Faster

Loads Bigger

Hauls Faster



Facts speak for themselves — and this is no isolated example. We have a variety of such case histories on record. Verify them by asking your International Industrial Tractor Distributor for a demonstration on your own job. Watch the Big Red Team outperform other crawler-scraper combinations — outperform rubber-tired outfits on much longer hauls than has been generally accepted.

248T51C

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

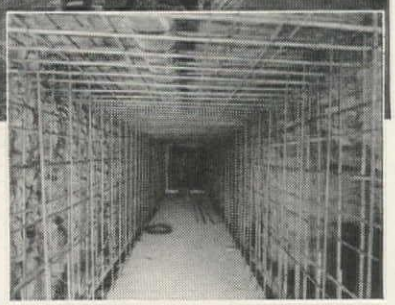
See Your

International Industrial Tractor Distributor

Low costs and no complaints on this midtown excavation-and-tunnel with **ROCKMASTER** blasting!

Excavation under way for new Cain-Sloan Co. department store at Nashville, Tenn. Oman Construction Co., contractors; Marr & Holman, architects.

Final stages of excavation. Entrance to utility tunnel in right hand corner.



Inside utility tunnel.

THE job called for blasting 35,000 cubic yards of solid rock in the heart of downtown Nashville, Tenn. Ordinary blasting methods would have required pecking away at the rock with small amounts of powder in a few holes at a time.

But the contractor used ROCKMASTER to speed the job! Result: More powder could be loaded into more holes for each shot—more rock was broken with each blast. Breakage was excellent. Valuable time and labor were saved in moving and placing protective mats. Normal traffic flow was maintained at all times; and there were no complaints about noise or vibration.

ROCKMASTER "16" may be the answer to *your* blasting problems—in the heart of town or 'way out in the open. Write for your free copy of the ROCKMASTER "16" booklet that shows how you can profit through the use of the correct numbers of the *sixteen* ROCKMASTER milli-second delay electric blasting caps teamed with the ROCKMASTER system of explosive choice and loading methods. Our technicians will be glad to assist you in applying ROCKMASTER "16" to your operations.

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

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

Put your hydraulic problems up to us!

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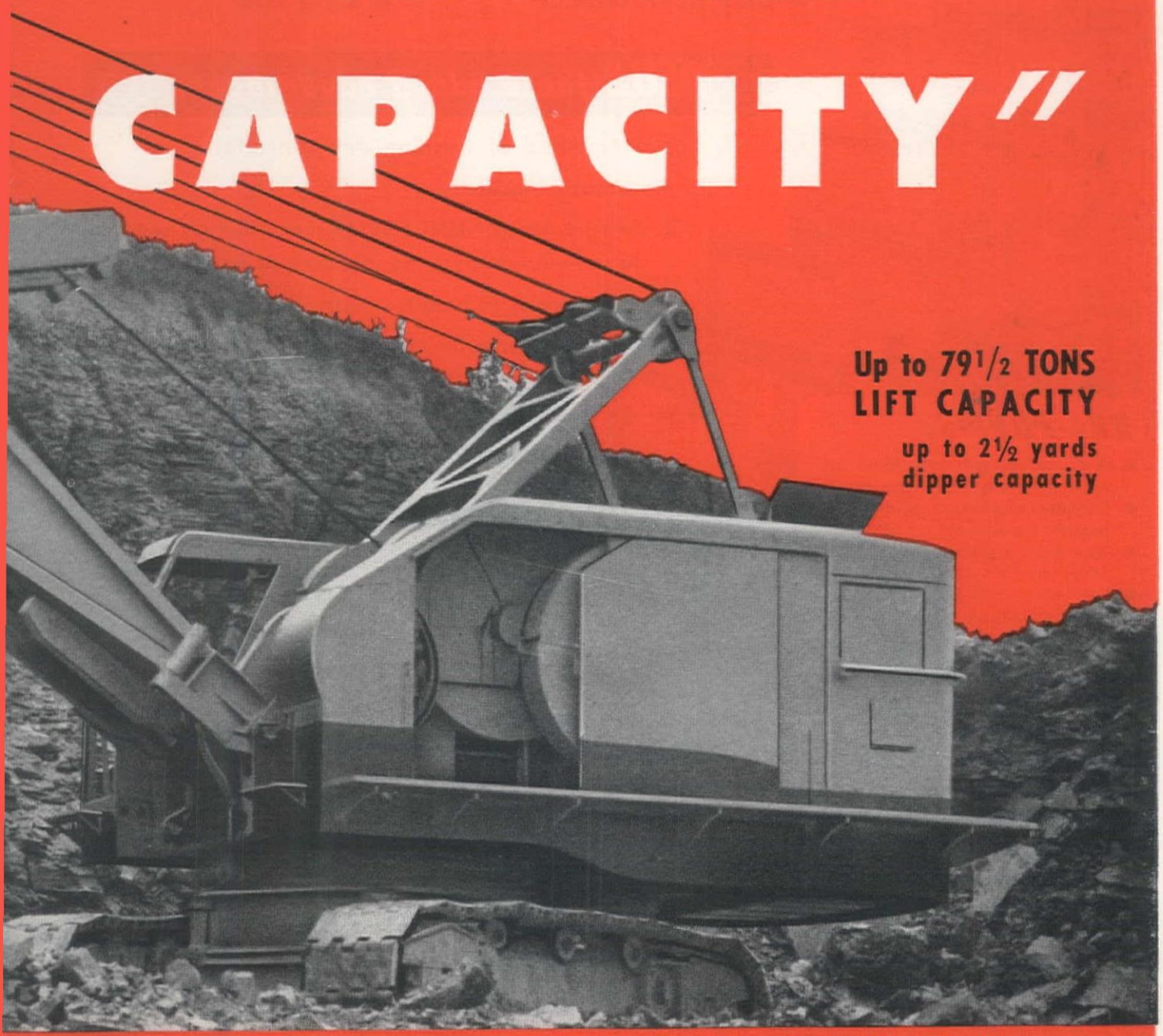

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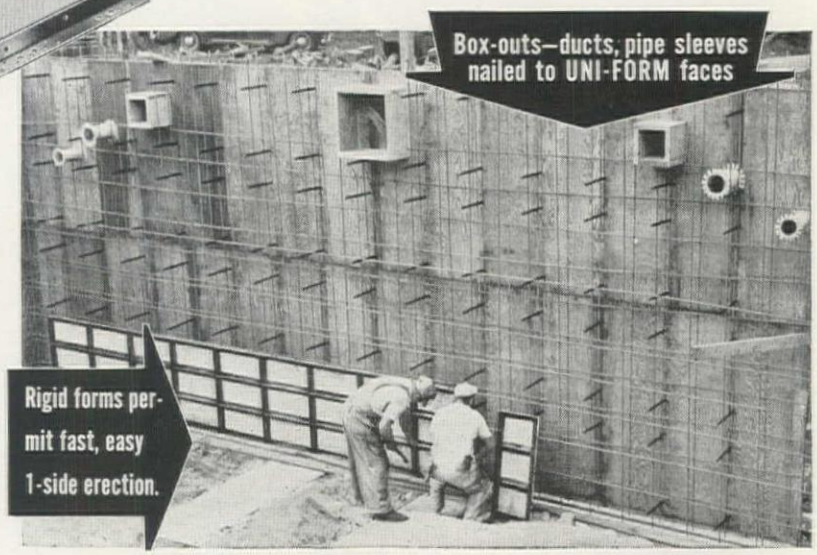

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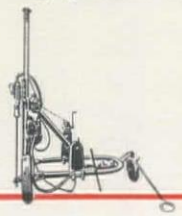
for DRILLING POWER and UNLIMITED VERSATILITY

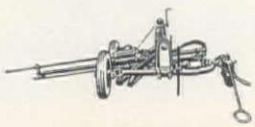
you can't beat this New FM-3 WAGON DRILL

Most construction and mining men are familiar with the famous X-71 WD Rock Drill. Its drilling speed and hole cleaning ability on deep holes are recognized wherever Wagon Drills are used. It is the only drill made especially for Wagon Drill service.

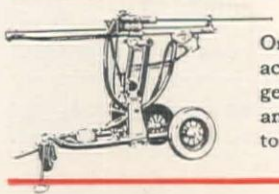
To permit even further utilization of the power and reliability of this drill, we introduce a brand new mounting known as the FM-3. It incorporates a new type of lifting mechanism and a rugged yoke that permits easy drilling in any position encountered in modern rock excavation.



Notice how the swivel wheels are turned and how the drill extends beyond wheels for line hole work against a face.

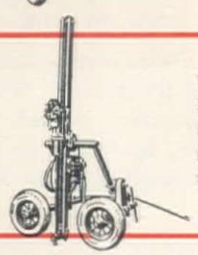


And how low the yoke can be lowered for efficient toe hole drilling.

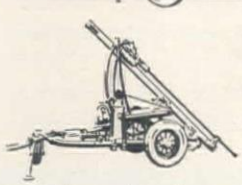


Or how, by a handy crank actuating a powerful worm gear arrangement, the yoke and drill can be easily raised to highest drilling position.

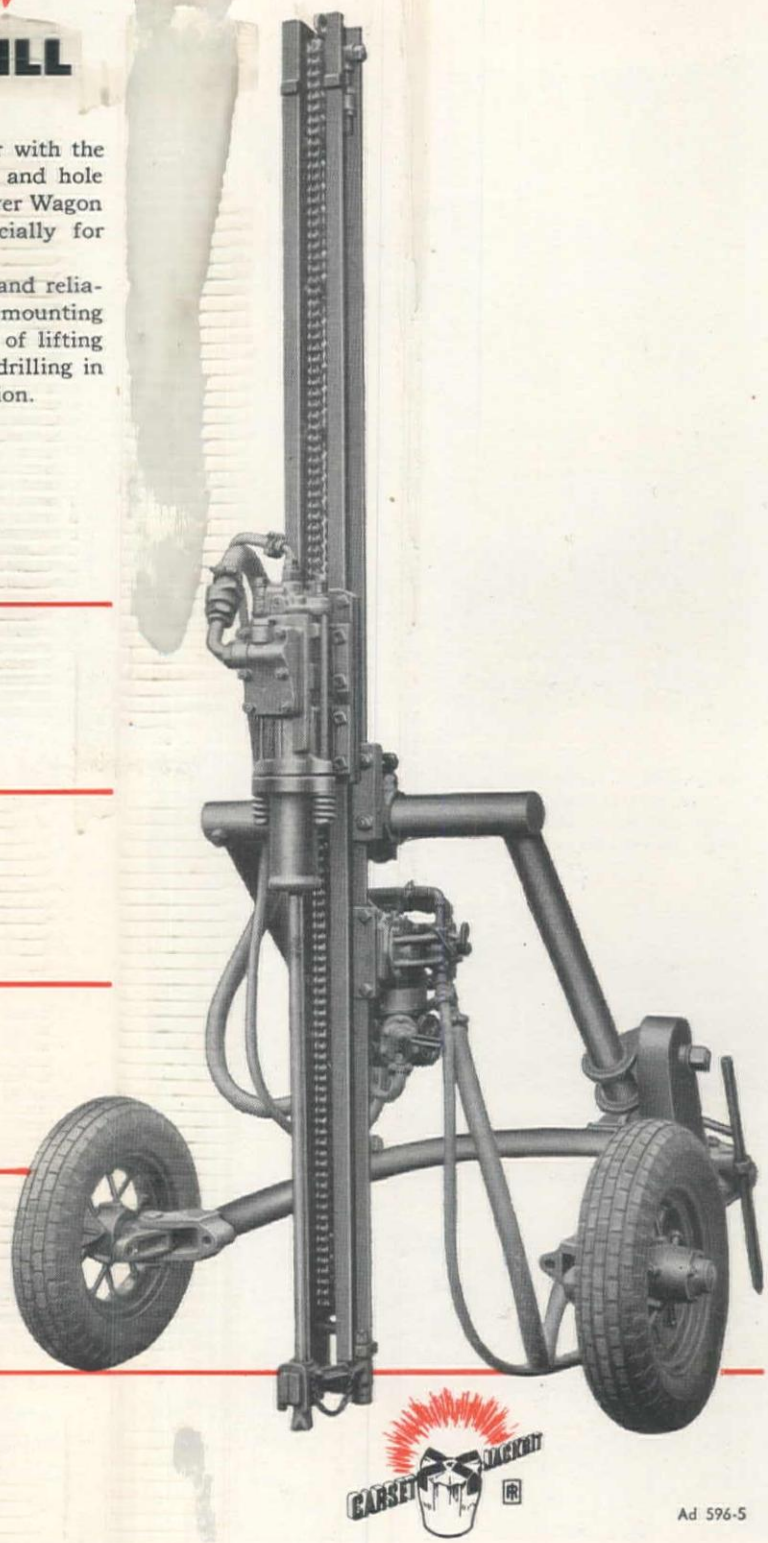
Here's an exceptionally stable and easily moved set up for drilling hole after hole along a face.



What could be more convenient for line hole work? It takes but a minute to swing the swivel mounted wheels through a 90 degree angle.



And for steeper angle drilling, here's another easy set up. All controls are at the operator's fingertips.



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CARSET JACKBIT

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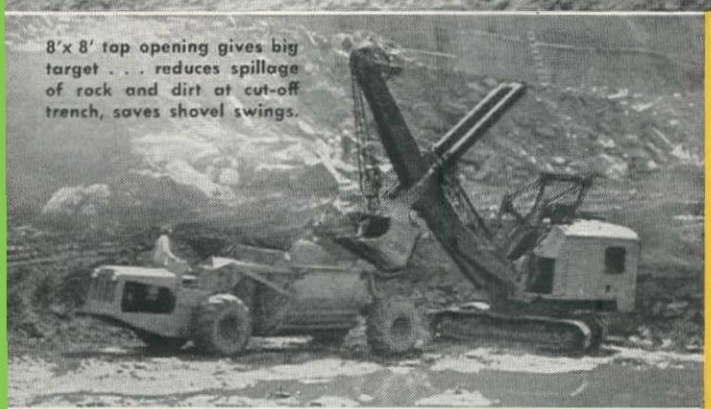
AN IDEAL DRILLING TEAM—TWO FM-3 WAGON DRILLS AND THE NEW I-R 600 C. F. M. "GYRO-FLOW" PORTABLE COMPRESSOR

"FINEST



8'x 8' top opening gives big target . . . reduces spillage of rock and dirt at cut-off trench, saves shovel swings.

Tournahopper dumps riprap through wide 8' opening . . . then turns 90° to clear. Clearance is 22" under open doors.

W. E. Logan & Sons of Muskogee, Oklahoma, report their 2-year, 4,500,000-yd. contract on Tenkiller Ferry Dam across the Arkansas River near Gore is now well ahead of schedule. Main reason, say company officials, is the all-around, all-weather production ability of 3 LeTourneau 15-yard, bottom-dump C Tournahoppers.

The Tournahoppers have been used so far on 4 major types of work: (1) hauling sandy clay and gravel from conveyor belt loader, (2) hauling shovel-loaded, unshot rock from cut-off trench, (3) dumping rock fill in the coffer dam, and (4) placing riprap on the dam face.

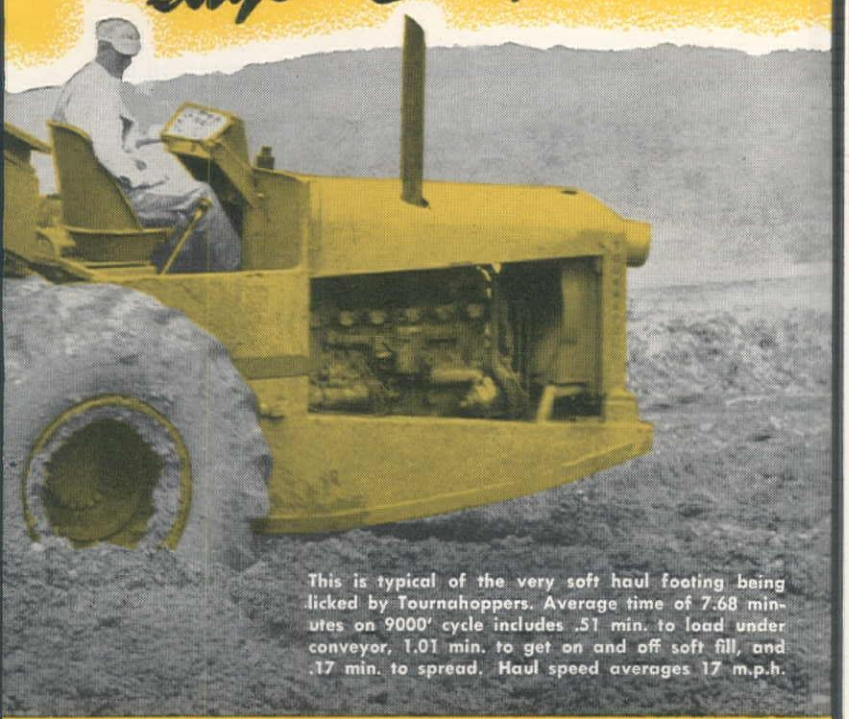
On 4500' haul . . . makes 8 trips an hour

When loaded by conveyor, each Tournahopper carries 12½ pay yards per trip . . . completes typical 9000-ft. cycles in 7.68 minutes. Hourly production on this haul averages 100 pay yards per machine, according to Contractor "Easy" Logan . . . combined output for the 3 rigs with loader is 300 yards hourly.

On cut-off trench assignment, now completed, the Tournahoppers moved approximately 80,000 yards of rock and 20,000 yards of moist dirt. Working under a 2½-yd. shovel, each "C" hauled 10 pay yards of mixed material per load . . . delivered 8 loads per hour on a 2000-ft. cycle

all-around hauling units I've ever seen"

says "Easy" Logan



This is typical of the very soft haul footing being licked by Tournahoppers. Average time of 7.68 minutes on 9000' cycle includes .51 min. to load under conveyor, 1.01 min. to get on and off soft fill, and .17 min. to spread. Haul speed averages 17 m.p.h.

despite soft, slick roads which held haul speeds well below normal. Combined output here averaged 240 pay yards per hour for the 3 rubber-tired rigs.

When heavy rains made these two sections impossible to work, the 180 h.p. Tournahoppers moved onto riprap placement where moisture control was no problem. In 4 months, the 3 "C's" windrowed 22,000 cubic yards of rock . . . much of it handled under weather conditions which stopped all other haul units. Operating efficiency for the Tournahoppers in 800 hours of work has been 95%. No wonder Mr. Logan claims they're "the finest all-around hauling units I've ever seen."

Has 11 electric rigs on dam

In addition to the 3 Tournahoppers, Logan, a LeTourneau equipment user since 1936, has 8 electric-control Tournapulls at Tenkiller Ferry Dam . . . 3 new 13.5-yd. "C's" and 5 big 30-yd. "B's". All 11 units were driven to the job site over paved highways from the nearest railhead.

Like Logan, you'll find it pays to standardize on Tournahoppers and Tournapulls for lowest-net-cost-per-yard. Ask your LeTourneau Distributor to show you what these modern, rubber-tired rigs can do to increase production and lower costs on *your* work. Call or write TODAY.

Read what the men on this job say about TOURNAHOPPERS

E. E. Logan, Partner . . ."Our C Tournahoppers have paid for themselves on this one job. No other machine could have handled the riprap and rock work in the cut-off section without costing us too much money. The Tournahoppers have withstood this rough work much better than any other type of hauling unit would have done . . . Tournahopper's electrical system is far superior to other power methods used to operate hauling and scraper units, with much more positive control. We can operate the machines better, maneuver better, and work in footing conditions where other units cannot be used . . . As far as I'm concerned, the C Tournahopper is very satisfactory for all types of haulage conditions and materials and I recommend it very highly."

A. C. Logan, Partner . . ."These Tournahoppers are very maneuverable and work well under both loader and shovel. The machine works much better on soft fills than 4-wheeled front-end hauling units. Its electric steer is a big help in tough conditions."

Charles Wills, Shop Foreman . . ."The upkeep and maintenance on the C Tournahoppers has been less than on any other hauling machine we've ever used . . . and much less than the upkeep and maintenance on the other type hauling units we've been running with the Tournahoppers. The 'C's' electrical system has my vote as the best way of operating any dirtmover. It's easy to work on, and the machines can do things no other type of unit could even start to do."

Ed Brown, Asst. Shop Foreman . . ."Mechanically, these machines have been just about perfect. Have had very little down-time for any reason. The electrical system has been 100% efficient. I'd rather work 10 to 1 on the C Tournahopper or C Tournapull than on any other type of hauling unit used on our job."

Robert Wright, Operator . . ."I like these machines because they handle so easily . . . it's the easiest-operating rig I've ever been on."

A. C. Kirk, Operator . . ."You can turn the Tournahopper on a dime."

Perry Johnson, Operator . . ."We work these rigs in places you could hardly get a mule through."

J. R. Cato, Operator . . ."I can position my Tournahopper under the loader quicker with this machine. It sure is easy to handle."

BARRETT* COAL-TAR ENAMELS PROTECT AMERICA'S GREATEST PIPELINES

HERE ARE 10 REASONS WHY...

1 Products and procedures available for every oil and gas pipeline requirement.
2 Withstand extremely high and low temperatures.
3 High ductility and flexibility.
4 Coatings not damaged by "breathing," nor by back-fill stresses.
5 High dielectric properties.
6 Impermeable to moisture.
7 Resistant to attack by gas and petroleum products.
8 Used by thousands of engineers and contractors.
9 Universally available and easy to apply—applicators all over the country.
10 Barrett engineering service always available.

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BARRETT Coal-Tar Enamels Protect The Plantation Products Line

*Reg. U. S. Pat. Off.

GALION TRENCH ROLLER

SIMPLIFIES ROAD WIDENING JOBS

GALION — THE ORIGINAL

Galion originated the trench-type roller - - and is now the first to offer a completely new and improved design.

FEATURES

- Hydraulically controlled dual steering wheels.
- Adjusting and steering wheels travel on pavement.
- Works 25" below to 6" above road surface - - adjustment hydraulically controlled.
- Large diameter, variable weight compression roll.
- Rugged, constant-mesh transmission and spur gear final drive.
- Powerful engine completely enclosed under housing.

GALION DISTRIBUTORS

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Spokane, Wn.....MODERN MACHINERY CO., INC.

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WASHINGTON:
Seattle.....NELSON EQUIPMENT COMPANY
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Portland, Oregon.....NELSON EQUIPMENT COMPANY

WYOMING:
Cheyenne.....CHEYENNE TRUCK EQUIP. 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

STANDARD ENGINEER'S REPORT

DATA

PRODUCT Standard Diesel Fuel

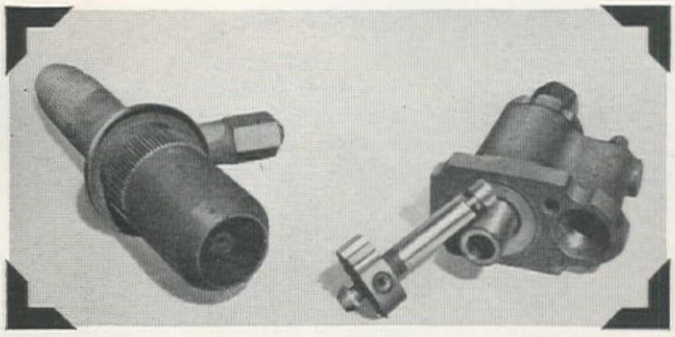
UNITS High-speed diesel engines

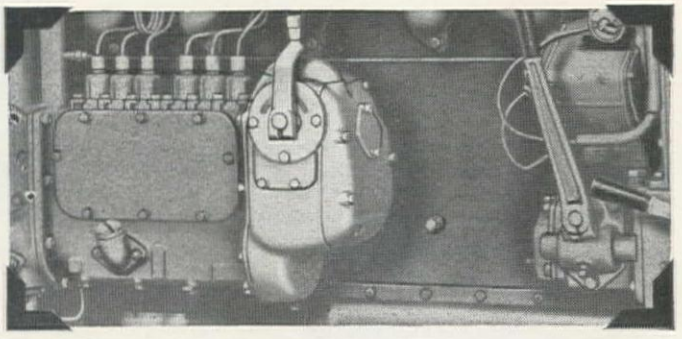
CONDITIONS Heavy duty service—overloads, heavy dust

PERIOD 10 years

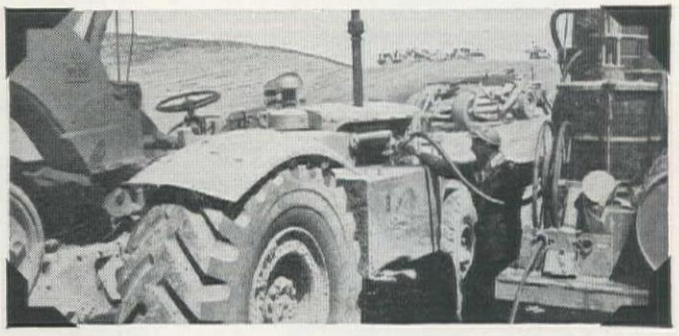
FIRM Parish Bros., Benicia, Calif.

Specially handled diesel fuel helps increase injector life





BURNING STANDARD DIESEL FUEL in their engines and using special precautions to keep it clean has lengthened considerably the service periods of injector pumps and valves for Parish Brothers, highway builders, Benicia, California. The unit above from one of their DW-10 Caterpillars gave the unusual service of 16,000 hours! STANDARD Diesel Fuel helped get this extra service and cut fuel parts expense because it is completely refined, then carefully handled to insure cleanliness from refinery to consumer.



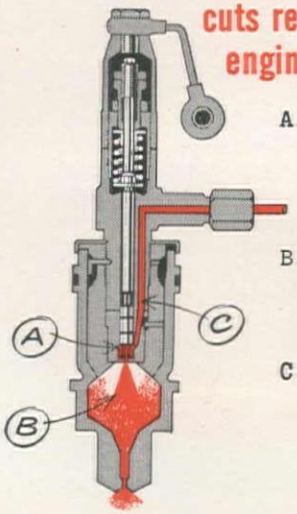
FUELING A HIGH-SPEED TRACTOR with a "wet hose" to avoid getting dirt in the fuel tank. Parish Brothers use STANDARD Diesel Fuel in engines powering many other types of diesel equipment, including stationary units on air compressors, pumps, shovels, etc.

FREE FOLDER tells how to keep fuel clean... gives more information about STANDARD Diesel Fuel, and STANDARD Automotive Diesel Fuel for certain high-speed engines that require a premium-quality high-cetane fuel. Write or ask for it today.

STANDARD DIESEL FUEL

TRADEMARK REG. U.S. PAT. OFF

How STANDARD Diesel Fuel cuts repairs and ups engine efficiency



A. Complete distillation and 100% cleanliness prevent wear of fuel parts and plugging of passages.

B. Atomizes easily and completely—delivers full power throughout distillation range.

C. Has sufficient body to lubricate moving fuel parts, but flows freely even in extremely cold weather.

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

STANDARD OIL COMPANY OF CALIFORNIA

Mechanical soldiers need good shoes, too!

THESE are days of grave concerns . . . of conservation and mobilization for strengthening the nation's defense—for the survival of our national economy—for the continuance of useful highway, airfield, dam-site, reclamation and other construction programs—for the keeping of every home-front machine in condition to stay on the job until its replacement again becomes a normal procedure.

That includes *your* equipment and emphasizes *your* responsibilities. To benefit fully from the productive life that has been built into your "Caterpillar" equipment, you must be alert to its needs as time and hard usage take their toll in wear and depreciation. For instance:

How are your "Caterpillar" track shoes?

Tough as they are, they can't battle rocks, shale, jolts and grinds forever. Growing shortages in the premium steels that go into them may make early replacements difficult—and extra care of track parts something to think about.

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

DO THIS NOW

YOU'RE THE DOCTOR. Check those sprockets, grousers, rollers, idlers, pins, links and bushings. Proper track adjustment minimizes wear. Sprockets may need switching from side to side, and pins and bushings need turning, to provide new wearing surfaces. Shoes serve longer if you have worn grousers built up before excessive wear occurs.

Reread your Operator's Instruction Book. Anticipate your future parts requirements. Take the facts to your "Caterpillar" dealer. His modern facilities and skilled servicemen are at your disposal. He can rebuild many parts to keep your machines on the job. Their added life will repay the reconditioning cost over and over.

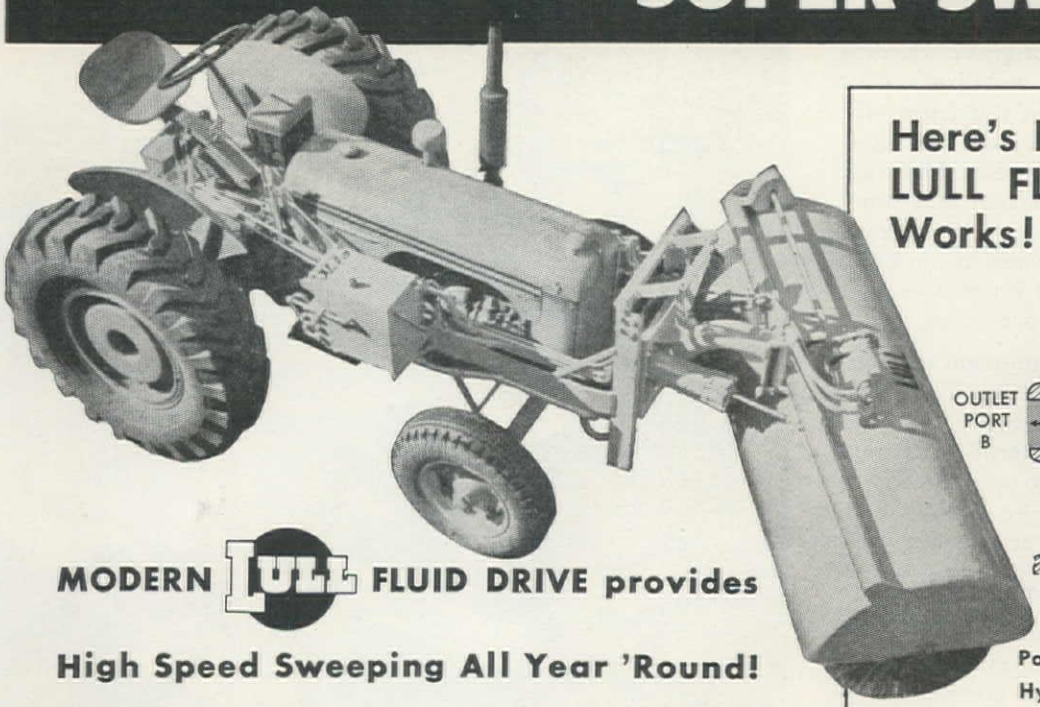
CATERPILLAR

REG. U. S. PAT. OFF.

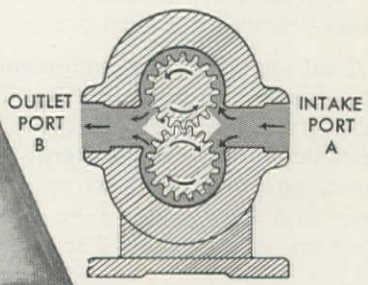
DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

. . . as simple and maintenance-free as a Waterwheel!

LULL Fluid-Driven SUPER SWEEPER



Here's How LULL FLUID DRIVE Works!



Powerful LULL Precision Hydraulic Pump forces fluid through flexible hose into intake port "A". Then fluid drives vanes around motor cavity until it reaches outlet port "B". Now fluid is returned to pump for recirculation. Smooth power is provided for the broom without complicated drive mechanism.

LULL FLUID DRIVE is simplicity itself. This means fewer moving parts . . . longer maintenance-free service. Lull Super Sweepers do more sweeping in less time and at lower cost!

MODERN LULL FLUID DRIVE provides

High Speed Sweeping All Year 'Round!

Application of LULL Fluid Drive marks an important milestone in modern sweeper engineering. No universal joints! No complicated gear and shaft mechanism for driving broom! LULL Fluid Drive provides flexibility and high efficiency under all operating conditions because it is simple and thoroughly dependable.

In addition, LULL Finger-tip Power Hydraulic Controls regulate broom height, angle settings, and broom rotation speed. Operator never leaves his seat. No time lost deadheading, backing, or making manual adjustments!

On any sweeping job . . . streets, blacktop highways, air ports, parking lots, strip mines . . . you can't beat the all year round performance of a LULL Fluid-Driven Super Sweeper. 5′, 6′, and 7′ models are all priced within your means.

WRITE TODAY for new LULL Sweeper Bulletin AD40

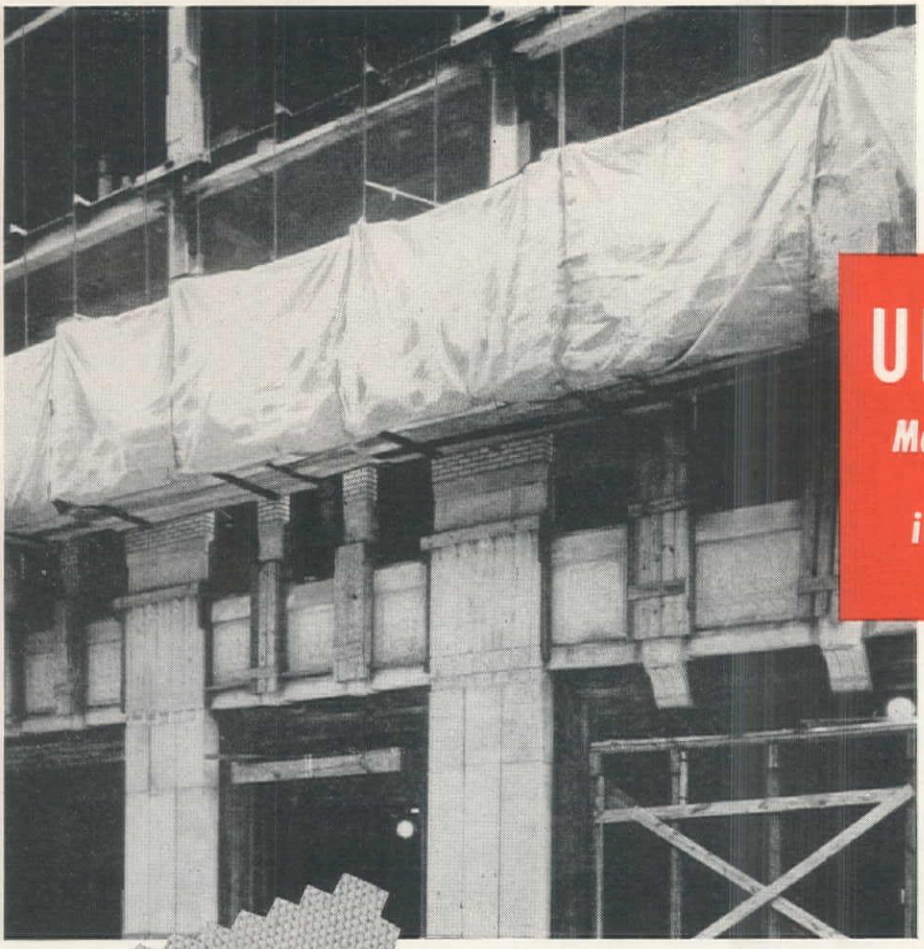
LULL Manufacturing Company
3612 East 44th Street, Minneapolis 6, Minn.

Designers and Builders of
The Largest Line of Allied Equipment
for Industrial Wheel Type Tractors


SHOVELOADER


UNIVERSAL LOADER

SHOVELOADERS • UNIVERSAL LOADERS • FLUID-DRIVEN SWEEPERS • LULLDOZERS • SHOULDER MAINTAINERS



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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.

DETERMINING YARN NUMBER WITH SUTER SCALES After Breaking Skein. One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

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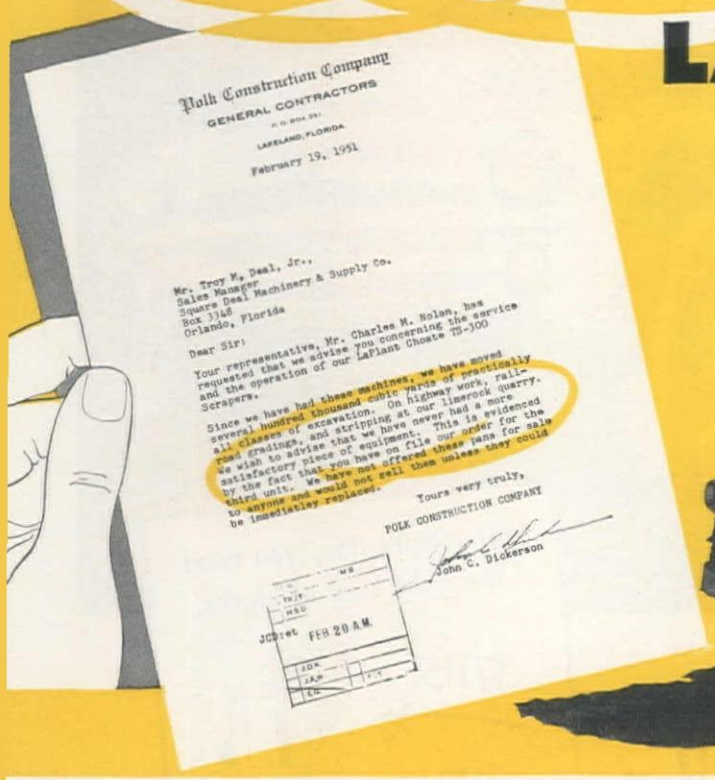
"We have never had a more satisfactory piece of equipment"

LaPLANT-CHOATE MOTOR SCRAPERS



Polk Construction Company
GENERAL CONTRACTORS
P. O. Box 39
LAKELAND, FLORIDA

February 19, 1951

Mr. Troy M. Deal, Jr.,
Sales Manager
Square Deal Machinery & Supply Co.
Box 3146
Orlando, Florida

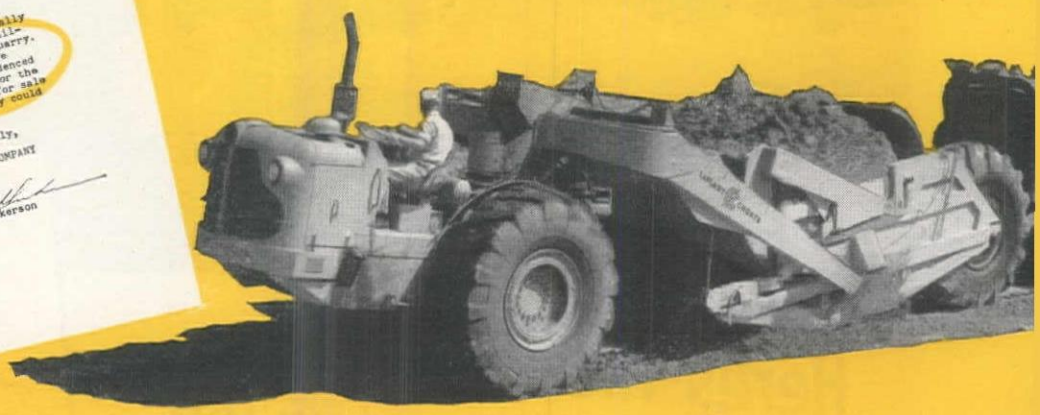
Dear Sir:

Your representative, Mr. Charles M. Nolan, has requested that we advise you concerning the service and the operation of our LaPlant Choate 75-300 Scrapers.

Since we have had these machines, we have moved several hundred thousand cubic yards of practically all classes of excavation. On highway work, railroad gradings, and stripping at our limerock quarry, we wish to advise that we have never had a more satisfactory piece of equipment. This is evidenced by the fact that you have on file our order for the third unit. We have not offered these jobs for sale to anyone and would not sell them unless they could be immediately replaced.

Yours very truly,
POLK CONSTRUCTION COMPANY
John C. Dickerson

JCD:et FEB 20 A.M.



• LIKE the boys at Polk Construction Company —you want *satisfactory performance* from your earthmoving equipment.

What does "satisfaction" mean?

It means the capacity to haul bigger payloads each trip . . . speeds that let you make more trips per hour. It means power to spare in the toughest going . . . power that's *useable* in the pit, on the haul road, on the fill. It means dependability . . . the ability to keep up the pace shift after shift.

In a word, *"satisfactory equipment" means LaPlant-Choate Motor Scrapers!*

Your LPC distributor can give you facts and figures on Motor Scraper performance . . . see him before you bid on your next job. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

On this Polk Construction Co. job at Minneola, Florida for the State Road Dept., yardage ran over 300,000 cubic yards. Part of the job included clay stabilization work with hauls up to 5 miles one way. With heaping 14-yd. payloads, the Motor Scrapers made the 10 mile load-haul-spread cycle *at an average speed of 14 mph!*

LaPLANT C CHOATE

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

WESTERN CONSTRUCTION EQUIPMENT CO.
505 N. 24th Street BILLINGS, MONTANA
Stephens & Mount Ave. MISSOULA, MONTANA

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STUDER TRACTOR & EQUIP. CO.
East Yellowstone Hwy., P. O. Box 779, CASPER, WYOMING

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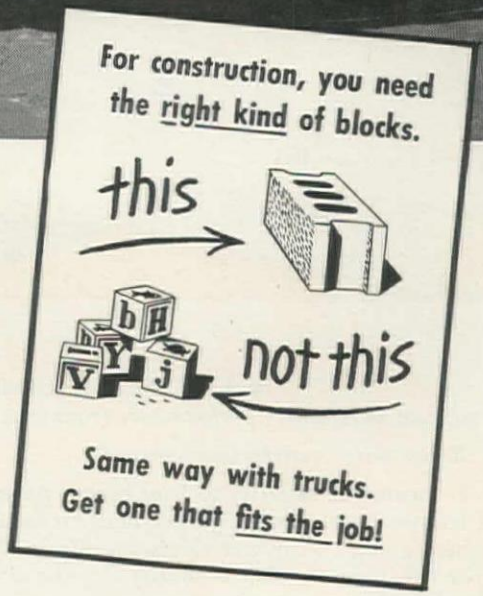
433 West Second South St. Salt Lake City 1, Utah

N. C. RIBBLE CO.
1304 N. Fourth St. ALBUQUERQUE, NEW MEXICO

Here's the POWER you want on your job... plus DEPENDABILITY



Whether you're hauling dirt, spreading asphalt, or doing one of many other rugged jobs, you want a truck that fits the job—and provides plenty of low-cost power. Such a truck is a Dodge "*Job-Rated*" truck.

New Dodge "*Job-Rated*" trucks provide more power than before. On 2½-ton models, for instance, Dodge now offers a new 114 hp engine . . . the most powerful Dodge engine ever available in that field. And on high-tonnage models twin carburetion and exhaust system gives you plenty of extra power with extra economy.

And talk about maneuverability! Shorter turning diameters and new worm-and-roller steering gears on many models make the new Dodge "*Job-Rated*" trucks far easier to handle.

If it's dependability you're after, (and who isn't?) you'll go for features like the new Dodge moistureproof ignition and the new high-torque capacity starting motor. They help make starting easier in bad weather.

There's a Dodge "*Job-Rated*" truck to fit your need *exactly*. Get the proof from your nearby Dodge dealer today.

DODGE "Job-Rated" TRUCKS

How Dodge Trucks are "*Job-Rated*" for the Construction Business

A Dodge "*Job-Rated*" truck is engineered *at the factory* to fit a specific job . . . save you money . . . last longer.

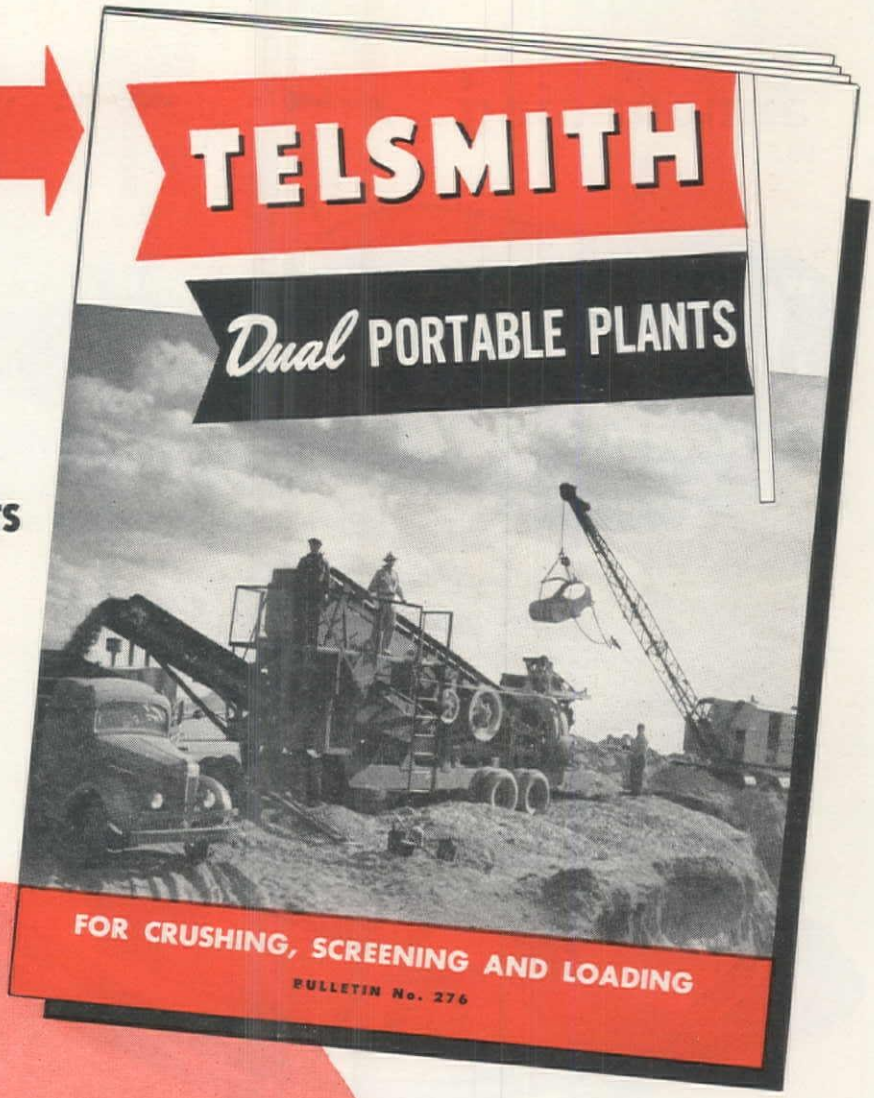
Every unit from engine to rear axle is "*Job-Rated*"—factory-engineered to haul a specific load over the roads you travel and at the speeds you require.

Every unit that SUPPORTS the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

Every unit that MOVES the load—engine, clutch, transmission, propeller shaft, rear axle, and others—is engineered right to meet a particular operating condition.

"Job-Rated" TRUCKS DO THE MOST FOR YOU

Get this

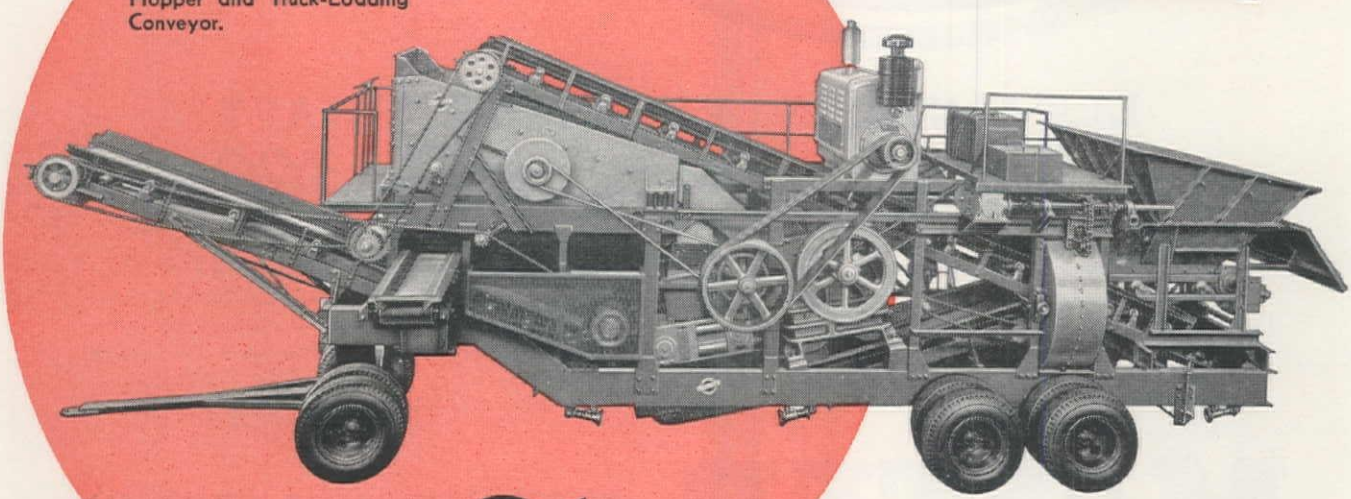


●●● it will tell you WHY and HOW Telsmith Dual Portables will give you

Greater capacity... lower operating costs

Ask for NEW Bulletin No. 276

9C DUAL PORTABLE PLANT with Plant-Mounted Loading Hopper and Truck-Loading Conveyor.



P-17

Now Made in Two Popular Sizes:

9C Dual—with 10-in. x 36-in. jaw crusher, 30-in. x 18-in. rolls, and 4-ft. x 10-ft. 2½-deck screen.

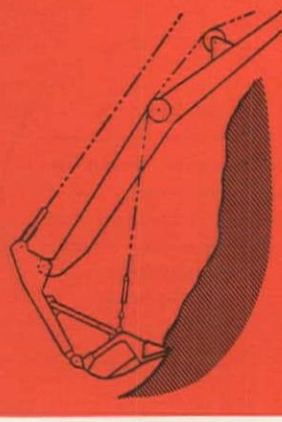
NEW 7A Dual—with 10-in. x 30-in. jaw crusher, 24-in. x 16-in. rolls, and 4-ft. x 8-ft. 2½-deck screen.

MINES ENGINEERING & EQUIPMENT CO.

369 Pine Street • SUtter 1-7224
SAN FRANCISCO 4, CALIFORNIA

Manufactured by SMITH ENGINEERING WORKS, MILWAUKEE 12, WISCONSIN

1½-yard Fastback hoe dipper on Thew-Lorain L-77, on pipeline job at Needles, California. Contractor: Bechtel, Price & Conyes. Note how long projected lip cradles the rocks. Below: long curved back eliminates heeling in every digging position.



Widths to Fit Any Job

...in sizes to Suit Your Machines

that's ESCO FASTBACK the non-heeling hoe dipper

With an ESCO FASTBACK mounted on your dipper sticks, you have an unbeatable combination for producing low cost yardage with your present machines. You can

Make wide cuts with small machines.

Get full capacities from large machines on narrow cuts.

Dig a deeper trench (as much as two feet deeper with some machines).

ESCO Fastback is made in sizes from ⅜ yard to 2½ yards —*and in 7 different basic widths.* Six different sets of interchangeable side cutters are available for each of these seven units, and through their use *each basic unit may be further varied to produce 37 combinations of cutting widths.* Side teeth also are furnished on request.

Require Little Maintenance on Tough Jobs

Based upon construction principles proven through the years by *ESCO* dipper and dragline bucket performance, the Fastback hoe dipper is built to take the punishment of hard work.

Cast alloy steel lip with integral cast tooth holders takes the shock and abrasion of digging. Alloy steel side cutters and teeth are properly mounted for efficient digging. Top and bottom corners are reinforced with alloy steel castings. Cast steel stick connections have manganese steel bushings.

For details of sizes and dimensions, see your nearest *ESCO* representative, or fill in and mail the coupon for specification sheet 177.

ESCO

Dippers, Hoe Dippers, Dragline and Coal Loading Buckets

ELECTRIC STEEL FOUNDRY

2163 N. W. 25th Avenue, Portland 10, Oregon

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Representatives in all Major Cities

ELECTRIC STEEL FOUNDRY
2163 N. W. 25th Avenue, Portland 10, Oregon.
Please send Bulletin 177, giving dimensions and sizes of the *ESCO* Fastback.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

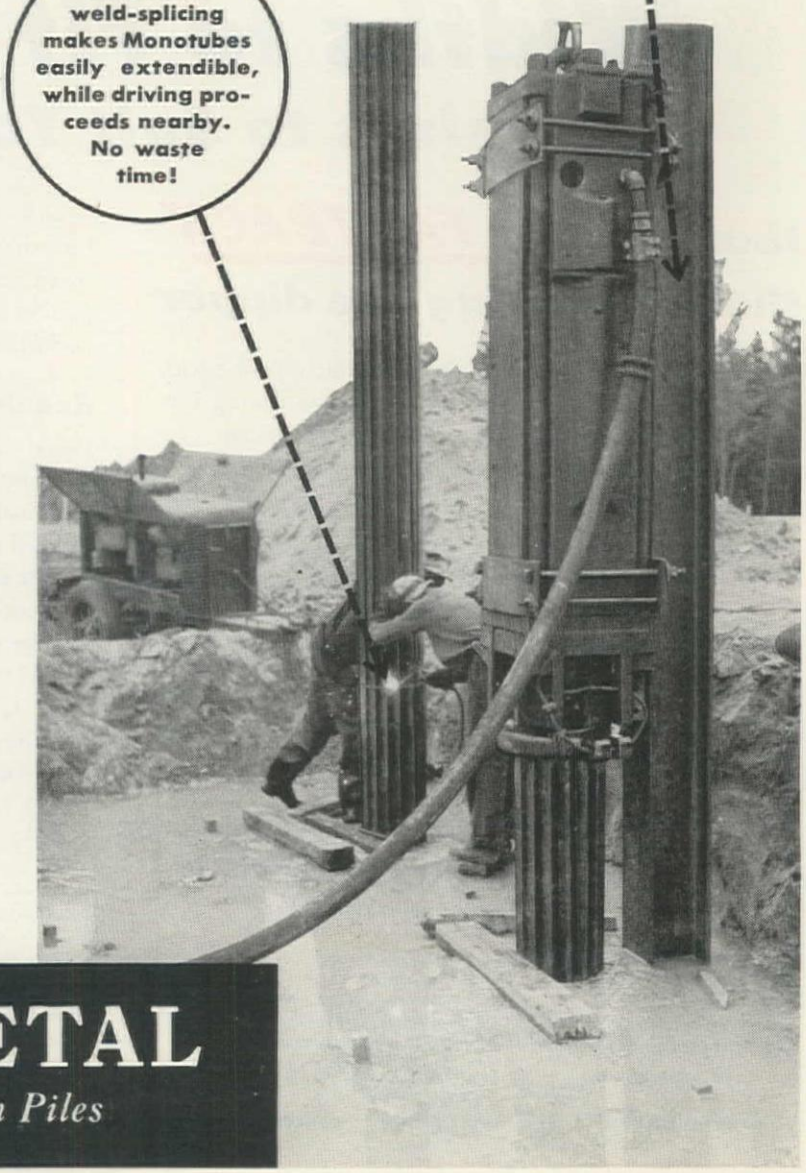
Make and Model of machines used_____

Two-way time savers on foundation jobs!

Easily extendible Monotube steel piles

Note how "H" beam may be used as hammer guide instead of usual "fixed" leads required for heavy piles. Work moves faster—driving, too.

Simplified weld-splicing makes Monotubes easily extendible, while driving proceeds nearby. No waste time!



WHEN you find that your foundation piles are driving longer than predicted, the problem is solved quickly with Monotubes. These taper-flute steel piles can be extended easily—right on the job—right to the length you require! Cut-offs can be made easily, with minimum waste. Saving No. 1!

And, extensions can be welded while other bottom sections are being driven. Saving No. 2!

That's just part of the story on how Monotubes help you save time—save critical materials—and save money. Here's more! Monotubes' tapered design and cold-rolled properties provide unusually high bearing values and exceptional lateral stability. High load-bearing values can often be met with fewer piles.

Because Monotubes are lighter in weight, handling and locating go easier and faster. On most jobs a standard, light crane can be used for driving.

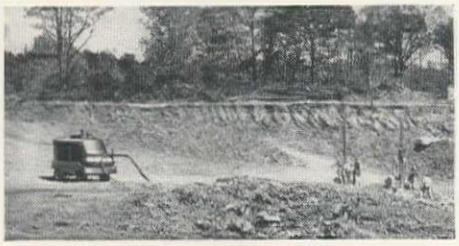
Send for complete information. Find out how Monotubes' many advantages bring extra savings in time, in money, on all types of foundations. Write The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

Monotube Foundation Piles

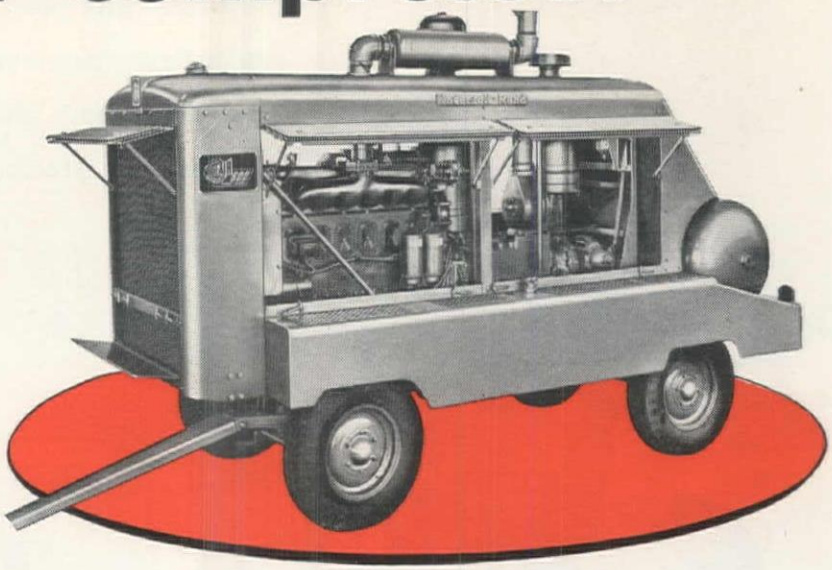
GM DIESEL powers world's most compact 600 cfm Compressor

CONSTRUCTION—"Starts like a charm, even on the coldest morning. No time wasted in getting up to pressure. Runs a heavy pile driver with ease. We can set it out of the way with a crane and move it back to the roadway for towing in no time."



QUARRYING AND MINING—"We couldn't imagine 600 feet coming from such a slick little compressor until we saw the increased drill footage, and the ease with which it took over two FM-2 wagon drills. Good fuel economy, too."

HIGHWAY BUILDING—"Plenty of reserve—full capacity at 6,730 feet altitude. We're operating eight 55-lb. blower drills putting in 20-ft. holes on cliffsides. So easy to maneuver and work with that it's a natural for tough jobs like this."



WINNING acclaim as the world's smallest, lightest, big-capacity portable compressor, the new Ingersoll-Rand Gyro-Flow 600 is powered by a 6-cylinder General Motors Series 71 Diesel engine.

This compact, high-powered portable delivers a full 600 cubic feet of air per minute at a steady 100-lb. pressure, yet it weighs only 9,500 pounds. It is 20 to 40% lighter—and as much as 20% smaller—than other portables of comparable capacity.

Being 2-cycle, GM Diesel engines pack more power in less space. They start quickly on their own fuel, run smoothly and enable equipment to maintain rated performance at high altitudes. They're designed for ease of maintenance—no high-pressure fuel tubing—unit injectors that can be changed in a matter of minutes. And, when needed, low-cost "Factory-Engineered" parts are readily obtainable.

These modern 2-cycle Diesels are bringing new economy and efficiency to more than 500 different kinds of power equipment built by 120 manufacturers. Ask your GM Diesel distributor or write us for full details.

ANSWER THE CALL
CIVIL DEFENSE

DETROIT DIESEL ENGINE DIVISION

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

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GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

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Anderson-O'Brien Co. LOS ANGELES 21, CALIF.
West Coast Engine & Equipment Co. BERKELEY, CALIF.
Stewart & Stevenson Services, Inc. HOUSTON 1, TEXAS
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Evans Engine & Equipment Co., Inc. SEATTLE 9, WASHINGTON
Gunderson Bros. Engineering Corp. PORTLAND 9, OREGON
Modern Machinery Co., Inc. SPOKANE, WASHINGTON
Southern Idaho Equipment Co. BOISE, IDAHO
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Seitz Machinery Co., Inc. BILLINGS, MONTANA
Diesel Power Co. OKLAHOMA CITY, OKLA.
Fehrs Tractor and Equipment Co. OMAHA 2, NEBRASKA
Sweeney Bros. Tractor Co. FARGO, N. D.
Colorado Builders' Supply Co. CASPER, WYO.
Cate Equipment Co., Inc. SALT LAKE CITY 4, UTAH
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Mountain Tractor Company MISSOULA, MONTANA
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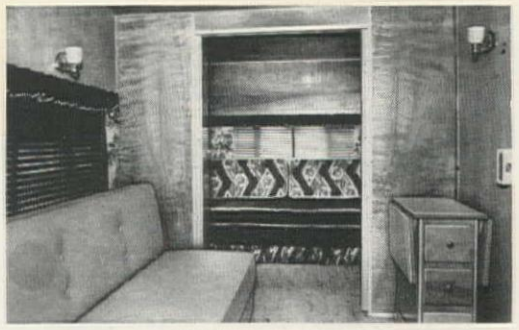
HOW TO KEEP WORKERS HAPPY ON THE JOB... Let them live and enjoy life—

preferably with their families. A marked increase in productivity per man hour has occurred on every construction job... the day that Pan-American Trailer Coaches were provided as workers' living quarters.

CONTRACTORS—ENGINEERS... Investigate Pan-American's facilities for fast, dependable service! PAN-AMERICAN is the world's largest factory devoted exclusively to mass production of trailer coaches.

Whether it's a single luxury home for your own family or a fleet of mobile homes, Pan-American will mass produce trailer coaches that fit your needs. The 33-foot model pictured above has two bedrooms, a complete bath, kitchen and living room. Pan-American also provides 26½-foot, 30-foot, and 35-foot trailer coaches—sleeping 2, 4, or 6—that you can haul to any job site, no matter how remote. Pan-American also builds barracks type trailer coaches that sleep 6 to 12 men, providing complete bath facilities.

Free consultation on plans, specifications and quick delivery dates. Write, wire or phone the factory for literature and specific information.



Living room

Bedroom

Bath

Built to TCA Trailer Coach Association Certified Construction Standards

PAN-AMERICAN TRAILER COACH COMPANY...1511 So. Shamrock Ave...Monrovia, Calif.

DIVISION OF MID-STATES CORPORATION

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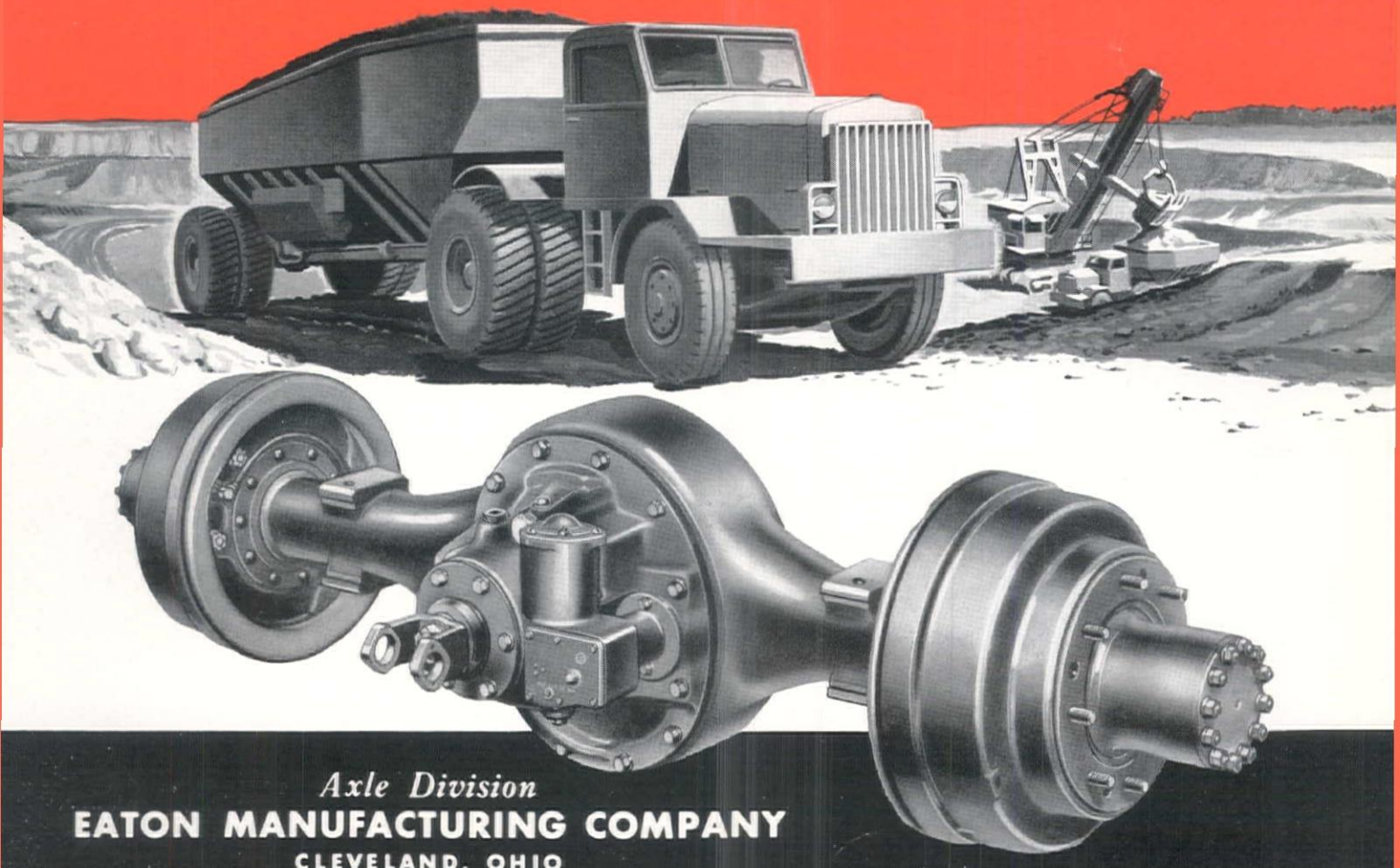
EATON

2-Speed Truck

AXLES

Can Take It!

Ruggedness of design, plus such exclusive features as planetary gearing and forced-flow lubrication, reduce stress and wear to a minimum, add thousands of miles to axle life. Eaton 2-Speed Axles also add to the life of the vehicle and insure lowest cost per mile, particularly in the kind of service where extra pulling power must be combined with speed. Because Eaton 2-Speed Axles provide the best gear ratio for every operating condition, they permit engines to run at most efficient speeds, and reduce strain on engine and power transmitting parts. Ask your dealer to explain how Eaton 2-Speed Axles will help your trucks do more for less.



Axle Division

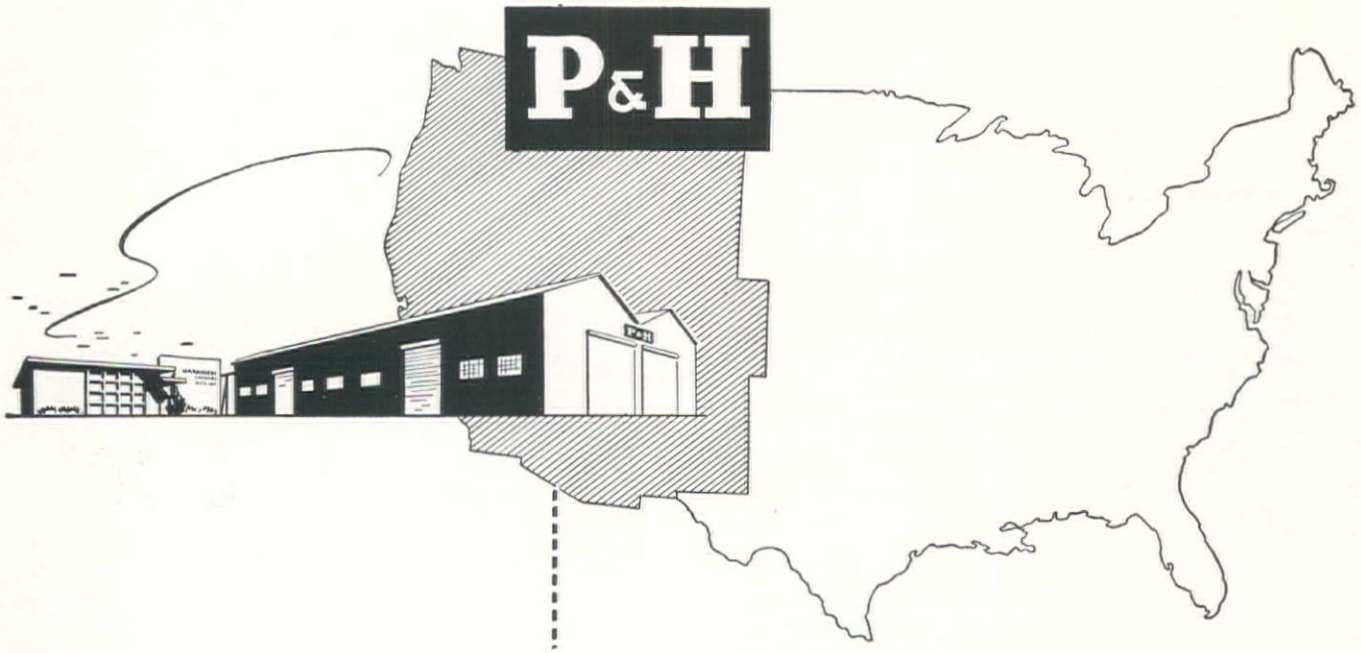
EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

Announcing

Better, faster service for all the West!



Harnischfeger's New Pacific Division to supply 11-State area!

Now! Harnischfeger serves the West from the West!

With its Pacific Division headquarters in Los Angeles, Harnischfeger Corporation inaugurates a new era of closer cooperation and improved service to western construction and western mining interests!

Here in this modern building will be centered the fully staffed sales and service offices for all P&H products. Experienced P&H technical advisers will be ready to consult with you on your equipment problems.

Ample stocks of genuine P&H reserve parts will be kept on hand at all times to give our customers in the West even faster service than before, thus helping them maintain their P&H equipment at peak operating efficiency.

First P & H Territorial Division

The new Pacific Division embraces the Los Angeles, San Francisco, Seattle and Denver branches.

This marks the first time a territorial division has been set up within the Harnischfeger organization. It is a direct result of the tremendous increase in heavy construction and mining throughout all the West . . . growth which has increased the demand for the kind of equipment that Harnischfeger knows how to produce.

P&H

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HARNISCHFEGER CORPORATION

P&H

the P&H Line

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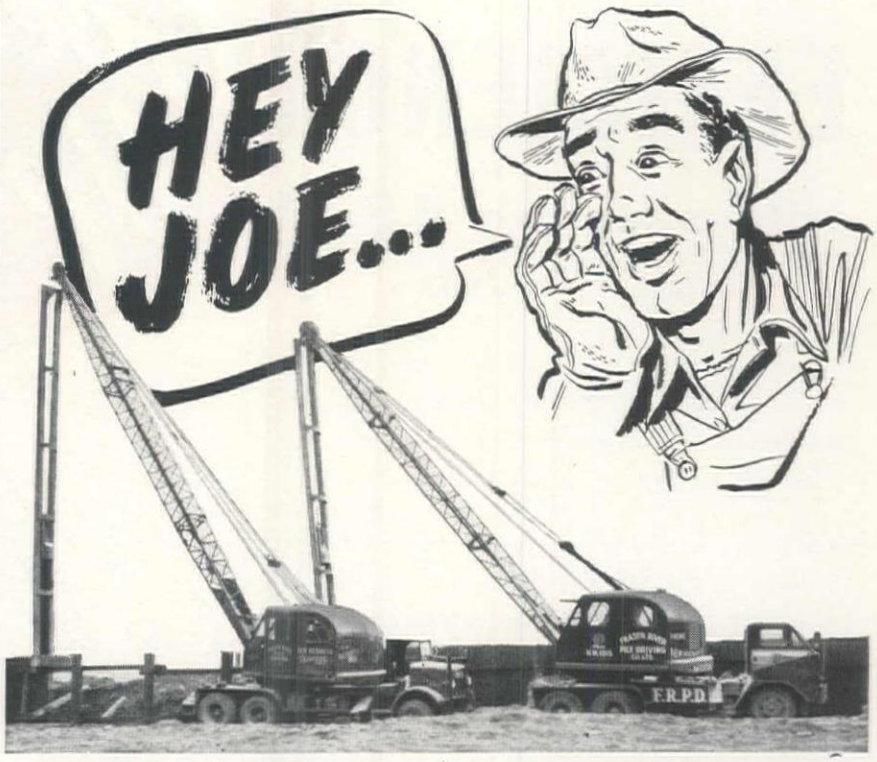


ANOTHER BREAK IN THE DIKE!

Tough words to hear when you're battling a river on a rampage. But that's what happened during the recent disastrous floods on the Fraser River in British Columbia.

Perhaps you don't have to keep "rivers caged up," but that's an important job for Fraser River Pile Driving Co., Ltd. and their experience *again proves* the unusual mobility and handling ease of MICHIGAN cranes.

Says K. A. Matheson of the above company, "In the City of Mission on the Fraser River, the MICHIGAN cranes did a splendid job owing to their mobility and being able to get from one break in the dikes to another in very short order. In particular the TLDT-20 with remote control was a decided advantage, as it enabled us to do the same work with one less man when labor of this sort was badly needed on other flood-fighting work."

Regardless of your type of work, when you need an excavator-crane . . . investigate MICHIGAN . . . you'll agree it's your best buy!

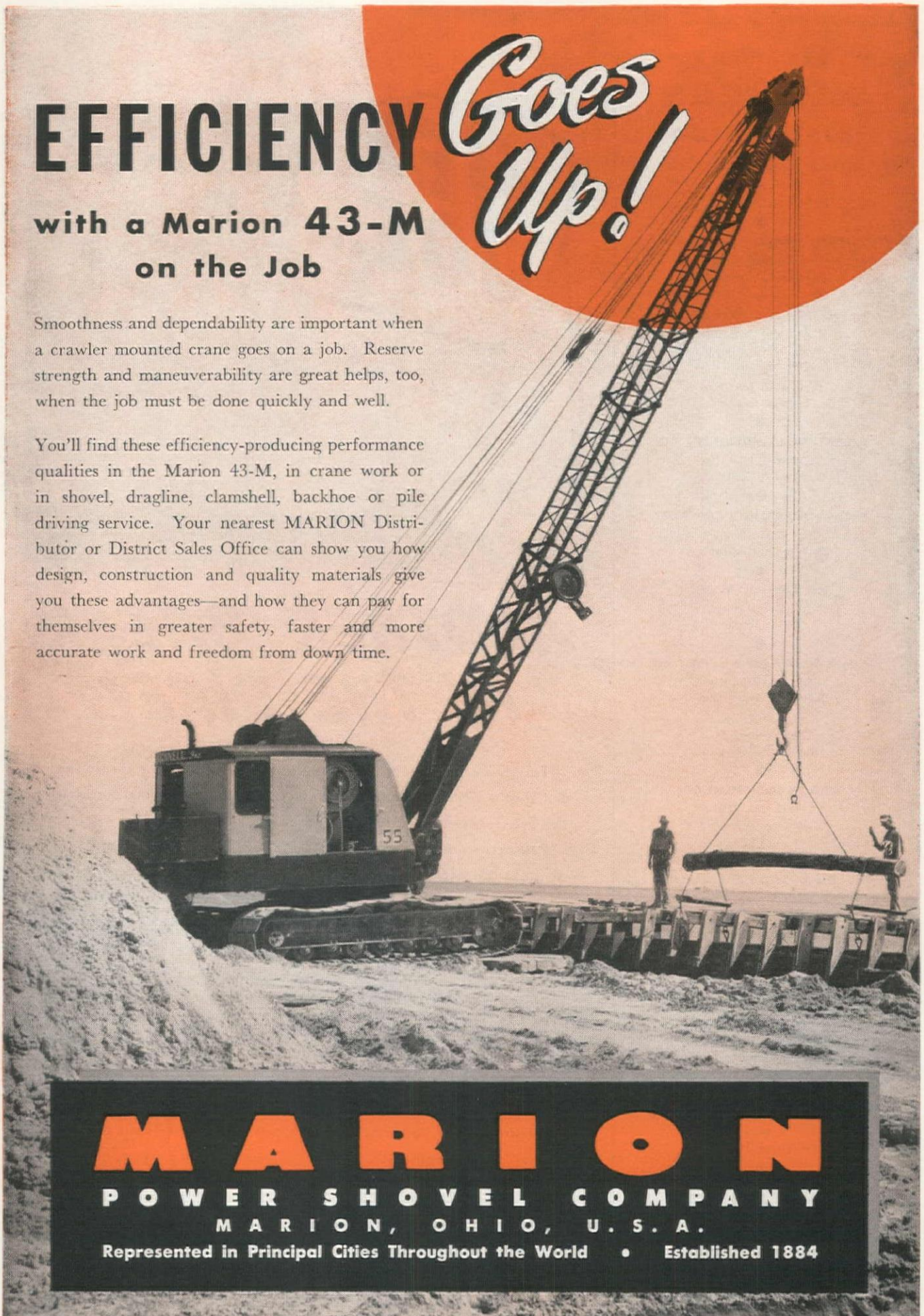
MICHIGAN POWER SHOVEL COMPANY
430 Second Street, Benton Harbor, Michigan, U. S. A.

EFFICIENCY Goes Up!

with a Marion 43-M on the Job

Smoothness and dependability are important when a crawler mounted crane goes on a job. Reserve strength and maneuverability are great helps, too, when the job must be done quickly and well.

You'll find these efficiency-producing performance qualities in the Marion 43-M, in crane work or in shovel, dragline, clamshell, backhoe or pile driving service. Your nearest MARION Distributor or District Sales Office can show you how design, construction and quality materials give you these advantages—and how they can pay for themselves in greater safety, faster and more accurate work and freedom from down time.



MARION

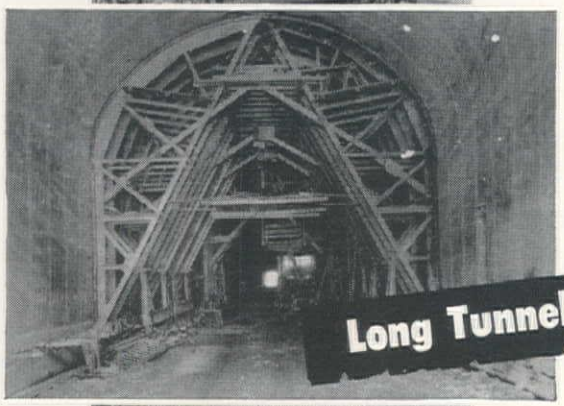
POWER SHOVEL COMPANY

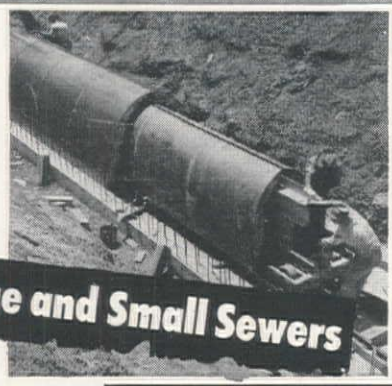
MARION, OHIO, U. S. A.

Represented in Principal Cities Throughout the World • Established 1884

Marion Power Shovel Company, 571 Howard St., San Francisco 5, Calif.; Star Machinery Company, 1741 First Ave., South, Seattle, Wash.; M & F Equipment Company, 2521 Isleta Highway, Albuquerque, N. M.; Marion Power Shovel Company, 2505 N.E. 33rd Ave., Portland, Ore.; Brown-Bevis Equipment Company, 4900 Santa Fe Ave., Los Angeles 11, Calif.; C. H. Grant Company, 1401 Eastshore Highway, Berkeley 10, Calif.; Star Machinery Company, E. 415 Sprague Ave., Spokane 8, Wash.; Marion Power Shovel Company, Title & Trust Bldg., 114 W. Adams St., Phoenix, Ariz.; Rasmussen Equipment & Supply Company, 1960 South Second West, Salt Lake City, Utah.

WHAT'S YOUR CONCRETING PROBLEM?





Solve it with BLAW-KNOX STEEL FORMS

WHATEVER your concreting problem—big project or small job—simple or tough—you'll get the job done faster and at lower cost when you use Blaw-Knox Steel Forms. There's no delay for dismantling or assembling . . . fewer operations are necessary . . . and they're tailor-made to fit *your* job, with many perfected details impossible to duplicate in wood.

Call on BLAW-KNOX ENGINEERING SERVICE

BLAW-KNOX engineers, backed by the 40-year experience of the original and most prominent manufacturer of steel forms for engineered construction, will gladly recommend the correct forms for your job. They specialize in helping you plan for the simplified forming methods that save time and materials and keep costs low. This Blaw-Knox consultation service is available to any contractor without obligation.

WRITE FOR BULLETIN 2035 TODAY—
It contains typical examples of the use of Blaw-Knox Steel Forms on big construction projects as well as special design suggestions that may fit your job. Send for your copy now.

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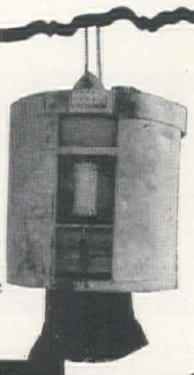
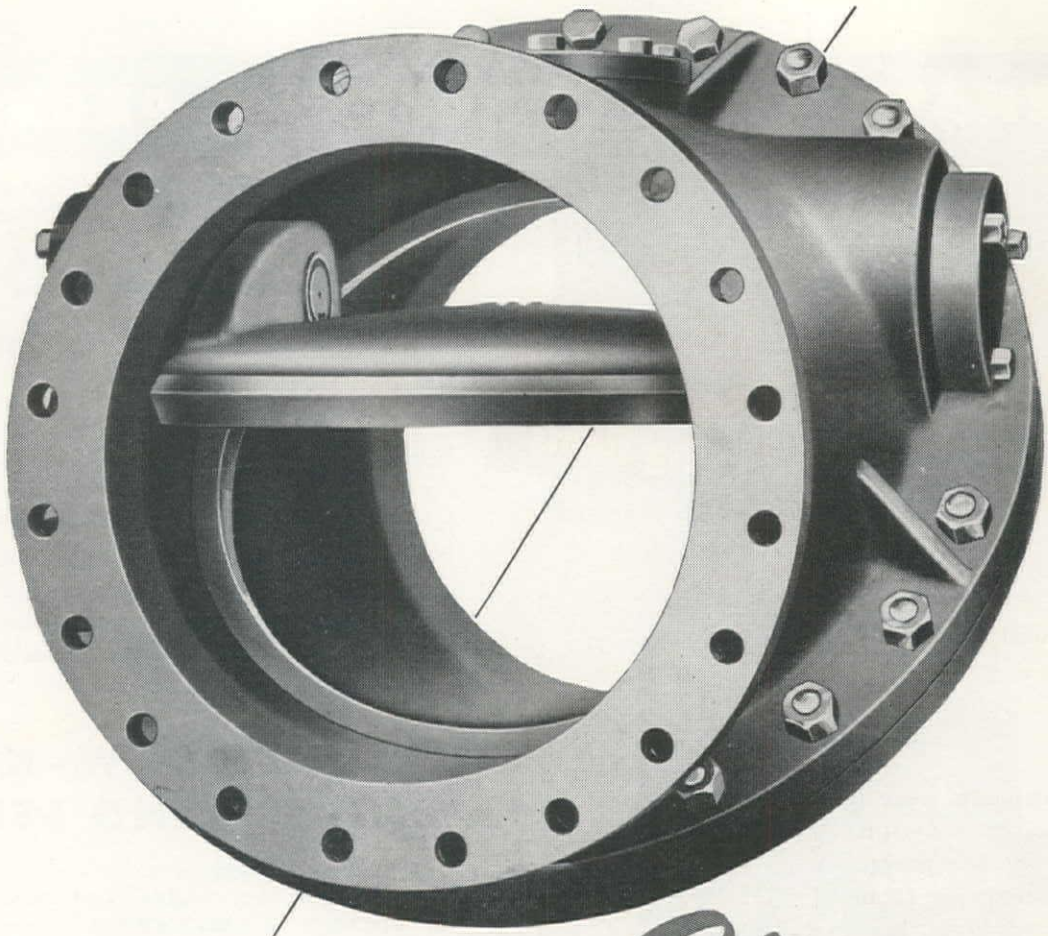
Ask about BLAW-KNOX CONCRETE BUCKETS

Model CAC Concrete Bucket is specifically designed for low cost handling and placing of harsh, low slump concrete for mass concrete construction projects. Bulletin 2331 gives complete details.



BLAW-KNOX

BLAW-KNOX DIVISION OF BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh 22, Pa.
New York • Chicago • Philadelphia • Birmingham • Washington • San Francisco



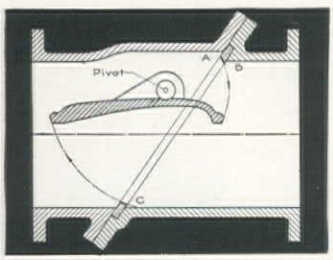
YOU GET *Cushioned Closing* WITH CHAPMAN

TILTING DISC CHECK VALVES

There's no impact on closing — with this valve by Chapman. The balanced disc rides the flow smoothly — uses the fluid or gas itself to cushion the closing action. The disc lifts away from the seat easily on opening; closes quickly, positively—yet quietly.

Consequently, there's no rubbing on the seats—little wear on hinge pins and bearings. Repair needs are at a minimum — maintenance costs low.

Chapman Tilting Disc Check Valves are available in either iron or steel. Write today for catalog with complete technical information.



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

The Chapman Valve Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS

MACK TRUCKS

See You Through

• There are many good reasons why a Mack is your best truck investment during times like the present. Most important of all is the undisputed fact that Mack trucks outlast them all.

This means that with a Mack truck you can face the uncertainties of the future with assurance...confident that even if trucks should become hard to replace your Mack will see you through...that it will stay on the job delivering dependable service mile after mile and year after year.

Thousands of truck users in World War II found out by actual experience that they were indeed "Lucky to own a Mack." Whatever the future may bring, you'll find that for a sound investment in long-term reliability and operating economy there's no other truck to match a Mack.

Your nearest Mack branch or distributor will give you the full story on what "Built Like A Mack" means in *extra* long life, *extra* strength and stamina, *extra* performance and *extra* dependability.

Mack TRUCKS

...outlast them all

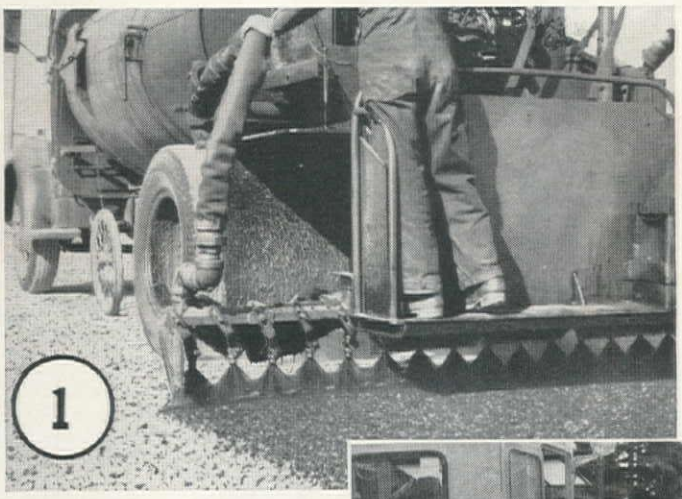
Mack Trucks, Inc. — Los Angeles • Denver • San Francisco Seattle • Portland • Salt Lake City • Factory branches and distributors in all principal cities for service and parts.

In rigorous earth-moving service, big Mack Model LRSW six-wheel trucks have won an outstanding reputation for "seeing things through" with long-lasting, dependable operation.

3 Types of Paving Built Better with Bitumuls

REG. U. S. PAT. OFF.

Paving engineers in all parts of the U. S., and in many foreign lands, select BITUMULS—for 3 reasons. It *PENETRATES* throughout interlocked stone without pre-heating. It *MIXES* easily, thoroughly, with damp sands and dense native materials. It *SEALS* with unsurpassed precision.



MAINE—

Highway Department engineers have placed over two million sq. yds. of BITUMULS macadam — a standard type of pavement since 1931. They know how thoroughly it penetrates interlocked stone.

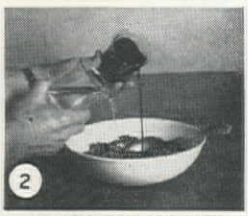
OREGON—

Engineers observe the ease with which BITUMULS mixes with damp native aggregates — and gives early pavement stability. Above is a road near Mount Hood, where crushed aggregate is not readily available.

HONOLULU—

In most highway paving manuals, BITUMULS is a recognized standard for sealing and surface treating. Engineers in Honolulu are no exception—they "shoot" BITUMULS the year 'round.

It PENETRATES



It COATS DAMP NATIVE MATERIALS

It SEALS

Our regional engineers can help you.

In the East

AMERICAN BITUMULS COMPANY

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Washington 6, D. C. · Baltimore 3, Md. · Perth Amboy, N. J.
Columbus 15, O. · St. Louis 17, Mo. · Baton Rouge 2, La.
Mobile, Ala. · E. Providence 14, R. I. · San Juan 23, Puerto Rico

In the West

STANCAL ASPHALT & BITUMULS COMPANY

200 BUSH STREET · SAN FRANCISCO 4, CALIF.

Los Angeles, Calif. · Oakland 1, Calif.
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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 . . . . . ☐
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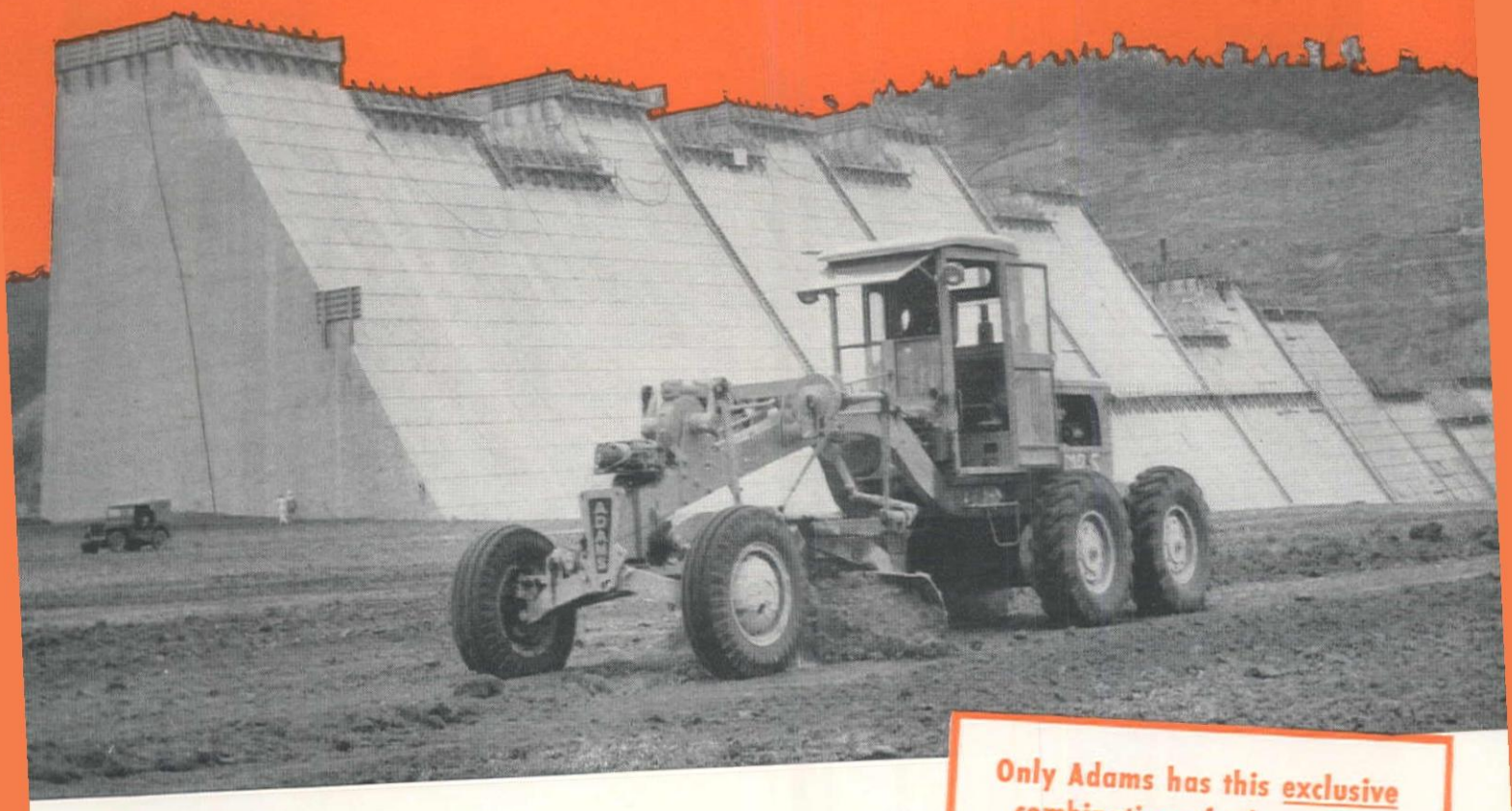
ADAMS MOTOR GRADERS

give you big capacity + versatility + economy



★ If you want to know how good Adams Motor Graders actually are, just watch them do their stuff on really rough, tough jobs—the kind where brute strength and stamina, massive power and traction and high-speed flexibility are "must" requirements.

On big dam projects, for example, like the one above, Adams Motor Graders frequently work the clock around—cutting and spreading huge masses of tough, hard-to-manage material, building haul roads and then keeping them in fast travel condition for great fleets of heavy earth-moving equipment.

Whatever grading operations your work involves—from deep ditch cutting to high bank sloping—you'll find Adams Motor Graders have what it takes to do the job in fastest time, at lowest cost. No other machines handle so many jobs, so fast, so well—scarifying, sub-grading, fine finishing, mixing, back-filling, etc.

Ask your local Adams dealer for complete information on these great machines—or write for illustrated literature.

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA

Only Adams has this exclusive combination of advantages

- **8 Overlapping Forward Speeds**... Flexible working range speeds work—increases output—provides high transport speeds.
- **Wide Range of Blade Positions**—Without Mechanical Adjustments . . . Saves Time in Adapting Machine to Needed Cuts.
- **Positive-Action Mechanical Controls** . . . Dependable, accurate adjustments—because they're geared . . . Easy, natural steering.
- **Ample Operating Clearances**... Quick, easy adaptation to work . . . Operator comfort, convenience, efficiency.
- **Fast, Easy, Servicing Plus World-Wide Dealer Service** . . . Saves time and money.

See your local Adams dealer

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Eureka—Tony Gosselin
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DISTRIBUTORS ALSO IN Seattle and Spokane, Washington . . . Portland, Eugene, Roseburg, Albany and Central Point, Oregon . . . Denver, Colorado . . . Phoenix, Arizona . . . Billings, Great Falls, Missoula and Kalispell, Montana . . . Boise and Pocatello, Idaho . . . Reno and Las Vegas, Nevada . . . Salt Lake City, Utah . . . Albuquerque, New Mexico . . . Fairbanks, Alaska.

Get ready for the long haul–get your
Free TRUCK SAVER *Inspection NOW!*

- **Open to all International Truck owners**
- **No charge, no obligation for complete 99-point checkup**
- **Free offer expires September 30, 1951**

If you want to make it easier to get peak efficiency from your International Trucks in an uncertain future, get your free Truck Saver Inspection now.

This Truck Saver Inspection is the first step toward warding off trouble in the uncertain months ahead. It can save you dollars now and could save you many more in the months ahead.

And the best part of it is that it doesn't cost you one penny. During the 90-day period ending Sept. 30, you can get your Truck Saver Inspection free of charge.

So if you want to protect yourself, make an appointment with your International Truck Dealer or Branch. Get your Truck Saver Inspection, get complete details on how the complete new International Truck Saver Plan can save you time, trouble and money.

Look what the complete International Truck Saving Plan offers

The complete International Truck Saver Plan has been developed by experts, after a thorough study of today's truck operating problems. It offers these benefits to International Truck operators:

1. Better performance over a longer truck life: trucks are kept in shape to do the most efficient job possible until they can be replaced by new units.

2. Delays minimized in getting new parts: by anticipating future requirements, the demand for needed parts can be accurately estimated.

3. Maintenance costs cut, down time reduced: by preventing major breakdowns, a big saving is effected in both time and money.

4. Truck value maintained: trucks kept in the best possible condition are worth more when it's time for replacement.

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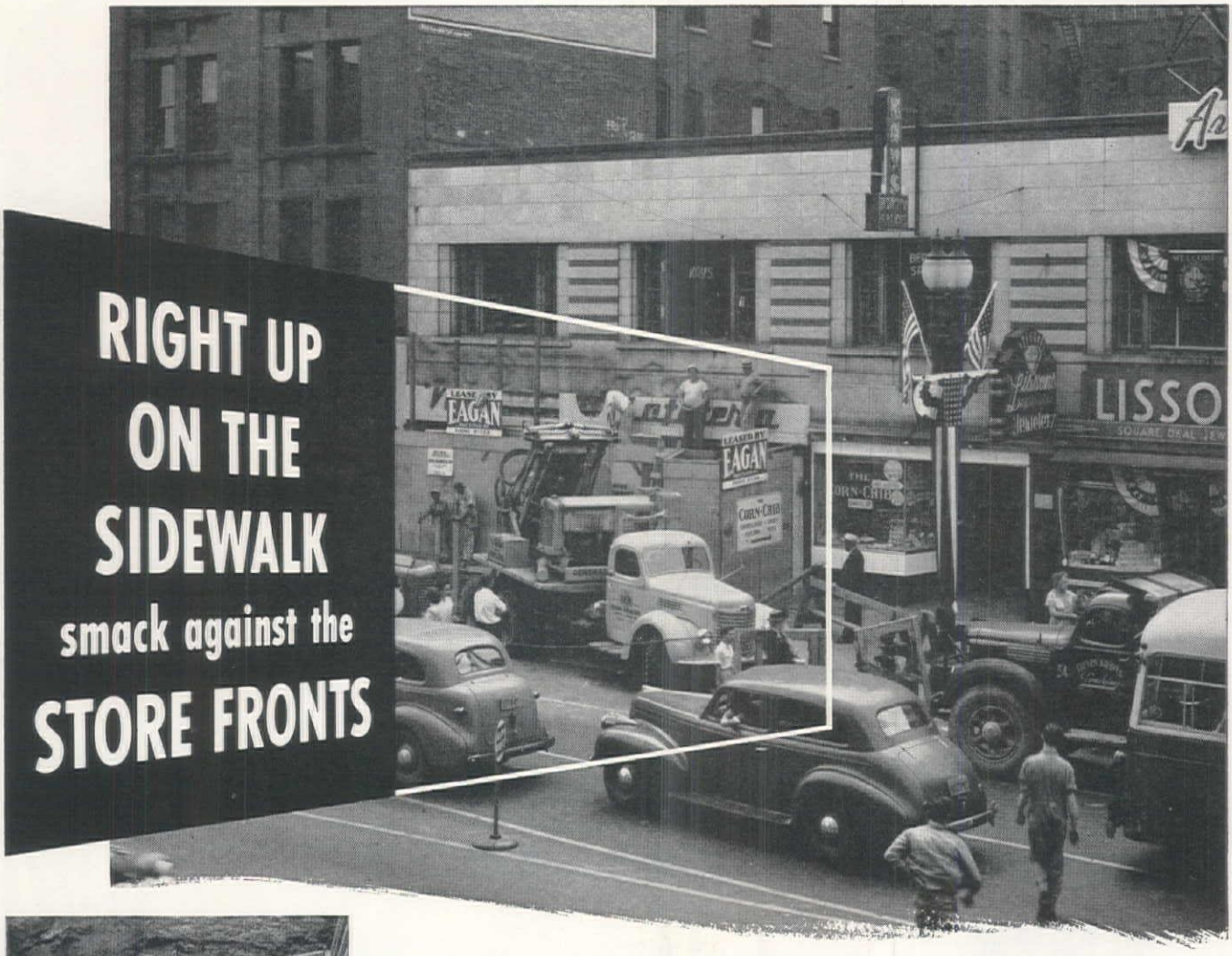


The job occurred in the heart of downtown Syracuse at one of the busiest intersections. Gradall's ability to work in close quarters avoided traffic troubles.

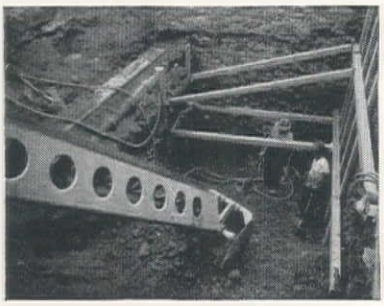
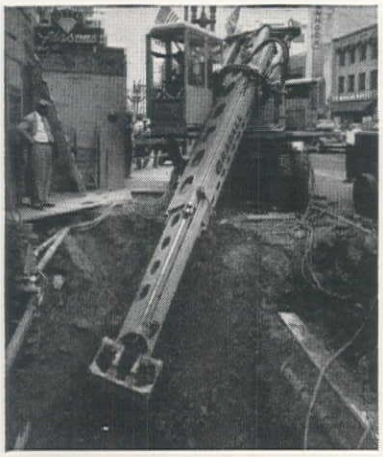


Photo above shows the rocks and concrete that had to be excavated.



Digging vertical walls in crowded quarters, around sewers and other utility lines called for utmost precision.

THE JOB—a deep, narrow excavation for a big electrical transformer. To contractors, the accompanying photos tell the story better than words. "Thanks to that telescoping boom," said the construction engineer on this job, "it's the only machine that could do it."

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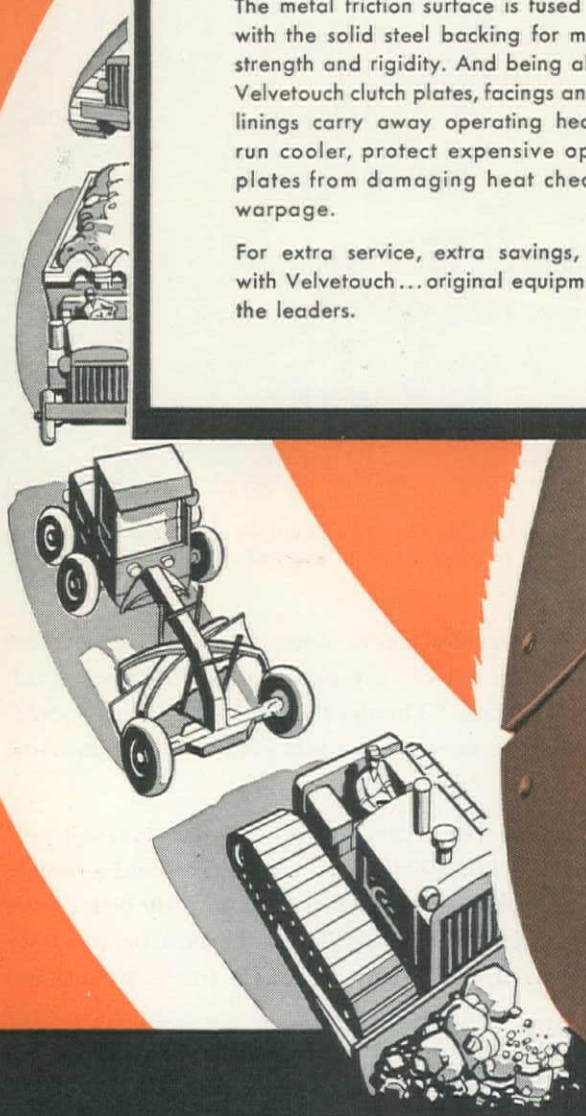

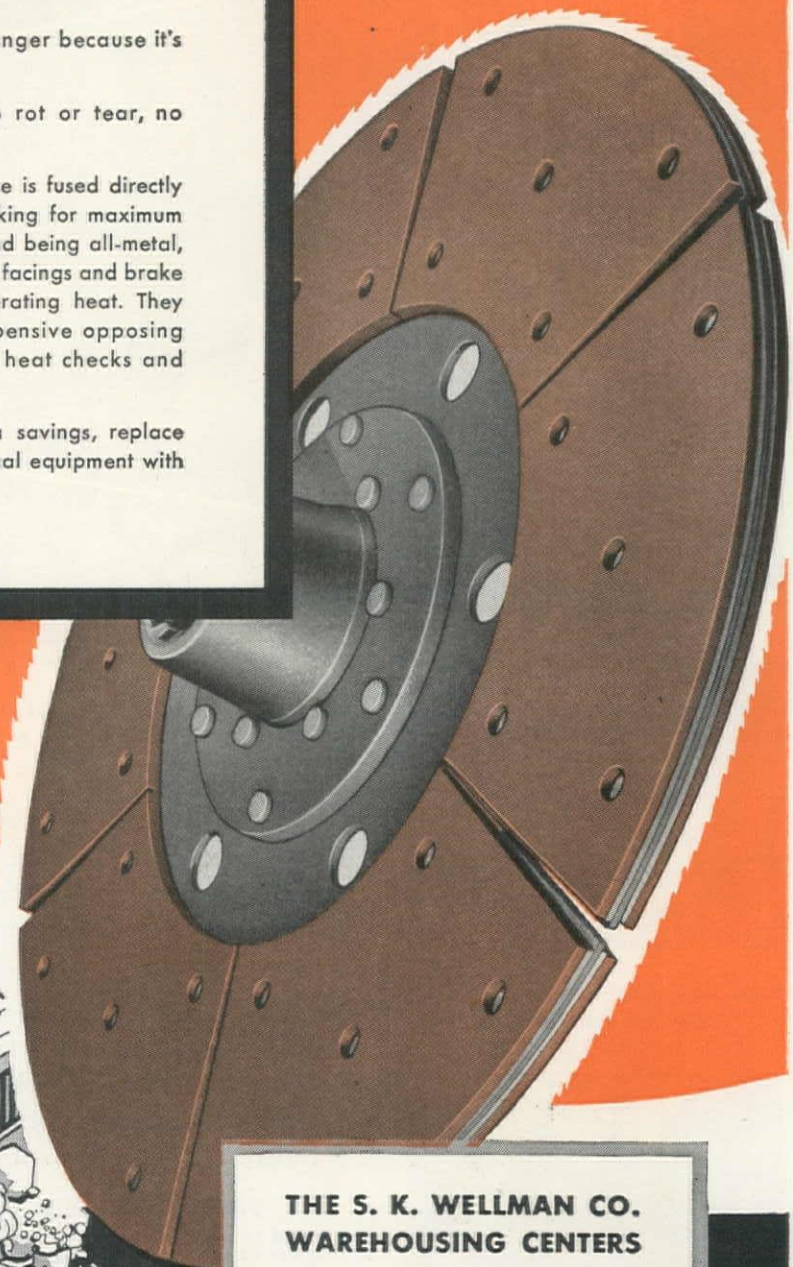

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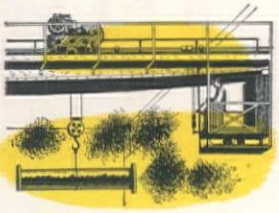

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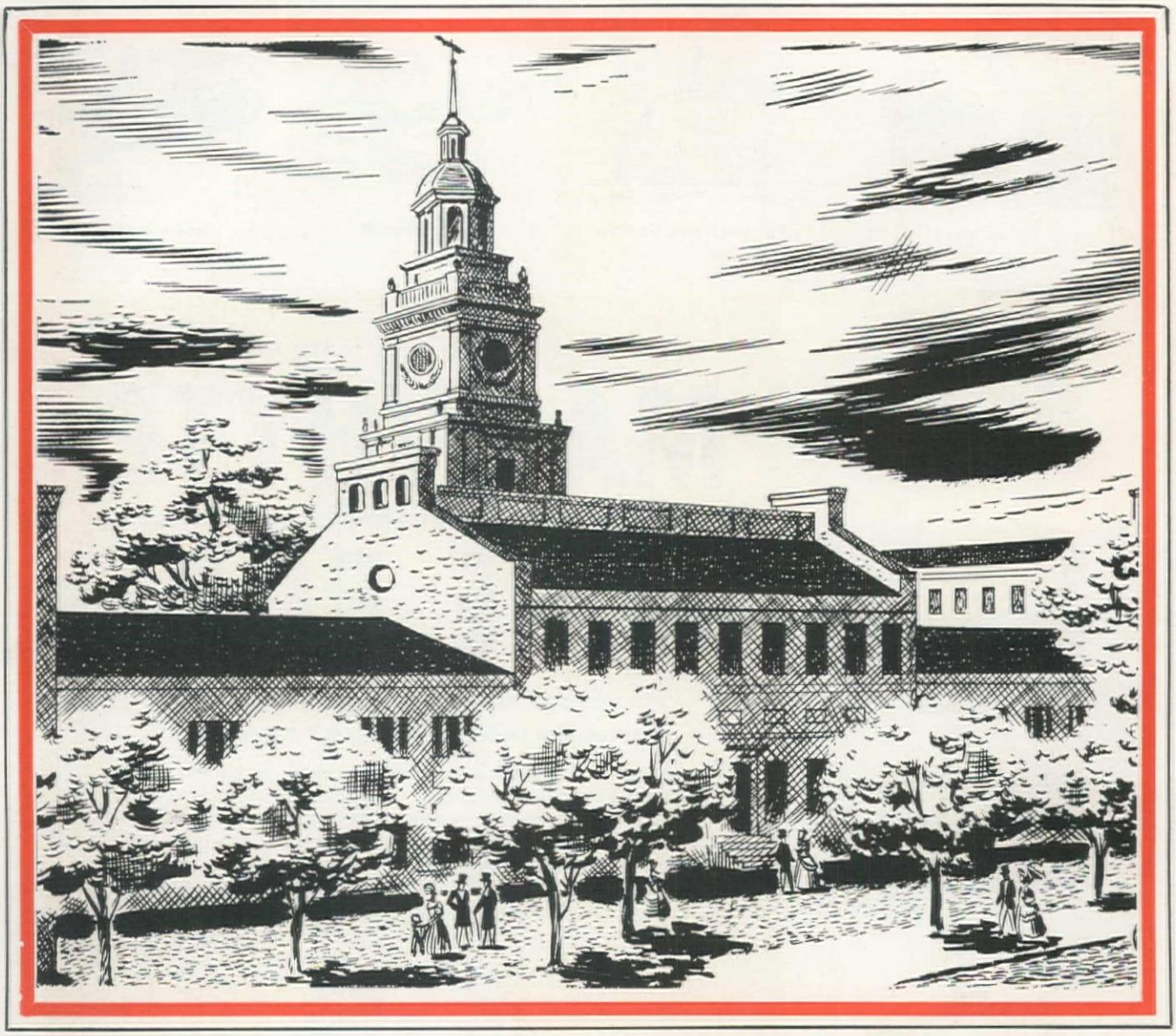
BULLETIN 5025 gives information on "How to order Wire Rope" and lists all sizes and constructions of Improved Plow Steel Monarch Whyte Strand Wire Rope. Copy sent on request.

TD09-4



Philadelphia's Independence Hall, where the Liberty Bell is housed, as it looked 100 years ago

Philadelphia has cast iron water and gas mains in service that were laid well over a century ago. One of them is America's oldest cast iron water main, still functioning despite the radically changed conditions of street traffic and underground utility services in 100 years. The fact that cast iron pipe, laid generations ago, withstands the shock of heavy-duty traffic and the stresses caused by congested underground structures, amply demonstrates its shock-strength and beam-strength. Because of these strength factors and effective resistance to corrosion, cast iron water and gas mains, laid over 100 years ago, are still serving in the streets of more than 30 cities in the United States and Canada. **United States Pipe and Foundry Co.,**
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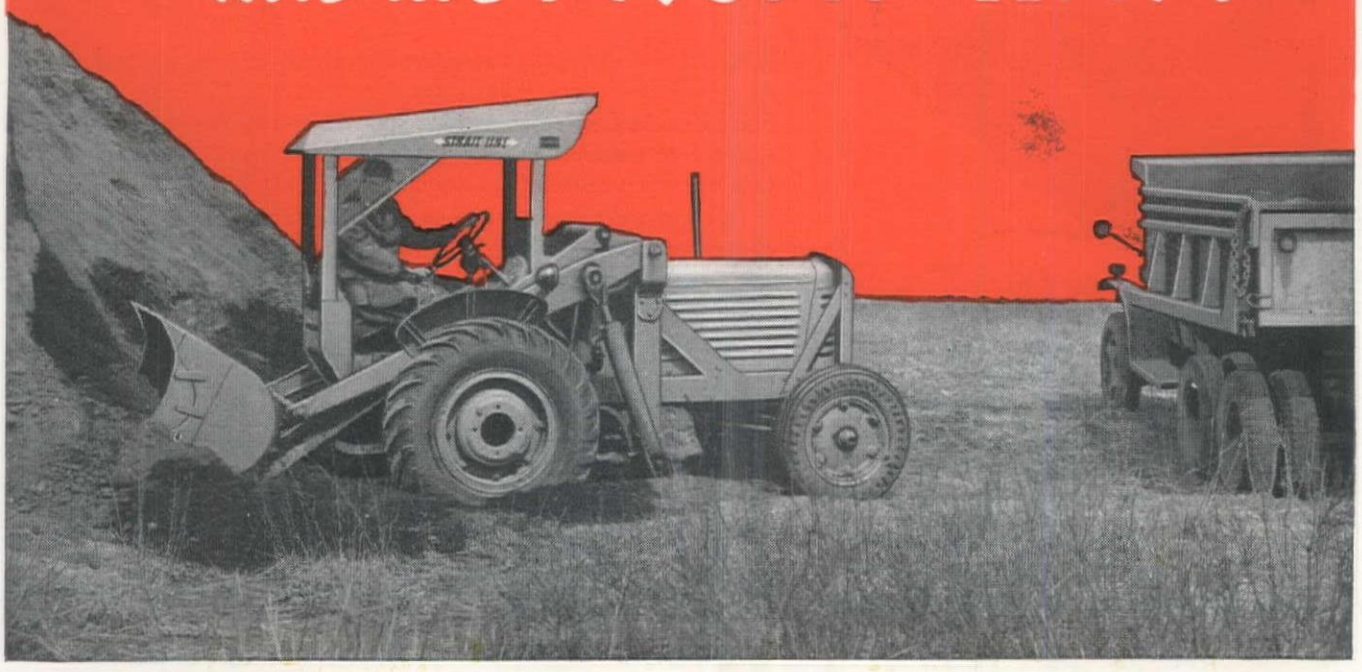

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February 26, 1951

Union Oil Company
1400 Powell St.
Emeryville, California

Attention: Mr. H. B. Anderson,
Resident Manager

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We use it in our whole varied line which includes approximately 100 operating pieces of construction and paving equipment from small gasoline powered tools and pick-ups to shovels, cranes and the largest size diesel operated tractors.

Along with your other products we can recommend T5X as an all-purpose motor oil and Unoba Grease as an all-purpose grease suitable for both water or heat conditions.

Very truly yours,

J. Henry Harris

J. Henry Harris

JHH:vv

Construction men such as J. Henry Harris know that all oils are not alike. They rely on heavy-duty T5X because this amazing *purple* oil means increased engine efficiency —less wear, lower maintenance and repair costs.

1. THE SUPERIORITY OF T5X is constantly being confirmed by large construction outfits such as the J. Henry Harris company, Berkeley, Calif. Heavy-duty T5X is made by blending a 100% paraffin-base stock with a powerful combination of *fortifying compounds*. T5X assures protection for every type of internal combustion engine under every kind of operating condition.

2. T5X REDUCES SLUDGE AND CARBON FORMATION! When engine fuels burn incompletely and ordinary lubricants break down or oxidize, insoluble compounds—the basis of sludge—are formed. T5X additives retard oxidation. T5X also cleans as it lubricates, keeping particles of dirt and sludge suspended harmlessly in oil.

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For full information on T5X, call your Union Oil Representative or write Sales Department, Union Oil Company, Los Angeles 17, California.

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Like growing cities, colleges of today have a big job supplying the needs of their people. Immediately after World War II, increased enrollment not only taxed teaching facilities, but also caused much of the physical plant to be outgrown or become obsolete.

The student body of Washington State College has grown to over 7,000 in the post war years. School authorities have, however, made a definite effort to keep pace with conditions. Among many improvements are temporary housing units and a new Horton elevated water tank.

This new 100,000-gallon elevated tank helps to help provide dependable water service for 240 campus buildings that dot 350 acres of ground, and for lawn and experimental plant irrigation.

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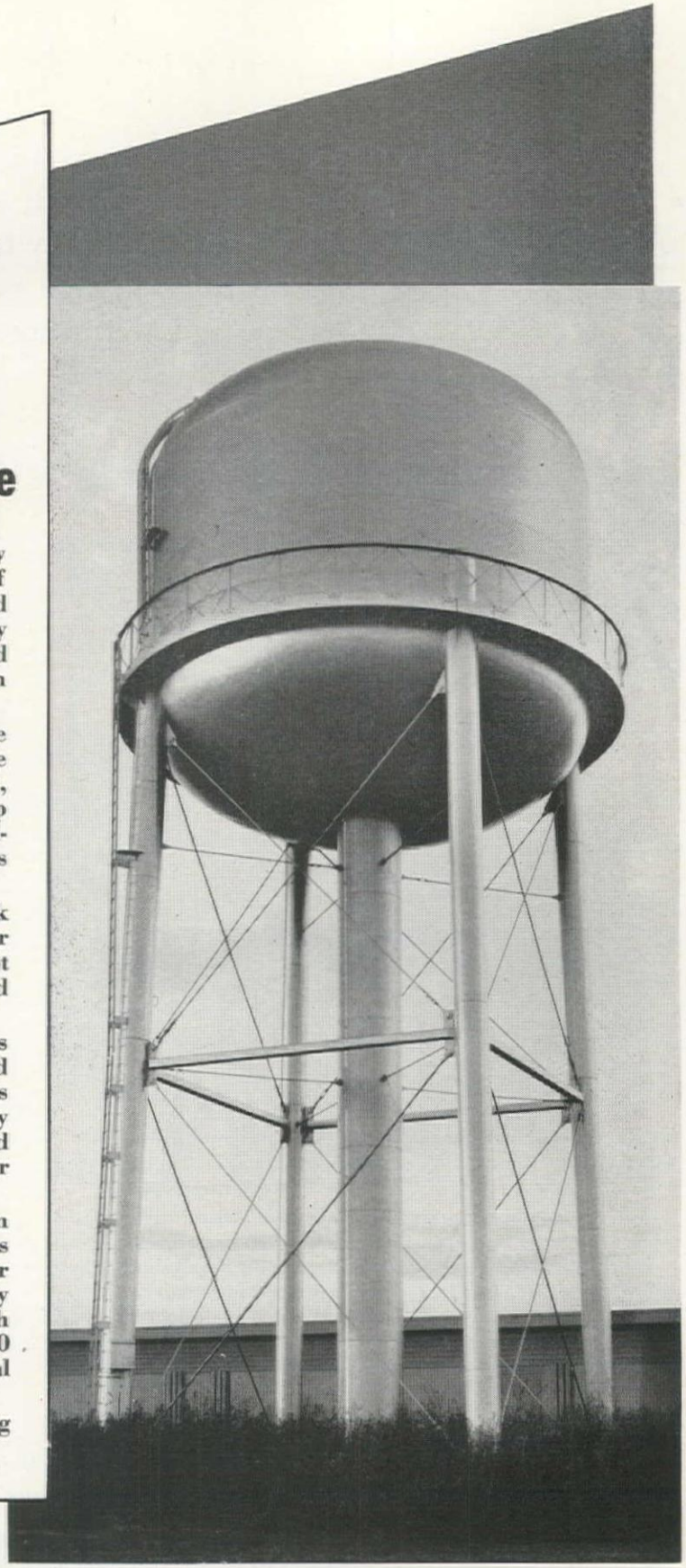

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WESTERN CONSTRUCTION

August 1951 Vol. 26, No. 8

JAMES I. BALLARD . . . . . Editorial Director
JOHN J. TIMMER . . . . . Managing Editor

The West Is to Have a Test Road

THE WEST is to have its own test road. Action on the part of the Western Association of State Highway officials at their recent meeting in San Francisco assures the building, testing and study of a highway section that will provide the factual information for establishing new approaches to design, construction, maintenance, and what may be even more important—financing. If the present impetus is not allowed to wane, the project can be carried forward toward some tangible results that would be available not only for some use next construction season, but will also provide the information that can be the basis for long-range programs presented to the legislatures early in 1953.

The recent test in Maryland has been watched with interest by Western highway engineers, but conditions of that study, including the type of pavement tested, the weather conditions, the loads and the design of the vehicles used for the test have not given answers to Western questions. Further, it was not feasible to try to interpret or translate these results into terms of Western practice. If Western highway engineering was to advance into a new era of improved and tested design, and the financing was to be equally sound and equitable, the facts would have to come from a similar full-scale test conducted in the West, and for the West. Action of WASHO will now make it possible.

Of the utmost importance is the attitude and action of the trucking interests of the West in this test project. The relationship between these important road users and highway authorities has always been relatively more amicable than the corresponding situation in the East. Therefore, it is to be hoped that the trucking organizations will assume a helpful attitude so that the tests can be accepted as providing basically sound engineering information. Trucking interests need Western highways and the highways of tomorrow must consider truck transportation in planning and design, so a common approach to the test road and its lessons would be of mutual advantage. No doubt some of the results will be interpreted differently by engineers and truckers, but if the factual data are accepted as sound the gap of misunderstanding will be closed to a working minimum.

It is particularly fortunate that WASHO exists and is the agency for sponsoring the test road. The project will avoid the necessity of duplicate effort on the part of individual states, and the pooled financing will make funds available in adequate volume. The test road project may be considered as one of the major contributions made by WASHO to highway development in this Western region.

The "Dr. L. I. Hewes Award"

NO ONE MAN contributed more to the development of the highways of the West than Dr. L. I. Hewes. During his long service as regional head of the Bureau of Public Roads for all of the West, he has stimulated and guided highway progress in an area representing one-third of the nation. He began his fight for funds and the recognition of this region at a time in the history of national road development when Washington, D. C. authorities thought that Indians were more of a problem than good roads. For years his dynamic personality not only provided the moving force behind the plans and accomplishments of the Federal agency, but it also permeated through state highway organizations with a coordinating and unifying effect. The interests of "Doc" Hewes extended to all phases of highway engineering and he was as much concerned with the problems of today's maintenance as with the long-range planning for tomorrow. Highway systems of the West will bear the stamp of his energy and wisdom for years, even though he is gone.

Further, his interest was not in any one state or any one section of this large Western region. He was completely "all Western." The problem of keeping a high mountain pass free from winter blockade in Colorado was of as much a fascinating problem to him as repairing flood damage on an Oregon valley road, or the threat of shifting sand to travel in the Imperial Valley. The Western Association of State Highway Officials is to be congratulated in setting up this annual reminder of his service to the West and *Western Construction* is proud to be associated in making the award possible.

"Vacuum Flasks"

WHEN A VETERAN Western construction superintendent announces on his new Australian job that "vacuum flasks will be provided for the men during morning and afternoon smoke periods" it is real news. Of course these may be the words of the local newspaperman, and what Jim Fogg of the Utah Construction Co. said might have sounded different. Anyway, the idea is intriguing, particularly the contents of the flasks during the rest periods. Possibly tea! It only goes to show the differences in construction practice between the West, where Jim Fogg has bossed many well-known projects, and the land "down under." Reports indicate that the design of the big earth dam and the construction equipment used will not be much different from similar Western jobs. But "vacuum flasks" would really seem to be an innovation when applied to the working conditions on a dam project. At least in the fiction which has been written about construction jobs the classic call of the American dam builder is "Water Boy." Perhaps, the cry will be "Vacuum Flask Boy" if international ideas are exchanged.

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What makes it easy for the front truck to ride the bank? . . . ALL-WHEEL DRIVE!

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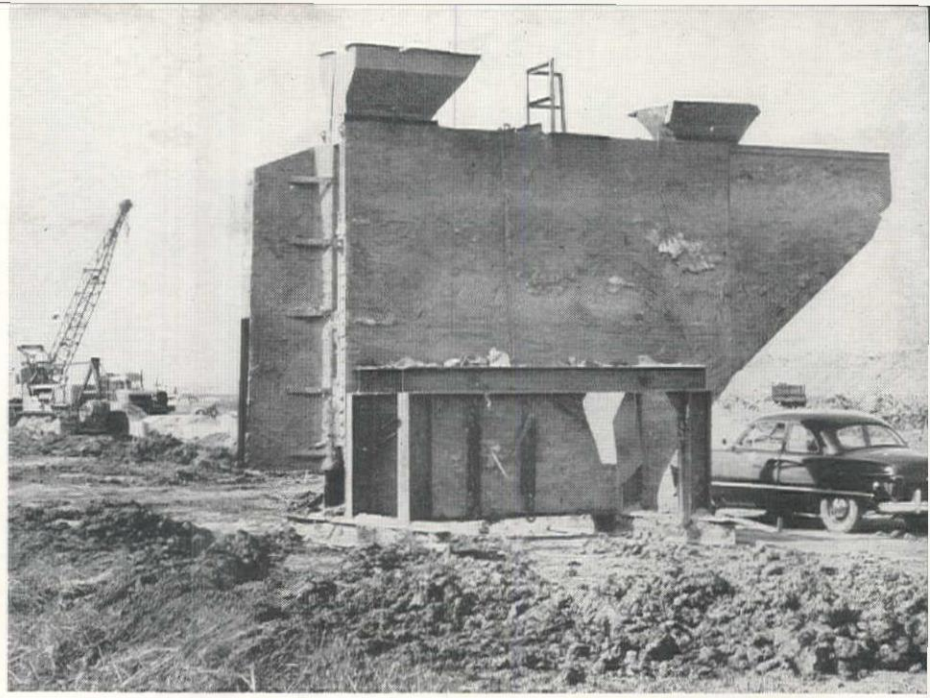
This traveling shield, pulled by a trencher, enables a 2-man crew to place 600 ft. of 12-in. drain in 8 hours. Gravel from hoppers in the shield is distributed through a hollow tail "fin" to form desired height of continuous gravel curtain. It all adds up to a . . .



Fast Way to Lay Pipe in Wet Trench

By

O. H. FOLSOM

Resident Engineer
Canal Division
Bureau of Reclamation

USE OF A SHIELD moving behind trenching equipment eliminated conventional shoring and sheathing in the laying of 7 mi. of closed drains in high water table lands along the Delta-Mendota Canal of the Central Valley Project. Being of compacted earth-lined construction almost entirely in cut, the canal in this 18-mi. reach constitutes an effective barrier to ground water flow. Therefore, it was decided to build closed drains to intercept such flow. Bureau of Reclamation specifications anticipated use of a trenching machine dragging a working shield, though no exactly similar piece of equipment was known to be in use. Successful bidder for this job of installing 12-in. concrete pipe drains was a joint venture composed of United Concrete Pipe Corp. and Vinnell Co., Inc., later shortened to United-Vinnell Co.

How the unit was built

The contractor rebuilt a 1910 Buckeye trenching machine by installation of a Caterpillar D-7 engine with twin disk clutch, a 22-ft. bucket ladder, and an underslung winch. In operation a 12-part line leads from the winch to a "deadman" made up of idle equipment.

The working shield as delivered was 26 in. wide, 16 ft. high, and about 15 ft. long on the bottom. It was spread apart and braced by steel channels and struts and had sides of ⅜-in. plate. The shield was furnished so that a 4-ft. horizontal section could be taken out for trenching at less than 10 ft. of depth, thus obviating having so much of the shield out of the ground. This splice was done away with after two sections of 7-ft. trench were completed.

An innovation in the use of this shield is the method of placing gravel around the pipe and a continuous gravel curtain over the pipe. A hopper is placed on the following end of the shield and gravel fed through a chute into a box, or "fin," 1 ft. wide which is so gated as to leave the desired height of gravel curtain over the pipe. Backfill is placed on both sides of this fin immediately to hold the gravel in position as the shield moves ahead. Gravel surrounding the drain comes directly from this same hopper.

The supporting sled (see illustration) for the shield is simply a frame built of 12 by 12-in. I-beams resting on runners 23 ft. long and 13 ft. apart, spanning the ditch and shield. This sled carries the weight of the shield by four Coffing hoists attached to pad eyes. Grade of the drain is controlled in part by these same hoists.

Two men work in the shield, one placing timber cradles and the other laying the drain pipe and building paper around the joints. Gravel packing is delivered automatically from hoppers. This gravel is a mixture of sand and gravel designed to give a filtering action. It is spotted along the trench alignment by dump trucks and placed from these piles into the hoppers by a skip loader. Backfill comes from previously excavated spoil and is pushed into the ditch directly behind the working shield. Line is controlled by a piano wire stretched along the line, and grade by a graduated rod attached to the inside of the working shield and read against the piano wire.

VIEW AT TOP OF PAGE—

Working shield details are apparent with the unit above ground. Note two hoppers, one for subgrade gravel, the other for gravel packing and a continuous gravel curtain above the drains. Leading end of the unit is to the right.

"Bugs" out

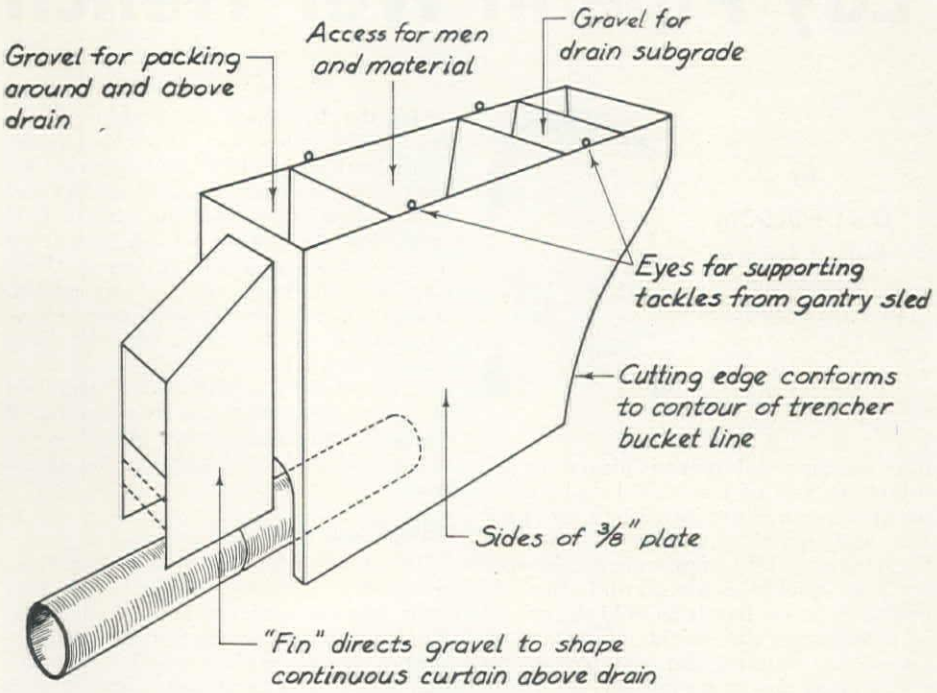
The first drain placed was in a relatively dry area and no particular difficulty was encountered beyond the usual breaking-in of new equipment and personnel. No gravel bed was laid beneath the drain pipe and very few timber cradles were used. The start of work in wet areas resulted in many changes.

The pressures under which the working shield operated were quite high. Additional bracing was found to be needed between the sides of the shield as deformations of the ⅜-in. plate occurred. A steel arch of ½-in. plate remedied this. Mud, sand, and water made it mandatory to place gravel underneath the pipe; a hopper and chute were built in the leading end of the shield to place this gravel on the newly cut subgrade. A mud pump was installed in the shield for dewatering the working space.

It was necessary to shield the bucket line of the trencher to prevent caving. At first this shield extended beyond the cutting blades, but pressures bent the edges of the steel plate enough to interfere with the buckets. This shield was then cut back behind the cutting blades

BACKFILLING by bulldozer constitutes final step in drain-laying operation, shown here in entirety. Trencher at right drags sled (center), from which hangs the working shield. Skip loader is charging gravel hopper from stockpile at right.

Schematic Sketch of Shield Shows How It Works



NOTE THAT shape of fin permits partial backfilling at the same time gravel is poured to form a continuous interceptor curtain one foot wide above the drain. Opening at back of fin may be varied (dashed line) to control height of the curtain.

and the cutters extended to trench 2 in. outside the shield to relieve the pressure.

Building up "know how"

It was found that the pulling winch did not move the equipment evenly, as it increased speed as the cable wound on the drum. The usual synchronized travel of the trencher could not be used as it was not heavy enough. Because of this unsynchronized travel, cutters were put on every third bucket instead of every fifth. The track on the machine was increased in width from 22 to 36 in. in these wet areas.

Considerable difficulty was experienced in maintaining proper depth of the working shield. At times it would either nose down in the soft muck or ride out in harder material. This fault was found to be a function of the location of the pad eyes for the supporting hoists. These locations were changed by trial and error until a satisfactory result was attained. Because the sled cut into the soft ground, it was necessary to put 2 by 12-in. wood runners under the original steel ones. In very soft ground a crane is employed to support the shield and take weight off the sled.

To date about 25,000 ft. of drain have been placed. The best run has been approximately 600 ft. in 8 hours, laying pipe at 13½-ft. depth. However, the monthly average comes to only about 5,300 ft.

As with any custom-built machinery, there has been considerable delay due to breakdowns and lack of "know how." Shafts, gears, chains, drives, and bearings have all had to be changed and strengthened. Despite the troubles encountered, job personnel believe they have discovered a feasible and economical method by which to lay closed drains 16 ft. below the surface in high water table areas previously thought to be impossible of excavation. Efficiency of the gravel curtain has been proved on the several occasions that it has been necessary to excavate to the curtain to drain surface water.

United-Vinnell intends to complete the last 10,000 ft. of drain by early August. Workers are convinced that, with the equipment and techniques they have developed, they can place a similar closed drain anywhere. As they say privately, "Where could you find worse conditions?"

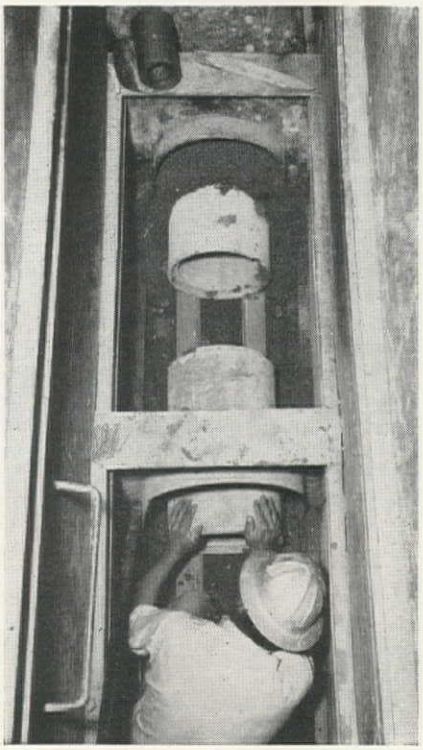
Personnel

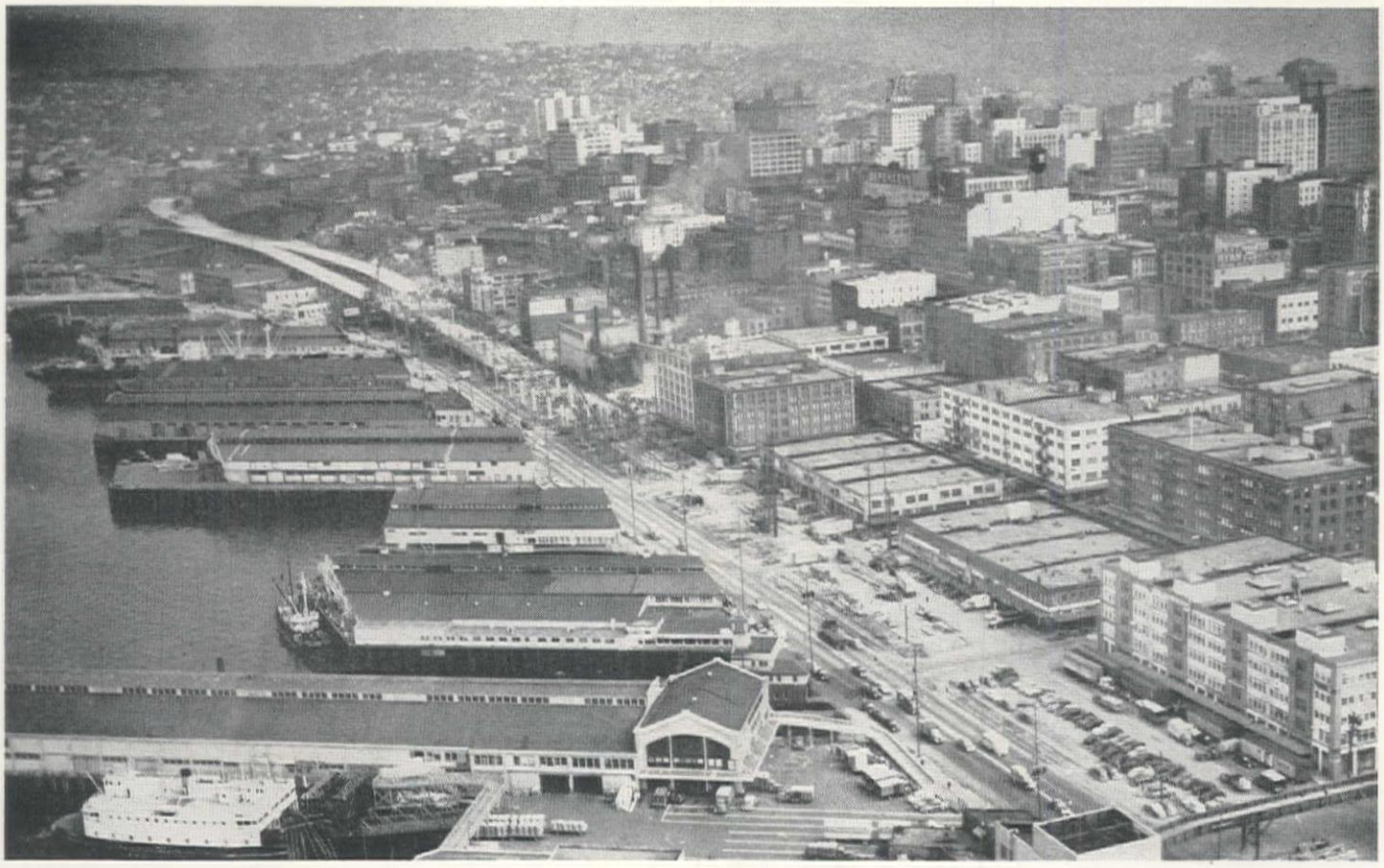
Rea B. Wickiser is project manager for United-Vinnell, and H. F. (Pops) Lilley is excavation superintendent. Jasper A. (Scotty) Scott is foreman in charge of the job for the contractor.

The Delta-Mendota Canal is being built by the Bureau of Reclamation. Richard Boke is Regional Director; Carl H. Kadie, Jr., is District Manager; O. G. Boden (deceased) was Construction Engineer, and E. O. Baird is Senior Inspector.

L. N. McClellan is Chief Engineer of the Bureau of Reclamation in Denver.

SEEN FROM ABOVE, workman in shield places 12-in. concrete pipe on timber cradle. Building paper will cover joint. As shield moves ahead, pipe comes under hopper from which gravel flows to pack drain installation.





PICTURED ABOVE—

NEARLY-COMPLETED portion of Alaskan Way viaduct includes transition to 2-level structure. Second contract is under way using gantry cranes to facilitate upper-deck construction. Marion St. pedestrian overcrossing, (right foreground) gave rise to design problems.

Photo Courtesy Seattle Times.

To Solve Rush-Hour Traffic Problem—

Seattle Builds 2-Level Expressway

Right-of-way costs dictate stacked structure above Alaskan Way to relieve business district congestion—Daily through traffic of 37,500 vehicles from residential and industrial areas will be diverted along 2.43-mi. harborfront viaduct

By H. WARD TYLER
Principal Engineer
Seattle Department of Engineering

and

CORWIN A. PILON
Resident Engineer
State Department of Highways

TYLER PILON

FACED with an increasing problem of traffic congestion in the downtown business district, Seattle has designed and now has under construction a double-deck viaduct structure skirting the business district along the waterfront, known as the Alaskan Way Viaduct.

Situated between two large bodies of water, Puget Sound on the west and Lake Washington on the east, Seattle has been confined in its growth to a north-south direction. Most of the industrial areas are in the southern part of the city, with large residential areas in the north. Principal north-south routes pass through the central business district; the daily flow of traffic to and from work has caused unusual congestion in this area.

The war years brought an influx of war workers to Seattle's shipyards and the Boeing Aircraft Co., who, contrary to expectations, remained after the war and found permanent employment in Seattle's expanding industries. Vehicular traffic increased 74% from 1939 to 1949.

The first step toward solution of the traffic problem was an origin-destination survey which was conducted jointly in 1947 by the State Department of Highways and the Traffic Division of the Seattle Engineering Department. This survey showed that, between 9:00 a.m. and 6:00 p.m., 50% of the 75,000 cars entering the central business district went through without stopping.

Routes were recommended for two expressways passing through this district. The Alaskan Way route was selected for first development because it could be built faster and at less cost. The central business district lies on a hillside overlooking the harbor. The new viaduct will skirt the foot of this hill, leaving only the docks between it and the harbor. Little condemnation of right-of-way was necessary and the route connects with existing semi-ex-

FOUR TRAFFIC LANES are accommodated by this finished section of viaduct, plus extra acceleration lane at ramp connections. Note split columns at ends of three-span rigid frame units.

pressways at either end. The traffic survey revealed that six vehicle lanes would be advisable, with interchange to the business district.

Principal features

A double-deck structure was found to be the solution providing this facility in the space available, and yet maintaining access to abutting property at ground level. Each of the two decks will carry traffic in one direction, permitting right or left turns from either deck to the business district.

Presently contemplated viaduct construction starts with ramps at the southern terminus, which will comprise a traffic interchange in the ultimate development. These ramps lead to the 4,502-ft. double-deck structure, and then through an elevated transition structure which brings the decks together to form a single roadway leading into a 2,134-ft. subway under seven principal streets, to emerge in Aurora Ave. for a total distance of 2.43 mi. of uninterrupted traffic flow.

Provisions for future ramp connections to First Ave. have been made at locations where ramps from the 55-ft. high upper deck of the viaduct can be practically level.

Design problems

The selection of a double-deck structure, while attractive from a traffic standpoint, has many problems not commonly found in structural design. It was necessary to spread the columns to accommodate the lower deck. Adoption of 14-ft. curb lanes and a 12-ft. center lane, with an additional 1½-ft. curb width, required a total distance between columns of 43 ft. At future connecting ramps a 12-ft. acceleration or deceleration lane was added, increasing the distance between columns to 55 ft.

Additional problems included special span lengths up to 86 ft., three-span rigid frame construction, necessity for railroad clearance under the lower deck and highway clearance between decks, and design for Zone II earthquake load. In a total of 1¼ mi. of viaduct structure there is no duplication of three-span units.

Early cost studies of structural-steel and reinforced-concrete designs favored concrete slightly. Materials shortages at present have proved this a fortunate circumstance. A total of 35,200 cu. yd. of concrete and about 4,900 tons of reinforcing steel will be required in the double-deck portion of the structure. Of this reinforcing steel, about 2,600 tons will be 2-in. square bars, rolled and fabricated in Seattle and shipped to the job by truck.

Subsurface explorations consisting of test pits, test borings, test piles and pile loadings disclosed that good foundation could be had with relatively short piling and shallow footings. Because portions of the viaduct are over filled beach areas, steel piles were selected, with mandrel-driven poured-in-place concrete piles as an alternative.

At Marion St. an existing pedestrian viaduct crosses Alaskan Way at an elevation to provide railroad clearance. Girders for the new vehicular viaduct also provide railroad clearance. To pass the pedestrian viaduct through the vehicular viaduct, a unique method was employed. By making this site the junction of two three-span units, end columns could be placed on either side of the pedestrian crossing, in effect widening the opening in a split column. Girders for the vehicular viaduct are 7 ft. 8¾ in. deep. The girder for this short span was eliminated and the roadway slab cantilevered out a short distance from each side to span the gap, providing space for the pedestrian viaduct.

Another similar widened split column is planned at University St. to permit future construction of a pedestrian crossing there should it become necessary.

Financing

Funds for the project have been provided jointly by the City of Seattle, the State Department of Highways, and the Bureau of Public Roads.

The City of Seattle acquired right-of-way by purchase and condemnation at a total cost of $1,220,000, including damages to adjacent property. Design drawings were also prepared by the Seattle Department of Engineering. The State Department of Highways checked the plans, awarded contracts, and is supervising construction.

Allocation of costs among the three agencies is as follows:

City of Seattle	$ 4,800,000
State (Motor Vehicle Fund)	1,100,000
Federal Aid	4,100,000
	$10,000,000

Construction schedules

The entire project has been divided into four sections, each referred to as a schedule and awarded under separate contract. Schedule A, the north approach to the viaduct, will be constructed as a four-lane subway with its north portal at Aurora Ave. and Denny Way, and its south portal just west of First Ave. at Battery St. The main trunk of the subway will lie directly beneath Battery St. between First and Fifth avenues. Width of the subway is limited to the present width of Battery St. Horizontal curves in the alignment will connect the tangent section under Battery St. with the alignment at the portals. Work planned for Schedule A includes widening and channelization of Aurora Ave. from Broad St. to Denny Way, and construction of the subway under Battery St. Total length of this schedule is 0.80 mi.

Schedule B is the north section of the viaduct. It begins at the south end of the subway near Western Ave. and Battery St. and extends southwesterly across Western Ave., Elliott Ave., and Lenora St., along and across the Great Northern Railway tracks and north portal of the railroad tunnel beneath the city, across Pine St., and on along Armory Way to Pike St. Total length of this schedule is 0.43 mi.

Schedule C is the central section of the viaduct. This schedule begins at the south end of Schedule B and extends southerly along the east side of Alaskan Way to King St., a total distance of 0.77 mi.

Schedule D is planned as the south approach to the viaduct. It will begin at the King St. end of Schedule C and will extend southerly across Railroad Way, where the viaduct will end abruptly. The reason for this abrupt ending is prevention of interference with traffic during construction of future extensions. Ramps will lead off the east side of the viaduct and will extend along and above Railroad Way to First Ave. South. Both ramps will meet the grade

of First Ave. South at Connecticut St. The total length of this schedule is 0.43 mi., making a grand total for the project of 2.43 mi.

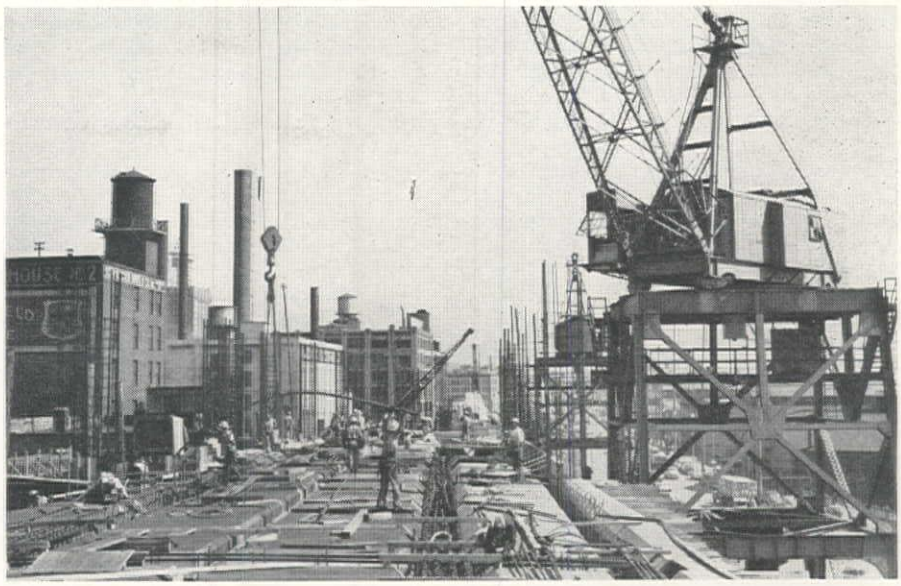
Contracts

Contracts have not been awarded to date for Schedules A and D, but it is expected that they will both be advertised during this summer. MacRae Brothers, general contractor of Seattle, was awarded the contract for Schedule B on a bid of $1,693,911.85. The contract is nearly complete at the date of this writing. The section covered by this schedule includes the transition section from the four-lane roadway of the subway to the two separate 40-ft. roadway surfaces of the double-deck viaduct.

Northbound traffic on the viaduct destined for Ballard, Magnolia Bluff, Queen Anne Hill, and other vicinities can turn off the viaduct via a ramp constructed to Western Ave. A ramp approach constructed from Elliott Ave. just south of Bell St. provides access to the viaduct for traffic going south from these same vicinities. No other approaches are planned at the present time.

Preparations for clearing the right-of-way for this schedule included the relocation of utilities at the owners' expense, and the razing of several residence, apartment, and warehouse buildings by the contractor.

The curved alignment of Schedule B necessary to utilize existing right-of-way and to clear existing structures, consisted of a series of horizontal and vertical curves. This alignment and the varying width of roadway to provide for the two ramps, and the transition from single to double roadway made construction rather complicated. Protection of existing buildings, and of street and railway traffic were also problems to be considered. Hazards to railway traffic were relieved somewhat by the use of structural steel supporting bents and beams for the sections spanning tracks. This difference in design eliminated the construction of falsework within the track areas.



CLOSE QUARTERS for construction work on the 0.77 mi. of viaduct under Schedule C are shown in this view looking south along Alaskan Way from vicinity of Pine St. Gantry cranes clear railroad and auto traffic on street below viaduct. Girder reinforcement in foreground is 2-in. square steel.

Existing streets provided the only access to the right-of-way. Other access was impractical because of the high, steep bank along the railway tracks and the existence of several large buildings. Because of the restricted access and the time allotted for construction, it was not advisable to complete the structure by building continuously from one end to the other. The contractor therefore elected to construct intermittent sections of the structure, taking care not to cut off access to succeeding sections.

A considerable number of the column footings for Schedule B were constructed as direct soil-bearing footings founded on solid hardpan material. Where solid material was not encountered within reasonable depth, 12 by 12-in. 53-lb. steel H-sections were driven as foundation piles. Construction of this schedule is along the originally irregular bank adjacent to the shore line of Elliott Bay. Development of the city has resulted in the filling of ravines and cutting of ridges. Therefore, the depth from ground surface to solid foundation material varies considerably, necessitating pile lengths from 10 to 50 ft. Skid pile-drivers with No. 1 Vulcan steam hammers were used for driving all foundation and falsework piles. This equipment, together with several Lorain Mobil cranes, constituted the major portion of the construction equipment used by MacRae Brothers. The Mobil units were converted to hoe or dipper-type shovels for excavation, and to cranes with various length booms for hoisting.

Morrison-Knudsen Co., Inc., and Rumsey & Co., joint venturers, submitted the low bid of $3,691,400 and were awarded the contract for Schedule C. The allotted time for completion of this schedule is 600 calendar days with February 13, 1951 as the starting date.

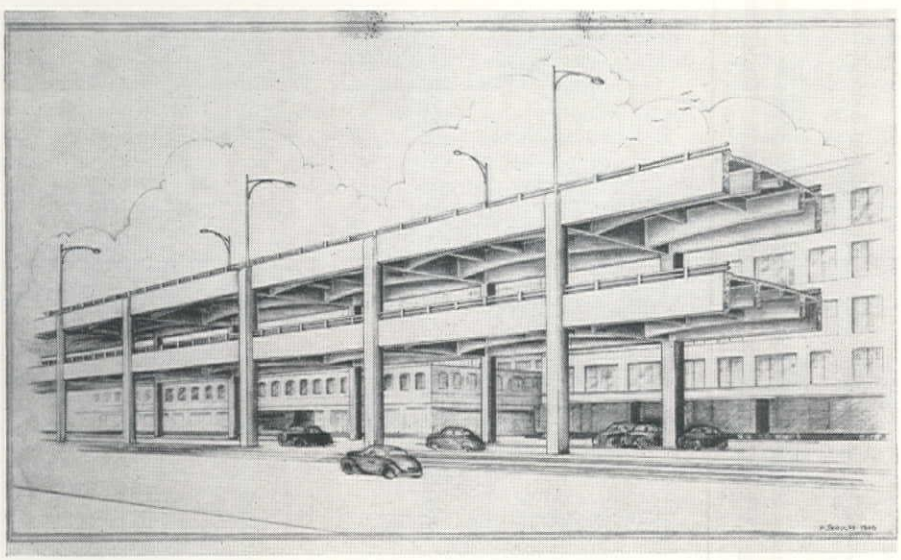
Schedule B is to be constructed as a double-deck viaduct with one 40-ft. roadway directly above the other. Provisions are included for future approaches to the main business district of the city.

Prior to the awarding of the contract it was necessary that the city relocate numerous underground utilities and overhead electric wires to clear the viaduct. Considerable care must be taken to protect these utilities during construction operations.

The viaduct is being constructed over numerous railway tracks and spurs leading to waterfront piers, warehouses, and other facilities. The railroad companies are vacating and relocating these tracks to clear the completed viaduct and the contractor's operations. However, railway service must continue at all times. Highway traffic north and south has been diverted to the paved section of the street along the west side of Alaskan Way. Intersecting streets to the business district must be kept open to traffic and freight-truck access must be maintained to numerous warehouses along the east side of Alaskan Way. The contractor's operations are therefore restricted to the right-of-way provided for the viaduct.

To keep within the allotted construc-

CUTAWAY SKETCH shows design of reinforced concrete columns, girders and decks of the 2-level viaduct. Structure is 43 ft. wide between columns.



tion area and permit railway and traffic movements the contractor acquired and set up two Washington (Model 28-105) revolving gantry cranes. These cranes operate along the west side of the viaduct with the gantry spanning one railway track, permitting trains to pass between the gantry legs and beneath the crane. Several crawler cranes are being used in conjunction with the gantry cranes.

Construction has started at the north or Pike-St. end of the schedule. The contractor plans to complete the structure progressively to King St.

Excavation for foundations is being performed by back-hoes and cranes with clamshell buckets. Originally the Alaskan Way roadway surface and the railway tracks were supported by pile trestles constructed over the water. In later years the city constructed a new bulkhead along the west side of Alaskan Way and filled the trestle area, leaving the existing trestles in place. This condition has created numerous hazards to excavation and pile-driving operations of the new construction work.

All foundations are supported on piles driven through the old fill material. A special pile-driver, using a single-acting steam hammer developing 19,500 ft.-lb. of energy per blow, is used. Raymond cast-in-place concrete piles are being driven for the foundations of bents 54 to 68 and 101 to 115, and steel H-piles for the foundations of the other bents. The steel H-piles are being used in the area where most of the buried trestles are expected to be encountered because they should be able to cut through the buried material. The Raymond piles vary from 20 to 52 ft. in length and the steel H-piles from 52 to 70 ft. After completion of the pile-driving for each bent, the contractor constructs the reinforced-concrete footing and the section of columns for the lower roadway. Falsework is then set up and the cranes are put into use hoisting and placing materials for construction of the beams, girders, and deck slab of the lower roadway. The sections of the columns for the upper roadway are then constructed, followed by construction of the upper beams, girders and deck slab. Falsework for the lower roadway is supported on driven timber piling. This falsework in turn supports the upper roadway by means of framed timber bents set on the lower roadway and directly above the pile-driven bents.

A fifth contract will be awarded for electrical installations for the project.

Materials

All concrete for the two contracts is ready-mixed concrete from central mixing plants, and is delivered to the job sites in agitator trucks. Pioneer Sand and Gravel Co. furnished the concrete for Schedule B and Glacier Sand and Gravel Co. is furnishing the concrete for Schedule C. Aggregates for the concrete are shipped via water from quarries at Steilacoom, Wash. Reinforcing steel for both contracts is furnished by Bethlehem Pacific Coast Steel Co., and structural steel by Pacific Car and Foundry Co. Raymond Concrete Pile Co. is furnishing the cast-in-place concrete piles.

Personnel

Design work and preparation of specifications was done by the engineering department of the city of Seattle, Ralph W. Finke, City Engineer; and H. W. Tyler, Principal Design Engineer. R. M. Murray of the State Department of Highways was design consultant. Checking and approval of plans and specifications was done by the Bureau of Public Roads and the State Department of Highways. Fred J. Dixon is District Engineer for the Bureau. William A. Bugge is Director of Highways, George Stevens is Bridge Engineer, and D. D. Forgey is District Engineer for the State. Supervision of construction is being performed by the State Department of Highways with Corwin A. Pilon, Resident Engineer, in immediate charge of construction.

Bid Opening This Month for Main Portion of Folsom Dam

BIDS will be opened August 30 for construction of the main portion of Folsom Dam, to be built by the Corps of Engineers. Located about 2½ mi. north of Folsom, Calif., on the American River, the dam is a multiple purpose project involving 8,438,000 cu. yd. of embankment and 1,015,000 cu. yd. of mass concrete.

Previous work at the 1,100,000-acre-foot reservoir site has included some stripping and the construction of several embankment dikes in low spots on the reservoir periphery. The new contract, to be completed within 1,200 days of its commencement, will see the dam and works to virtual completion, as construction of the powerhouse and facilities will proceed concurrently under separate contracts let by the U.S.B.R.

Major construction problem to be met is that of pouring the concrete river section from bedrock to streambed elevation in one working season. Army engineers estimate that this work will entail excavation of 70 ft. of river gravels and placement of 150,000 cu. yd. of concrete, including 25,000 cu. yd. in one abutment.

Features of the contract, to be awarded as a whole to one bidder, include the following:

(1) Care and diversion of water, including provision and operation of cofferdams.

(2) Excavation and foundation preparation. Rough excavation has been completed at both abutments.

(3) Construction of the concrete river section of the dam, about 1,400 ft. long, including a stilling basin, tower, service bridge, and other appurtenances. The river section is composed of mass and reinforced concrete; its construction consists of producing and transporting aggregate, furnishing cement, mixing and placing concrete, and furnishing and placing reinforcing and structural steel and miscellaneous steel.

(4) Construction of right and left wing dam earth embankment sections and three earth embankment dikes composed of pervious and impervious fill with gravel and rip-rap slope protection. Rip-rapping of four previously constructed dikes.

(5) Installation of government-furnished radial gates and operating machinery, sluice gates, and conduit and penstock lining. Sluice-gate operating machinery will be furnished and installed by the contractor.

(6) Construction of a reinforced-concrete pumping plant about 25 by 165 ft., including furnishing and installation of all pipe and equipment, except pumps.

(7) Construction of water, sewer, and electrical utilities required for operation of the dam and pumping plant.

(8) Miscellaneous other work as specified or shown on the drawings, including construction of a bridge, removal of plugs at ends of a diversion tunnel, plugging the diversion tunnel, excavation of a portion of a tailrace channel, and other work as necessary for completion.

Approximate quantities of major work items in the contract for construction of the main portion of Folsom Dam are:

	Item		Quantity
1.	Miscellaneous unclassified excavation	cu. yd.	3,412,000
2.	Borrow excavation	cu. yd.	6,610,000
3.	Embankment	cu. yd.	8,438,000
4.	Rip-rap and filter blankets	tons	300,000
5.	Mass concrete	cu. yd.	1,015,000
6.	Miscellaneous concrete	cu. yd.	74,000
7.	"Prepakt" concrete	cu. yd.	4,700
8.	Steel reinforcement	lb.	4,100,000
9.	Structural steel	lb.	1,033,000
10.	84-in. steel pipe	ft.	3,570
11.	42-in. steel pipe	ft.	3,360
12.	Install steel penstocks	lb.	390,000
13.	Install penstock gates, embedded metal and hoists	lb.	918,000
14.	Trashrack metalwork	lb.	835,000
15.	Install conduit slide gates and accessories	lb.	1,900,000
16.	Install tainter gates and accessories	lb.	2,420,000

Preliminaries Over, Material Begins to Roll Into

5,800,000-Cu. Yd. Fill at Cachuma

Storage of 210,000 acre-feet will provide relief for serious water shortage at Santa Barbara and nearby irrigated areas—Dam contract being carried out by Mittry Constructors for USBR

ON MAY 24 the first truck load of impervious fill (Zone 1) was placed in Cachuma Dam, which is being built by the Bureau of Reclamation to provide a supplementary supply of irrigation and municipal water to Santa Barbara, Calif., and surrounding area. Contract for constructing the earth and rock fill, which will be 206 ft. high and contain 5,800,000 cu. yd., is being carried out by Mittry Constructors. The dam is located on the Santa Ynez River and storage will be conveyed by the 6.4-mi. Tecolote tunnel through the Coast Range to a conduit that will deliver this supply to the city and existing irrigation districts.

History

Water problems at Santa Barbara and the rich agricultural areas extending east and west on the coastal plain have been the subject of extensive engineering study and planning for many years. The general situation was reviewed in some detail in *Western Construction*, June 1948, page 105. The water shortage has been aggravated by the continuing cycle of sub-normal precipitation and the city is now reserving its small available storage behind Gibraltar Dam as an emergency supply and depending on the local wells for municipal service. Further, the supplies for extensive lemon groves and other high value crops have been declining to such a degree that one of the Districts has now reduced its service to irrigators to the "keep-the-trees-alive" basis.

At the request of Santa Barbara County the Bureau of Reclamation conducted a study of the county's water resources and their utilization. The study placed first emphasis on the situation around Santa Barbara. The closest supply of water is in the Santa Ynez River which lies immediately behind the first range of mountains and flows west to enter the Pacific Ocean at the town of Surf. Flow in this stream is most erratic, not only during each season, but over an extended number of years. For example, the record for 1948 indicates that surface flow did not take place at any time during the year, whereas in 1941 total flow in the stream was 478,200 ac. ft. with a peak daily discharge which reached 18,100 sec. ft. Average annual run-off is 72,600 ac. ft. from a 421-mi. drainage area.

With this characteristic of run-off the storage to be provided must allow for a holdover that can be regulated through a cycle of subnormal years. The reservoir site selected will have a capacity of 210,000 ac. ft., which is approximately three times the average annual stream flow. This storage is located about 20 mi. downstream from the Gibraltar Dam constructed by the City of Santa Barbara in 1920. Storage behind Gibraltar Dam is conveyed through the Mission Tunnel to the municipality.

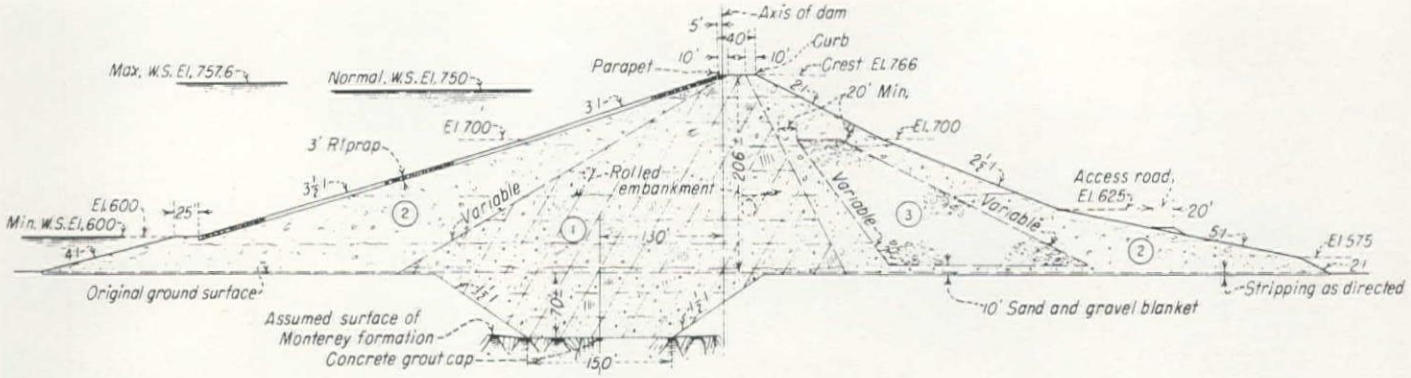
The new storage will be conveyed through the Tecolote Tunnel (see location map), with an outlet about 5 miles northwest of Goleta. From there the water will be conveyed by concrete pipe a total distance of about 25 mi. to irrigated areas and Santa Barbara.

VIEW AT TOP OF PAGE—

EXCAVATION of about 70 ft. in streambed showing two wells on the right-hand slope and sump pumps which handled the small volume of summer flow. Zone 2 fill is being placed at the extreme left. The line of the grout cap extends up slope marking center of Zone 1 contact with foundation rock.

Design of Cachuma Dam

In common with other embankment type dams, the design for Cachuma Dam represents the best and most economical use of material available in the dam site area. Exploration of borrow pits in the vicinity of the dam site indicated that materials could be found in adequate volume which graded almost exactly from finest silt to cobbles of 12-in. size and over. This permitted the design to



MAXIMUM CROSS-SECTION, indicating the following zones of the 5,800,000-cu. yd. fill: Zone 1—Selected clay, sand and gravel from borrow pit and excavation rolled to 6-in. layers. Zone 2—Sand, gravel and cobbles and oversize from screening. Zone 3—Selected material from spillway excavation rolled to 6-in. layers.

include the usual Zone 1 of impervious embankment supported on either side by the more pervious Zone 2 fill, with material of less than 3-in. size going into Zone 1 and the remainder into Zone 2. Boulders scalped at the plant will be used at the toe of the downstream Zone 2. This material from borrow pits and site excavation will be ample for the 5,800,000 cu. yd. of estimated quantity.

In plan, the structure extends about 3,000 ft. and is provided with a controlled spillway on the south side. This spillway includes a concrete lined channel about 1,400 ft. long to a discharge in the river below the dam. The spillway will be provided with four 50 x 30-ft. radial type gates and will have a capacity of 161,000 sec. ft.

Outlet works to control release of water down the Santa Ynez River from the reservoir is provided through a 7-ft. diameter tunnel extending through the south abutment and discharging into the lower end of the spillway. The tunnel extends about 700 ft. to a gate chamber and another 750 ft. to a control house with hollow jet valves. From the gate chamber to the control house the supply is carried in a 38-in. outlet pipe.

Geology of site

Typical Coast Range formations consisting of sedimentary rock of typical shale formation represent the foundation material. Most characteristic rock in the damsite area is massive siltstone. This material is similar to shale, except formed from silt deposits rather than clay and usually appears in massive layers rather than laminations. This foundation rock is exposed by excavation over the entire 150-ft. bottom width of the cut-off trench as well as in the excavation of the spillway.

To use this suitable material in the building of the dam, the design calls for an extensive section of siltstone (Zone 3) to be incorporated in the downstream pervious section. Placed in 6-in. layers, the siltstone breaks up to provide a zone of adequate weight and proper degree of perviousness. As indicated in the cross-section drawing, it is completely encased in Zone 2 material including a sand and gravel blanket 10 ft. thick over the foundation.

Another minor, but interesting geological feature exposed during excavation on the north abutment was a 4 to 5-ft. layer of unconsolidated gravel lying under a massive thickness of siltstone. Because of the small area of this gravel it was not exposed by exploratory drilling at the site, but developed when the excavation to bedrock reached this elevation on the abutment. This porous material must be removed in the cut-off trench to extend the impervious zone to complete contact with bedrock.

Elimination of cut-off wall

Another interesting feature of design is the complete elimination of any cut-off wall extending above the level of bedrock under the impervious fill. This represents the ultimate step in the elimination of a cut-off wall which has been gradually reduced in size in the evolution of earthfill dam design.

Some years ago the concrete cut-off wall extended from bedrock to the crest of the dam and represented the water barrier which was supported by fill on either side. As greater reliability was placed on the watertightness of the central impervious core, this full-size cut-off wall has gradually been reduced in both size and importance. Until quite recently it has remained in a rudimentary stage extending from a cut-off trench excavated into rock to a height of possibly 4 to 6 ft.

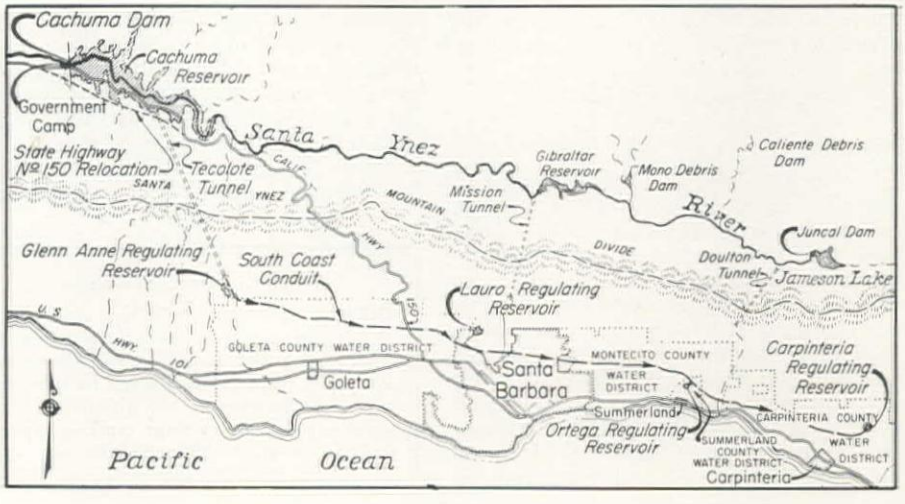
Such a cut-off wall extending through the bottom layer of the impervious fill represented an addition to the line of percolation, but also constituted a field problem in developing proper compaction next to the wall. Much hand work was required which not only represented additional cost, but also some question as to adequate contact between the fill and this concrete cut-off.

In the Cachuma Dam, the concrete cut-off wall has been completely eliminated, at least it does not penetrate above foundation rock into the fill. What is left of the cut-off is now termed a "grout cap" and is a fill in a trench about 5 ft. deep and 3 ft. wide extending along the entire center line of the dam. The purpose of this concrete-filled trench is primarily to provide support for the group pipes. These pipes are set at 10-ft. intervals in the bottom of the trench prior to back-filling with concrete. After the concrete is set holes are drilled through these pipes at staggered depths ranging from 30 ft. to 140 ft. Grouting is then done prior to the start of placing fill and the pipes cut off at the top of the grout cap. Thus, nothing remains of the concrete cut-off above foundation rock. This enables the fill to be placed across the entire foundation and compacted without resorting to hand tamping or any break in the use of standard equipment, except for minor irregularities in the rock surface.

Contractors' operations

Contract was awarded to Mittry Constructors July 1950 on a low bid of $6,722,520. Eleven bids were submitted

MAP shows features of Cachuma Project which will deliver supplemental supply from Santa Ynez River to Santa Barbara and adjacent irrigation districts. Carryover storage provided by Cachuma Dam will flow through Tecolote Tunnel to South Coast Conduit.



and the complete tabulation of bids and unit prices appeared in *Western Construction*, September 1950, p. 118. One of the features of the bidding was the recent change in Bureau of Reclamation bid form, which requires the contractor to bid on a specific amount of each type of fill, with a supplemental bid for any additional amount of this same type of material. For example, specifications required contractors to bid on the first 1,500,000 cu. yd. of Zone 1 fill and to bid separately on any fill over this fixed amount. The purpose of this plan is to allow contractors to apply their fixed charges to the specific amount of fill, leaving only labor and material charges for the additional quantity. Most of the contractors allowed such a differential, although the low bidder did not make any difference in the fill for Zone 1. On the other hand, the low bid for Zone 2 was 8c per yd. for the first 1,400,000 cu. yd. and 4c for additional material in this zone.

Towns adjacent to the site and an excellent state highway made it unnecessary for the contractor to provide any camp at the site. Extensive shop facilities have been erected for the servicing of the large fleet of equipment. Major units of this equipment fleet are indicated in the accompanying table.

In general, contractor's work has followed rather standard practice, with excavation carried out with shovel or dragline loading into a fleet of Euclid wagons. The site was cleared of river debris down to suitable foundation for the pervious zone (Zone 2) and filling begun at once in this area. This material is placed in 12-in. layers including everything up to 12-in. cobbles and is completely saturated by sprinkler truck as placed. The specifications require each 12-in. layer to be compacted by four complete passes of a crawler-type tractor weighing not less than 40,000 lb.

At the present time this fill is well advanced, using both excavation from stream bed through the Zone 1 area and from upstream borrow pits. As excavation advanced in the spillway section, the siltstone was deposited in Zone 3 to maintain the height of this zone as Zone 2 was expanded.

Excavation to bedrock in the Zone 1 area with further excavation for the grout cap has been extended on both abutments and down to a narrow channel in the center of the stream bed. Grouting has been completed on the south abutment and the start of placing Zone 1 fill took place on May 24 as indicated. This zone will be spread and rolled in 6-in. layers.

Control of water

Aside from the possibility of flash floods during the winter months, the contractor did not have to be concerned about the water problem. Surface flow is zero during the summer months, without exception. To handle the underground flow the contractor drilled five wells and installed five turbine pumps connected to pipe headers extending to the downstream toe of the dam. These wells are located in the river bed, three at the upstream toe of the dam and two at the downstream edge of Zone 1. In addition, four sump pumps were provided for pumping directly from the excavated trench, only two of which were ever operated at one time. The water extracted from these five wells has been adequate to un-water the site down to the lowest foundation level. In fact, frequently two pumps are all that are required and the volume of water handled during the summer has not exceeded 2,800 gal. per min. Present program for placing fill indicates work will be advanced beyond flood danger by the next winter season.

FOR SEPARATING Zone 1 and 2 material as excavated from the borrow pit, this plant contains a double vibrating grizzly with 3-in. spacing. The minus 3-in. will go into Zone 1. A sprinkling system below the grizzly provides for moisture control.

Screening plant

Specifications selected the 3-in. size as the distinction between Zone 1 and Zone 2 material. To carry out this screening process for several million yards of fill, the contractor has built a plant with a capacity of 1,000 cu. yd. per hr. Essential feature of this plant is the double set of vibrating grizzlies with 3-in. spacing between bars. Material is divided into two types at this 3-in. dimension.

Equipment in Use at Cachuma Dam

20	Euclid 13-yd. bottom dump wagons
6	Euclid 11-yd. end dump wagons
15	Euclid 17-yd. bottom dump wagons
3	Lima 1201 shovels and draglines
1	Northwest 80D shovel
1	Northwest Model 6 shovel
1	Lorain 802 shovel
1	Northwest Model 25 backhoe
16	Caterpillar and International tractors
3	5,000-gal. water wagons
3	Specially built sheepsfoot tampers
	C. S. Johnson concrete batch plant
	Several electric generator sets
	Motor patrols

Raw material from borrow pit or excavation is delivered by the Euclids through a primary grizzly of 12-in. size. Except for the small number of larger boulders rejected by this primary grizzly, all the material is fed onto two 42-in. belt conveyors and elevated to the top of the screening plant. The material then passes through the double sets of 3-in. vibrating grizzlies into the two hoppers for reloading. To assist in regulating moisture for the Zone 1 material a water spray has been added at the underside of the grizzly. Depending on the moisture of material arriving from the borrow pit, supplemental water will be added at this point in an effort to reduce sprinkling on the fill to a minimum.

Because the screening is carried out with grizzlies as compared to square mesh, some of the material going into the minus 3-in. bin is in excess of this dimension. Some readjustment may be required in connection with this situation.

Operation of this plant will be stepped up as area becomes available for Zone 1 fill. At the present time the contractor has additional hauling units available to operate the screening plant at maximum capacity, with one fleet hauling from pit to plant and the other fleet hauling from plant to fill.

The final placing of material will be the 3-ft. thickness of rip-rap on the upstream face of the dam. This material will be quarried at a distance of 3 mi. from the site and a construction road will be required to be built to this quarry.

Organization

The Cachuma Dam project is being carried out by the Bureau of Reclamation under the immediate direction of E. R. Crocker, Project Manager, with headquarters at Goleta. L. N. McClellan is Chief Engineer of the Bureau of Reclamation. Richard E. Burnett is construction engineer for the entire project and A. M. McClure is resident engineer at the site, with Emile P. Bachand chief inspector in charge of the fill operations.

Mittry Constructors' operations are under direction of the following staff: F. K. Mittry, project manager; F. K. Mittry, Jr., assistant project manager; O. K. Mittry, superintendent; Robert McAtee, project engineer; Jim Morton, office manager; and P. O. Carver, tunnel and concrete superintendent.

Forest Service Builds Dams of All Types for "Upstream Engineering"

"UPSTREAM ENGINEERING," which is the flood control term applied to stabilizing channel side slopes and retaining bed load, provides an opportunity for the application of modern materials and construction procedures. An unusual example of this type of work, which is an attack on a typically Western problem, is the program carried out during the last several seasons by the U. S. Forest Service in the upper watershed of the Los Angeles River. Such a program of small channel structures is usually supplemented by vegetative treatment of the side slopes.

Objectives are long range

This type of program is naturally more costly than one designed to merely detain debris or flood waters in downstream reservoirs. However, it is directed at a longer range objective than is the usual case in downstream basin construction. The need for economy is apparent when such a program is analyzed by the usual formula of "cost benefit ratio" currently being used in determining the feasibility of such works.

There is considerable precedent in upstream engineering both in this country and abroad. "Torrent control" as it is called in the French and Swiss Alps is a classical example. However, in the Los Angeles area itself there are already many examples of similiar works put in by the Los Angeles County Flood Control District and the U. S. Forest Service.

Lessons in barrier construction

One such approach to the channel barrier construction problem is the wire-bound rock basket structure. Numerous barriers of this type were built in the Los Angeles drainage areas during the early days of flood control work. Many of them are still standing, but a large percentage were destroyed in the floods of 1938 and 1943. Much has been learned about this type of construction and reasonably long lived structures can be built. The high cost of labor at the present time militates against this form of channel barrier.

The conventional approach in Europe is the rock masonry type of construction. This is an economical type where labor costs are low and suitable building material is available in the stream channels, but is costly if rock and aggregate must be imported. Some dams of this type have been built by the Forest Service under the current program — also some appurtenant works are of masonry construction.

Conventional concrete construction involves the importation of large quantities of aggregate, and is costly unless roads are located reasonably close to the site. Arch dams are particularly well suited to barrier construction because of the small volume of concrete required. Such a dam is shown in Fig. 1.

Tests with soil-cement

Soil cement has been used in a number of the barriers. The Forest Service has had long experience in building structures of this sort. As long as 17 years ago road drainage aprons were constructed in the San Bernardino Forest. Today these structures appear to be in excellent condition. First attempts at soil cement construction, using native

FIG. 1—Conventional concrete dam arched to reduce required volume of concrete.

FIG 2—Gravity dam of soil-cement (cement proportion slightly more than 10%).

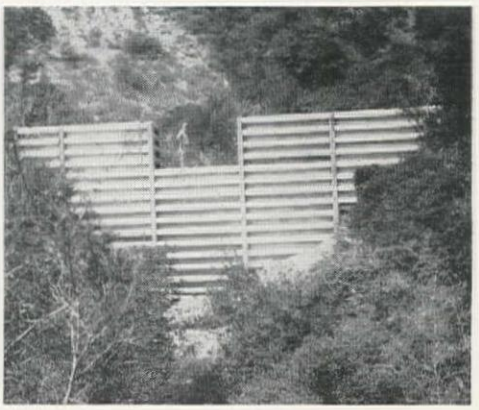


FIG. 3—Metal bin-type dam filled with tamped earth and tilted slightly upstream.

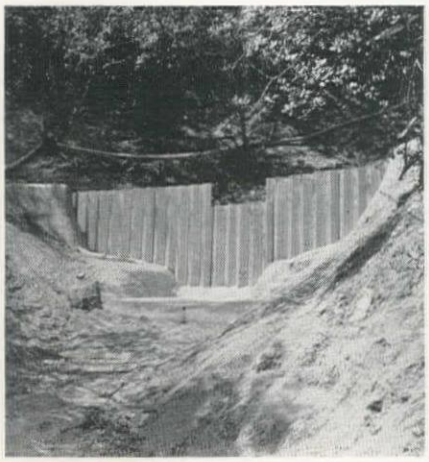


FIG 4—Dam of Armco-sheet piling set in soil-cement in excavated trench.

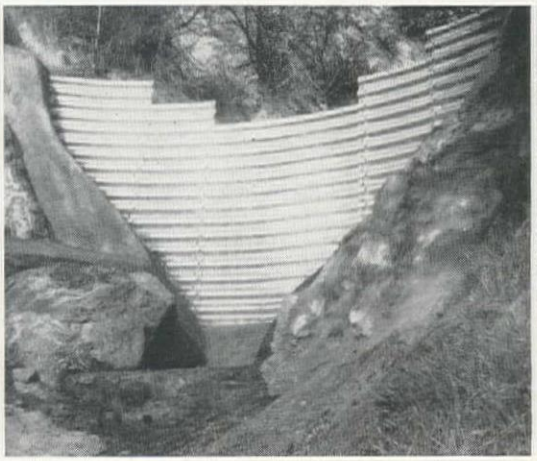


FIG. 5—Multiplate arch with rammed soil-cement abutments and stilling basin.

FIG. 6—"Horse-trailer" dam of compacted earth with corrugated metal spillway.

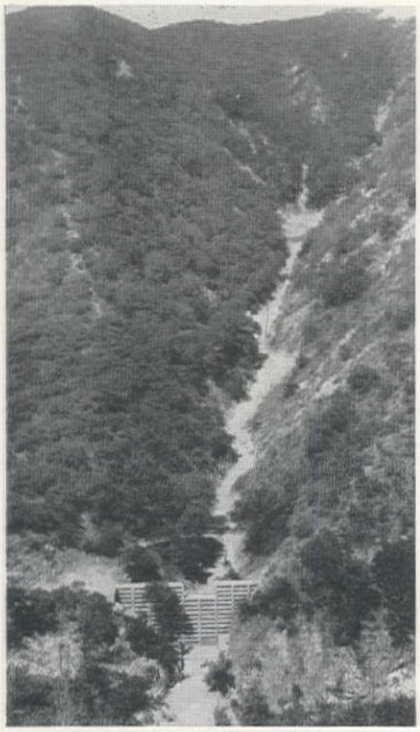


FIG. 7—Rock-filled timber crib structure (foreground) is about 25 ft. high. Also note two other structures upsteam illustrating the plan of barrier construction in such channels.

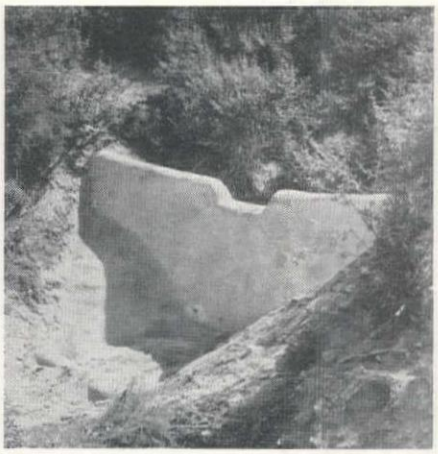


FIG. 8—Thin-arch dam built up by gunite over reinforcing mesh.

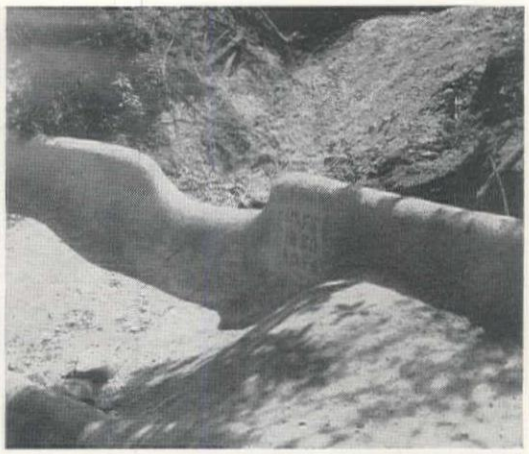


FIG. 9—Small gravity dam built up by gunite without forms of any kind.

decomposed rock material and hand tamping, were not too encouraging from a cost standpoint. However, the use of pneumatic tampers and a mortar mixer for combining soil and cement reduced cost practically one third. This reduction in cost is also attributed to the increased skill of the workers and the elimination of forms except for a backing form. A gravity dam of this type of construction is shown in Fig. 2. Soil cement with as low a proportion as 10% cement showed compressive strengths of over 2,000 psi. The weakness of soil cement is its medium resistance to abrasion. However, flood flows are infrequent and abrasion may be corrected readily by guniting spillway aprons.

Use of metal shapes

Light metal shapes were also employed in dam and revetment construction. Armco metal bins, sheet piling, multiplate arches, and other corrugated shapes have been used according to site conditions. These light metal shapes proved economical since transportation of materials was one of the difficulties of the job. Metal bin type dam construction is shown in Fig. 3. This dam is about 12 ft. high to spillway level. It is filled with tamped earth and tilted upstream at a slight angle from the vertical. Dams up to 16 ft. in height were built of these materials.

A multiplate arch with rammed soil-cement abutments and stilling basin is shown in Fig. 5. This is a very economical type of dam where site conditions are favorable, and appears practical up to about a 15-ft. height without additional stiffening members. Metal of #7 gauge thickness was used in these structures. Compressive stresses at abutments were accommodated by angle members bolted in the multiplate sections.

Another steel shape used was Armco sheet piling, as shown in Fig 4. It was not possible to drive this piling at sites where solid rock was encountered, and a trench was hacked out and the piling set in soil cement. Soil cement abutments were also used. Most of the so-called solid rock in this drainage area is a soft diorite which weathers readily upon exposure to the air, and is comparatively easy to cut with usual digging tools. An unusual structure using a combination of round and flat plates (Fig. 6) is locally referred to as the "horse-trailer dam." This dam is built of compacted earth with a corrugated metal spillway. The corrugated metal is held in place with anchors embedded in the embankment.

Pre-cast concrete cribs

In addition to the metal structures many others were built of pre-cast concrete crib members. This type of structure was limited to sites where a large quantity of rock was available. Fig. 7 shows a rock filled concrete crib approximately 25 ft. in height. It can also be noted (Fig. 7) that two other structures are located upstream from the rock crib illustrating the plan of barrier construction in such channels. One common occurrence in the upstream channels of the Los Angeles River are the debris slides which form temporary channel blocks. When flood flows occur the lower part of the slide is washed away and the slide continues to feed debris to the flow until slide materials are exhausted.

Gunite proves feasible

One of the most feasible construction materials for these structures was found to be gunite. Dams of thin, as well as thick, gravity sections were formed of this material. Also appurtenances to earth- and rock-fill dams were constructed of gunite. It was found that gunite could be transported by pumping up steep channels a distance of about 1,000 ft. from the mixer, which greatly simplified the problem of material supply. Also novel methods were to reduce or eliminate the need for form work. Structures constructed by this method were found to be far less costly on a cubic yard basis than was either soil cement or conventional concrete. Also much thinner sections were possible since compressive strength as high as 8,000 psi. was developed.

A thin arch dam built by gunite methods is shown in Fig. 8. This dam was built by first forming reinforcing mesh in the desired arch shape and cementing it into the abutments and base by gunite. The arch was then built up by using a movable shield to buck up the gunite gun. Dams up to 12 ft. high were built by this method.

Because of the low cost of mass gunite, several small gravity dams were built by this method without forms of any kind, as shown in Fig. 9. A variation of this type of construction is to lay up rocks and gunite the voids.

Gunite was found to be very practical for lining spillways over earth dams. The usual method was to lay a base of loose rock over which reinforcing mesh was laid. Gunite was then applied to form a blanket of the desired thickness. Such a spillway is shown in Fig. 10 for a dam which is a combination earth and rock fill. It is built at the outlet of one of the canyons given stabilization treatment, and the amount of debris discharge as well as maximum flows will be measured here. Note the corrugated structure to the right of the spillway which houses the recording gauge.

A few other types of barriers and sills have been built. Fig. 11 shows a dam constructed of 12 x 12-in. precast concrete members anchored in soil cement. Fig. 12 is a corrugated apron spillway over an earth dam. Note the brush wattles where vegetation has been planted to stabilize earth slopes.

Materials transportation a problem

Transportation of materials is a major problem on projects such as this. Use of construction roads is not feasible in most instances except in the larger channels, and the handling of materials has been carried out by cable-highlines, tram, and even by air. The low-barrier type of treatment is only one phase of the channel program carried on by the U. S. Forest Service in this Los Angeles River watershed. One of the early proj-

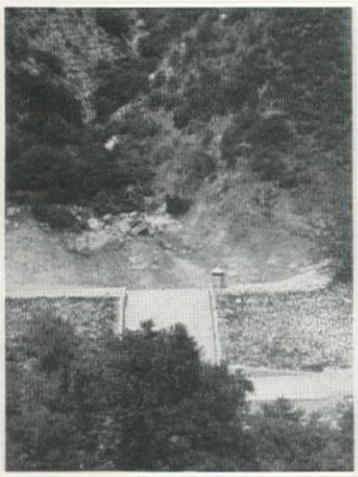


FIG. 10—Gunited spillway on loose rock and reinforcing mesh.

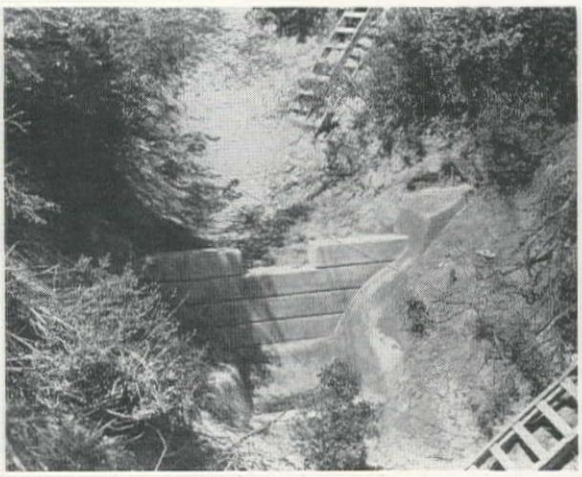


FIG. 11—Dam constructed of 12 x 12-in. precast concrete members anchored in soil-cement.

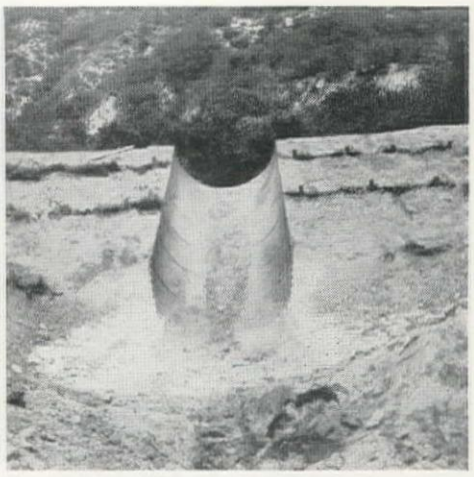


FIG. 12—Corrugated apron spillway over an earth dam.

ects constructed was the 85-ft. Brown Canyon Barrier, which was completed a few days before the 1943 flood, and the basin practically filled by the one run-off. This type of structure is applicable to major drainages where a combination of debris storage, bed load retention and side slope stabilization is feasible.

The upstream program of the Forest Service is not in conflict with that of the Corps of Engineers or with that of the Los Angeles County Flood Control District which handle the downstream phases of flood control—rather it is complementary. The program in the upstream channels is designed chiefly to hold soils and bed loads in place, insofar as is practical, and thereby extended the life of the downstream structures. A number of benefits will also accrue from the standpoint of providing more usable water from upstream drainages by retardation of runoff.

The Forest Service is one of the agencies of the U. S. Department of Agriculture engaged in flood control works designed to stabilize the watersheds. The Soil Conservation Service also works in this field, their work being directed chiefly toward improvement on the agricultural lands.

Information for this article was made available by J. J. Byrne, Regional Engineer, California Region, U. S. Forest Service, with headquarters in San Francisco.

Jim Fogg on Big Australian Project

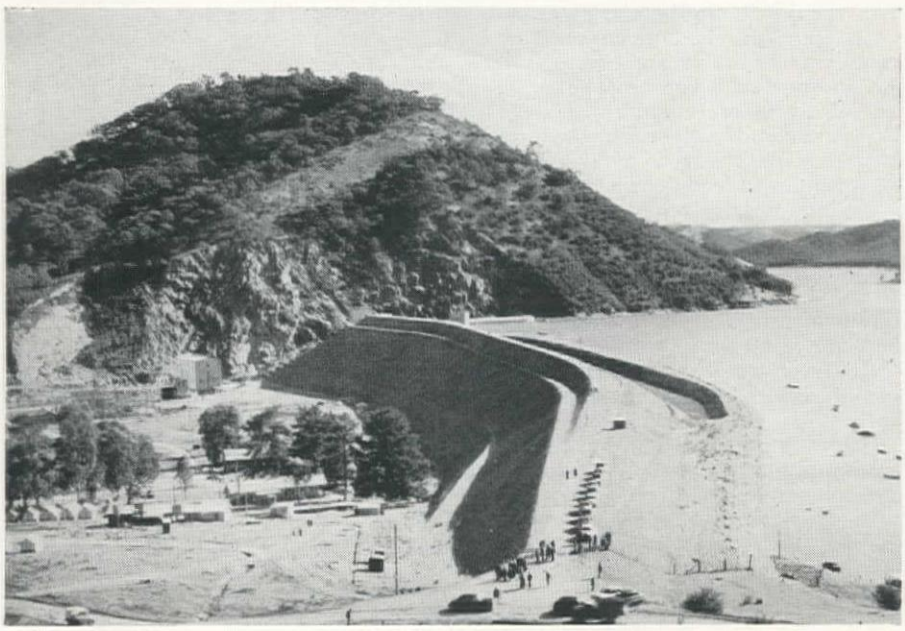
ON JUNE 15 work started on the Eildon Dam in Australia which is under contract to the Utah Construction Co., with work under direction of J. D. Fogg as project manager. The project is being carried out by the state government of Victoria under the general supervision of the State Rivers & Water Supply Commission. The dam, which will be the largest in the Southern Hemisphere, is scheduled to cost about £12,000,000 and is part of a £50,000,000 water conservation program.

According to local reports, the structure will be an earth embankment 260 ft. high and 2,600 ft. long. It will double the state's water storage and increase hydroelectric energy from 16,000 kw. to 120,000 kw. Volume in the dam is reported to be 13,000,000 cu. yd. of earth and rock fill. Jim Fogg, who is well known to contractors and construction men throughout the entire West, has about twenty-five American technicians with him to train Australians in the use of present equipment. Paul E. Hatch is Fogg's principal assistant. Construction period is estimated at less than five years.

John L. Savage, formerly chief engineer of the Bureau of Reclamation, was consultant on the design of Eildon Dam.

According to the local Australian newspaper, Jim Fogg stated, "We are issuing vacuum flasks to save time during morning and afternoon smokes." Readers of *Western Construction* are free to translate this expression into appropriate terms.

SITE of Eildon Dam is 88 mi. from Melbourne, Australia. The new embankment will cross the valley (left-hand side of photograph) behind the present Eildon Weir (right). New water level in the reservoir will be considerably higher than the top of the weir.

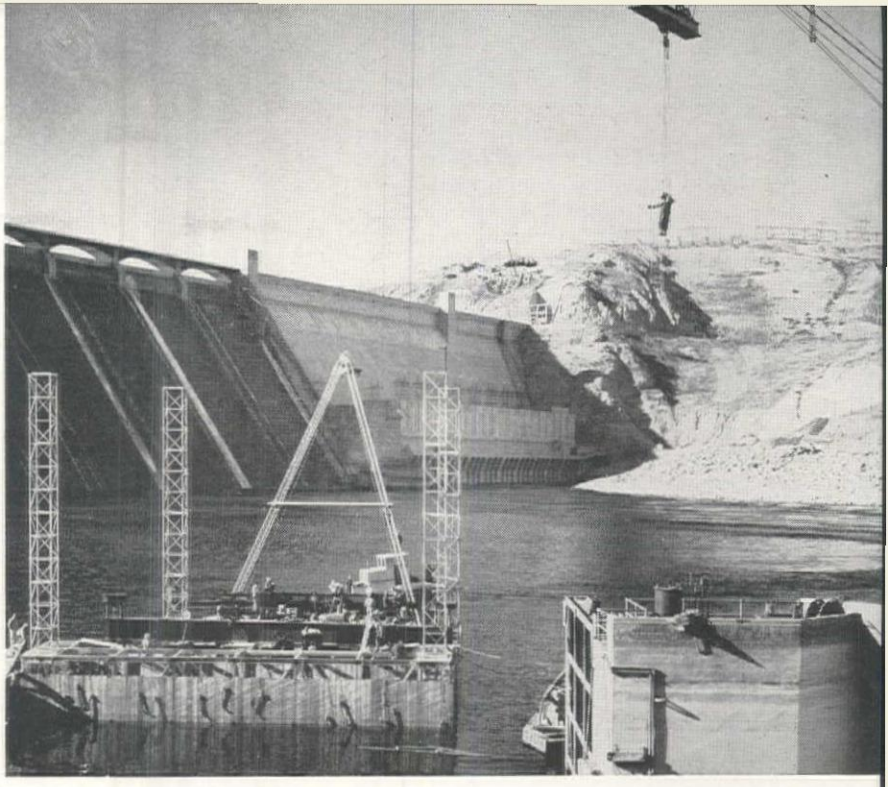


Alaska's First Public Works Project Completed

THE COMPLETION of 2,600 ft. of sewers and graveled streets in Juneau marks the end of Alaska's first public works project. This is one of 14 projects started under a $9,000,000 public works program financed jointly by local agencies and the federal government.

The $4,036,600 work now in progress includes construction of a Juneau public library, school construction in several cities and street, sewer and building repairs. Plans are in preparation for 15 projects which will total $3,366,950.

Beginning in 1950, a five-year public works program in Alaska costing $70,000,000 got under way. The entire program is aimed at continuing and encouraging the growth of population in the territory.



Working 70 feet below tailwater surface, forces of the Pacific Bridge Co. are carrying out their second contract for repair of eroded concrete in the spillway bucket of Coulee Dam

Use of Special Equipment for

Spillway Repairs at Grand Coulee

By GLENN R. BURROWS
Assistant Office Engineer
Residency No. 5
Bureau of Reclamation
Coulee Dam, Washington

EROSION of the spillway bucket at Grand Coulee Dam in Washington is being remedied by the Pacific Bridge Company on its second contract for spillway maintenance, using novel equipment designed by the Bureau of Reclamation. Though noted for the seasonal regularity of its high and low flows, the Columbia River peaked twice during the past winter working season, causing considerable loss of time and hazard to these maintenance operations. Despite the delays, work has proceeded vigorously and the contractor expects to complete in two years a three-year contract awarded last September.

Floods increase damage

Designers of the dam had anticipated erosion at the toe and before the dam was completed were considering means of accomplishing its rehabilitation. Damage was greatly accelerated during construction, however, by material being deposited in the spillway bucket and eroding it under action of powerful eddy currents, particularly during the flood season of late spring. These eddy currents were the result of unsymmetrical spillway flows necessarily occurring in diversion of the river as the dam was built. The first actual inspection of the bucket by divers, in March 1943, disclosed that serious wear had taken place in some sections and that large quantities of riverbed material, including boulders, overlay other areas. To prevent further damage, a dredging program was initiated and carried over a number of years, removing this material and also all material down to bedrock for a distance of 300 ft. downstream.

Of several methods possible to accomplish actual repair of the bucket, the use of a floating caisson was deemed the most feasible. Accordingly, the Bureau of Reclamation had in previous years designed and had built special equipment for the job. The four main items are: the floating caisson, the steel frame for seat construction, the face caisson, and the circular drydock. The latter is a reinforced concrete structure 163 ft. in diameter, used for construction, repair, and storage of the other items.

The floating caisson is a maneuverable, self-contained assembly of structural steel which, when sunk in place, provides an unwatered working area over the spillway bucket 50 by 135 ft. It consists primarily of two parts: the caisson, which can be lowered to rest on and fit into the bucket section; and the barge, which contains hoisting machinery. The bottom edge of the caisson has two parallel rubber strips, each 6 in. thick and 12 in. wide, to form a watertight seal with the concrete surface. Four steel shafts 7½ ft. in diameter extend above the river surface at all times; one contains a passenger elevator, two others have pumps and related piping and controls, and the fourth provides access for construction materials. Through these shafts also air is circulated at atmospheric pressure to the working chamber. Buoyancy and trim tanks are located amidships.

In surface trim the caisson's well-deck construction and its four shafts completely confine the barge (see illustration). The two units of the assembly are connected by multiple parts of wire rope. Total capacity of the hoisting winches on the barge exceeds 1,000,000 lb.

PICTURED AT TOP OF PAGE—

MOVING from drydock to the dam spillway, the steel frame for construction of caisson seats is suspended from beams cantilevered across a special barge. Tongue-and-groove form sheathing of the end section seen here will be driven down to the eroded concrete when the assembly is sunk at the spillway.

Seat frame

The steel frame for seat construction was designed to restore portions of the eroded area to their original contour, as the caisson cannot be adequately sealed by lowering it directly on the worn surface. The seat frame consists primarily of two structural steel side girders with bottom skin plates five feet wide, and an end frame all held together by suitable bracing. At the upstream end is an A-frame for attachment to anchors on the dam face to control lateral orientation of the seat frame in the spillway bucket. Towers at the four corners project

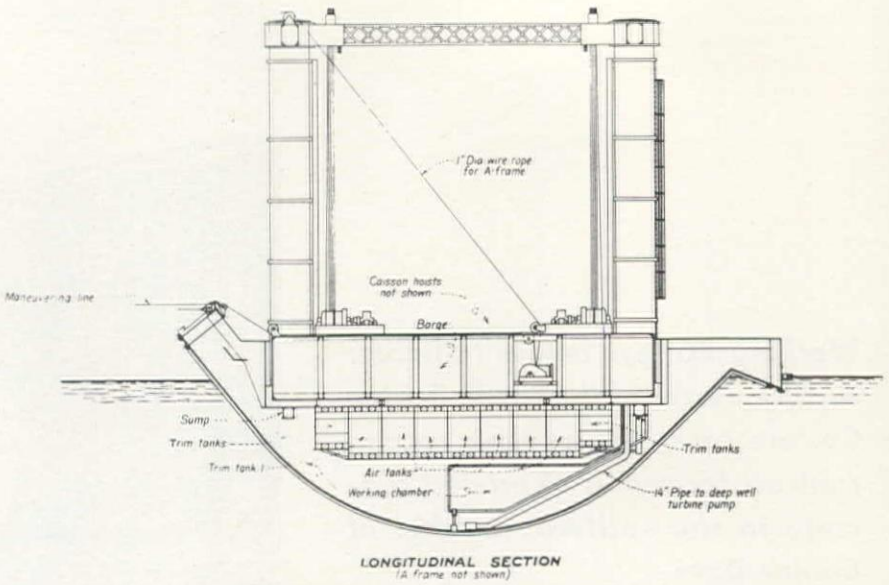
above the water surface when the seat frame is in position and are used as references for exact vertical adjustment.

The face caisson was built to dewater for repairs those areas on the spillway face below tailwater which cannot be handled from the floating caisson. The face caisson is fabricated of structural steel with inside working-chamber dimensions 53 by 58 ft. It is a buoyant vessel equipped with tanks and pumps enabling it to be towed to position and sunk into place. As with the floating caisson, the lower perimeter has rubber seals for sealing the working area. The upper end is open and extends above the river surface. An A-frame is provided to anchor the caisson against the dam.

Previous work

During the Pacific Bridge Company's first contract, five of the 33 blocks in the spillway section were successfully repaired, three of them with the floating caisson. Using the seat frame as a template, further surveys were conducted on the remaining blocks. Sections were taken at joints between blocks, at centers of blocks, and 5 ft. from the joints of odd-numbered blocks. Divers were employed to take vertical measurements from the seat frame skin plate to the eroded concrete surface at 5-ft. stations along each section. A specially designed caliper was used for variations to 1 ft., while for greater distances a steel tape and plumb bob were employed.

Results of this survey indicated that repairs were warranted in the bucket section of ten more blocks. (A separate survey by divers showed that three more blocks should be repaired with the face caisson.) Eight of the ten blocks could be repaired using the floating caisson; the other two are at the ends of the spillway section next to the training walls. As caissons cannot be utilized for their repair, rubber-covered steel wearing plates were designed for permanent installation in them.



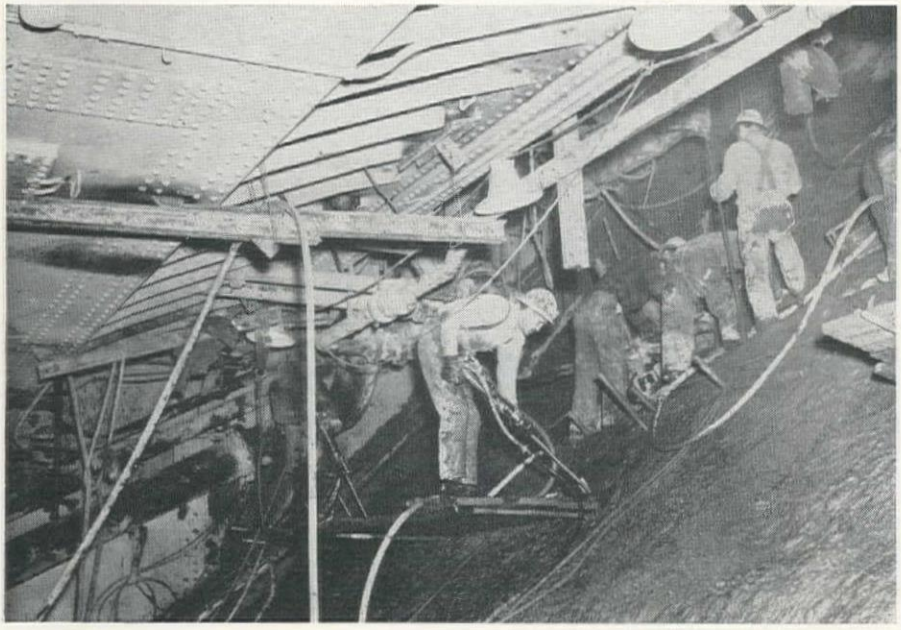
LONGITUDINAL SECTION
(A frame not shown)

CONTOUR of spillway bucket is duplicated by shape of floating caisson. Working chamber spans entire arc of bucket. Four towers provide access for men, materials, and air.

At the beginning of the second contract the drydock was flooded and the floating caisson maneuvered to the spillway face by means of cables attached to specially designed winches on each river bank and on the gantry bridge decks of the two powerhouses. At the spillway face the caisson was moved laterally until over the first block to be repaired and was lowered into place. Divers cleaned the concrete seat surfaces prior to final contact and inserted additional sealing materials where necessary. After final positioning the barge was raised to afford additional bearing on the seals. Dewatering of the working chamber generally took from three to five hours before it was accessible for workmen to bring in construction equipment and begin operations.

Repair of each block consists of removal of the eroded concrete to a minimum depth of 18 in. in all areas where erosion over 1 in. has taken place. Concrete is excavated by line drilling a series of holes parallel to the surface and breaking out the concrete in blocks with hydraulic rock jacks. Dowels of ¾-in. reinforcing steel are grouted in holes drilled 30 in. deep and spaced at 3 ft. in horizontal rows, the rows 18 in. apart and the spacing staggered between them. A mat of ¾-in. reinforcing steel on 18-in. centers is tied to the dowels at a depth of 5 in. below the finished concrete surface. A special wear-resistant concrete mix using high early-strength cement is supplied from a 40-cu. ft. pugmill type mixer mounted on a barge moored to the caisson. Replacement concrete is delivered to the working chamber in a concrete bucket through the materials access shaft. For the upper pours the concrete is transferred directly into buggies on a temporary suspended platform for delivery to the pour. For pours farther down in the bucket section, the concrete empties into a chute gated at temporary lower platforms from which it is transported to the pour by buggies and portable chutes.

PREPARING for placement of new concrete, excavation progresses at atmospheric pressure in the 50- x 135-ft. working chamber of the floating caisson, sealed against the spillway bucket 70 ft. below tailwater surface.



Finished bucket surface

When all pouring is completed, the area of eroded concrete just upstream from the replacement concrete is ground smooth, using a mill grinder with a carborundum grinding roll 2 ft. long and 12 in. in diameter to achieve an even transition between the old and the new concrete. For the four blocks repaired during the past working season, an average of 35 calendar days was required for each. Average quantities were 201 cu. yd. concrete excavated and 309 cu. yd. replaced. The last block was completed March 5 and the caisson returned to drydock the following day. Had not the river's rise interfered, the contractor could have repaired another block as had been his intention.

In order to prepare seat pads for additional caisson settings, operations with the seat frame proceed simultaneously. The seat frame is assembled on a special temporary support in the drydock. To

minimize underwater work as far as possible, tongue-and-groove form sheathing along the sides of the skin plates is installed at this time together with grout pipes and support jacks. The drydock is then flooded and a barge, approximately 40 by 60 ft. is floated into place between the towers of the seat frame. This barge is equipped with two large I-beams and cables and hoists for handling the seat frame. The cables are attached, the seat frame lifted, and the barge with seat frame suspended is floated to the spillway face. This method of assembly was devised by the contractor for a saving of much time and expense, the seat frame having originally been designed under the assumption that it would be assembled under water by divers at the location for operation.

Positioning seat frame

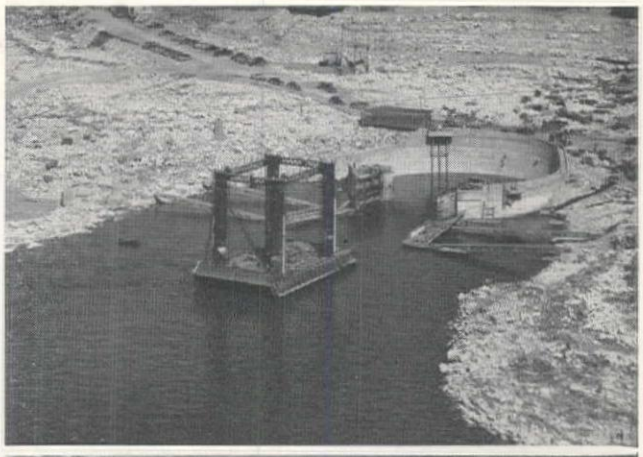
The concrete surface to be covered by the seat pad is next cleaned by divers using high pressure jets and the seat frame lowered into place. Divers direct the positioning of the frame and engineers check the elevation by level readings on the top of the towers. Ballast crates are placed to weight the frame down and the sheathing driven down to the eroded concrete surface. Various bottom-sealing materials were tried: partly filled bags of grout, ropes of oakum and folded burlap. The last, nailed to the bottom of the sheathing before driving, has proved the most satisfactory. For points requiring additional caulking, a quick-setting mixture of a sand-cement grout mixed with Tricosal is used.

The grout-mixing and pumping equipment is mounted on a barge and includes a Winslow Binanbatch aggregate batcher for batching the sand and four grout mixers which discharge into an agitator to which the suctions of four duplex piston pumps are attached. A crawler crane with clamshell bucket is used to charge sand bunkers and move cement from the materials barge to the mixing barge.

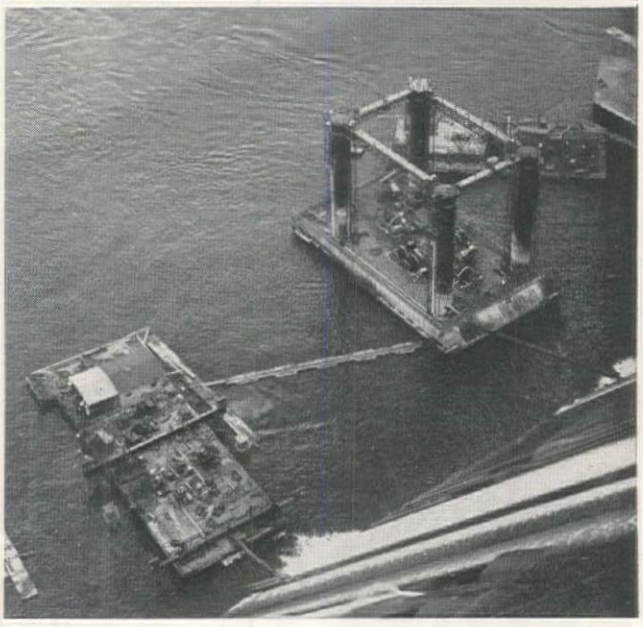
Pumping of the grout is carried on continuously insofar as possible, beginning at the invert of the bucket and alternating from side to side as the form filled. After the apex is reached, grouting of the end section across the apron is accomplished. Pumping proceeds slowly: too fast a rate builds up hydraulic head and aggravates leaks through the forms. Regardless of the best efforts to seal the forms, much leakage has occurred; in most pads, approximately twice as much grout has been pumped as was required to fill the void.

Raising seat frame

After removal of ballast crates and loosening of sheathing, the bond between the skin plate of the seat frame and the concrete seat is broken by water pressure and the seat frame raised to the surface. Generally the seat frame is brought into the drydock in preparation for the next setting. For those blocks where only an end frame pad is required, such preparation could be done in the spillway bucket area.



AFLOAT outside the circular drydock, the floating caisson is towed toward the dam by cables from winches on shore.



SUNK into position, the seat frame (left) shows only two towers and its anchoring A-frame above water. The floating caisson is being accurately positioned at right.

For shallow operations the face caisson is pushed to the spillway by a "sea mule" tug and aided into position over the block to be repaired by a derrick barge. Pulling-in and lateral control lines are attached to anchorages on the face of the dam and the caisson tilted part way toward the slope of the spillway by admitting water to the lower ballast tank. When in the proper lateral and vertical position the "A" frame is attached to the anchorage and additional water pumped into the lower tank, tilting the caisson flush with the face of the dam. Dewatering is accomplished by pumping out the working chamber. In most instances, the eroded surface is uniform enough so that the extensive use of additional sealing material is not required.

Face caisson access

The open upper end of the caisson provides access to the working chamber for workmen, equipment and materials. Specifications for the excavation and replacement of concrete are the same for areas repaired under the face caisson as for those under the floating caisson. All three blocks specified for repairs under this contract were completed during the past working season.

These special items of equipment have proved eminently satisfactory and have accomplished most successfully the purposes for which they were designed.

The wearing plates, previously mentioned, are of 5/8-in. steel plate with a facing of 7/8-in. rubber bonded to their upper surfaces. The plates are rolled to conform to the radius of the spillway bucket and extend from the beginning of the bucket radius at the upstream end to the apex of the bucket toe. The plates have a developed length overall of 102 ft. and average approximately 18 ft. in width. For ease in manufacture and handling, each plate is divided into 13 sections. Adjustment screws are provided to set the plates to proper line and grade in the spillway bucket. Anchors will be grouted in place to hold the plates after setting. Removable grout pipe assemblies will be used for grouting between the eroded concrete surface and the under side of the plates.

As mentioned earlier, work has been interrupted twice by unusually high river flows. One rise occurred just at the conclusion of both a floating and a face-caisson repair operation, and while work was in progress sealing the bottom of the seat frame. In this instance almost two weeks elapsed before operations could be resumed. The second interruption came during preparations for a setting of one side frame and required that the seat frame be brought into drydock. Because of the possibility that the river flow would require moving the floating caisson into drydock, also the

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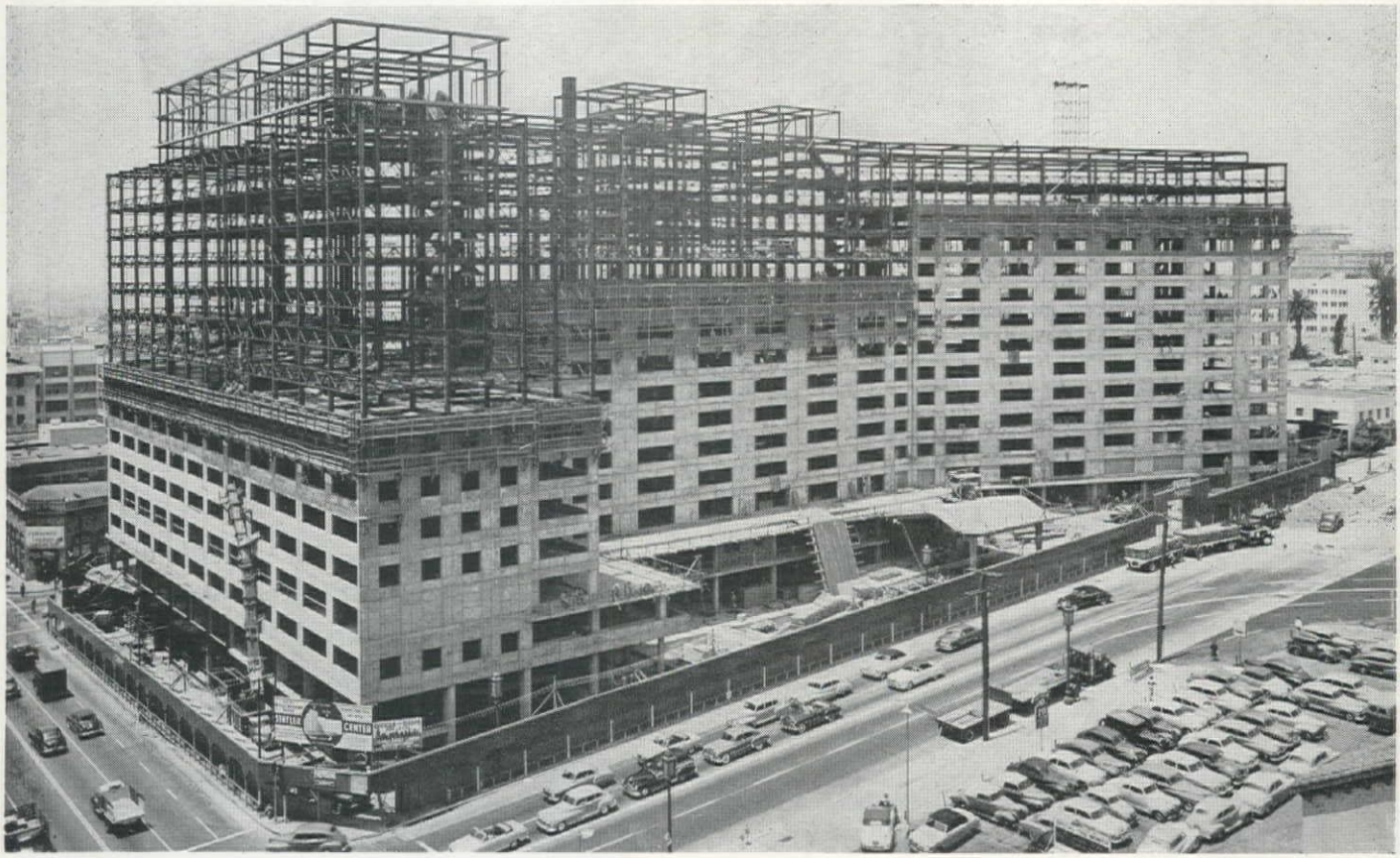

Photo Tunick & Tunick.

Lightweight Aggregate Volume Tops Records on Statler Building Project

Over 35,000 cu. yd. of lightweight concrete used to effect economies for combined hotel and office building project — Daily pours are about 300 cu. yd. from plant erected on site

ONE OF THE LARGEST volumes of lightweight aggregate used for a building project in the West is represented by the 35,000 cu. yd. of concrete now being placed in the Statler Center project in Los Angeles. This combined hotel and office building, which contains 7,500 tons of structural steel in its frame, will have about 25 acres of floor area and a total enclosure of 14,000,000 cu. ft., making it the largest single building project to be carried out in the West since the war. The general contract was awarded to Robert E. McKee, General Contractor, Inc., Los Angeles, Calif., by the Hotel Statler Corporation, and completion is scheduled for May 1952. General architectural features of the structures are outlined on the next page. The following review is confined to the field operations in designing, mixing and handling the large volume of lightweight concrete.

Concrete elements in the building

The structure below street level is mainly of conventional sand-gravel concrete, furnished and delivered as ready-mix by Graham Bros., Inc. However, all concrete above street level is of lightweight type, including fireproofing of the steel frame, floor and roof slabs, exterior walls and some interior walls. Typical floor slab is two-way reinforced concrete, 6 in. thick. supported on beams of the frame. Top and bottom deformed bar reinforcement is used. Typical bay dimensions are approximately 23 x 16 ft. for hotel and 22 x 18 ft. for office sections. Encased lower columns are 14 to 16 in. square, which reduces to 14 x 8-in. section at upper levels. Architectural concrete walls are 8½ in. thick.

Important considerations influencing the use of lightweight concrete include the reduction of dead load, which has marked effect on design requirements for both vertical and lateral forces, and which permits considerable saving in tonnage of steel frame members.

Located on Wilshire Blvd. at Figueroa St., just outside the business center of Los Angeles, the problem of delivering steel and concrete to the 3-ac. building site was an important consideration. After erection of the steel frame had advanced sufficiently to allow unrestricted area for concreting, the contractor planned a schedule which called for placing an average of 200 cu. yd. per day, with a usual single day requirement of 250 to 300 cu. yd. This fast schedule was essential in meeting the rest of the building program.

Translated into truck-mixer loads, this would have required a fleet of trucks moving in the downtown area which might reach a rate of 12 to 15 per hr. The uncertainties in connection with such a concrete delivery schedule caused by traffic delays with resulting disruption in the concrete placing routine forced the decision to establish batching and mixing facilities at the site. This decision was influenced by the city announcing that concrete or aggregate delivery to the site should be made as far as possible during night hours.

This proposed restriction raised the

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LOCATION of the hoisting tower at the right-rear shows the length of travel for the motor buggies in pouring the lightweight concrete. The area was divided into eight pouring areas, each of which provided for a day's pour of almost 300 cu. yd.

problem of providing enough aggregate and cement storage at the site so that night deliveries would be adequate for the day shift in mixing and placing. Though it was found impracticable to follow this procedure, and actually aggregate deliveries were handled during 20-hr. periods per day, the plant facilities described proved satisfactory for the method of operation actually adopted. To work out the details for a bin and batching plant, the contractor turned over design problems to C. S. Johnson Co. The plant they designed and built at the site has the following general features.

Batching and mixing plant

Major feature of the installation is a specially designed Octo-Bin with a total capacity of 504 yd. of aggregate storage. The handling of lightweight aggregate in this plant involved no special engineering problems. Incidentally, area at the site was so restricted that storage of aggregate on the ground was not possible and the total capacity for the day's run was required to be stored in the aggregate bin.

Compartments for aggregate are arranged radially around the central cement tank. This arrangement provides for the best flow of aggregates out of the bins into the batcher. The cement tank has a capacity of 650 bbl., providing adequate storage and eliminating any silo on the ground. As a result, cement is handled only once and is always available for gravity feed from the overhead tank, eliminating mechanical equipment.

The plant is located in an area which will be a swimming pool when the project is completed. The base is about 25 ft. below street level and cement is delivered at the street level with trucks discharging into a small receiving hopper. A high-capacity screw and cement elevator transfers the material to the tank in the bin. A concentric type of aggregate and cement batcher was installed with the cement moving through semi-automatic equipment to speed up these batching operations. The batcher is provided with a two-way discharge into the two Koehring 28-S non-tilting mixers. These mixers discharge into hoisting buckets which operate in a double hoisting tower delivering concrete to the various floor elevations.

Operation of the plant is handled entirely by three men in addition to the plant foreman. This crew consists of the plant operator, an assistant and a laborer for incidental work around the mixers. All materials are weighed, including the water and the dispensed admixture. Hand lever control is used and an alternating gate allows charging either of the two mixers. Mixing time is from 1½ to 2 min. With two mixers, two elevator buckets and two hoppers at working level, the set-up would permit placing concrete simultaneously in two separate sections of the building, though this procedure has not been used.

Aggregate

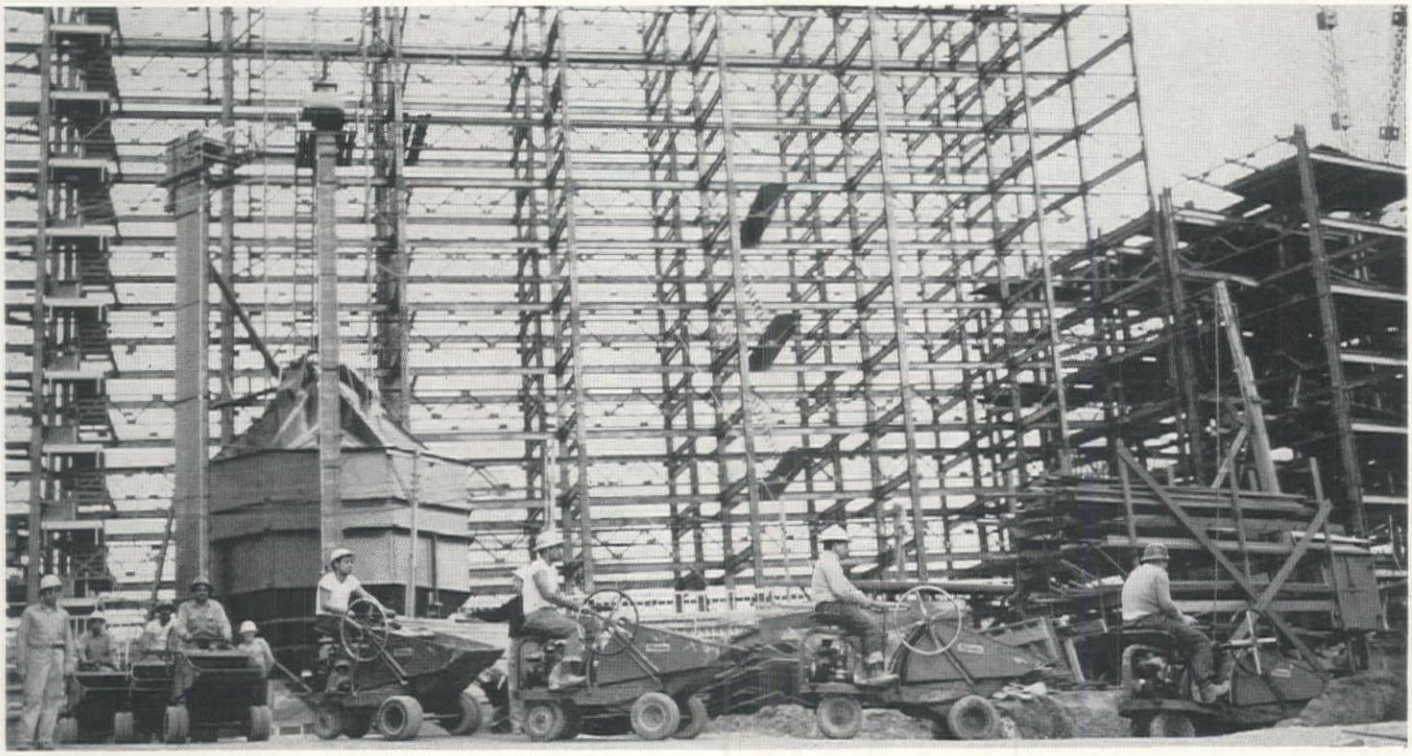
The product selected for the lightweight concrete is Rocklite, which is an aggregate produced from crushed and graded blue shale, calcined to incipient fusion. The result is a lightweight aggregate of rounded particles each having a hard outer shell and vesicular interior. Final screening produces four sizes (sand, 5/16, 9/16 and 1 in.) for commercial use. Dry weight per cubic foot for this material ranges from 63 lb. for sand down to 36 lb. for the largest size. Concrete of 2,500-psi. strength made entirely from this aggregate will weigh from 80 to 90 lb. per cu. ft. Blending with natural sand as practiced on this job increased this weight about 10 lb. per cu. ft. Design strength can be secured by using con-

General Features of the Statler Center Project

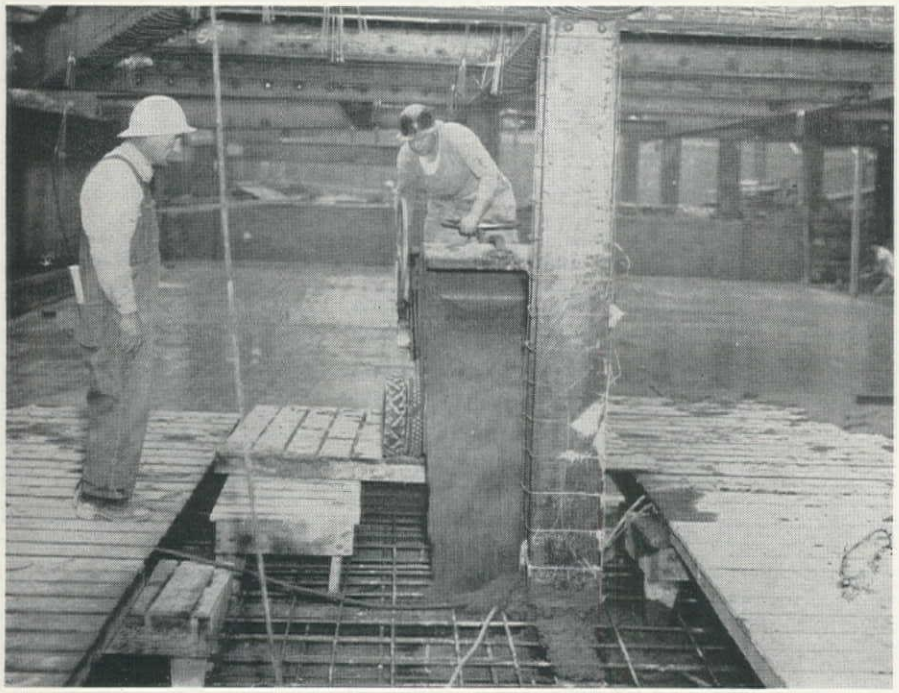
LARGEST HOTEL built in the United States during the last 20 years and the biggest single building job in the West since the war, the Statler Center in Los Angeles will enclose 14,000,000 cu. ft. in its 13-story height, and will cost about $21,000,000. The hotel section will provide 1,275 outside rooms of studio style, the garage will provide for 500 cars, while the office building section will have 150,000 sq. ft. of rental area. Containing 7,500 tons of structural steel and 50,000 cu. yd. of concrete (35,000 cu. yd. of lightweight), this structure on Wilshire Blvd. in downtown Los Angeles is scheduled for completion in May 1952.

Located on a 3-ac. site bounded by Figueroa, 7th and Francisco Streets and Wilshire Blvd., the hotel section above the public floors, will occupy about half the area of the lot with the remainder open. All rooms will be air conditioned and equipped for radio and television. Elevators will be equipped to provide music or announcements. The lobby will be "daylighted" and will open out on a garden and swimming pool. Architectural style is contemporary modern, with color and lighting arrangements which will maintain the atmosphere of Southern California throughout the building.

Holabird & Root & Burgee of Chicago are architects for the project and are represented on the job by A. A. Nickman. Steve Barnes of Los Angeles was consulting engineer; L. T. Evans investigated foundation conditions. General contract is held by Robert E. McKee.



FLEET OF BUGGIES delivers lightweight concrete at speeds up to 16 mph., each buggy having a capacity of 13 cu. ft. On the shorter hauls from the hoisting tower the fleet consisted of 6 to 8 units. This size fleet was increased to 12 and 15 units on the long hauls.



RUNWAYS for the buggies were built in sections 5 ft. wide and 10 ft. long. Three lines of 2 x 4's supported the 1-in. deck lumber. The 3-point load distribution on double wheels helped reduce the size and weight of the runway design.

ventional water-cement ratio control.

Produced in Ventura, the material is trucked directly to the job and stored in the bins over the batching plant. The present project represents the largest single job volume of Rocklite used to date.

Mix and its characteristics

Design of the lightweight concrete mixtures was predicated on a 28-day strength of 2,500 psi. This requirement was amply met with the specified minimum cement factor of 6 sacks per cu. yd. Typical batch weights of aggregate call for 700 lb. natural sand, 440 lb. Rocklite sand, 443 lb. Rocklite—9/16 in., and 345 lb. Rocklite—1 in. Air-entraining admixtures (Tricosal and Durair) are used to improve plasticity and uniformity and the amount added is controlled accurately by employing a dispenser.

Usual slumps at place of deposit are 3 to 4 in. for floor slabs and 4 to 5 in. for walls. Mixtures used in architectural wall sections may be given improved workability by some adjustment of weights, as by increasing the Rocklite sand and reducing the coarser sizes. The question of the need for pre-wetting of the lightweight aggregate was given considerable study and it was found that for these job conditions it appeared to be unnecessary with the materials used. Good workability and good control of consistency were readily obtained.

A typical day's pour

The building divides itself logically by arrangement of wings and expansion joints into eight approximately equal areas. Placing concrete in one story of one such section is one day's work and involves a quantity approaching 300 cu. yd. It includes a full story from floor surface to floor surface, 9½ ft. in height, comprising the walls, the fireproofing encasement of the frame members and the floor slab.

A typical section may have floor dimensions of 200 x 50 ft., and total wall length of over 400 ft. Steel or glazed plywood forms are used for floors, steel forms being furnished and set by Steelform Contracting Co. for areas where the ceiling is not exposed.

Exterior wall forms are of glazed plywood, processed at the mill. The ease of conditioning for re-use makes it possible to raise the forms and set them for the story above with minimum delay, so that one set suffices for wall construction in each section of the structure.

Floor forming, of course, requires different treatment, since soffit forms must remain in place while the concrete gains a greater strength. Hence, it has been found necessary to use three sets of forms for floors. It is a point of interest affecting job efficiency that floor forms are installed for the story above before concrete is placed on the working level, so that the work of electrical and other trades may be going on in the story above. A complete series of one set of wall forms and three sets of floor forms is provided for each of the eight sections or areas of the building.

A feature of the project is the use of motor buggies to transport concrete from the hoppers served by the elevator buckets to the walls, columns and floor system of the pour. Most of the development of these modern-type motor buggies has taken place in the last three years. It has been stated that on the average job one motor buggy will handle a concrete volume requiring four buggies of the ordinary type wheeled by hand.

On this job, motor buggies have been furnished by Whiteman Manufacturing Co. of Los Angeles. The buggy has a capacity of 13 cu. ft., and is powered by a 7½-hp. Gladden gasoline engine. It has a loaded speed of 16 mi. per hr., and can turn on a 5-ft. width of runway. On this job, runways are made in sections 5 ft. wide and 10 ft. long. It might be expected that greater speed and loads involved in the use of motor buggies would dictate a considerably heavier runway design. However, there are compensating influences. The buggies have 3-point load distribution, with 2 wheels at each point, so that an effective spread of pressure over the runway is obtained. Three 2 x 4-in. supports are decked with 1-in. lumber.

Because the elevator tower is located well out on one of the wings, there is great variability in length of haul for the buggy fleet. The sections having short hauls can be poured with 6 to 8 buggies delivering concrete, while the longest hauls require 12 to 15 units. The system has speed and flexibility of movement which makes it most adaptable to variations resulting from fixed conditions in the job plant layout.

Special problems

Internal vibrators are used to consolidate the concrete. It has been found effective in floor slabs to heap the concrete and apply the vibrator tube to the mound to consolidate the mass. In wall sections where spandrel trusses are encased and the thin concrete section carries reinforcement, the internal vibrator can not be easily inserted and careful placement and rapping of the forms has proved satisfactory. At long window runs in walls, good placement and filling of sill sections has been obtained by carrying concrete to sufficient head adjacent to the openings and providing space for escape of air at the center.

On the architectural concrete wall surfaces, scoring—both horizontal and vertical—is produced by attaching rounded strips to the form faces. Construction joint lines are obscured by placing them to coincide with these grooves. Patching of concrete cast against the glazed plywood form surface requires some departure from the usual technique. Steel trowel finish is used on such patches to produce smoothness similar to the wall texture.

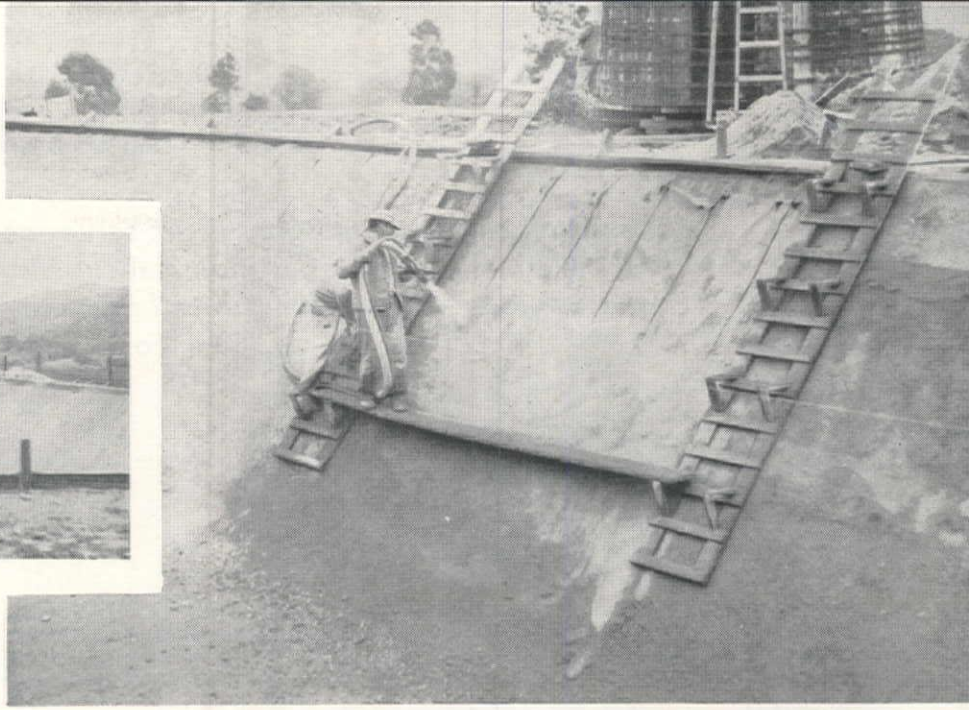
By the third week of June, more than 60% of the 50,000 cu. yd. concrete total had been placed, and topping out of the northwest wing was scheduled for early July.

Contractors personnel

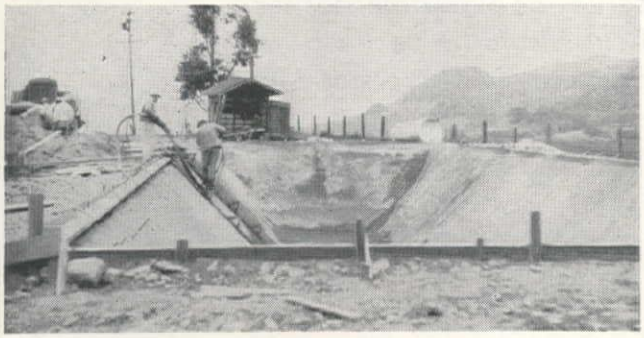
For the Robert E. McKee organization, Lamar Wilson is manager of the Los Angeles office of the company. At the job, J. L. Morris is general superintendent and C. C. Wright is project manager. Al Moody is the concrete superintendent. Other key employees in the concrete organization include concrete foremen Langford and Andreason, plant foreman Ramsey and plant operator Rentmeister.

Los Angeles Testing Laboratory has supervised design and control of concrete mixtures, with Crawford Strohecker as job representative.

Consolidated Western Steel Corp. fabricated structural steel for the frame in its Maywood Plant and erected the 7,500 tons at the site.



BELOW—Overall view of job shows size of reservoir. Protective gunite blanket is in place throughout. At left center, asphaltic lining is receiving coat of gunite.



RIGHT—Vertical strips of asphaltic lining in place, the final protective blanket of gunite is applied in lifts, starting at the bottom of the reservoir. Each layer of gunite is ¾ in. thick.

GUNITE-ASPHALT-GUNITE for reservoir lining

A SANDWICH of gunite and asphalt lining material makes up the lining of a small water-supply reservoir at the Santa Rosa, Calif., golf club. A 30- by 100-ft. pocket 10 ft. deep, with 1:1 side slopes, the reservoir was constructed of material too rough to support properly an unprotected prefabricated asphaltic lining.

The Dennis Company, contractor, decided to achieve the requisite smoothness by application of a ¾-in. blanket of gunite. Following placement of the asphaltic lining material another layer of gunite completed the sandwich and provided resistance to deterioration under changing conditions of weather and water level.

Binding agent between overlapping layers of asphaltic lining was kerosene. Adherence to the lower layer of gunite was improved by the sun's heat, according to the contractor.

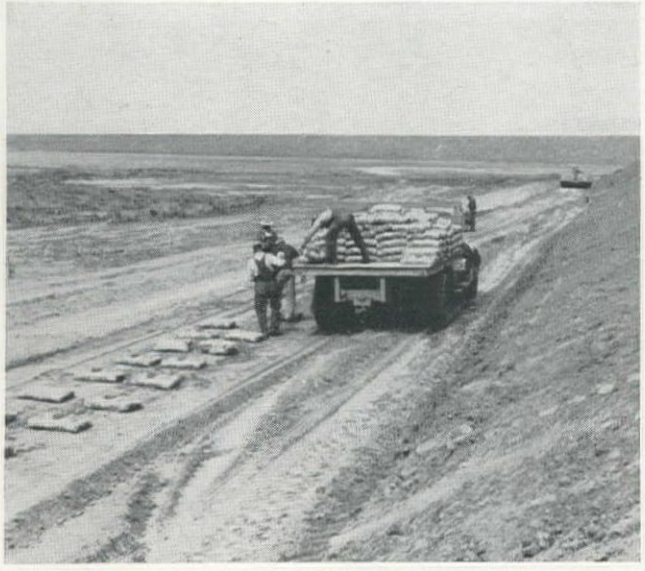
LEFT—Adherence achieved with kerosene binding agent at asphalt material overlap is shown in this photo. Exposure to sun's heat is believed to have aided the process.

RIGHT—Coarseness of excavated reservoir surface is indicated by comparison with tape and fountain pen. This surface required treatment for stabilization and smoothing before prefabricated asphaltic lining material could be placed. Gunite did the job.

LEFT—Test slab of gunite and asphalt lining shows good bond between layers of sandwich. Pencil indicates point where prefabricated asphaltic lining has been pulled away from the gunite.

First Soil-Cement Laid in Colorado

Reservoir slope site at Bonny Dam serves as experimental section in an effort to find economical substitute for rock rip-rap on dam face—Soil-cement placed in successive layers of 6-in. thickness 7 ft. wide—Two kinds of soil used



SPOTTING bags of portland cement for a 7-ft. wide layer of soil-cement section.

MIXING soil-cement with a rotary speedmixer pulled by a crawler tractor.

ADDING WATER to the layer from a 1,600-gal. water truck mounted on a flat-bed truck.

By

FLOYD A. BAKER

Baker & Burgwin Contractors

Denver, Colorado

FIRST SOIL-CEMENT to be laid in Colorado has recently been placed as an experimental section in an effort to find an economical substitute for rock rip-rap on the face of Bonny Dam. The Bureau of Reclamation has been faced with the problem of transporting suitable rip-rap material long distances to provide protection for the faces of some earthfill dams against erosion through wave action. This was the case at Bonny Dam, located in eastern Colorado (*Western Construction*—May 1951, pp. 65-68) and other structures where a suitable rock was not available locally. The Bureau selected a section of the Bonny Dam reservoir for the present test. Soil-cement shows promise of being an excellent substitute for stone rip-rap.

Bonny Dam is located on the South Fork of the Republican River about two miles west of Hale, Colo., and about half-way between Burlington, Colo., and St. Francis, Kan.

A site consisting of an embankment of the reservoir about ½ mile upstream from Bonny Dam was selected for the test section. This location would be in the face of the prevailing wind, also sub-

Information from the laboratory

The 12% cement content soil was a USBPR A-4(4) type soil having a laboratory standard AASHO maximum density of 114 lb. per cu. ft. at an optimum moisture content of 12.5%. The 10% cement content soil was a USBPR A-3(0) type soil having a laboratory standard AASHO maximum density of 122 lb. per cu. ft. at an optimum moisture content of 9.4%. Seven-day compressive strengths for these soils at 10% cement by volume were 391 and 325 psi. respectively. At 28 days the strengths were 464 and 408 psi. respectively. These compressive strengths were obtained in the laboratory on cylindrical specimens of 2-in. diameter and 2 in. high submerged in water 1 hour before testing.

jected to severe wave action due to a long fetch of water in the reservoir.

Design

Two types of facing were designated for the test section: soil-cement and asphaltic concrete. The soil-cement portion, which we built, specified a 3-ft. thickness when measured perpendicular to its face. The completed slope measured about 50 ft. up and down the slope and a length of 345 ft. at its longest horizontal distance.

Two kinds of soil were used, one with 12% cement and the other with 10% cement. A third soil was used to back up the soil-cement facing and make it possible to simulate the building of an earth dam facing. The layers of soil were placed in about 6-in. thicknesses; 10 ft. wide for the back-up material and 7 ft. wide for the soil-cement section.

Contract awarded

The Bureau of Reclamation advertised for bids on February 8 on the test section and the Northwest Engineering Co. of Denver was the successful low bidder at $82,890. We subcontracted the soil-cement portion of the test section since we were interested in learning about soil-cement construction. The first soil-cement on the Bonny Dam test section was placed on April 13, 1951.

COMPACTING mixture with a sheepsfoot roller loaded with sand.

FINAL ROLLING over surface mulch by a flat-bed truck loaded with cement.

Construction procedures

Since this was the first time soil-cement had been built in this way, procedures were varied a trifle from regular paving methods. It should be kept in mind that the soil-cement portion was the outside face of the section under construction. Mixing the portland cement with the outside 7 ft. of soil and packing it into a hard mass, provided a good, safe foundation all the way to the top of the test section. As evidence of this, immediately after a layer of soil-cement was compacted, a Caterpillar D-8 hauling a 20-cu. yd. Carryall pulled on with soil for the next layer.

Building of the test section was done in the following sequence:

1—Hauling dirt to the site.

2—Leveling dirt layers to proper depth and grade.

3—Hauling cement to the section.

4—Unloading and spotting bags of cement.

5—Emptying cement bags into windrows.

6—Spreading windrows with a spike-tooth harrow hitched behind a pick-up truck.

7—Scarifying the section to make it easier for mixer to penetrate the layer of soil and cement.

8—Mixing soil and cement with a rotary speedmixer pulled by a crawler tractor.

9—Adding water to the layer from a 1,600-gal. water tank mounted on flat-bed truck. Water was applied by gravity flow through a 6-in. spray bar. To get uniform application of water truck was pulled by a crawler-type tractor.

10—Mixing with rotary speedmixer.

11—Packing mixture with sheepsfoot roller loaded with sand.

12—Leveling the section with a motor grader.

13—Packing surface mulch with cement truck loaded with cement.

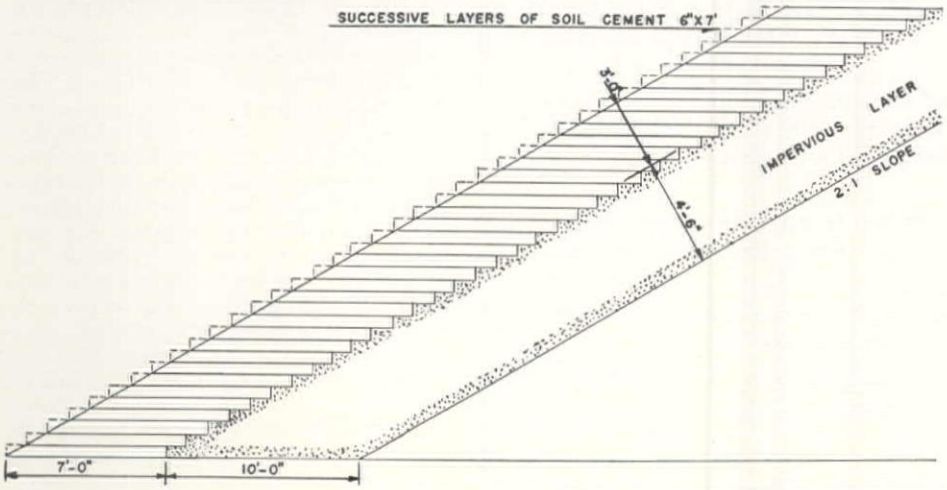
14—Scratching surface to provide bonding with next layer.

15—Watering completed layer to insure complete hydration of the incorporated cement.

Although this may appear to be an extensive series of manipulations, the operations were very simple and easily performed. They would be the same for a regular dam-facing job when using this type of construction equipment.

TYPICAL CROSS-SECTION OF EMBANKMENT CONSTRUCTION

COMPLETED test section on slope measures about 50 ft. up and down the slope and has a length of about 345 ft. at longest horizontal dimensions. Layers were placed in about 6-in. thicknesses.



Conclusions

After this experience with soil-cement I find it is no longer a mysterious concoction for contractors. After the first few days it was evident why the different operations were necessary. It soon became clear that three times as much work could have been done with the same equipment had this been an actual facing project on an earth dam.

The interesting thing for contractors working with soil-cement for the first time was the way it hardened soon after it was packed. When we tried to cut the outer edges of the layers to grade, several trips were required with the motor-grader to do the job. This leads me to believe that in future work the surface of the dam should be left rough to permit lower costs and be more efficient as a facing.

Highway Officials Endorse Test Road for the West

Western Association of State Highway Officials at annual conference in San Francisco take action insuring a test project of flexible pavement type — Approve plan for establishing a "Dr. L. I. Hewes Award" — Elect W. A. Bugge, Director of Highways of Washington, president

AUTHORIZING a test road project of flexible pavement type and establishing an annual "Dr. L. I. Hewes Award," the Western Association of State Highway Officials held its thirtieth annual conference in San Francisco June 25-28. The meeting was well attended, with a registration of almost 500, and included technical sessions, an excursion to inspect freeway construction in Oakland and social functions. General sessions were presided over by President W. L. Anderson of Utah.

Probably the most important result of the conference was a resolution which provided official WASHO sponsorship of a test road to be located in the general area of south Idaho or northern Utah. The resolution indicated that the road should be of flexible type and that the program should be instituted as promptly as possible. Financial contributions would be made by each of the Western states and the general set-up of the investigation would parallel the recent one carried out in Maryland. The existing WASHO committee which has been studying this subject will be continued until a permanent board is established for the execution of the test program. The report of the test road committee that ended in the favorable resolution was presented by W. C. Williams of Oregon.

GOVERNOR WARREN of California hands the safety merit award won by California to Charles H. Purcell, Director of Public Works.

The convention approved an offer by *Western Construction* to sponsor an annual award to commemorate the many services of Dr. L. I. Hewes to highway developments in the West. The award would consist of $500 and a suitable plaque to be presented by WASHO each year to a highway engineer of the West who had made an outstanding contribution in the field of highway engineering during the preceding year. General terms for the award, as approved by the conference, appear in the box below.

Recognition of the importance of WASHO was indicated by the appearance of Thomas H. MacDonald, Commissioner, U. S. Bureau of Public Roads, Washington, D. C., and Governor Earl Warren of California on the program.

Officers elected for next year include William A. Bugge of Washington, president; Mark U. Watrous of Colorado, vice president, and G. S. Paxson of Oregon, secretary-treasurer.

Fred J. Grumm, retired deputy state highway engineer of California, was presented with an honorary life membership in WASHO.

Thomas MacDonald speaks

The address by Thomas MacDonald was of particular significance, presenting the attitude and approach of the Bureau of Public Roads in the present controversy relating to the lifting of weight restrictions from trucks in connection with the present defense effort. Mr. MacDonald re-emphasized the fact that our existing highways, for the most part, were designed and built for truck traffic of twenty years ago and did not provide engineering adequacy for proposed loads. He indicated that the responsibility of the BPR and the state highway organizations was to preserve our existing highway system as a national asset in peace or war. This was the first appearance of Mr. MacDonald before a WASHO gathering for several years and members were particularly interested in his extended remarks on many phases of the highway situation.

THE DR. L. I. HEWES AWARD

Awarded annually by the Western Association of State Highway Officials

This award, established in 1951, will perpetuate the name and achievements of Laurence Ilsley Hewes, the late Western Regional Chief of the U. S. Bureau of Public Roads, one of the principal organizers of the Western Association of State Highway Officials, whose superlative contributions in every phase of highway engineering gave great impetus to Western highway development.

The award has been instituted and funds provided by *Western Construction*, civil engineering-construction publication of the West.

I. The award will be known as the "Dr. L. I. Hewes Award."

II. The award will consist of $500 cash and an appropriate plaque.

III. The award will be given annually to a highway engineer in the West selected by the Executive Committee of the Western Association of State Highway Officials from a list of candidates submitted by the constituent organizations. The award is to be in recognition of an outstanding contribution to highway development. The recipient is to be connected with any one of the organizations making up the membership of the Western Association of State Highway Officials.

IV. The engineer receiving the award is to be actively engaged in any one of the following types of highway engineering: (a) planning; (b) design; (c) construction; (d) maintenance; (e) bridges; (f) materials and research, and (g) traffic.

V. In the interest of recognizing and stimulating contributions made by those advancing in the ranks of highway engineering, chief engineers and their principal staff assistants are not to be considered as candidates for the award.

VI. There is no obligation on the committee to make the award unless a contribution was made during the preceding year which was considered worthy of the award.

VII. The award is to be presented during the annual convention of the Western Association of State Highway Officials.

Western Association of State Highway Officials formally approved the establishment of the "Dr. L. I. Hewes Award" at its annual convention in San Francisco June 28, 1951.

NEW OFFICERS OF WASHO: (left to right) Mark Watrous of Colorado, vice president; Ralph Jones of New Mexico, executive committee, W. A. Bugge of Washington, president, Glen Paxson of Oregon, secretary-treasurer.

ON THE PLATFORM (above right): R. H. Baldock of Oregon, W. L. Anderson of Utah, retiring president of WASHO and Hal Hale secretary of AASHO.

H. H. Hale, secretary of the American Association of State Highway Officials, reviewed present operations in the national association, reporting to the member states from the West.

A paper presented by John A. McNamara, regional office, National Production Authority, reviewed the function of NPA and discussed the regulatory orders that apply most directly to the work of highway officials. A. N. Carter of the Washington office of AGC, reviewed the problems of contractors in the present national emergency.

SPEAKERS: A. N. Carter, secretary; Highway Division of AGC, Thomas H. MacDonald, Commissioner, U. S. Bureau of Public Roads, and John A. McNamara, regional office of NPA.

"Viewpoint of Motor Carriers"

Wade Sherrard, general manager, Motor Truck Association of California, presented the "Viewpoint of Motor Carriers" in a paper which avoided many of the most serious points of controversy. It was particularly significant that he stated that the motor carriers of the West were not proposing any increase in truck sizes or loads over those generally accepted in this region.

In a discussion of the problem of overrun in contractors' operations, William A. Bugge, Director of Highways of Washington, took an objective approach to this problem which is constantly before highway engineers. He discussed the subject from the standpoint of the state inspector and district engineer, without overlooking some of the peculiar problems faced by contractors. In general, he felt that engineers were rather lenient with contractors who have a tendency to overrun on their contract time and suggested that engineers should be firmer and that penalties should be increased. The problem of a contractor who fails to carry out a project on time and turns up as the low bidder at the next letting received special consideration by Mr. Bugge, who indicated that the laws of his state do not permit the elimination of such a bidder in spite of an unsatisfactory record.

On the second day, the Operations session was presided over by R. N. Gillis of California and the Design session had as its chairman Mark U. Watrous of Colorado.

NEW MEXICO was represented by D. W. Thornberg, district engineer; T. T. Mann, commissioner; T. B. White, construction engineer; and C. O. Erwin, district engineer.

WYOMING representatives at the conference were: J. E. Graham, right-of-way engineer; E. R. Reed, assistant bridge engineer and G. T. Bath, planning engineer.

Views on Qualifications for Civil Engineering Licensing

DISCUSSION and editorial comment on the subject of the qualifications necessary to obtain registration as a civil engineer in the State of California appeared in the April issue of *Western Construction* (pages 65 and 75).

Some of the comments and expressions of opinion on this subject received from readers were presented in the July issue (page 75).—*Editor.*

Board's Opinion Seems to Contradict the Law

Sir:

As a professional engineer, and as a member of the American Society of Civil Engineers, I have followed with interest the discussions raised in your recent issues concerning the problem in California of graduate engineers with engineering-construction experience obtaining professional licenses.

The sincerity of those men who have written to your publication concerning this matter including Allen Brownfield, W. W. Hoagland, Thomas Paul and Spencer Webb, is impressive and adds much to your editorials to bring the issue sharply into focus.

Regarding the discussion of the Board's rejection of an applicant having 2½ years of engineering experience with a contractor in your April 1951 issue, it is difficult to comment on the Board's action without reviewing in detail the applicant's experience record and his presentation. Inasmuch as a minimum of 2 years of civil engineering experience is required after graduation it is quite possible that his rejection could have been based on factors other than that of being engaged for a minimum period in engineering-construction work.

However, the fact that the Board is opposed to recognizing graduate engineers with engineering-construction experience has been established some time ago. While serving as Chairman of the AGC Committee in San Francisco for the past three years to study this matter, a letter was received from the State Board of Registration for Civil and Professional Engineers which stated:

" . . . As pointed out by you, it is quite natural that engineering graduates, at least a majority of them, will desire to become registered engineers. The problem that faces them is, of course, whether or not construction experience is also Civil Engineering. The Board does not consider a superintendent of construction, an engineer in charge of construction, time keeper, estimator, material clerk or personnel rendering a service from the constructor's viewpoint, as having had engineering experience as defined in the law. . . . "

In the opinion of many engineers this position of the Board is questionable and arbitrary because Section 6731 of Article 3 of the California Act states that:

"Civil Engineering embraces the following studies or activities. . . . (b) The supervision of the construction of engineering structures."

Certainly then, a superintendent of engineering-construction, or a graduate engineer in charge of engineering-construction would not be barred under the law as conclusively as stated in the above letter; and from discussions with some of those who originally worked on the preparation of the law, it was not the intent to make such a restriction, nor was such a meaning implied in the law.

This is the principal reason why many of us, as professional engineers in the construction industry, desire to have a construction engineer on the State Board of Registration, coupled with the idea that the profession of engineering should be permitted to expand and not be confined to the realm of design alone.

The position of the engineering graduate to obtain adequate recognition for his work in engineering-construction has always been difficult because the very nature of his work generally removes him to large project sites away from urban centers where engineering committees meet to draft resolutions affecting him. Also affecting the entire profession is the ever increasing abuse of the word "engineer" by non-professional users, contrary to Eastern practice; this tends to decrease the prestige of the title of engineer, creates confusion in the minds of the public and results in an unfavorable public reaction because of numerous strikes engaged in by crafts terming themselves engineers. To recognize the qualified graduate construction engineer gives our profession many powerful supporters to help maintain its dignity, and a ready field corps to combat the constant attempts to unionize the professional side of the industry.

Solidarity has already been demonstrated by the engineering profession in resisting initial union efforts to segregate our profession; we should likewise be united in interpreting the present law as written thereby helping to clarify the minds of the graduate engineers who are particularly adapted to the construction side of the engineering profession.

CHARLES C. MacCLOSKY
Partner
Charles MacClosky Company
San Francisco.

* * *

Roadblocks in the Path of the Young Engineer

Sir:

I have read with real interest the article appearing in the April 1951 *Western Construction* titled "Is He Qualified for a C.E. License?" This controversial situation out of which you have taken this one case certainly requires a thorough airing for two primary reasons: (1) Is the young engineer you spoke of really qualified for a C.E. license based on the facts of his record when compared with the specific wording of the California Registration Act? (2) Is the California State Board of Professional Registration really correct in their assumption of power of decision in interpreting the Act as they have done in the case we are discussing?

The arguments advanced in the NO column of your article require some comment. The whole thing appears to have been written to "put the contractor in his place." Actually, there is no point in anyone stating that "The contractor's sole function is to execute the work of the designer as directed by his representatives on the job."

I was amused at such statements as: "The basic function of registration for civil engineers is to provide a measure of protection and safety to the general public. . . . This question of providing protection to the general public is quite distinct from the business of contracting." Inasmuch as all a contractor has to do is hire professional engineers directly on his payroll (and, as I stated before, many of them already have such engineers) there is not much point in this stuff. In view of the ease by which contractors could do this so-called "engineering" if they chose to, doesn't it seem reasonable that they would long since have "moved in" on the situation if they had really wanted to?

No, the questions to be considered are just the simple ones listed in the first paragraph above. This takes us directly to the heart of the thing and at this point some of the statements in your NO article require rebuttal, particularly those that state, for example, "He (the contractor) is not concerned with engineering problems." Here the facts of what is engineering—not to be defined in a conveniently limited way to serve a purpose, but instead strictly as an on-top-of-the-table interpretation as generally accepted by professional men—should be the sole criterion.

What seems to be overlooked in all this is the plain fact that the reputable contractors—who are all qualified to do "engineering," by the way—sincerely want to strengthen the engineering profession, not weaken it. I feel sure that a reinterpretation of the word "Engineering" in the light of the workaday world's technical reality would do a lot more for the profession than the present restrictive efforts. For these efforts, far from curtailing any of the activities that the article rightly or wrongly deplores, actually work only to the detriment of the young engineer. It seems too bad that this young person should have roadblocks put in the way of his professional development when they serve no useful purpose at all.

LLOYD THORPE
San Mateo, Calif.

Mr. Thorpe writes to express his personal views on this subject. He is qualified to comment on this situation from his position as Personnel Manager of Guy F. Atkinson Company.—*Editor.*

Intake Channel at Chief Joseph Dam Cut From Granite

EACH of the four shovels wore out two buckets while working in "tombstone" granite during excavation of intake channel for Chief Joseph Dam powerhouse.

HARD "TOMBSTONE" granite required the use of over 1,500,000 lb. of powder and a regular two-man crew applying hard facing on buckets of shovels during excavation of 3,500,000 cu. yd. for the Chief Joseph Dam powerhouse intake channel at Bridgeport, Wash. The project was carried out on a $2,265,325 contract by General Construction Co., Seattle. (Design features and construction preview of Chief Joseph Dam were reviewed in *Western Construction*—March 1950. Second stage pre-construction problems were reviewed in *Western Construction*—November 1950.)

Excavation of the 4,000-ft. long by 1,100-ft. wide channel that is curved near the end for a surge pool was completed early in June. Cuts for the channel averaged 50 ft. in depth. Excavated material was used for fill, the base of a relocated road that was included in the contract, rip-rap, and wasted at each end of the channel. Using two shifts per day, six days a week, 15 months were required to complete the project. The best production day saw 16,000 yd. of material moved.

Due to the extreme hardness of the rock, wear on shovel buckets was severe. During the project each of the four shovels wore out two buckets. Two men worked each night, on a graveyard shift when the equipment was idle, hard facing the bucket. This hard facing operation was carried out during the entire project.

Generally, the contractors felt that down-time for equipment was very light for a job of this size and type. Although a large number of equipment units were constantly on the move, there were no collisions throughout the project. Four mechanics and one helper on each of two shifts kept equipment rolling.

KEY MEN at job were E. W. Elliott, general superintendent, in dark shirt, and George Revazoff, powder chief, third from left.

Part of the lack of down-time was attributed to the practice of giving the head runner of a piece of equipment the responsibility of taking care of his machine.

Almost 3,000,000 cu. yd. of the total amount excavated had to be drilled and shot. Powder played an important part on the project, and the eight- to ten-man powder crew loaded and shot on an average from 6,000 to 8,000 yd. per day.

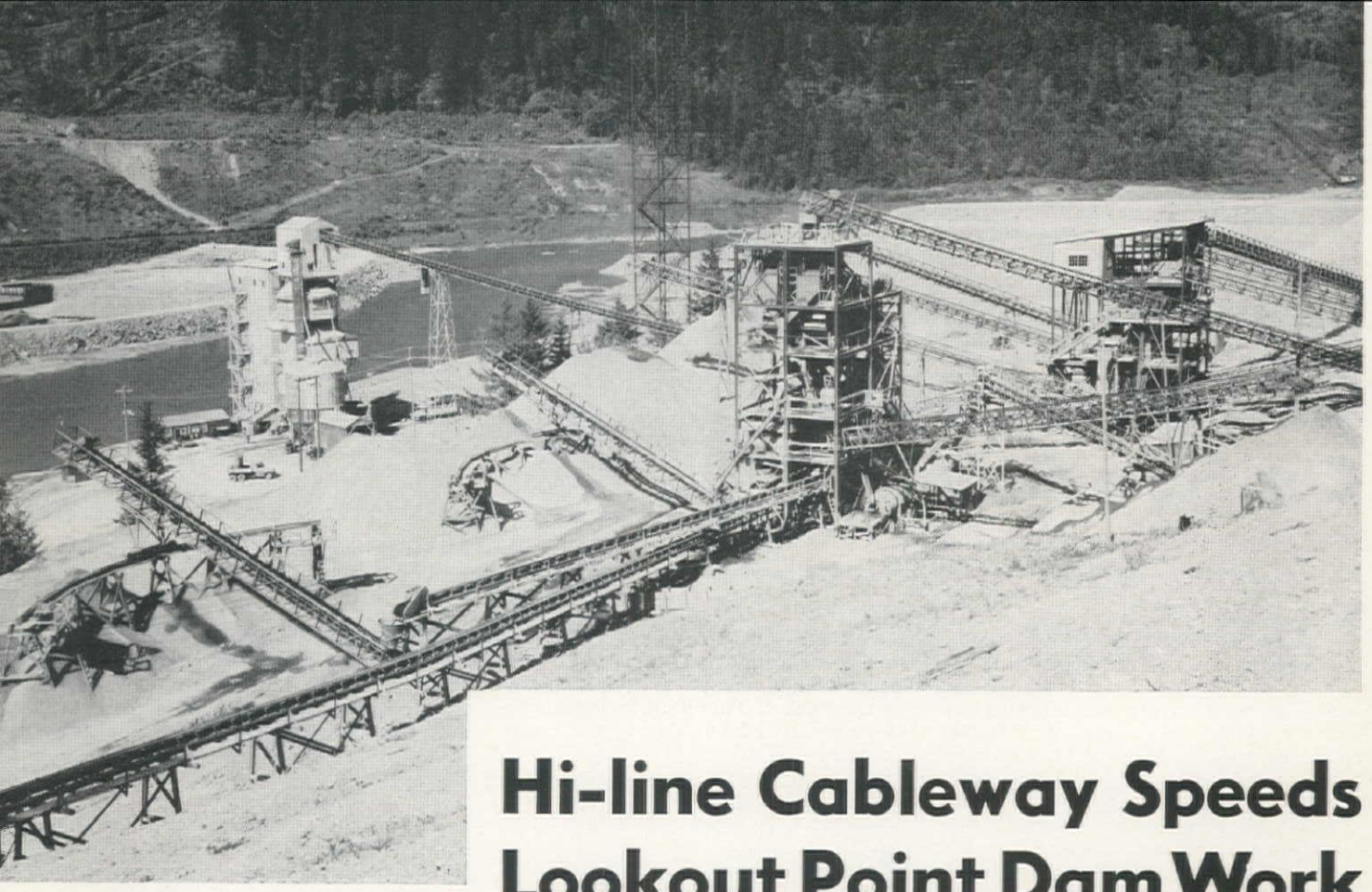
The standard practice in loading was to set all powder in holes 24 ft. deep. About 90% of all holes used were horizontal. The usual method was to put in a line of lifter holes about 2 ft. below grade and a row of reliever holes about 4 ft. above the lifter holes. In some instances the height of the face made it neecssary to put in six rows of reliever holes at 4 ft. vertical spacing. In the event the face was higher than average some down holes were also drilled. Vertical holes, of various depths, were used if the cut was shallow. Spacings of the holes varied and depended on the existing conditions. Explosives were supplied by Pacific Powder Co., and were primarily 40 and 60%.

Equipment used on the project included: four 80-D Northwest Shovels with 2½-yd. buckets; five 17-yd. and four 12-yd. end-dump Euclids; five LeTourneau Tournarockers and six Tournapulls (power units for these two units were interchanged as needed); eight Caterpillar D-8 tractors; 16 Gardner-Denver wagon drills; three Le Roi 600 compressors; one Chicago Pneumatic 1100 compressor; and four Chicago Pneumatic 600 compressors. (All compressors were electrically operated and their air piped to drills and hammers.)

E. W. Elliott was general superintendent for General Construction Co., Seattle, with Jim Davis and Bert Duncan as assistant superintendents. George Revazoff acted as powder superintendent with Art Cronin filling the capacity of shovel foreman.

The Chief Joseph Dam project is being built by the Seattle District, Corps of Engineers. C. H. Wagner is resident engineer.

BATTERY of wagon drills receives real workout as they drill through hard "tombstone" granite for excavation of intake channel at Chief Joseph Dam. Over 1,500,000 lb. of powder was used to remove 3,500,000 cu. yd. of material.



CONSTRUCTION PLANT for Lookout Point Dam will supply an estimated 835,000 cu. yd. of concrete and 1,600,000 tons of aggregate before job is brought to completion.

Hi-line Cableway Speeds Lookout Point Dam Work

New cableway supplements trucks to speed concrete operations at Oregon dam—Contractor's aggregate from adjacent mountain, 1,250 ft. above dam elevation, brought to plant by long conveyor

CONCRETE placing operations with a 2,600-ft. highline started May 28 at Lookout Point Dam, a multipurpose project being constructed under an $18,689,357 contract by Morrison-Kiewit-Macco (Morrison-Knudsen Co., Inc., Peter Kiewit Sons' Co., and Macco Corporation) for the Portland District, Corps of Engineers. The earthfill dam with gravity-type concrete spillway is being constructed on the Middle Fork of the Willamette River 23 mi. southeast of Eugene, Ore. Overall length of the structure will be 3,370 ft., with the concrete section 1,390 ft. in length and rising 278 ft. from foundation to crest. Spillway will be 248 ft. wide. The earth and gravel-fill section of the dam will be 256 ft. high with a maximum base width of 1,130 ft., and a crest width of 24 ft.

Trucking concrete

Prior to installation of the cableway, concrete was transported from batching plant to the initial blocks in the spillway section, the spillway apron, and the stilling basin, a distance approximating 2,500 ft., by a fleet of from four to six flat-bed trucks. Some concrete will still be transported with trucks but the cableway will handle the bulk of the yardage. Four 4-yd., and two 2-yd. concrete buckets are used in the trucking operation with one 4-yd., or two 2-yd. buckets comprising a load for each truck.

One man is stationed at batching plant discharge spout for spotting the truck-mounted buckets and filling them. Two cranes transfer the buckets from the trucks and spot them in the desired location. Traversing the route between batching plant and placing location includes crossing a bridge spanning the river. On the spillway end of the bridge is a rather sharp turn, and to facilitate making this turn the trucks cross the bridge on the left side, instead of the

KEY MEN AT LOOKOUT POINT

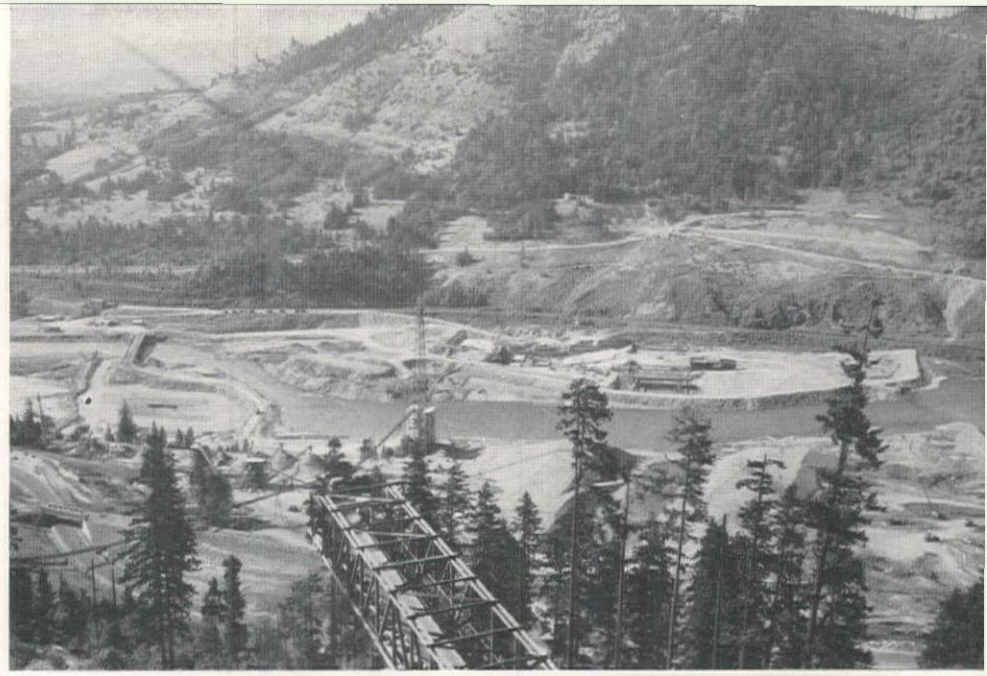
Project manager for Morrison-Kiewit-Macco, L. E. Steelman, left, confers with assistant project manager H. I. Maxwell, center, and superintendent of excavation Ray Travis, standing at right.

David "Wally" Lutes, project engineer, at right, goes over plans with Ray Foster, at left, assistant engineer, and Floyd Mercer, center, superintendent for electrical work.

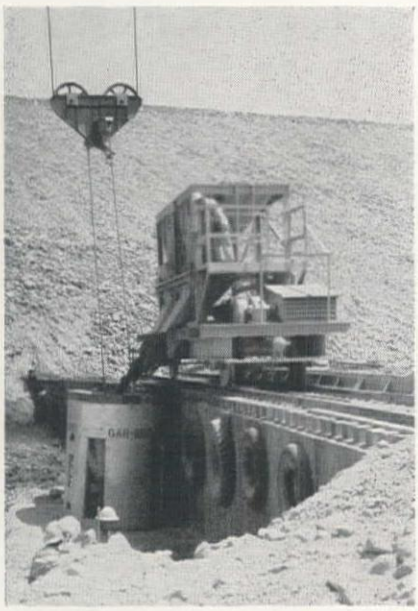
usual right. Concrete carriers have right-of-way over other traffic on the route. The contractor has posted ample warning signs and accidents during the operation have been negligible. The best production week during the trucking operation alone showed an average daily pour of 2,790 cu. yd. Work was done on a two 10-hr. shift per day basis. With the advent of cableway operations the contractor has changed to three 8-hr. shifts per day with a six-day week.

Cableway

The recently erected cableway is the type that lifts the load as it moves ahead or back instead of lifting the load to a certain height before moving towards the delivery point. Capable of handling a load of about 77,000 lb., the cableway has a 2,600-ft. span with a 428-ft. fixed head tower and a 157-ft. traveling tail tower. The tail tower, erected on a hillside above the right abutment of the dam, has a track 950 ft. long. An 8-yd. bucket with two 4-yd. compartments



LOOKING DOWN from primary crusher provides bird's-eye view of Lookout Point Dam operations 1,000 ft. below. Batching plant, head tower and aggregate plant may be seen at end of conveyor. Conveyor that carries aggregate down mountain enters picture from lower left corner.



SELF-PROPELLED transfer car fills concrete bucket at landing. Rubber tires protect side of trestle.

that permits the handling of two types of mixes in one trip is being used to transport concrete. A 500-hp. electric motor powers the cableway.

Operating controls for the highline are installed in a sound-proof room adjoining the batching plant control room. Linked to the spotter by telephone and loudspeaker system the operator is not able to see where concrete is being placed, but has full view of the bucket landing platform near the batching plant. Concrete is carried from batching plant to bucket landing by a self-propelled transfer car equipped with two 4-yd. hoppers (see illustration). As cableway operation commenced the contractors anticipated placing about 15,000 cu. yd. of concrete per week by using both methods of transportation. It is estimated that 8 yd. of concrete can be poured with the high line every four minutes.

Among the many interesting features at Lookout Point Dam is the aggregate procurement and production. As local river gravels and sand are reactive and therefore unsuitable for use in concrete, material for aggregates had to be obtained from a quarry. The nearest source is 1,250 ft. above the river on the side of an adjoining mountain that overlooks the dam site. Three 14-yd. end-dump Euclids haul the material from the quarry to the primary crusher, located about ¼ mi. from the quarry and 500 ft. lower in elevation.

The conveyor system

From the primary crusher material is carried by a 48-in. conveyor 132 ft. to the first surge pile. From a tunnel beneath the surge pile it is carried by a 36-in. conveyor 1,570 ft., dropping 336 ft. in elevation to the second surge. Then, in the same manner, it is carried 1,416 ft. to the final surge, dropping in elevation 262 ft. The conveyor from second to final surge passes over existing highway, as well as the current railroad and highway relocation work. From the final surge the material is lifted 51 ft. and fed to the secondary crusher and screening plant by a 36-in. conveyor 261 ft. in length.

After screening, aggregate is stockpiled according to size. Six sizes, ranging from 6 to 3 in. down to minus-16 sand, are being used. Stockpiles are in a single line with a single 30-in. conveyor 632 ft. long running beneath the piles and their feeders. From the conveyor running under the stockpiles aggregate is picked up by a 30-in. conveyor, 346 ft. long and delivered to the batching plant where it is rescreened and stored in the plant's bunkers. The three finer aggregates have radial conveyor belts, two 83 ft. long and one 114 ft., leading to the stockpiles. A total of 13,573 ft. of belting is being used in this conveyor system.

An estimated 1,600,000 tons of aggregate will be used in the 835,000 cu. yd. of concrete scheduled to be placed in the dam. The aggregate plant has a capacity of 400 tons per hour, with two rod mills used to manufacture sand. Capacity of the batching plant is 160 cu. yd. per hour.

One of the tough jobs in installing the primary crusher was moving a 30-ton section up the mountain. The road leading to the crusher site, constructed by the contractor, is quite steep and contains several extremely sharp switchbacks. The unit was carried on a low-bed trailer and pulled by a heavy-duty truck. Two tractors, one in front and one behind, helped inch the load up the mountain and around the switchbacks.

Placing earth fill

For placing the 7,400,000 cu. yd. earth-fill section of the dam the contractor is using twelve 25-yd. bottom-dump Euclids built up to 30-yd. capacity and four Terra Cobras. The bulk of the fill, 5,733,000 cu. yd. of random gravel, will be taken from the river bed in an area ranging from 5,000 ft. to an ultimate 9,200 ft. upstream from the dam. A Monighan dragline with a 9-yd. bucket and a Marion dragline with a 3½-yd. bucket will be used for loading the gravel carriers. The remainder of the fill, which represents the core of impervious clay and silt, will be hauled by the Terra Cobras from several designated borrow areas approximately ¾ mi. upstream from the dam.

Two 50-ton pneumatic rollers are being used to compact the material when placed. To date, gravel has been compacting readily with four passes, offering no particular problem. On the core section no trouble with moisture control drying has been encountered. The contractor has converted a Euclid to a water truck.

Extensive relocation work

In addition to the Morrison-Kiewit-Macco dam work, the project at Lookout Point includes relocation of 23 mi. of railroad, including building of two bridges, relocation of 13 mi. of state highway and 20 mi. of secondary roads,

Concluded on page 129

Operational Planning Lends to

Efficiency in Use of Vacuum Lifter

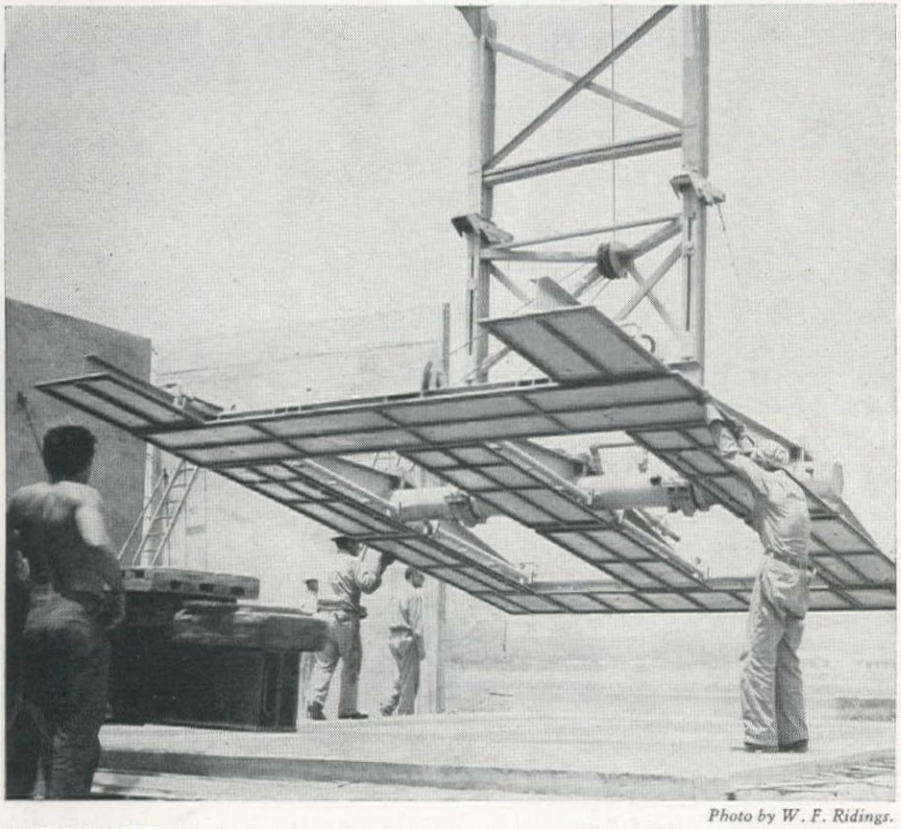


Photo by W. F. Ridings.

VACUUM LIFTER is steadied over next tilt-up panel to be erected. A and B assemblies of vacuum mats are in use; also, on near edge, two units of C assembly. Panel on casting slab is 26-ft. high, 18½ ft. wide, weighs 21 tons.

Four weeks sees completion of coordinated construction schedule — 65 reinforced concrete wall panels cast, cured and erected by tilt-up technique using vacuum lifter

SPEED OF ERECTION characterized construction of a bakery building in San Fernando, through use of a vacuum lifter to tilt up precast reinforced concrete wall panels. Over ¼ mi. of wall was so placed in 26 work hours by Myers Brothers, contractors, employing equipment and personnel of C. D. Wailes Corp. Location of the work was a new plant of the Guthrie Biscuit Co., an 86,100-sq. ft. structure of a design well adapted to tilt-up construction.

Typical tilt-up procedure has been generally described before in this magazine (*Western Construction*—May 1951, pp. 74-75); here the emphasis will be upon details of vacuum lifting and upon the timing of successive construction operations to show how well the tilt-up contractor can meet the criteria of speed and efficiency.

Design of building

The Guthrie building has a long dimension of 525 ft. in the east-west direction and is 164 ft. wide. In addition, a rail dock runs the length of the south side and truck loading docks adjoin the end walls. Wall columns, formed and cast in place after erection of precast panels, are, in general, 20 ft. on centers in the long walls, and up to 25 ft. on centers in the short walls. A row of steel columns divides the building longitudinally into two unequal bays of about 70 and 90 ft., respectively. Glued Summerbell trusses carry roof sheathing and built-up roof covering. The precasting job entailed 65 tilt-up panels, one remaining end panel to be cast in place. Panels of the north wall and part of the west wall were one-piece to the footing, with a horizontal beam section at the bottom. These were 26 ft. high and weigh over 20 tons each. Other panels were typically 21½ and 19½ ft. high. All had a net thickness of 6 in.

The vacuum lifter

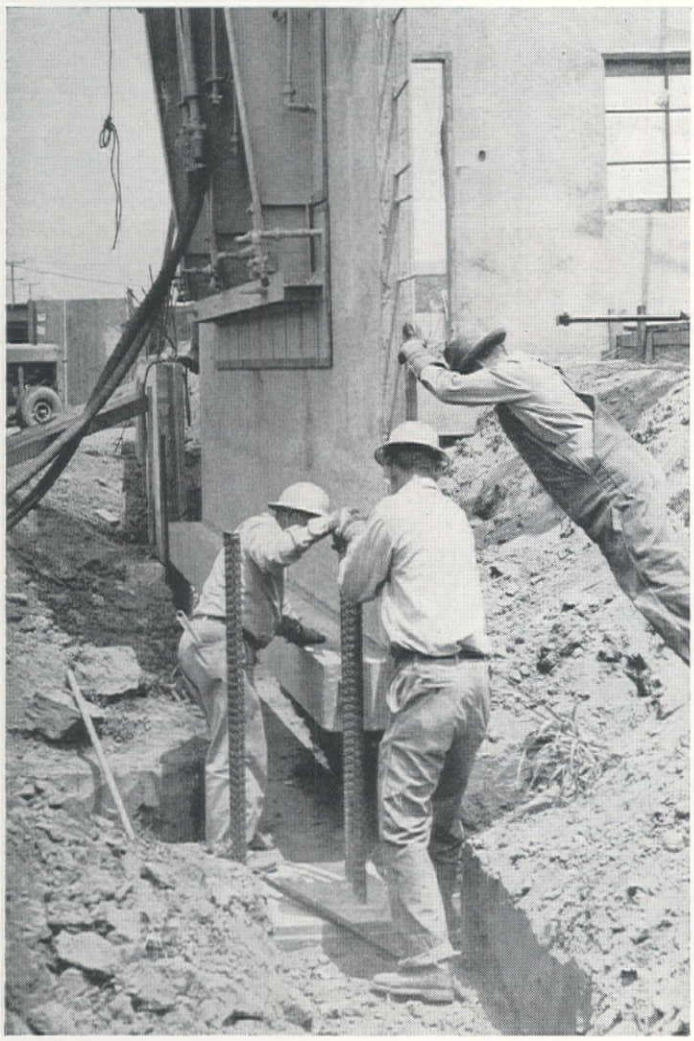
Basis of the lifter used to erect these panels is a rectangular steel frame having a horizontal central axis about which it may rotate through an arc of 90 deg. With all its vacuum cells, or mats, assembled, the lifter measures 15 by 24 ft., and has a capacity of 42 tons. Lift value is conservatively computed at 3 psi. in shear. When sections such as roof or floor slabs are handled without tilting to the vertical, a value of 5 psi. may be used.

In normal operation, only partial use is made of available vacuum facilities. The central "A" assembly of mats consists of 24 units in groups of 4, arranged above and below the lifter axis at the center and each side of the frame. At 1,620 lb. lift per unit, this assembly has a capacity of over 19 tons. Mats of the "B" assembly are located above and below the "A" assembly and are arranged in continuous rows across the frame. These mats may be removed if necessary; their aggregate capacity is 16 tons. The "C" assembly, readily demountable, extends 3 ft. above and below the rows of the "B" group. Consisting of two units at each side of the lifter frame, on both top and bottom edges, plus an additional pair at the middle of the bottom edge, the "C" assembly provides the final lifting increment of 7 tons.

The lifter has interesting and important features for safety and practicability of use. A safety chamber insures that vacuum can be maintained for a period in the event of a pump failure. When openings in a panel render vacuum mats ineffectual, such mats can be by-passed simply by closing their controlling valves.

Sequence of operations

As first operation in the tilt-up construction schedule, a 30-ft. band of the bakery floor slab was laid to serve as a casting bed, leaving the interior portion and a circumferential strip next to the walls to be placed later. The use of membrane curing allowed the setting of panel forms to start the following day. Forms of 1- by 6-in. material were stiffened at top and bottom by 2 by 4's placed flatwise. Blocking between 2 by 4's of adjacent panel forms was set to dimension properly the dowel rod extending from one form to the next. The 1 by 6's were bored for dowels and kerfed to simplify subsequent stripping, as their



WORKMEN GUIDE a 21-ton panel into position. This wall extended to footings below grade in loose soil, necessitating sloped excavation and an 8-ft. gap to the casting bed. Thus, heaviest lift was longest crane reach.

BRACING IS SECURED while vacuum lifter holds panel. Turnbuckles provide adjustment as required for transit alignment. Vacuum mats coinciding with panel openings are isolated from vacuum line by control valves.

reuse was found unnecessary.

Window assemblies were set accurately in position and weighted against the casting surface by heavy concrete blocks. Another use has been suggested for these blocks: on jobs where dock-height walls are to be precast and tilted up, adequate brace anchorage for such walls could be provided by burying the blocks and fitting them with bolts for brace attachment.

Panel forms were placed and panels cast for convenience in handling and erection. Inserts for brace anchors were accurately set, flush with panel surfaces, and properly corked to facilitate attachment. The panel layout provided in general for casting singly, but in some cases panels were "stacked" two or three panels high.

No extra panel steel used

Using the vacuum lifter, there was no need to use extra steel or stiffeners to bear lifting stresses, nor to provide the lifting inserts essential with other pick-up methods. All the panels, weighing from 14 to 21 tons each, were lifted clear of the floor in a horizontal position. Lifting, turning to a vertical position, and setting in place required less than two min. per panel. The time-consuming elements of erection were those of plumbing, aligning, and bracing. A transit was used to determine proper panel alignment.

The 40-ton crane of Hesse Crane Service was, of course, more than adequate for handling panels of the weights here involved. However, the convenience of extra crane capacity was well demonstrated in setting panels in the north wall. Sandy soil conditions here dictated a sloped excavation from floor level to footing grade, resulting in an 8-ft. gap from casting surface to final panel position. In placing these highest and heaviest panels, the crane had a reach of nearly 26 ft. from the center pin of its boom.

Tilt-up time schedule

Work started on laying of the floor slab on May 17. Casting of the 65 tilt-up panels was finished on May 29. Vacuum lifting began on June 11; all lifting, setting, and bracing was completed on June 13. In summary, the entire cycle of pouring the casting bed, forming and casting the panels, allowing time for them to gain the desired strength, and erecting all panels was completed in exactly four weeks.

The actual erection job was completed in 26 working hours, indicating an average of 2½ panels per hr. While handling of corners and a few other difficult situations doubtless slowed the operation temporarily, it is probable that compensating speed was attained in straight-wall erection, though speed is less important than accurate alignment and secure bracing.

It is generally agreed that speed and economy in tilt-up construction can only be the result of efficient layout, attention to detail, and competent supervision. The contractor's organization on this project operated under this principle. The smooth and consistent progress of the work, and the results attained are evidence of planning, coordination, and well-executed construction practice.

Personnel

Preston Construction Co. (a division of Safeway Stores, Inc.) was responsible for preparation of plans and for supervision of the work, and was represented on the job by W. F. Ridings. Kaj Theill of San Francisco and his associate, James M. Fox of Huntington Park, were the structural engineers. General contractor for the project was Myers Brothers of Los Angeles, with Paul Huntley, superintendent, in direct charge. C. D. Wailes Corp. furnished equipment and crew for erection of the precast concrete wall panels.

HOW IT WAS DONE . . .

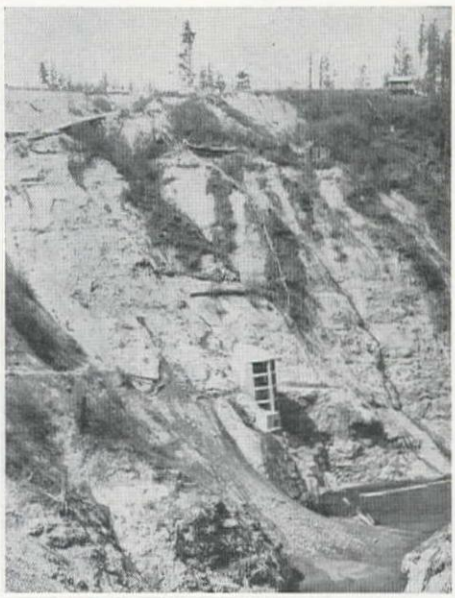
Highline Used to Install "Snorkle" On Nearly Vertical Canyon Wall

INSTALLATION of a 450-ft. vent or "snorkle" on a nearly vertical wall of the canyon upstream from Mud Mountain Dam was recently completed by M. P. Butler Co., Seattle, for the Seattle District, Corps of Engineers.

The vent, made up of 8-ft. lengths of 36-in. diameter bell and spigot concrete pipe, is connected to the outlet tunnel near the intake structure and will permit air to enter tunnel that carries the normal flow of the White River around the dam. Mud Mountain Dam is a flood control structure located near Enumclaw, approximately 47 mi. southeast of Seattle. Design and construction details of the dam were reviewed in *Western Construction*—August 1939, September 1940 and October 1941.

Erection of a cableway of 10,000-lb. capacity with a 1,500-ft. span from canyon rim to rim was necessary to carry out the project. All equipment and materials were handled by the cableway. In addition a stairway made from 2 x 6's with 2 x 4 cross pieces snaked its way up the face of the cliff. Ample hand and man lines were also provided.

First step in the operation of placing the vent was removal of 12,000 cu. yd. of material from a bulge in the cliff. Material on the cliff face was rock and hardpan, requiring drilling and shooting. A small shelf was excavated on this bulge and a light-weight wagon drill lowered by the cableway. Air for the drill was piped about 400 ft. from the top of the cliff. Holes were drilled from 12 to 20 ft. deep and the bulge removed in stages. Jackhammers were used for excavating the 6-ft. trench for the vent pipe. Some shooting was done on the pipe trench with approximately 75% of the trench excavation done by hand labor. Material removed, both from bulge and trench exavation, was wasted into the river.

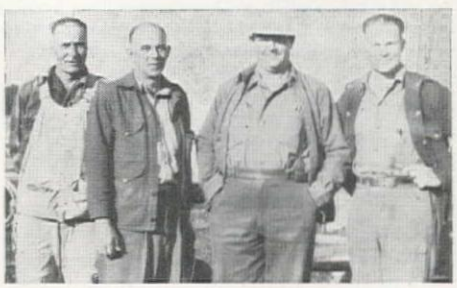


CONCRETE pipe vent was laid on canyon wall from near intake structure to canyon rim.

A large shelf near the base of the cliff prevented wasted material from falling freely into the river and a small tractor was lowered by cableway to the shelf to doze material into the river.

Specifications called for the vent pipe to be fully encased in concrete. Minimum thickness for this concrete was required to be: top, 1 ft., 6 in.; bottom, 9 in.; and 1 ft., 2 in. at sides. Where necessary, as in areas where the rock was loose, a small amount of forming was used. Pipe was laid on 4 x 4 sleepers laid in the trench and when required the pipe was wedged or blocked at the sides with pieces of wood. These pieces were removed as concrete work progressed. The contractor's crew averaged approximately 50 ft. of pipe per week, including excavation, laying pipe and placing concrete around it. Transit-mix concrete was lowered to the trench in a 1-yd. bucket.

The contract also called for installation of concrete cribbing at two locations near the intake structure and construction of a slide shed. Cribbing members were 6 x 12 and made up in sections. Stretchers were 6 ft. long and headers were 5 and 8 ft. in length. Tapping and connecting vent to existing tunnel was carried out under separate contract.



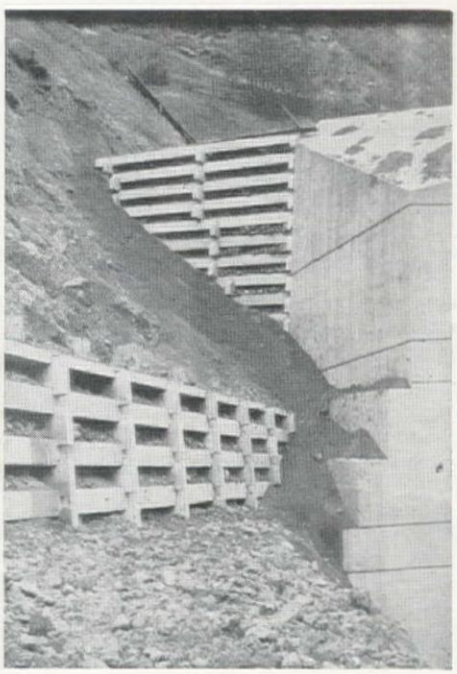
PRINCIPALS at Mud Mountain Dam vent job were, left to right: Otis Buzard, R. S. Butler, George Barker, and P. J. "Pete" Peterson.

The work was carried out under a $145,000 contract with the Seattle District, Corps of Engineers. Pipe and cribbing was supplied by Graystone Concrete Products Co., Seattle. Cableway for the project had a Young Iron Works frame and carriage that utilized a 3-drum Jaeger hoist.

P. J. (Pete) Peterson was general superintendent for M. P. Butler Co., with R. S. Butler as contractor's engineer. Otis Buzard acted as general foreman. Everett Talbot was resident engineer under the direction of George Barker of Seattle District, Corps of Engineers.

PIPE SECTION is lowered to ditch. Work was carried out from bottom of canyon to top.

CABLEWAY used also for lowering sections of concrete cribbing included in contract.



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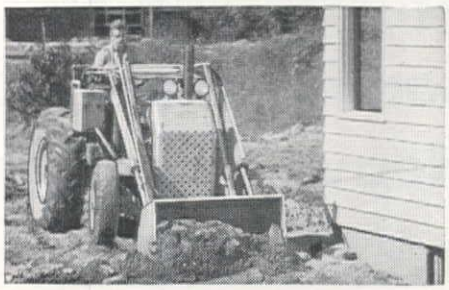


CONSTRUCTION WORK. Case "SI" Tractor completes grading and backfilling work at Bon Ami Homes project in New York. Moves over 200 yards per day.

ROAD MAINTENANCE. Loading debris into trucks after grader has scraped ditch—cuts time and man hours. Shown on the job for a town in Pennsylvania.

COAL YARDS. Compact, maneuverable Case "SI" helping load a 16-ton coal truck in Lakewood, Ohio. Moves quickly from one coal pile to another.

SAND AND GRAVEL PLANTS. Here the Case Tractor speeds the loading job for a gravel plant at Ft. Atkinson, Wis. Faster loading cuts trucking time, boosts income.

QUARRIES. Moving heavy loads of cut stone at Lannon, Wisconsin. Owners say Case "SI" Industrial Tractor stands up well on this hard, gruelling work.

Prestressed Underpinning in Sandy Strata Supports Heavy Buildings

UNDERPINNING and foundation contractors have completed a critical job in connection with construction of the new Hastings Law College at the corner of Hyde and McAllister Streets in San Francisco. Here, as in many other areas of the city, the ground is composed of a fine grade of unstable beach sand which requires great care in the placement of retaining timbers and underpinning elements wherever extensive excavation is necessary. The method and character of underpinning the buildings adjoining the site was generally controlled by the type of structure, the loads to be transferred and the division of responsibility of the owners concerned.

Pit-type underpinning

Consequently, as rapidly as legalities were settled and the individual owners could engage engineers to provide for their requirements, the D. J. & T. Sullivan Co. of San Francisco brought in crews and equipment to do the work. Installation of the interrupted pit-type underpinning under a light two-story brick wall started first. On this, the structure was in comparatively good condition and excavation of the staggered series of pits and converging of building loads by conventional methods progressed without noteworthy incident.

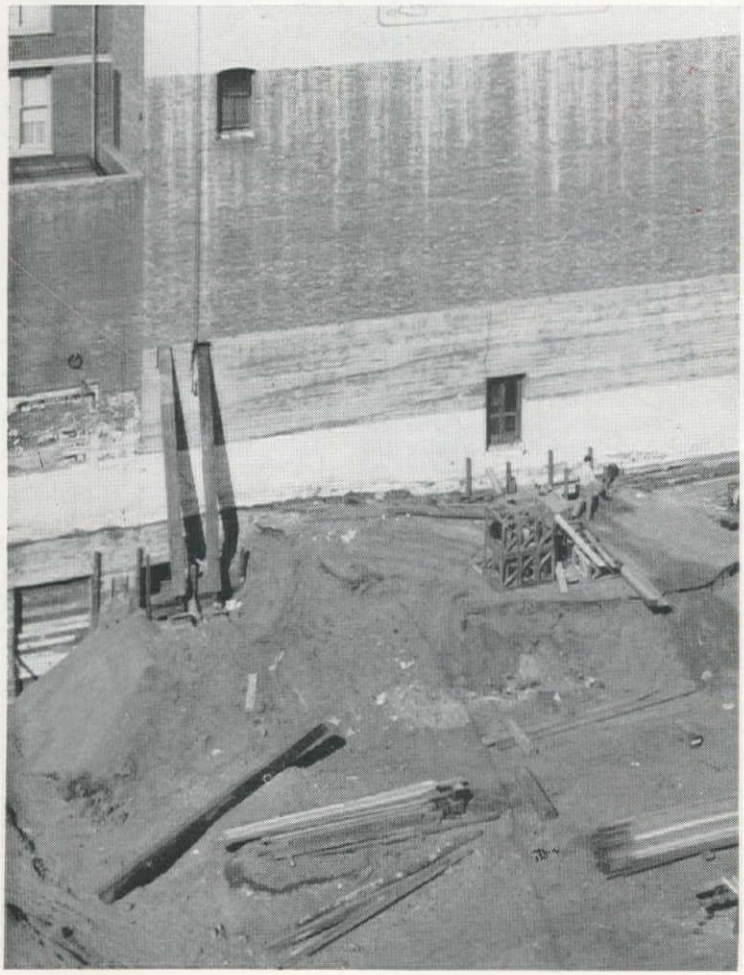
Dangerous settlement

However, in the case of the Eagles Building, examination disclosed that the 28-in. thick continuous bearing footing was without reinforcement and possibly undersized. Both it and the brick wall rising about 8 stories above had cracked and settled dangerously. It was therefore imperative that the weight of this building be transferred to the new foundations without movement and to protect it from a future long term settlement which might result in destruction. Accordingly, by prestressing all materials and members, the work was accomplished successfully.

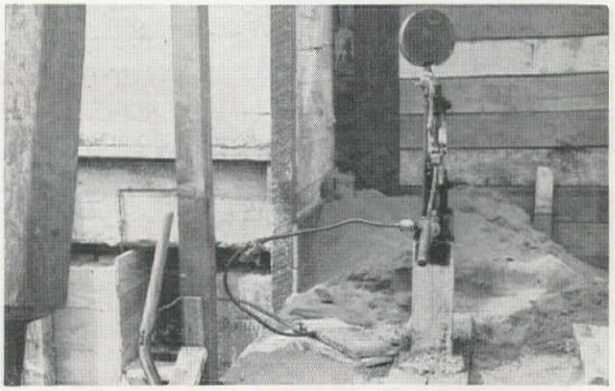
The work began with the installation at each corner of supplemental relieving shores, one end of each shore reacting against a socket chipped out of the brick facing. The other end, at the base, was prestressed with 60-ton screw type jacks. These jacks permitted the shores to be continually stressed as soil consolidation at their base occurred. The load on these timbers was calculated at about 30 tons each while, to induce rapid compaction and consolidation of the sub-soil at the underpinning sections, a 25 to 35% overload was imposed by hydraulic jacks. This maintained the prestress until consolidation had ceased over a 24-hour period. Final closure of the sections was accomplished by force placing of dry-pack material.

In regard to the aspect of keeping measurements, the density and consolidation of the soil below the pit sections could be checked by periodic readings of the pressure gauge on the jack cylinder. Besides this, a mechanical gauge was made up with a simple lever and fulcrum as a double check. A series of remote bench marks from neighboring buildings was continually used to sight against level marks on the side of the job. Upon completion, no settlement nor lateral displacement was detected.

AT CORNER of Eagles Building, braces and jacks prestressed load bearing areas to forestall shifting during excavation of pit and installation of permanent members. Both the bearing footing for the old building and 8-story brick wall had cracked and settled dangerously. Note crack over window.



CLOSE-UP of corner pit. Line from jack pump runs between timbers to cylinder hidden in pocket at head of sunken column. Safety auxiliary equipment here included short mechanical screw jacks (not visible) above column and a rod-and-lever mechanism to supplement readings of gauge on hydraulic line.



WORKMAN takes reading (below) on pressure gauge of hydraulic jack. Indicating needle gave continuous and accurate picture of stability of soil which was necessary to assure final and correct prestressing loads. Supplemental prestressed bearing shores are visible.

Jumbo Lathe Solves Specs Problem for "Camel" Logs

INSTEAD of requiring "camel" logs with the usual natural taper, specifications for a steel sheet-pile and concrete bulkhead called for a fender system made up of sixteen 32-ft. floating camels that were of a uniform 24-in. diameter.

In contracting to construct the bulkhead at the Spencer Kellogg & Sons plant on Terminal Island, Long Beach, Calif., Ben C. Gerwick, Inc., San Francisco, had to find a method to turn down logs ranging from 26-in. diameter at one end to as much as 48 in. at the other, either by use of a lathe or with hand labor and adzes.

Fender camels are logs moored end-to-end in the water along a bulkhead dock or other waterfront structure to provide protection to the fender system and spread force of impact in the event a ship moves against the structure. Generally the natural taper of logs is used, but designing engineers felt that in this instance the uniform diameter would tend to spread the load of any impact more evenly.

Constructing lathe

The problem of turning down the logs was given to H. G. (Hap) Wentworth, the enterprising foreman at the firm's Richmond, Calif., yard. As a considerable amount of cutting would be required to reduce the logs to the required diameter Wentworth ruled out hand labor as too slow and costly and set about erecting his own lathe by assembling various "on hand" items in the yard. The only pieces for the lathe purchased or fabricated outside the yard were the cutter head and its bearings and the two rims or riding bearings for the logs. Total cost for these items was about $100.

For the lathe's bed two 10-in. steel H-beams, 40 ft. long, were laid parallel to each other on four timber sleepers spaced along their length. Laid together with the web vertical they were joined together by plates welded at each end. Two 10-in. wheels, made from fibre wheels turned down to the desired size, were used at each end of the logs as bearings or idler wheels. These were supported above the steel beams by two short pieces of scrap steel. Bolts were used as axles for the wheels and a cross piece was placed axle-to-axle to keep the bearing wheels from spreading under the weight of the logs.

H. G. "Hap" Wentworth, left, assembled odds and ends in the yard to make jumbo lathe for turning down logs to a uniform diameter. Operator Robert Bond moves cutter carriage along length of log as it is turned at one rpm.

Carriage track

Two more beams, of the same size, were laid parallel to each other alongside the other two to form a track for the cutting carriage. These two beams were laid with the flanges vertical and also were held together with plates welded at their ends. The carriage or cart, to carry the cutting tool and the 7½-hp. electric motor that powered it, was 3 ft. square and constructed from scraps of steel and rode the "track" on four wheels taken from an unused mine cart.

Cutter head

The cutter head, made outside the yard, was constructed from a 4-in. piece of cold rolled steel and had two U-shaped blades. The blades had a square base and were 6 in. wide at the bottom of the U and extended 3 in. from the shaft. Two V-belts were used to connect the motor to the pulley wheel on the shaft of the cutter bar. The cart was moved along the length of the log by the operator while the cutting was being done. A shield was installed over the cutter bar to protect the operator from flying chips.

To maintain a uniform cutting depth of 5/8 in., and move the cutting tool closer towards the center of the log, Wentworth attached two large turnbuckles between the two sets of beams, one at each end. After the cutting tool made a pass over the log the turnbuckles were tightened to bring it closer to make the next cut. Incidentally, with this control the lathe would have been able to turn out a spar that was tapered from 18 in. at the butt to 8 in. at the tip.

Production method

The ends of the log were reduced to the desired diameter by hand and the steel rims mounted over them. Logs were then lifted by hoist and placed on the lathe with the rims setting on the bearings or idler wheels. To keep the logs from traveling endwise and slipping off the bearing wheels two pins were attached to the center of the rims and fastened to the beams.

A one-ton compressed air powered tugger hoist was used for placing the logs on the lathe and to provide power to turn them during the cutting operation. A sheave was mounted on one of the rims and a continuous belt ran around it, the boom of the hoist, and the hoist's engine drum.

Using a three-man crew, the operator, one man preparing ends of logs, and one hauling away chips, the lathe turned out three finished logs ir one normal working day.

CHIPS FLY as one of the sixteen 32-ft. long logs is turned down to a uniform 24-in. diameter. Hoist at right was used to place logs on lathe and to revolve them during the cutting operation. Man at right is preparing end of next log to fit rim that acts as bearing surface.

CONSTRUCTION DESIGN CHART

By
JAMES R. GRIFFITH
Seattle, Wash.

CXXXIV ... Column Reinforcement for Ratio

WHEN DESIGNING reinforced concrete columns, it becomes necessary to translate the ratio (p_g) into terms of vertical reinforcement. The ACI Building Code[1] defines

p_g = ratio of the effective cross-sectional area of vertical reinforcement to the gross column area A_g

When a spiral reinforced column is cast as a square column, the gross area (A_g) is conventionally computed as a circular column having a diameter equal to the side of the square. The ACI Code, par. 1103(h), states

"As an exception to the general procedure of utilizing the full gross area of the column section, it shall be permissible to design a circular column and to build it with a square, octagonal, or other shaped section of the same least lateral dimension. In such case, the allowable load, the gross area considered, and the required percentages of reinforcement shall be taken as those of the circular column."

The accompanying chart is solved by the use of two straight lines intersecting on the "Support." I have drawn solution lines on the chart for the following assumptions:

Given: Spiral reinforced concrete column with an outside diameter of 16 in., also applicable to a 16 x 16-in. square column having a spiral reinforced core.

$p_g = 0.03$

Solution line (1) has been drawn between these values on their respective (A) scales. Using the intersection of line (1) on the support as a point of rotation, the various possibilities of bar combinations may quickly be determined. Line (2) has been drawn for 1-in. square bars, indicating that six such bars are slightly under the requirement. In order to check this result we have

Area of a 16-in. circle, $A_g = 201.06$ in.^{2}

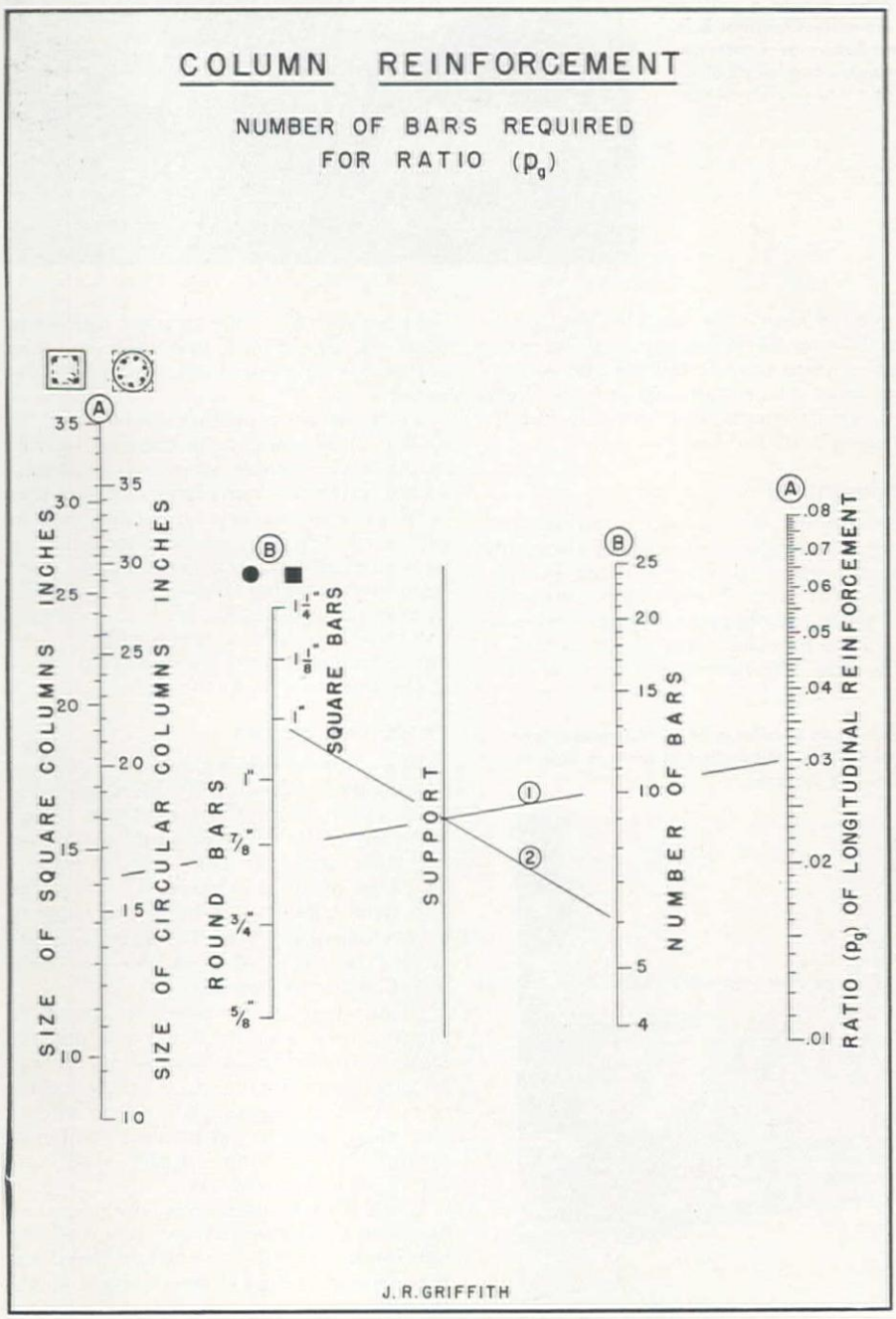
Area of steel $= p_g \times A_g = 0.03 \times 201.06$
$= 6.01$ in.^{2}

The area of six 1-in. square bars is 6.00 sq. in., and while slightly deficient, would probably be used.

The conventional column formula used for reinforced concrete is

$$P = A_g\,(0.225\,f'_c + f_s p_g)$$

which gives the total load allowable on a spiral reinforced concrete column. The allowable load on tied columns is taken[1] as 80% of that given by the above formula. Whether the designer assumes a value of (p_g) and solves for the total allowable load for an assumed column size, or solves for (p_g), it is a factor which must always be changed to terms of reinforcing bars.



[1] *Building Regulations for Reinforced Concrete*, 1941, American Concrete Institute.

Collapsed Cofferdam Cell Delays Work at McNary Dam

REPLACEMENT of Cell No. 52 in the Washington channel of the downstream wing of main second-step cofferdam at McNary Dam, which collapsed during flood-flow, will not be undertaken until the Columbia flow returns to normal summer volume.

Great pressure caused by high water and undercutting of the cell's foundation resulted in the collapse. The cofferdam inclosure, totaling some 43 ac., already was flooded by high water in the Columbia River, preventing any work in the area. It will be necessary to replace the cell before the area within the cofferdam wings can be unwatered, permitting excavation to solid foundation. Replacement will start as soon as river flow over the cofferdam stops. Meanwhile contractors will turn their attention to work on the powerhouse and other phases of construction.

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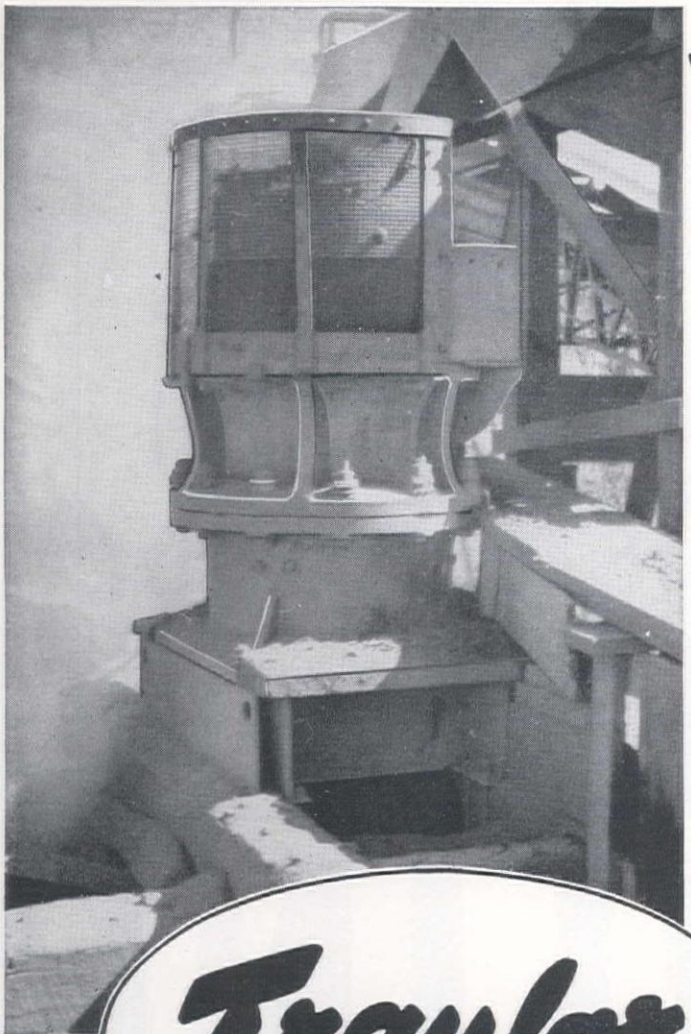

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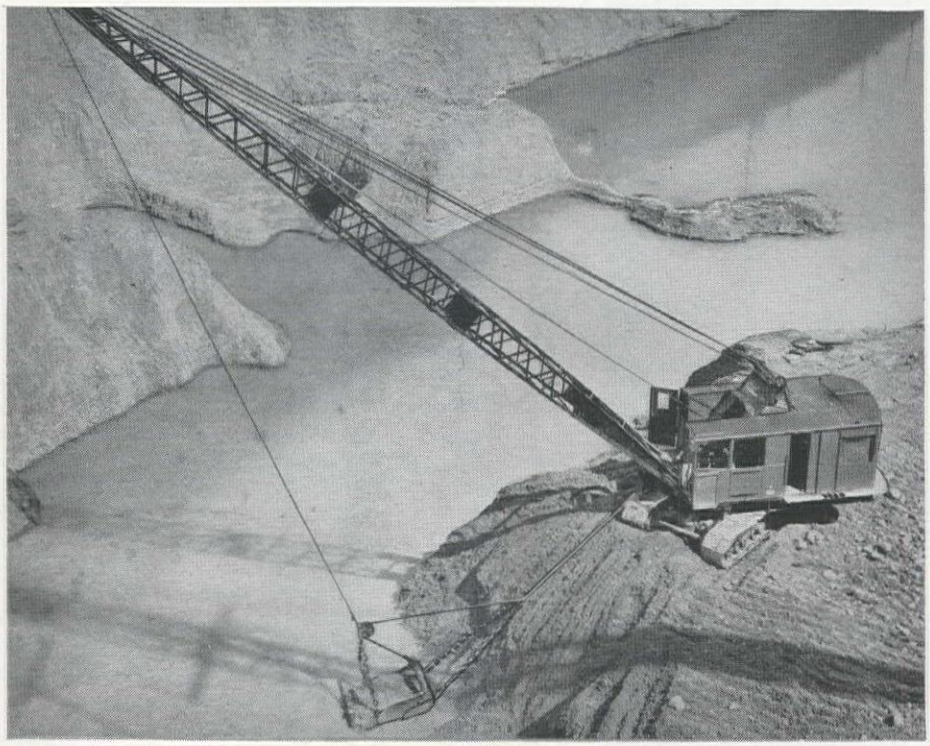

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NEWS OF WESTERN CONSTRUCTION AUGUST, 1951

Long Range Plan to Beat Utah Water Shortages

RELIEF of water shortages in central Utah, principally in highly developed Bonneville Basin, is the objective of a 16-year construction program outlined last month by the Bureau of Reclamation. This first of two phases of the Central Utah project is seen as an integral part of the Bureau's plan for eventual coordinated multi-purpose control of stream flows in the upper Colorado River basin.

Lands of the Central Utah project lie on both sides of the Wasatch Mountains, western boundary of the Colorado River watershed, with water resources of Uinta Basin, tributary to the Colorado, designated as the supply to be developed under the project. Benefits eventually to be derived would include full irrigation water supplies to about 147,500 acres in Bonneville Basin and to 52,000 acres in Uinta Basin, and supplemental water supplies to 135,500 acres in Bonneville Basin and to 104,400 acres in Uinta Basin. An additional 48,800 acre-feet of annual water supply would be provided for municipal and industrial purposes. Hydroelectric capacity of 249,000 kw. would derive from project installations, including 231,000 kw. for use in Bonneville Basin.

Recommended for the initial phase of the project are those units that would most readily relieve water shortages in Bonneville Basin, expanding center of Utah's economy. Estimated construction cost for this phase is $198,840,000, of which all but $2,570,000 would be repayable to the federal government over a period of years. Benefit-cost ratio of the initial phase, computed over 100 years, is 1.2.

Collection of Uinta Basin waters for Bonneville Basin would involve a 37-mi. aqueduct tapping seven streams and necessitating construction of three dams. Arriving at Strawberry River, the water would flow into a 1,370,000-acre-foot Strawberry Reservoir, to be impounded by construction of Soldier Creek Dam 9 miles downstream from the existing dam.

From Strawberry Reservoir the water would drop through three power plants having an aggregate installed capacity of 55,000 kw., to reach Monks Hollow Reservoir. From here, via the Wasatch aqueduct, the water would flow 8 mi. to a division point in Spanish Fork Canyon. Beyond this point, north and south branches would convey the water to areas of agricultural use between Salt Lake City and Nephi. Additional hydroelectric power would be developed along these branch aqueducts.

In certain areas, municipal and industrial water requirements as estimated for the next 50 years would be met under the initial phase of the project. Such areas include Salt Lake and Utah counties and Nephi in Bonneville Basin, and eastern Duchesne County and Ashley Valley in Uinta Basin. All communities of Salt Lake County could be benefited except Salt Lake City and those communities west of the Jordan River that are inaccessible for gravity flow. Cost of municipal water in Bonneville Basin would be about $30 per acre-foot; and in Uinta Basin, between $24 and $29.

Apportionment of Federal-aid Funds in West

DETAILED APPORTIONMENT to the states of Federal-aid highway funds for the fiscal year 1951-52 has been made by the Department of Commerce on the basis of revised results of the 1950 report of the Bureau of the Census. Total allotment to the 11 Western States and Hawaii amounts to over $91,000,000, or nearly 18½% of the national total of $485,000,000. Apportionment by state and classification of road appear in the following table:

	Federal-Aid Highway System	Secondary or Feeder Roads	Urban Highways	Total
ARIZONA	$ 3,308,306	$ 2,253,807	$ 473,230	$ 6,035,343
CALIFORNIA	10,244,021	5,282,861	10,850,592	26,377,474
COLORADO	4,011,724	2,678,449	1,015,600	7,705,773
IDAHO	2,758,529	1,939,651	234,784	4,932,964
MONTANA	4,513,057	3,103,036	287,653	7,903,746
NEVADA	2,885,661	1,928,176	92,960	4,906,797
NEW MEXICO	3,646,852	2,503,839	401,259	6,551,950
OREGON	3,838,173	2,680,584	978,738	7,497,495
UTAH	2,568,068	1,698,505	517,205	4,783,778
WASHINGTON	3,701,693	2,477,755	1,835,635	8,015,083
WYOMING	2,774,425	1,879,889	132,717	4,787,031
HAWAII	1,091,250	727,500	410,687	2,229,437
TOTAL	$45,341,759	$29,154,052	$17,231,060	$91,726,871

NEW STEEL TRESTLE FOR WASHINGTON BRIDGE

MORE THAN 1,700 tons of structural steel, representing the first major job to be fabricated at Bethlehem Pacific's new Seattle Works, is shown below in the new North approach to highway bridge, Longview, Wash. The new trestle-type structure is 1,507 ft. long. The original wooden timber approach, a portion of which is still standing, will be replaced eventually with a dirt fill. New approach was designed by State of Washington Highway Department. Guy F. Atkinson, San Francisco, was general contractor and steel erection, which has just been completed, was handled by Bethlehem's Erection Division. Steel work for the bridge proper was fabricated about 1930.

SIX HARD MILES OF HIGHWAY LAID IN FIVE LONG YEARS

ENOUGH DYNAMITE for a small war, and enough sweat for several construction jobs, went into the laying of a highway across Colorado's Grand Mesa, one of the largest flat-top mountains in the world. Crews of Colorado Contractors, a joint-venture, blasted through rugged basalt and solid ice and withstood high altitude conditions to build the 27-ft. wide gravel surfaced roadway from Skyway to Mesa. Pictured above is an International TD-24 tractor supplied by H. W. Moore Equipment Co., Denver, at work for Brown Construction Co. on its part of the $1,000,000 job.

Feather River Bonds Get Governor's Signature

THE FEATHER RIVER project of California (*Western Construction*—July 1951, p. 73) passed its first hurdle in July with the signing by Governor Warren of a bill authorizing the Water Project Authority to issue revenue bonds for construction of the project. Proposed as a feature of the California Water Plan, a comprehensive plan for the control, conservation, and utilization of all the waters of the State, the Feather River project will complement existing and contemplated units of the federal Central Valley Project.

Spectacular nature of the project is illustrated by the unprecedented inter-watershed transfer of water which it makes possible. Conserved water from the 711-ft. Oroville reservoir will be used to augment and stabilize Sacramento River flow into the central valley delta, whence a system of pumping plants and canals will convey the water to Santa Clara and Alameda counties in the San Francisco bay area, as well as to southern San Joaquin Valley and, finally, the water-deficient areas of Southern California as far as the Mexican border.

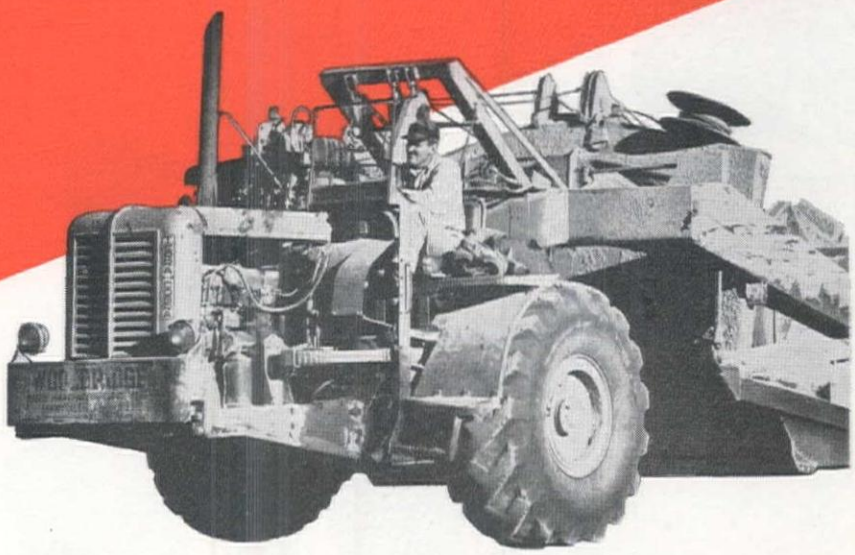
Feasibility report on the Feather River project was adopted by the State Legislature in June, following its submission by the State Water Resources Board. Engineering studies of the report were conducted for the Board by the California Division of Water Resources under the direction of A. D. Edmonston, State Engineer.

Yuma Project Division Goes To Local Water Group

ARRANGEMENTS were made for transfer on July 1 of the care, operation, and maintenance of the Valley division of the Yuma project to the Yuma County Water Users' Association in conformance with a contract negotiated with the Association by the Bureau of Reclamation. The Valley division has been operated by the Bureau since water was first available in 1912. The Bureau will continue to operate the Reservation division and Yuma auxiliary project.

Out of the Frying Pan...

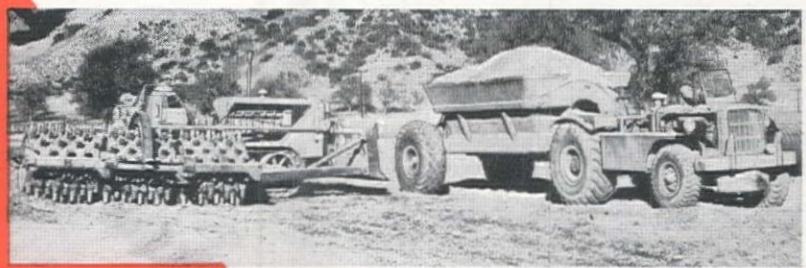
..into the Freezer!



It's one temperature extreme and then the other for the roadbuilding equipment on N. M. Ball Sons' contract to widen and improve 11½ miles of Highway 99 through the crest of the famed Ridge Route between Los Angeles and Bakersfield. The job began last spring, sweltered through a 100° summer, shivered through a below freezing winter and now is in the midst of summer again.

In snow and muck . . . heat and dust, General Petroleum Lubrication Engineering Service has kept all equipment rolling without a single breakdown due to lubrication failure, according to job superintendent E. "Frosty" Frost. G.P. supplies all the fuels and lubricants for the three Northwest Drag Lines, six Woolridge Terra-Cobras, eleven Caterpillar DW-10 wagons and eight Caterpillar D-8 Bulldozers on the job.

Northwest Drag-line excavates shoulder of highway. These units are in operation the year-round.



Caterpillar wagon removes dirt from rough grade while D-8 Bulldozer with sheep-foot roller compacts fill area. Preventive maintenance techniques provided by General Petroleum have allowed continuous operation under severe conditions.

Take Advantage of G.P. Lubrication Engineering Service On Your Jobs!

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

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First Unit of B. C. Power Project Hits the Line

FIRST UNIT of an ultimate 66,000-hp. hydroelectric development of the British Columbia Power Commission went on the line recently in opening ceremonies of the Whatsan development about 90 mi. southeasterly from Vernon, B. C. Capacity of the Whatsan development is over twice that of the three plants it replaces. Of the latter, the hydro plant at Shuswap and the coal-steam plant at Kamloops will be retained for stand-by and emergency use, the obsolete Barriere hydro plant to be dismantled.

Surveys of the Whatsan development in 1944 and 1945 led to the start of its construction in September 1948. The project includes two dams on the Whatsan River, a tributary of Lower Arrow Lake on the Columbia River, and nearly 2½ mi. of hard-rock tunnels and shafts for diversion of the impounded water to a powerhouse on Lower Arrow Lake, operating on a head of over 700 ft. Tunnel excavation, completed in 19 months, involved 63,000 cu. yd. of rock and 25,000 cu. yd. of concrete lining. Diversion dam of the power development, an earthfill structure 35 ft. high, was designed to permit enlargement at a future date to develop the full capacity of 74,000-acre-foot Whatsan Lake, an upstream reservoir impounded by a 600-ft. long dam.

The two 16,500-hp. turbines presently installed were built by Canadian Allis-Chalmers. Generators are 6,900-volt units by Canadian General Electric.

Man-made Channel Tastes Colorado River Water

TWELVE MILES of man-made Colorado River channel between Needles, Calif., and Topock, Ariz., first received waters of the river on June 25 when engineers of the Bureau of Reclamation dynamited a sand plug at the mouth of the new cut. The new channel, 200 ft. wide and 17 ft. deep, by-passes a reach of meanders and miles-wide flood plain that had constituted a flood hazard to Needles and supported extensive growth of wasteful water-loving swamp vegetation.

Construction of the new channel commenced in February 1949 by the Bureau of Reclamation's hydraulic suction dredge "The Colorado" (*Western Construction*—June 1950, pp. 96-98) and was completed in April 1950 after removal of almost 9,000,000 cu. yd. of material. Subsequent efforts have been devoted to protective works for bank stabilization in the area.

Deterioration of the natural river channel by 1944 gave rise to fears not only that possible flood releases from Hoover Dam would endanger Needles, but also that the city would incur damage from seepage. Emergency funds provided by Congress financed temporary protection while concurrent investigations sought a permanent solution. Outcome of these studies was the plan for the new, defined channel to eliminate completely the flood hazard.

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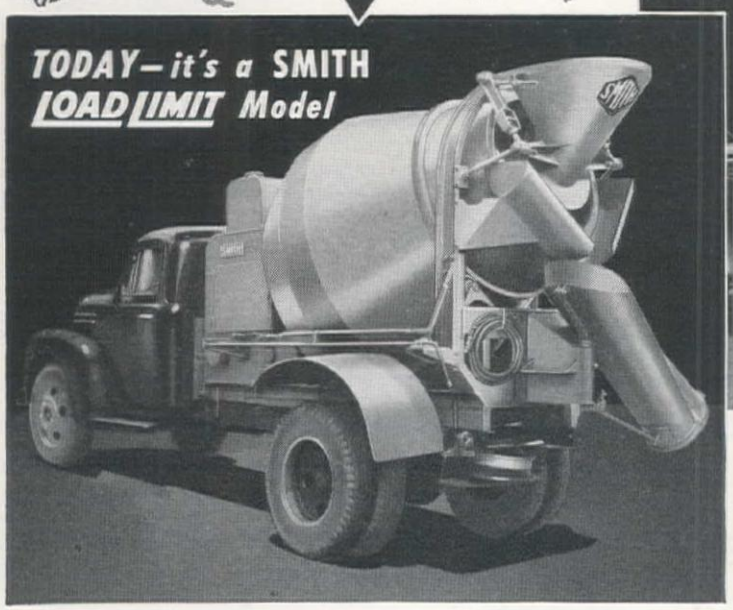

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Smith-Mobile LOADLIMIT models give you just what you are looking for...lower weight ...lower initial cost...less maintenance... BIG payloads . . . and greater profits. 4 sizes available. And remember, these sturdy machines carry identically the same factory warranty as standard Smith-Mobiles.

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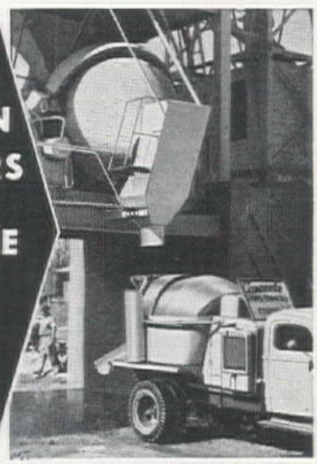

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Bureau of Public Roads Given Highway Authority

THE BUREAU of Public Roads has been delegated authority to authorize commencement of construction on highway projects under National Production Authority Order M-4. Pertinent items relating to such highway projects include construction and maintenance of rural and urban highways, streets, highway equipment repair shops, highway bridges and tunnels, and toll road facilities, and operation, including traffic control, of the highways themselves.

Application forms for authority to begin project construction may be obtained from field offices of the Department of Commerce and, when prepared, should be directed to the District Engineer of the Bureau of Public Roads in the project state. Applications submitted by other than a state highway agency should be directed through the state highway agency for prior recommendations.

Although the Defense Transportation Administration is authorized to process applications under NPA Order M-4 for new construction in the internal domestic transportation field, such authority relates to the regulation of public carriers operating over the highways and to terminal and wayside facilities used by public carriers. Authority of the Bureau of Public Roads, on the other hand, covers all construction, maintenance, and operation of the highways themselves, as noted above.

General criteria for acceptable construction projects include: identity as a project for the Department of Defense, the Atomic Energy Commission, or the National Advisory Committee for Aeronautics; or identity as a project furthering the defense effort or being essential to the public health, safety, and welfare. Types of highways particularly referable to the above include legally certified access roads, urban or rural sections of interstate highway system routes, and sections of routes which are inadequate and unsafe and cannot be retained in service over a 10-year period without excessive maintenance, vehicle depreciation, and vehicle operation costs.

Designs for all proposed projects should incorporate a minimum of critical materials. Permits are not required for projects using less than 25 tons of steel.

Pontoons Replace Float Logs To Defeat Waterlogging

PROBLEMS of teredo infestation and waterlogging of float logs used by many Canadian waterfront facilities are expected to be solved by substitution of pontoons constructed of creosoted douglas fir plywood. Present prospects are that the three-year life of cedar float logs will be greatly exceeded by the new pontoons.

Practicability of a plywood pontoon installation being done by the Canadian government for its Westview wharf in Vancouver will be observed with interest by many other waterfront float users, among them canneries, shipyards, etc.

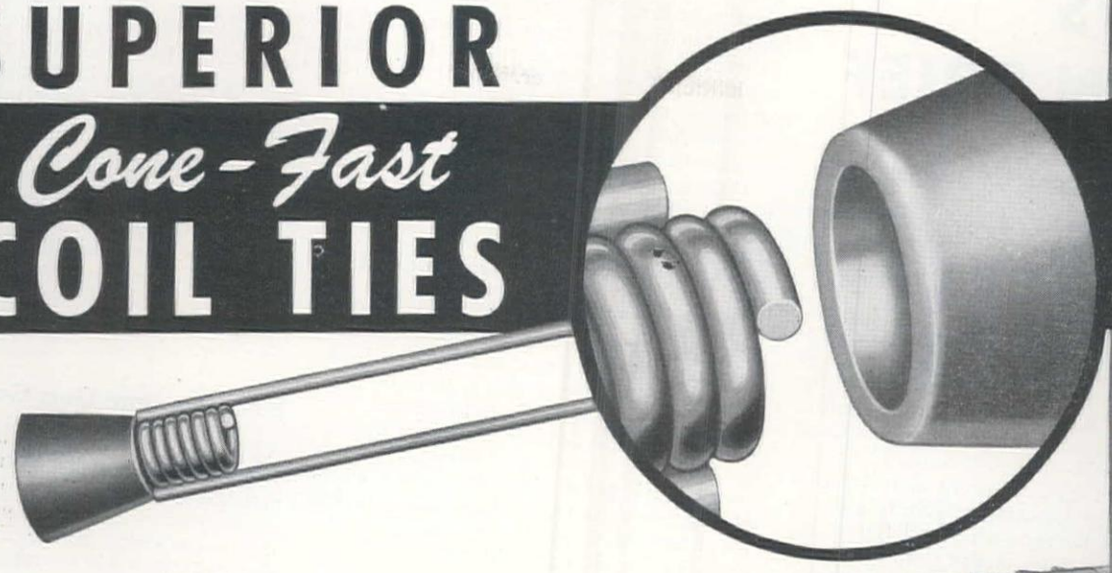
Pontoons for the Westview wharf are constructed of Sylvaply waterproof-glue plywood ⅝ in. thick in panels 10 ft. long. A total of 14,000 sq. ft. of plywood were given a coal tar creosote pressure treatment by the Canadian Creosoting Co., Ltd. The contract includes 93 pontoons, each 4 by 10 ft. in plan and 2 ft. deep. Complete penetration is achieved in the treatment, using 24 lb. of creosote per cu. ft. of plywood; the panels may then be sawn, bored, and fabricated without exposing any untreated surface.

2nd Annual Report Due from Colorado River Commission

THE UPPER Colorado River Commission announces the forthcoming publication of its Second Annual Report. A record of the Commission's activities during the year ended March 15, 1951, the report contains particularly the views and recommendations of the commission presented to the President's Water Resources Policy Commission.

Copies of the report, at $1.15, are available to the public. Address the Upper Colorado River Commission, 520 Rood Ave., Grand Junction, Colo. Copies of the First Annual Report, containing basic information as to the development, conservation, and utilization of Western waters, are also available. The price is $1.35 per copy.

SUPERIOR *Cone-Fast* COIL TIES



YOU CAN CUT YOUR FORM COSTS!

Because the cost of form work is a prime factor in the total cost of bridge piers and abutments, retaining walls, filtration and sewage disposal plants, and other engineering projects, it is obvious that the forming phase offers the greatest opportunity to save material and reduce labor costs.

The use of Superior Cone-Fast Coil Ties is one direct means of cutting costs and here's why: The *exclusive* feature of this tie is the extension of the coil beyond the ends of the wire struts (enlarged detail above) which allows a reamed Coil Cone to be fitted snugly in place before the opposing panel is erected. No separate gadgets are required. Cone-Fast ties are practically a "must" when large panels are used on walls where the workman cannot get inside the forms. Cone pointed Coil Bolts are easy to engage because of the large square openings in the cones. Bolt Holders (shown on panel form) keep bolts and washer on panel when stripping and moving for reuse.

Cone-Fast Coil Ties are available for Coil Bolts ½" to 1¼" in diameter and can be used with all types of forms. All working parts are returnable. For maximum efficiency plan your form work with SUPERIOR Cone-Fast Coil Ties.

REQUEST a copy of our 56-page catalog. It contains a valuable table for spacing studs, wales, and form ties.

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NEWS IN BRIEF

CVP in Full Operation August 1

FULL OPERATION of the California Central Valley Project works begins August 1, when the mighty San Joaquin and Sacramento Rivers go under "push-button" control.

A gate will be opened by electrical impulse at Shasta Dam and trapped flood waters will hurry through a complex system of gauges, turbines, siphons, meters, etc., to emerge ten days later in Bakersfield—500 miles away.

The main control point for the vast network is in Sacramento where all conditions will be tabulated and the water needs of various areas will be met. Legislation is pending before Congress for additional funds to further the control of rivers in the State and harness the water for use in farm lands where drought conditions prevail.

USBR Calls Glen Anne Dam Bids

BID CALLS were issued by the Bureau of Reclamation July 3 for construction of the Glen Anne Dam, Santa Barbara County, Calif., a unit of the Cachuma Project. The earthfill dam would be 102 ft. high, 250 ft. long, and form a reservoir of 500 acre-feet capacity on the west fork of Glen Anne Creek 4 mi. northwest of Goleta. A 7-ft. diameter horseshoe-shaped tunnel outlet, reinforced concrete chute-type overflow, stilling pool and a wasteway are called for in the specifications. Upstream face of the dam will be protected by either a rock rip-rap or asphaltic concrete layer. The alternative asphaltic concrete covering is a recent innovation in Bureau of Reclamation specifications.

Bids will be opened August 7 at Cachuma Project offices, Goleta, Calif.

Marble Canyon Cableway Moved

FOLLOWING INSTALLATION of a cableway at Mile 32.8 on the Colorado River in Marble Canyon (*Western Construction*—October 1950, p. 69) the Bureau of Reclamation's field forces diamond-drilled and made geologic investigations of the potential dam site there. Investigations at this site being completed, the cableway is being dismantled for removal downstream to Mile 39.5 dam site for similar field studies.

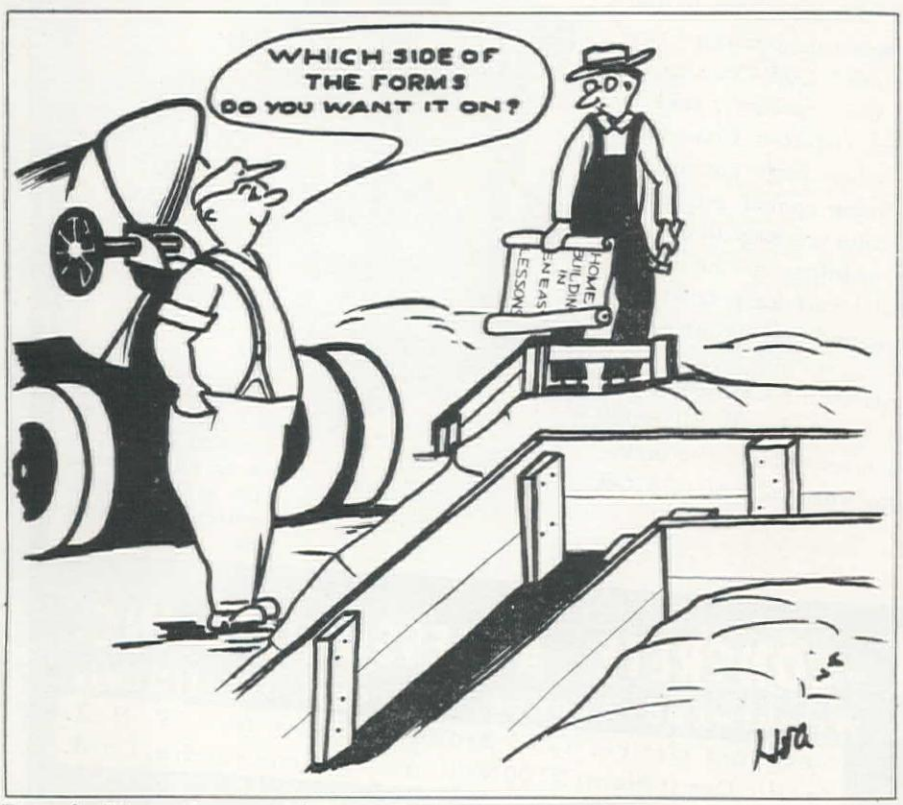
Canada to U. S. Gas Line Proposed

THE MONTANA Power Company, Butte, Mont., has filed an application with the Federal Power Commission proposing construction of pipeline facilities which would be used to import natural gas from fields in Alberta, Canada, into Montana.

Gas would be imported from fields in the Pakowki Lake in southeastern Alberta. The gas is to be produced and transmitted in Canada by two newly-formed subsidiaries of Montana Power. Included in the proposed importation of natural gas are about 18 mi. of 16-in. line extending from the Pakowi Lake area to a point on the Canada-Montana border, and approximately 52 mi. of 16-in. line extending from that point to a connection with Montana Power Company's existing system near Cut Bank, Mont. The 18 mi. in Canada would be owned and operated by one of the new subsidiaries.

Reserves of the Montana Power Company have been depleted to the point where curtailment of industrial gas loads seems necessary unless new supplies can be found. The application to the FPC gave no estimate concerning the cost of the proposed pipeline facilities.

Down-time Dopes . . . . . by Anderson



Drawn for *Western Construction* by Harold V. Anderson

Palisades Dam Gets Go-Ahead

APPROVAL was given by the Defense Electric Power Administration for construction, by the Bureau of Reclamation, of Palisades Dam and power plant on the main stem of the Snake River at Calamity Point in eastern Idaho.

Additional irrigation water for 650,000 ac. of Upper Snake River Valley farm lands will be provided by the project and answer needs for additional defense electric power in the Pacific Northwest.

The power plant will have an installed capacity of 112,500 kw. and, in a median water year, will produce approximately 500,000,000 kw-hr. of electrical energy. Secretary of the Interior Oscar Chapman said he would recommend an immediate appropriation to get started on the project, with an eye toward making first power available in 1955. The project already has been authorized by Congress and some $3,000,000 have been spent on preconstruction work.

Local residential and commercial power loads, particularly in the Idaho Falls area, are growing rapidly, due in part to the new construction program of the Atomic Energy Commission.

Palisades is a multiple-purpose Reclamation project, including irrigation, power, flood control, recreation and fish and wildlife benefits. The reservoir will have a total active storage capacity of 1,200,000 acre-feet. Estimated cost is $76,601,000.

Another Record at Hungry Horse

SINGLE-DAY concrete placing records at Hungry Horse Dam in Montana were shattered June 10 when General-Shea-Morrison construction crews placed 8,369 cu. yd. of concrete in the huge multi-purpose dam on the south fork of Montana's Flathead River.

Best previous record, figured on the basis of three-shift, midnight to midnight operation, was 8,065 cu. yd. on June 2. The Bureau of Reclamation credits the advancing height of the dam and the coordination of all labor crafts engaged on the project for the record-breaking progress. High blocks in the dam now tower 299 ft. above the lowest point in the bedrock foundation. When the dam is completed late in 1953, it will be 564 ft. high, ranking third behind Hoover and Shasta dams.

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Wickwire Rope gives you the benefit of long experience and specialized know-how which assures you of exactly the right kind of rope your particular job demands.

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Alcova Dam Power Contracts Let

CONTRACTS for the manufacture and delivery of two 18,000-kw. electric generators and two vertical-shaft 26,500-hp. turbines were awarded by the Bureau of Reclamation for the Alcova Dam power plant on the Kendrick Reclamation Project near Casper, Wyo.

Elliott Company, Jeannette, Pa., received the generator contract on its bid of $1,038,000. The first generator must be installed in the plant within 960 days, and the second within 1,050 days after notice to proceed with the work.

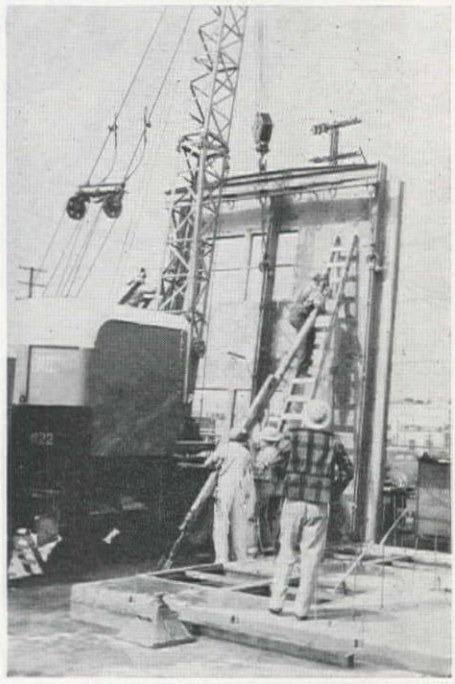
Newport News Shipbuilding and Drydock Co., Newport News, Virginia, was awarded a separate contract for the turbines on its delivered-cost bid of $512,360.

When completed, the Alcova plant will provide 92,000,000 kw-hr of electric energy annually for irrigation pumping, rural electrification, municipalities and industries in Wyoming, Colorado and Nebraska.

Tilt-up Beats Building Problems

PROBLEMS of irregular floor plan, restricted working space, large wall openings, and partial two-story construction have all been reconciled in completion of a precast concrete tilt-panel office and warehouse for the Gar-Bro Manufacturing Co., Los Angeles builders of concrete placement equipment. The new structure, located at Washington Blvd. and Santa Fe Ave., was long termed "too impractical and complex" in design for tilt-panel construction. Undertaken by MacIssac, Menke & Roach, Inc., general contractors, however, it was opened for business late last month.

With a maximum of only 69 ft. of floor width to work in, the contractor was unable to cast all wall panels in a single operation. Neither was he able to reuse his forms without alteration, due to the variety of panel shapes and sizes dictated both by the site of the building and its eventual highly specialized use. Heaviest panel cast, for a portion of the front wall, was 27 ft. long, 24 ft. high, and 8½ in. thick. Despite the use of lightweight concrete, this unit weighed 23 tons. Other panels ranged to extremes in height and width of, respectively, 32 ft. and 31 ft.



TILT-UP PANEL goes up on a job that couldn't be done but was. Limited space and plan difficulties are licked for new Gar-Bro plant (see item).

Foundation problems were encountered on the job. The west half of the building, of heaviest construction, rested on a 7-ft. fill, while alignments of two walls were found to be directly over two 16-ft. cesspools.

Despite the presence of factors thought to be unfavorable to tilt-panel construction, the contractor's crew achieved success; all agree that invaluable lessons were learned in the course of this toughest tilt-up.

So. Calif. Asks More Natural Gas

JOINT APPLICATION has been made to the Federal Power Commission by Southern California Gas Co. and Southern Counties Gas Co., both of Los Angeles, for authorization to build pipeline facilities to carry an additional 150,000,000 cu. ft. of natural gas per day to markets in Southern California.

The two companies jointly own a pipeline extending from the Arizona-Cali-

fornia border to a point near Los Angeles, and in the new application, are proposing to increase its capacity from 405,000,000 cu. ft. per day to a total of 555,000,000 cu. ft. This plan includes construction of about 81 mi. of 30-in. pipe paralleling the existing line between Whitewater and Desert Center, Calif. Another section of 30-in. loop line, about 6 mi. long, between the Blythe, Calif., compressor station and the California-Arizona boundary are included. Two 1,760-hp. compressors would be installed at the Blythe section.

The two companies presently receive gas from the El Paso Natural Gas Co., which has petitioned the Commission for a permit to construct facilities to deliver the additional 150,000,000 cu. ft. Estimated cost of the project is $7,767,525.

California Transporation Map

A REVISED edition of the California Transportation Map is now ready for distribution. The map is in 21 sheets, and the highway data are corrected to May 1947. Copies are available to Division and District offices of Bureau of Public Roads and to State highway officials for official use. The map is available to the general public by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at a price of $11.55 for the 21 sheets. This notice supersedes all previous ones concerning the California Transportation Map.

USBR Facilities Booklet

BUREAU of Reclamation technical facilities available at the Engineering Center in Denver are described in a new illustrated booklet which has been prepared to answer numerous inquiries about the Center.

Facilities of the Center include a library containing detailed studies of engineering problems encountered in Federal Reclamation's half-century of planning and constructing the world's largest dams, reservoirs, hydroelectric power plants and water distribution systems; more than $2,000,000 worth of laboratory equipment and a large staff of engineering specialists. Technical installations include a 5,000,000-lb. capacity universal testing machine, capable of testing specimens up to 32 ft. in height, and special equipment for model making and research into materials and other stress and stain problems.

Many engineers in the United States and from foreign lands have taken advantage of the Center's facilities and requests for detailed information about available services are increasing. This booklet describes some of the technical assistance that has been rendered at cost.

Copies of the booklet may be obtained from L. N. McClellan, Chief Engineer and Director, Branch of Design and Construction, Bureau of Reclamation, Denver Federal Center, Denver, Colo. or from the Commissioner of Reclamation, United States Department of the Interior, Washington 25, D. C.

ENGINEERS ON THE MOVE

William R. Canton is the new county engineer of Klamath County, Ore. He succeeds **Wallace Hector,** who resigns to accept the county engineer post in Roseburg, Douglas County, Oregon.

* * *

J. W. Gibbs becomes Bureau of Reclamation office engineer, Juneau district, Alaska. Gibbs' post as resident engineer for the Duck Creek-Auk Bay road improvement will be taken over by **A. T. Williams,** former assistant resident engineer on road work near Seward.

* * *

Ryan

New District Engineer for The Asphalt Institute at Sacramento, Calif., is **Alfred E. Ryan.** Ryan, who has served for the past three years as testing engineer for the City of Oakland, Calif., will headquarter at 301 Forum Building, Sacramento. Before joining the City of Oakland, Ryan served 20 years with the U. S. Bureau of Public Roads engaged in asphalt research and field engineering. Ryan is a graduate of George Washington University where he majored in chemistry, physics and materials of construction. From 1938 to 1948 with the exception of three years of military service with the SeaBees, Ryan engaged in Bureau of Public Roads projects in San Francisco and Albany, Calif. He then became head of the City of Oakland's engineering laboratory where recent study and research have related to the design of subgrades, base courses and pavements, together with their specifications.

* * *

Lewis J. Workman, formerly field engineer with the Bureau of Reclamation in Alaska on hydro-power development, is now with the Defense Electric Power Administration, Washington, D. C. His duties concern materials and equipment priorities.

* * *

J. A. Fraps, formerly field engineer on the Friant-Kern Canal for the Bureau of Reclamation, is now project engineer with North Atlantic Constructors, Minneapolis, Minn.

* * *

Robert C. Brown is now resident engineer for the Bureau of Reclamation, Huron, S. D. on the construction of 115 kv. transmission lines near Watertown. Brown was formerly field engineer for the Bureau at Shadehill Dam. **R. C. Boyd,** location engineer, **Peter Hardin,** chief civil inspector and **J. J. Ross,** civil inspector were also transferred from Shadehill to Watertown. **Simon Shellberg,** electrical inspector, **Richard Anderson,** survey aide and **John Schaffer,** survey aide were transferred to Watertown from the district office of the Bureau at Huron

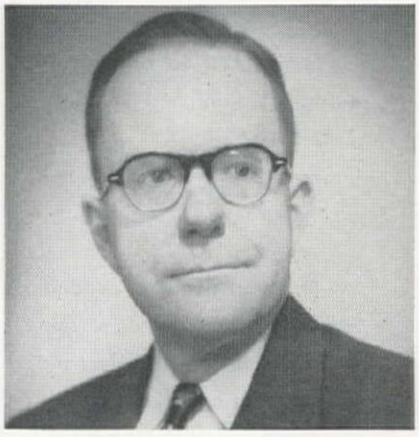
* * *

L. M. Armstrong is now a registered irrigation engineer opening an office in Mesa, Ariz. He was formerly with the U. S. Indian Service as a consulting engineer, and retired from the government service March 1 at the age of 70.

* * *

Lawrence L. Dushkin is resident engineer for the California division of architecture on the reinforced concrete construction of the California Vocational Institute at Tracy. **Nathan C. Bengtson, A. McLellan** and **H. C. Day** are assistant engineers.

* * *



***George M. Tapley* is chief, engineering division, Alaska Road Commission with headquarters in Juneau. He was the author of the article in the June issue of *Western Construction* on the 1951 highway program in Alaska of the ARC.**

* * *

James A. Stauff, highway foreman for California State Division of Highways, retires after almost 40 years of service. Stauff, during his long career with the Division, was in on the original surveys for some of California's most prominent highways. For the past seven years Stauff has been in Los Angeles County at the Glendora Maintenance Station.

* * *

Carl E. Green announces the establishment of Carl E. Green & Associates, consulting engineers, 510 Henry Bldg., Portland, Ore.

* * *

John R. Burky, veteran engineer of the Bureau of Reclamation's Branch of Design and Construction, retires after 43 years of active engineering practice, 21 years of which he spent with the Bureau. As head of the canals and drains section of the Canals Division, Burky made substantial contributions to such Bureau projects as the All-American Canal, the Columbia Basin Distribution System and the Missouri River Basin Project.

* * *

Robert M. Snyder is now superintendent with Leonard & Slate Oregon Ltd., on the Stevens Canyon Highway project, Mt. Rainier National Park. The firm is engaged in working on reinforced concrete viaducts. Snyder was formerly an office engineer with the U. S. Army Corps of Engineers, Lookout Point Dam project, Lowell, Ore.

* * *

A. A. Lewis is assigned the post of acting regional engineer for the Bureau of Reclamation's Southwest Region. He will headquarter at Amarillo, Tex. Former Regional Engineer, **O. I. Craft,** resigned his post as a result of ill health.

* * *

Frank Z. Howard announces the opening of an office for the practice of land surveying and civil engineering at 208 Willits Bldg., Klamath Falls, Ore.

* * *

L. G. Vinson, Vinson Construction Co., Phoenix, is the new president of the Arizona Chapter of the AGC. **R. M. Makemson,** Wallace and Wallace, Phoenix, is vice president; **R. H. Markham,** Phoenix-Tempe Stone Co., treasurer and director; **W. E. Naumann,** M. M. Sundt Construction Co., Tucson, director and **Joseph P. Condrey** is reappointed executive secretary.

* * *

James H. Bett is now with the North Atlantic Constructors, New York, New York. He is assistant chief engineer and is engaged in overseas construction. The North Atlantic Constructors is a joint venture which includes Peter Kiewit Sons' Co., Bett's employer.

* * *

F. S. McGarvey is office engineer with Morrison-Knudsen Co., Inc., on airport construction at Travis Air Force Base, Fairfield, Calif.

* * *

Alfred L. Miller, professor of engineering at the University of Washing-

CALENDAR OF MEETINGS

Aug. 14-16—National Conference on Prestressed Concrete, at the Massachusetts Institute of Technology, Cambridge, Mass.

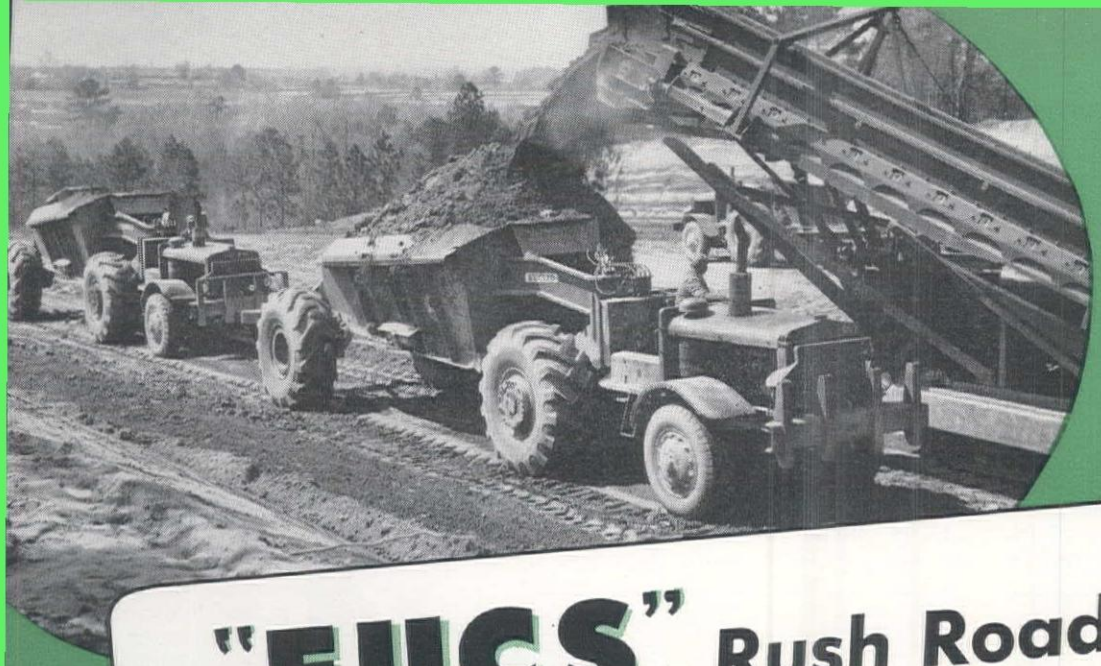
Sept. 24-25—American Water Works Association, Rocky Mountain Section, annual convention at Cosmopolitan Hotel, Denver.

Sept. 24-27—Institute of Traffic Engineers, annual convention at Ambassador Hotel, Los Angeles.

October 11-13—Structural Engineers Association of California, annual convention, at Yosemite Park, Calif.

October 22-25—American Society of Civil Engineers, Annual Convention, at New York City, N. Y.

October 23-26—California Section, American Water Works Association, annual meeting, at Fairmont Hotel, San Francisco.



Bottom-Dump Euclids receive heaping loads in less than 40 seconds.

"EUCS" Rush Road To Hydrogen Bomb Plant

Hauling an 18 cu. yd. payload of sandy clay.

Construction of a four-lane highway 24 miles long—an access road to a Hydrogen Bomb Plant site in South Carolina—is another rush project where Euclid speed, capacity and dependability paid off.

Fourteen Bottom-Dump "Eucs" of 13 cu. yd. struck capacity and a Euclid Loader enabled contractor R. B. Potashnick to complete this big earth moving job ahead of schedule. Seven of the Bottom-Dumps were used under the Loader; the remaining "Eucs" were loaded by 3½ yd. and 2½ yd. draglines. Some of the units were equipped with top extensions to accommodate heaping loads of 16 and 18 cu. yds.

The job required moving 1,925,000 cu. yds. of sand and clay on hauls averaging 900 feet, up six per cent grades. Euclid staying power and continuous operation were important factors in getting the job done on time.

Your Euclid Distributor will be glad to provide helpful information and discuss your present or future earth moving requirements.

The EUCLID ROAD MACHINERY CO.
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MORE LOADS PER HOUR—
MORE PROFIT PER LOAD

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ton, will be the civil engineering representative on an engineering educators panel leaving for Japan. Fourteen engineers in all compose the commission which will discuss the various engineering education techniques employed in this country with the Ministry of Education of the Japanese government. Departure was scheduled for July 1 and present plans indicate that the panel will return in time to meet their classes in September.

* * *

Colonel John R. Noyes, Commissioner of Roads for Alaska, leaves this position with the Alaska Road Commission to assume new duties in the Far East. Noyes has directed commission affairs in Alaska for the past three years during which time a total of $75,000,000 in road building was accomplished. Among the projects he directed are: the Seward to Anchorage Highway, now nearing completion; the completion of Sterling Highway on Kenai Peninsula; the reconstruction of the Tok Cutoff Road connecting Anchorage with the Alaska Highway and the commencement of a new road connecting the Richardson Highway at Paxsons with Mt. McKinley National Park. During his 25 years with the Commission Colonel Noyes has aided and encouraged the development of the great road expansion program now under way.

* * *

H. H. Nicholson, construction engineer at Ft. Peck, Mont., for the Corps of Engineers since 1933, accepts a new assignment in Omaha, Nebr. Nicholson will be chief of the construction supervision and inspection branch of the Construction Division. He was engaged in work on the Ft. Peck project and since 1946 he has supervised all construction activity in the Ft. Peck district.

* * *

Layton

Raymond E. Layton announces the establishment of a consulting engineering practice with offices in Hayward, Calif. He will engage in a general civil engineering practice with special emphasis on the design of dams, hydro-electric plants, water supply facilities and related hydraulic structures. For the past two years he has been Senior Civil Engineer in the Structures Unit, Water Supply Section of East Bay Municipal Utility District, Oakland, Calif. Prior to this position, Layton was hydraulic design engineer for Pioneer Service and Engineering Company, Chicago, Ill., where he was engaged in the design of hydro-electric plants in Oregon and Wisconsin. An article in the September 1950 issue of *Western Construction* by Layton, presents a description of the Oregon hydro-plants.

* * *

George R. Larsen, Ft. Peck, Mont. construction engineer for the Bureau of Reclamation, leaves his post to become chief engineer with Morrison-Knudsen Construction Co. on the construction of transmission lines in Brazil.

* * *

In accordance with the terms of the Point-Four program, a 10-man Bureau of Reclamation's team goes to Beirut, Republic of Lebanon, to aid that country in the solution of its economic problems. The mission plans a three-months' study to determine the feasibility of basin-wide development of the Litani River. Potential dam sites will be examined and irrigable lands will be classified. Recommendations on the reduction of water pollution are also anticipated. The group is headed by **Robert F. Herdman,** Hardin, Mont. Other Westerners participating are: **Arthur F. Johnson,** Imnaha, Ore.; **Mortimer R. Lewis,** Evanston, Wyo.; **William W. Gorton,** Boise, Idaho; **Robert M. Ancell,** Denver, Colo.; **Frederick C. Roberts, Jr.,** Tucson, Ariz.

* * *

New highway engineer for Idaho is **Earle V. Miller,** formerly deputy highway engineer for Arizona. Miller has been with the Arizona highway department since 1923. In the past he has served with the Oregon Highway Commission and the Corps of Engineers. Miller's work has been concerned mainly with design, location and administration.

* * *

John Whitchurch is now an estimator with the Utah Construction Co. for the Rocky Mountain Arsenal near Denver.

DEATHS

Oscar G. Boden, 66, Tracy Pumping Plant construction engineer, died June 27 at Tracy Memorial Hospital after an illness of three months. Boden had been with the Bureau of Reclamation for 40 years and before coming to California he had been construction engineer on the Kittitas project in central Washington and the Owyhee project in Oregon. He was construction engineer for the Delta division of the Central Valley Project at the time of his death.

* * *

W. Earl Jones, 43, construction supervisor, died May 13 in Los Angeles, Calif.

* * *

Charles W. Cook, 62, surveyor and engineer, died June 3 in his Los Angeles, Calif., home.

* * *

Charles K. Robertshaw, 61, retired construction superintendent, died June 2 in Los Angeles, Calif.

* * *

Boyd Scott Brown, 39, Bureau of Reclamation civil engineer, died June 8 from a heart attack while on an assignment in Nicaragua. Brown was on a Point Four program mission which was engaged in investigating water power resources near Lake Nicaragua. Brown was a native of Denver, Colo., and his body was returned to his home for internment. Prior to joining the Bureau, Brown had served as engineer for several construction firms in Colorado and California.

* * *

John A. Artukovich, 58, prominent contractor, died June 15 at his Los Angeles, Calif., home. Artukovich participated in many large projects since arriving in Southern California in 1919. He engaged in work on part of the Colorado River Aqueduct.

* * *

Don Hull McCreery, 52, civil engineer, died June 11 in Los Angeles, Calif., of a heart attack. McCreery had been connected with the construction industry for 30 years and had recently become a director of engineering and presidential assistant to Holmes & Narver, Consulting Engineers.

* * *

Walter Hovey Hill, 82, prominent mining engineer, died June 10 in Grangeville, Idaho. Just prior to his death Hill had been urging support of plans for private development of Snake River power through construction of 5 low dams along the route where the Department of the Interior is planning a high-level dam in Hell's Canyon.

* * *

Henry Forsyth, 59, contractor, was drowned July 3 when his boat capsized on the Colorado River near Martinez Lake, Ariz. He was fishing with two companions when the boat suddenly overturned. He was unable to swim, and two companions could not reach him.

SUPERVISING THE JOBS

N. L. Basich and **Milo Lubanko** are supervising the resurfacing of 46.0 mi. of highway between Dixieland and El Centro in Imperial Valley, Calif. Basich Bros. Construction Co., San Gabriel, Calif., is the contractor on the $470,990 job.

* * *

Artell Aslett is job superintendent for Aslett Construction Co. on the bituminous surfacing of 7 mi. of Clearwater Highway, and the widening of an existing bridge between Greer and Weippe in Clearwater County, Idaho.

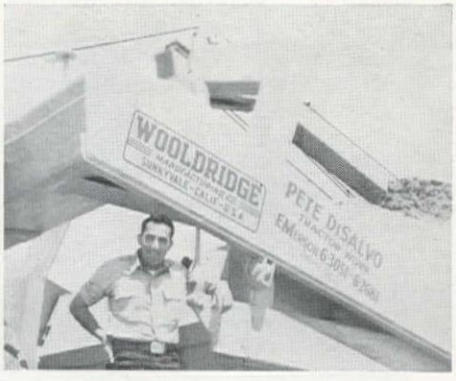
* * *

Railroad rehabilitation at Umatilla Ordnance Depot, Ordnance, Ore., is being supervised by **J. L. Green. Claude Fleming** is engineer and **Robert Morris** is office manager. J. A. Terteling & Sons, Inc., Boise, Idaho, has the $193,529 contract.

* * *

Construction of a building for California Vocational Institution, Tracy, is being supervised by **A. J. Sturney** with **H. A. Sturney** as assistant. The $5,449,300 job was started by Johnson, Drake & Piper, Inc., in August 1950. **Chuck Loudon** and **Pete Phillips** are carpenter foremen, **Barney Holder** is bench foreman and **Bill Peach** is concrete superintendent. **Lee Rathbone** is engineer.

* * *



***Pete DiSalvo*, contractor, is preparing a tract for 1,800 homes at Redwood City, Calif. and using this 17.5-cu. yd. rig. About 500,000 yd. of dirt is to be moved on job.**

* * *

Salem, Ore. is the site of sawmill construction for the Oregon Pulp and Paper Co. **Fred Woods** is project manager for Austin Co., contractor. **Oliver Fursman** is carpenter foreman and **R. E. "Bob" Hagerty** is steel superintendent. **C. K. Murphy** is labor foreman.

* * *

Sewage treatment plant construction in Salem, Ore. is being supervised by **Walter Nordstrom** for the Halvorson Construction Co. **W. W. Smith** is carpenter foreman and **Fred Peters** is engineer. The $750,000 project is now well under way. **Oral Conyers** is the engineer representing the City of Salem.

* * *

Highway surfacing between Sovar and Monmouth, near Corvallis, Ore. is being supervised by **Vince H. Colvin** for Warren Northwest, Inc. **W. W. Head** is over-all superintendent for the firm. **R. A. Meredith** is foreman and **Charles Updergraf** is hot plant foreman.

* * *

Cottage Grove, Oregon sewer construction is being supervised by **Ellis Beeson**, and **George Crawford** is foreman for H. C. Werner, Inc., contractor. The key operating engineers are **Harry Peek, Ernest Burns** and **Marion Smith.**

* * *

Dam and tunnel construction on Carter Lake 7 mi. west of Berthond, Colo., is being supervised by **G. McAfee** for Winston Bros. Construction Co. **Roy Skinner** is master mechanic. **Ernie Shaffer** is carpenter foreman and **Fred Petterson** is project manager of the $2,389,350 project. The job began in July

1950 and consists of three earth and rockfill dams and one outlet tunnel, 800 ft. long. The Bureau of Reclamation job, which is a major part of the Colorado-Big Thompson project, is scheduled for completion in October of this year.

* * *

Construction of a sewer interceptor and storm sewer system in Pocatello, Idaho, is being supervised by **Thomas Liddil** for W. T. Grayson, general contractor on the $138,000 job. The firm is also constructing the Jerome Sewage Treatment Plant for the City of Jerome, Idaho. **William Cooper** is supervising this job. **W. W. Halsey** is engineer.

* * *

The construction of military installations on St. Lawrence Island, Alaska, is being supervised by **A. Anderson. Ralph Woolworth** is office manager for Morrison-Knudsen Co., Inc., Boise, Idaho, on the $5,000,000 job. **V. Doran** is project engineer.

* * *

In Medford, Oregon, Plaza apartment construction by M. O. Bessonette, contractor, is being supervised by **Charles Hinrichsen. Al Reed** is carpenter foreman on the $490,000 job, which is scheduled for completion December 1, 1951.

* * *

Bridge construction at the Riverview St. Viaduct, Eugene, Ore. and also on the highway at Goshen, Ore., is being supervised by **H. I. Hamilton. Bob Fifer** is carpenter foreman; **H. C. Holmes** is pile driver foreman for McNutt Bros., contractors.

* * *

B. F. Kelly, Jr., is job superintendent for Armstrong & Armstrong, Roswell, N. Mex., contractor on a highway project, 12.044 mi. in length along the Lordsburg-Deming route, Luna County, N. Mex.

* * *

W. E. Moore is superintendent for Harold E. Olds, Tacoma, Wash., contractor, on sewer construction in Kelso, Wash.

* * *

M. K. Buick is general superintendent for Stevenson Construction Co., Salem, Ore., excavation contractor on the Turner Reservoir for City of Salem. **Jay Berdue** is foreman and **Ed Bryant** is night shiftboss on the $115,000 job.

* * *

B. M. Robertson is general superintendent on all construction in the Portland, Ore., area for Warren Northwest.

* * *

Near Newman, Calif., the Delta-Mendota wasteway construction is under the supervision of **Marty Sheeran. "Whitey" Williamson** is dirt superintendent, **Skip Young,** structural superintendent, and **Fred Harker,** pile superintendent. United Concrete Pipe Co. and Vinnell Co., Inc., hold the contract.

* * *

Firebaugh, Calif., is the scene of a Bureau of Reclamation canal project. **Wes Morgan** is field superintendent in

charge of structures with **Dick Belske** as his assistant. **Bill Williams** is excavation superintendent with **Tommy Akers** as his assistant. **Harry Porter** is project engineer and **R. B. Wickiser** is project manager. **Ed Baird** represents the Bureau of Reclamation on the $3,000,000 project. United Concrete Pipe Corp. and Vinnell Co., Inc., are contractors.

* * *

Reinforced concrete hospital construction in Ceres, Calif., is being supervised by **William F. House** for Stolte, Inc. **Dave Freitas** is assistant superintendent on the $990,000 job and **Carl Daniels** is project manager on the Memorial Hospital Association's project.

* * *

Construction on the general plant expansion program of the Dow Chemical Co., Pittsburg, Calif., is being supervised by **Lou Alexander** with **Bill Hamer** as his assistant. **A. N. Leh** is project manager for The Austin Company on the $3,500,000 contract. **George Plantz** is chief engineer.

* * *

The $650,000 structural steel and concrete newspaper office building construction in Modesto, Calif., is being supervised by **William F. House** for Stolte, Inc. **Jack Marshall** is assistant superintendent and **Carl Daniels** is project manager. McClatchy Newspapers let the contract.

* * *

Plumbing and heating construction on the California Vocational Institution, Tracy, Calif., is being supervised by **William Vaughan** for Earl O. Stice Co., Glendale, Calif., contractor. **Albert Brown** is assistant superintendent and **R. D. Junge** is project manager. The $596,000 structure is a project of the State of California Department of Public Works, division of architecture.

* * *

On the construction of Detroit Dam, **C. C. Davis** is project engineer and **S. R. Overholser** is assistant project engineer for the Corps of Engineers. **Harry Rutherford** is office engineer and **Ken Ramsey, J. W. Glasgow** and **M. B. Hutchison** are construction engineers. **Woody Burgess** is concrete technician and **D. E. Loughran** is resident geologist.

* * *

Allison Honer Co., Santa Ana, Calif., contractors, have several projects under way in the West. **William Bouck** is superintendent for the firm on construction of a million dollar defense job at Norton Air Force Base, San Bernardino, Calif. **Richard Honer** is office manager on this job. In Fullerton, Calif., **A. L. (Andy) Jensen** is superintendent on construction of a reinforced concrete and masonry Sears store. **E. (Ernie) Everman** is job superintendent for the firm in Garden Grove, Calif., where construction is under way on a new reinforced concrete and masonry building for Capital Company. **L. H. Pember** is job superintendent for Allison Honer Co. on construction of a reinforced concrete and masonry store building in Santa Ana, Calif. The project includes 18 shops and will cost $150,000.

CONTRACTS

A Summary of Bids and Awards For Major Projects in the West

★★

Alaska

$229,495—**Anderson Construction Co.** and **Montin-Benson,** joint venturers, Seattle, Wash.—Low bid for construction of heating plant at Eielson Air Force Base; by Corps of Engineers.

$2,129,275—**S. Birch & Sons,** Seattle, Wash., and **C. F. Lytle Co. & Green Construction Co.,** Des Moines, Iowa, joint venturers—Low bid for construction of outside utilities at Elmendorf Air Force Base; by Corps of Engineers.

$7,243,490—**Grove, Shepherd, Wilson and Kruge,** joint venturers, New York, N. Y.—Low bid for construction of a station hospital at Ladd Air Force Base; by Corps of Engineers.

$5,827,000—**Haddock Engineers, Ltd.,** and **Wyatt & Kipper,** joint venturers, P. O. Box 409, Los Alamos, N. M.—Low bid for construction of heating and power plant facilities at Whittier; by Corps of Engineers.

$1,714,000—**Haddock Engineers, Ltd.,** Montebello, Calif.—Low bid for construction of outside utilities at Whittier; by Corps of Engineers.

$3,323,000—**Haddock Engineers, Ltd.,** Montebello, Calif.—Low bid for construction of non-commissioned officers' family housing at Whittier; by Corps of Engineers.

$3,936,000—**C. F. Lytle Co. & Green Construction Co.** and **S. Birch & Sons** and **J. C. Boespflug Construction Co.,** joint venturers, Seattle, Wash.—Low bid for construction of outside utilities in the army construction area, Eielson Air Force Base; by Corps of Engineers.

$1,899,055—**S. Macri Construction Co.** and **A. G. Rushlight,** joint venturers, Anchorage—Low bid for construction of water treatment plant at Ladd Air Force Base; by Corps of Engineers.

$3,735,000—**S. Macri Construction Co.,** Anchorage—Low bid for construction of outside utilities at Ladd Air Force Base; by the Corps of Engineers.

$3,198,500—**Morrison-Knudsen Co.,** 603 Hoge Bldg., Seattle, Wash.—Low bid for construction of petroleum storage and facilities at Eielson Air Force Base; by Corps of Engineers.

$21,321,690—**Morrison-Knudsen Co.** and **Peter Kiewit Sons' Co.,** joint venturers, 603 Hoge Bldg., Seattle, Wash.—Low bid for construction of the Eklutna tunnel and surge tank; by Bureau of Reclamation.

$7,400,000—**Morrison-Knudsen Co.,** 603 Hoge Bldg., Seattle, Wash.—Low bid for construction of outside utilities and railroad trackage at Fort Richardson; by Corps of Engineers.

$2,060,910—**Mortensen Construction Co.,** Seattle, Wash.—Contract awarded for construction of Alaska communications system facilities to benefit Harding Lake, Big Delta, Johnson River, Tok Junction, Northway, Glennallen, and Sheep Mountain; by Corps of Engineers.

$1,983,000—**J. H. Pomeroy & Co., Inc.,** 333 Montgomery St., San Francisco, Calif.—Low bid for construction of a composite-type administration building at Fort Richardson; by Corps of Engineers.

$1,858,000—**Scheumann-Johnson-Osberg-Manson,** joint venturers, Seattle, Wash.—Contract awarded for expansion of port facilities at Haines; by Corps of Engineers.

$2,055,000—**Southern Constructors,** Anchorage—Low bid for construction of water treatment facilities and sewage treatment plant at Eielson Air Force Base; by Corps of Engineers.

$8,406,020—**Valle & Sommers Construction Co.,** Seattle, Wash.—Low bid for construction of three 500-man dormitories at Elmendorf Air Force Base; by Corps of Engineers.

Arizona

$2,871,880—**Grafe-Callahan Construction Co.,** 714 W. Olympic Blvd., Los Angeles, Calif.—Low bid for completion of Davis Dam spillway and stilling basin; by Bureau of Reclamation.

$1,486,358—**Marshall, Haas & Royce,** Box 95, Belmont, Calif.—Low bid for earthwork, canal lining, and structures for Mohawk Canal and Tyson Protective Dike and Outlet Channel, Wellton-Mohawk Division, Gila Project; by Bureau of Reclamation.

$292,427—**Pioneer Constructors,** P. O. Box 5768, Tucson—Low bid for highway work on Tucson-Nogales highway, beginning at Santa Cruz-Pima County Line and extending northerly a distance of about 5 mi.; grading and draining, and placing select material, aggregate base, bituminous mix and seal coat; by State Highway Department.

$176,968—**Reliance Truck Co. & A. L. Snuffer,** P. O. Box 2293, Phoenix—Low bid for construction on Geronimo-Solomonsville highway. The work is located on U. S. Route 70 between the towns of Pima and Thatcher about 5 mi. west of Safford, and consists of grading and draining, and placing select material, aggregate base and bituminous road mix over 3.5 mi. of roadway; by State Highway Department.

$491,960—**Wallace & Wallace,** P. O. Box 470, Phoenix—Low bid on construction of Ehrenberg-Wickenburg highway, extending mostly over new alignment, consisting of grading and draining, and placing select material, aggregate base and bituminous road mix; by State Highway Department.

California

$860,940—**American Pipe and Construction Co.,** P. O. Box 3428, Terminal Annex, Los Angeles—Low bid for schedules 1 and 2, earthwork, pipe lines and structures, including reservoirs and pumping plant, Kieter Irrigation District, Friant-Kern Canal Distribution System, Central Valley Project; by Bureau of Reclamation.

$2,044,200—**Guy F. Atkinson Co.,** P. O. Box 593, South San Francisco—Low bid for construction of additional aircraft parking and loading facilities, including excavation, grading, paving, etc., at Moffett Field, Santa Clara County; by 12th Naval District.

$637,340—**Cox Bros. Construction Co.,** Stanton—Low bid for highway construction in San Diego County 0.7 mi. south of Carlsbad, about 3.2 mi. in length, to be a graded roadbed adjacent to the existing highway and consisting of portland cement concrete on cement-treated subgrade. Three reinforced concrete bridges and one double-reinforced concrete box culvert to be constructed; by State Division of Highways.

$378,862—**Clements & Co.,** P. O. Box 277, Hayward—Low bid for construction of about 3 mi. of highway, grading and surfacing with plant-mixed surfacing on crusher-run base; and construction of four reinforced concrete slab bridges, in Colusa County; by State Division of Highways.

$179,612—**Erickson, Phillips & Weisberg,** 3341 Telegraph Ave., Oakland—Low bid for highway construction across Paradise Cut overflow about 6.7 mi. east of Tracy; a reinforced concrete slab bridge to be constructed and approaches to be graded and paved with portland cement concrete on untreated rock base, in San Joaquin County; by State Division of Highways.

$1,374,058—**Fredrickson & Watson Construction Co.,** 873 Eighty-first Ave., Oakland—Low bid for highway construction near Dublin, about 4.6 mi. in length and parallel to existing roadway, ultimately to form a 4-lane highway; by State Division of Highways.

$290,976—**Harms Bros.,** 5261 Stockton Blvd., Sacramento—Low bid for restoration of 1.3 mi. of flood-damaged roadway on U. S. Route 40 between Flycaster and Mystic; by State Division of Highways.

$236,903—**Harms Bros. & C. M. Syar,** joint venturers, 5261 Stockton Blvd., Sacramento—Low bid for highway construction, about 7.2 mi. in length to be surfaced with plant-mixed surfacing on crusher-run base in Napa County between Lake County line and 1.5 mi. north of Calistoga; by State Division of Highways.

$199,180—**J. Henry Harris,** 2657 Ninth St., Berkeley—Low bid for highway construction, about 1.9 mi. in net length, to be graded and penetration treatment applied in Sierra County, west of Sierra City and north of Yuba River Bridge; by State Division of Highways.

$761,900—**Hess Construction Co., Inc.,** 2303 E. Artesia, Long Beach—Low bid for highway construction in Kern County between 4.5 mi. northwest of Isabella and Isabella Dam site; about 4.6 mi. in length to be graded and surfaced, and a reinforced concrete and structural steel bridge to be constructed; by State Division of Highways.

$242,775—**Edward Keeble,** R. 4, Box 64, San Jose—Low bid for highway work on McKee Road between Bayshore Highway and Gordon Ave., about 3.1 mi. in length; the existing roadbed to be widened, seal coat applied, a 4-lane divided highway to be provided; by State Division of Highways.

$6,080,000—**M & K Corp., Fredrickson & Watson Construction Co.,** and **Piombo Construction Co.,** joint venturers, San Francisco—Low bid for construction of administrative and hospital buildings and related service buildings at Atascadero State Hospital; by State Department of Public Works.

$279,955—**Mercer Fraser Co.** and **Mercer Fraser Gas Co., Inc.,** 2nd and Commercial Sts., Eureka—Low bid for construction of two reinforced concrete girder bridges to be constructed and approaches to be graded and surfaced with plant-mixed surfacing on imported base material, over Burns Freeway, at 11th and 145th Sts., in Arcata; by State Division of Highways.

$199,301—**Oberg & Cook,** Gardena—Low bid for construction of a reinforced concrete girder bridge across San Gabriel River on Orangethorpe Avenue, Los Angeles County; by State Division of Highways.

$1,212,424—**Piombo Construction Co.,** 1571 Turk St., San Francisco—Low bid for highway construction between Briceburg and Yosemite National Park boundary, about 17.7 mi. in length, grouted rock toe walls and rip-rap to be constructed, portions of the project to be graded and plant-mixed surfacing to be placed over existing surface and untreated rock base; by State Division of Highways.

$464,925—**Rhoades Bros. & Shofner Construction Co., Inc.,** 3869 Medford St., Los Angeles—Low bid for construction of a concrete lined tunnel at Gaviota Gorge, about 1.5 mi. south of Las Cruces, and about 0.1 mi. of roadway to be graded and paved with portland cement concrete, Santa Barbara County; by State Division of Highways.

$204,770—**R. P. Shea Co.,** P. O. Box 218, Indio—Low bid for highway construction between 5 mi. north of Sonora Junction and Antelope Valley, portions about 2.7 mi. in net length to be graded and road-mixed surfacing to be placed on imported base material; by State Division of Highways.

$709,603—**Stolte Inc., & Fred J. Early, Jr., Co., Inc.,** joint venturers, San Francisco—Low bid for construction of pumping plant and high level distribution reservoir for Lindsay-Strathmore Irrigation District; by Bureau of Reclamation.

$636,275—**United Concrete Pipe Corp.,** P. O. Box 425, Baldwin Park—Low bid for construction of earthwork, pipe lines and structures in Ivanhoe Irrigation District, Friant-Kern Canal System, Central Valley Project; by Bureau of Reclamation.

Colorado

$1,149,210—**Winston Bros. Co.,** 1532 So. California Ave., Monrovia—Low bid for earthwork, canal lining, tunnel and structures for Horsetooth Feeder Canal, Colorado-Big Thompson Project; by Bureau of Reclamation.

$1,287,880—**Peter Kiewit Sons' Co.,** P. O. Box 4149, Denver—Low bid for schedules 1 and 3 of Willow Creek Pumping Plant and Willow Creek Pump Canal, Colorado-Big Thompson Project; by Bureau of Reclamation.

Idaho

$122,720—**Asphalt Paving Constructors,** Boise—Low bid for surfacing of highway in Nez Perce County; by State Highway Department.

$140,495—**Roy L. Bair Co.,** 1220 Ide Ave., Spokane, Wash—Low bid for surfacing U. S. Highway 10 in Kootenai County; by State Highway Department.

$185,610—**Pickett & Nelson,** P. O. Box 755, Idaho Falls—Low bid for highway surfacing in Twin Falls; by State Highway Department.

$187,310—**Quinn-Robbins Co., Inc.,** 703 S. 16th St., Boise—Low bid for highway surfacing in Adams County; by State Highway Department.

$254,603—**Quinn-Robbins Co., Inc.,** 703 S. 16th St., Boise—Low bid for construction of three bridges in Canyon County, Caldwell; by State Highway Department.

Montana

$215,385—**Darneli and Askevold Construction Co.,** P. O. Box 1125, Missoula—Low bid for construction on Canyon Ferry-East Helena 115-kv. transmission line, Missouri River Basin Project; by Bureau of Reclamation.

$953,430—**Hoops Construction Co.,** Twin Falls—Low bid on schedule 1 construction of 24.5 mi. of road along the upper half of the winding 34 mi. long Hungry Horse Reservoir; by Bureau of Reclamation.

$101,575—**Peter Kiewit Sons' Co.,** P. O. Box 875, Sheridan, Wyo.—Awarded contract for 7.772 mi. grading and surfacing with

road-mixed oil near Winnett, south Petroleum County; by State Highway Commission.

$196,645—**Lewis Construction Co.,** Great Falls—Low bid for construction of ground control approach system and instrument landing facilities at Great Falls Air Force Base; by Corps of Engineers.

$150,995—**Naranche & Konda,** 2000 Aberdeen St., Butte—Contract awarded for construction on Norris-Bozeman highway in Madison County; work includes 3.005 mi. grading and gravel surfacing with road-mixed oil and small drainage structures and a timber bridge; by State Highway Commission.

$1,295,830—**Sletten Construction Co. & Pappen Construction Co.,** Great Falls—Contract awarded for construction of barracks and mess facilities, Great Falls Air Force Base; by Corps of Engineers.

$102,940—**R. J. Sundling Construction Co.,** Livingston—Contract for construction on Manhattan-South Highway, Gallatin County, including 8.163 mi. grading, surfacing with road-mixed oil and erecting small drainage structures; by State Highway Commission.

Nevada

$315,106—**Isbell Construction Co.,** P. O. Box 2351, Reno—Award for construction on portion of State Highway System in Elko County from Jiggs to 1.5 mi. north of the South Fork of Humboldt River, to be 15.0 mi. in length; by State Highway Department.

$108,335—**Silver State Construction Co., Inc.,** Fallon—Low bid for construction of a portion of a State Highway System in Churchill County; by State Department of Highways.

New Mexico

$910,985—**Armstrong & Armstrong,** Box 873, Roswell—Contract awarded for highway construction in Luna County, about 15.841 mi. in length, Deming-Lordsburg route; by State Highway Department.

$221,517—**Jack Adams,** Santa Fe—Contract awarded for construction of highway in Rio Arriba County and Chama-Colorado-New Mexico state line, to be about 10.705 mi. in length; by State Department of Highways.

$451,170—**Brown Contracting Co.,** P. O. Box 1479, Albuquerque—Contract awarded for highway construction in Colfax County on Raton-Hoxie Junction Road, about 6.484 mi. in length; by State Highway Department.

$210,650—**Brown Contracting Co.,** P. O. Box 1479, Albuquerque—Contract awarded for highway construction in Colfax County on Maxwell-Springer Road, about 5.354 mi. in length; by State Highway Department.

$147,950—**Skousen-Hise Contracting Co.,** 201 Springer Bldg., Albuquerque—Contract awarded for highway construction in Bernalillo County, Miera-Chilili Road, about 8.996 mi. in length; by State Highway Department.

Oregon

$591,810—**Babler & Rogers,** 4617 S.E. Milwauke Ave., Portland—Low bid for construction of the Hampton-Gap Ranch Section of the Central Oregon Highway, in Lake, Harney and Deschutes counties; by State Highway Commission.

$149,440—**Durbin Bros.,** Eugene—Low bid for highway construction in Island City and Island City-Lone Tree city street and Island City-South County Road, Union County; by State Highway Commission.

$419,820—**Peter Kiewit Sons' Co.,** P. O. Box 491, Longview, Wash.—Low bid for Willow Creek-Boardman Section of the Columbia River Highway in Morrow and Gilliam counties; by State Highway Commission.

$517,312—**George W. Lind,** 5000 N.E. Killingsworth, Portland—Low bid for construction of the Sellwood Unit of the City interceptor sewer system; by City of Portland.

$214,950—**F. L. Somers,** P. O. Box 938, Klamath Falls—Low bid for construction of the East Unit, Antelope-Clarno, Shaniko-Fosseil Secondary highway in Wasco County; by State Highway Commission.

$147,830—**Warren Northwest, Inc.,** P. O. Box 5072, Portland—Low bid for the Davies-Forest Grove Section of the Nehalem Secondary in Washington County; by State Highway Commission.

Utah

$130,290—**W. W. Clyde & Co.,** Springville—Low bid for highway construction in Iron County, Dixie National Forest, the Cedar-

Long Valley project to be 10.710 mi. in length; by Bureau of Public Roads.

$176,650—**Germer, Abbott & Waldron Construction Co.,** Tremonton—Low bid for highway construction in Box Elder County to be 3.029 mi. in length; by State Road Commission.

$298,630—**L. T. Johnson,** Logan—Contract awarded for construction of a 3-in. road-mixed bituminous surfaced road along Soldier Summit-Colton route in Utah and Wasatch counties about 6.494 mi. in length; by State Road Commission.

$508,920—**Strong Company,** Springville—Low bid for highway construction at Beaver Canyon-Fremont Junction in Beaver and Iron counties, a plant-mixed bituminous surfaced road; by State Road Commission.

$117,640—**Whiting & Haymond,** 250 W. 2nd St., Springville—Low bid for construction of a 2-in. road-mixed bituminous surfaced road about 19.400 mi. in length, Tooele County; by State Road Commission.

Washington

$6,659,850 approximately—**Guy F. Atkinson Co.** and **Ostrander Construction Co.,** 806 Cascade Bldg., Portland, Ore.—Awarded contract for completion of the Rock Island Dam and Power House near Wenatchee; by Stone and Webster County Public Utility District.

$2,051,320—**S. Birch & Co.,** and **McLaughlin & Co.,** joint venturers, 314 Ford Bldg., Great Falls, Mont.—Awarded contract for construction of a 10,000-ft. runway at Fairchild Air Force Base; by Corps of Engineers.

$221,345—**Columbia Asphalt Paving Co.,** Yakima—Low bid for surfacing, fencing and seeding work at the Yakima Training Center; by Corps of Engineers.

$1,429,850—**Dahlgren Construction Co.,** Seattle—Low bid for construction of bulk petroleum storage facilities at Mukilteo; by Corps of Engineers.

$362,410—**Erickson Paving Co.,** 1550 No. 34th St., Seattle—Contract awarded for construction of the Skagit County Road to be 5.179 mi. in length; by State Department of Highways.

$120,970—**Hall-Atwater Co.,** Seattle—Low bid for the rehabilitation of spillway at Keechelus Dam; by Bureau of Reclamation.

$2,044,500—**H. Halvorson, Inc.,** 4324 Trent Ave., Spokane—Low bid for two wing additions and alterations to Deaconess Hospital, Spokane; by Board of Directors.

$433,064—**Peter Kiewit Sons' Co.,** 8th & Douglas Sts., Longview—Low bid for canal construction; a 5-mi. extension of the 4th section of the West Canal and a 3-mi. wasteway in the vicinity of Frenchman Hills; also 2 mi. graveled road, a canal check, installation of radial gates and erection of barbed-wire fencing; by Bureau of Reclamation.

$3,840,785—**Lease & Leigland,** 1501 N. 35th St., Seattle—Contract awarded for Moses Lake barracks and mess facilities; by Corps of Engineers.

$128,280—**Materne Bros.,** 2424 N. Division St., Spokene—Contract awarded for highway improvement in Douglas County on Primary State Highway No. 10, a length of 15.2 mi., grading, bit surfacing, and drain structures; by State Department of Highways.

$2,199,800—**Pacific Bridge Co.,** 333 Kearny St., San Francisco—Low bid for channel slope protection, Coulee Dam; by Bureau of Reclamation.

$846,675—**Pieler Construction Co.,** Seattle—Award for extension of the north-south runway at Paine Air Force Base; by Corps of Engineers.

$128,288—**John H. Sellen,** 228 Ninth St., Seattle—Contract awarded for construction of navigation aids at McChord Air Force Base; by Corps of Engineers.

$289,730—**J. P. Surace Construction Co.,** 2414 Blue Ridge Drive, Seattle—Contract awarded for highway construction in Jefferson County about 3.950 mi. in length, on Primary State Highway No. 9, Contractor's Gulch to Junction City; by State Highway Department.

Wyoming

$244,610—**Strong Company,** Springville, Utah—Low bid for highway construction in Fremont and Teton counties on the Wind River route in Teton and Shoshone National Forests, a 22-ft. roadway, 18.1 mi. long, crushed rock base course and bit surfacing and drain structures; by Bureau of Public Roads.

$299,580—**Knisely-Moore Co.,** P. O. Box 77, Douglas—Low bid for relocation of State Highway Keyhole Dam Reservoir, Missouri Basin Project; by Bureau of Reclamation.

NEWS of DISTRIBUTORS AND FACTORY BRANCHES

CUMMINS ENGINE CO., INC. dealers gathered for breakfast in Colorado Springs during the Western Highway Institute meeting. Left to right, seated: *J. E. Cannon*, Seattle; *George Clarke* and *Fred Clarke, Jr.*, Vancouver, B. C.; *S. B. Cook*, Los Angeles; *Fred Clarke, Sr.*, Vancouver; *R. G. Moran*, Phoenix; *A. S. Leonard*, Los Angeles. Standing: *J. B. Chambers*, Denver; *C. J. Wilhite*, Seattle; *W. E. Pugh*, Salt Lake; *L. E. Williams*, Denver; *J. H. Flanagan*, Los Angeles; *R. P. Meehan*, San Francisco; *R. H. Wills*, Portland and *L. W. Beck*, vice president of the firm in charge of sales.

Albert Cope Co., 954 Howard St., San Francisco, Calif., is appointed Northern California and Nevada distributor for *David Round & Son*, manufacturer of hand and electric-operated hoists.

☆ ☆ ☆

Wilson

J. HOWARD WILSON, well-known in the construction and industrial fields in Northern California for 14 years, resigned from the *Industrial Equipment Company*, Emeryville, Calif., to become one of the organizers and owners of *Standard Machinery Company* in 1945. Wilson has now disposed of his interests in this firm to form a company under his own name and sole ownership, *J. H. Wilson Company*, 600 Sixteenth St., Oakland, Calif. Wilson, who was president of the Construction Equipment Distributors of San Francisco and Oakland during 1949, will center his activities in Northern California. The following lines will be represented by the new firm: *Airoil Burner Co.; Bodinson Mfg. Co.; Broderick & Bascomb Rope Co.; Duff-Norton* Jacks; *Electric Steel Foundry* (ESCO); *Hensley Ripper & Scarifier* teeth assemblies; *Hercules Equipment & Rubber Co.; Kohler Company; Morse-Starrtett* Wire Rope Cutters; *McCaffrey* Clam, Dragline and Shovel Buckets; *Murphy Company* Truck Scales; *Pacific Pumping Co.; Quincy* Air Compressors; *Round California Chain Co.; Skilsaw* Tools; *Southwest Welding & Mfg. Co.; Viber Company; Waterloo* Steel Bending Machine. In addition, the firm offers sales of parts and complete engines of *Chrysler, Continental, Hercules* and *Wisconsin.*

☆ ☆ ☆

The Bay Cities Equipment Co., Inc., Oakland, Calif., recently held a preview showing of the new Ingersoll-Rand Model 600 compressor. At the same time other equipment and the new International mobile training unit were on display. Lunch, movies and refreshments were included in the program, according to HOWARD STILLEY, sales manager.

☆ ☆ ☆

Industrial Equipment Co., Los Angeles, Calif., becomes Northern California distributor for *La Plant-Choate Mfg. Co.*, according to C. E. SKIDMORE, general manager, Los Angeles. Offices, service department and parts department facilities will be established at the present location of the branch offices of La Plant-Choate Mfg. Co., 1022 Seventy-seventh Ave., Oakland, Calif. Northern offices will not be a branch of the Los Angeles office, but will be operated independently, although owned by the same stockholders. A complete line of construction equipment will be handled.

☆ ☆ ☆

LEO M. STAUFFER becomes manager of *General Electric's* Apparatus Dept., Rocky Mountain District. Stauffer will maintain offices in Denver, Colo. He joined G-E in 1925 after working with the *Pasadena Municipal Light Department* and *Midwest Refining Co.*, Casper, Wyo. In 1949, after holding a position as district manager of the Engineering Division, Stauffer transferred to Salt Lake City, Utah. D. H. MCALLISTER will succeed him as head of the Salt Lake City office.

☆ ☆ ☆

Construction is under way on a new 53,420-sq. ft. building at 2940 East 44th St., Los Angeles, Calif., which will house the new headquarters for five sales divisions of the *B. F. Goodrich Co.* Office space will comprise 8,000 sq. ft., with 45,420 sq. ft. for the warehousing of tires, tubes, accessories, industrial products, etc. Another 13,320 sq. ft. outside will be devoted to truck dock and customer parking.

☆ ☆ ☆

The Standard Machinery Co., 450 Bayshore Blvd., San Francisco, Calif., becomes exclusive Northern California distributor for *Douglas Products Corp.*, Pittsburgh, Pa. J. D. CLOKEY, JR., president, was a recent visitor to San Francisco for the purpose of getting this distribution established. C. A. WINROD, president of Standard Machinery Co., announces staff changes in the company. E. J. MARRIOTT is now vice president; R. H. DAUFORD is secretary, and MAURICE NELSON is an addition to the sales force.

☆ ☆ ☆

Two executive promotions in the Sales Department of *Columbia Steel Company*, a *U. S. Steel* subsidiary, go to LORING S. BROCK and BURTON C. SMITH. Brock, formerly manager of sales and manufacturing accounts for the Los Angeles, Calif., office becomes manager of sales for the Inter-Mountain Sales District with headquarters in Salt Lake City, Utah. Brock joined *U. S. Steel Products Co.* in 1929 after attending University of California at Los Angeles. Smith, a senior technical field representative, succeeds Brock at Los Angeles. Smith joined the company in 1933 after graduating from Sawyer School of Business in Los Angeles. During the past

THESE TWO FAMILIAR ZANIES have caught the attention of the industry through Richmond Screw Anchor Co. advertising. The firm is now offering "*Screwy*" and "*Ty*" buttons to construction workers who want to go along with the gag. (Reproductions of the buttons inserted at far right.)

NEWS of DISTRIBUTORS AND FACTORY BRANCHES

Continued from page 117

ten years he has represented the Columbia sales organization at various times in San Diego, Los Angeles and the State of Arizona.

☆ ☆ ☆

Plenty of Hollywood glamour highlighted the formal opening of the new quarter-million dollar *B. F. McDonald Company* industrial safety equipment plant, Los Angeles, Calif. The opening was televised for one hour while onlookers watched the presentation of a program which stressed the importance of safety equipment in preventing industrial accidents. GLENN MCCARTHY, prominent Texas oil man, delivered the dedicatory address, which officially opened the new headquarters.

☆ ☆ ☆

***Ralph H. Cockroft* of Flexible Tubing Corp. now directs company sales in the eleven Western States (see item below).**

☆ ☆ ☆

RALPH H. COCKROFT, Western sales manager for *Flexible Tubing Corp.*, Guilford, Conn., directs all company sales activities in the eleven Western States. He headquarters at 416 Citizens Bank Bldg., Pasadena, Calif. Cockroft was a member of the firm during the time Spiratube was first introduced into commercial use. Prior to World War II, Cockroft was in the treasurer's office of *Walworth Valve Co.* After the war, Cockroft was the Spiratube sales representative in Southern California from 1946 to 1947 for *Warner Brothers*, and from 1948 to the present with Flexible Tubing Corp.

☆ ☆ ☆

International Harvester Company, Motor Truck Division, Oakland, Calif., announces organizational changes in several branches. In the San Francisco branch, Manager D. P. MCSTOCKER transfers to Foreign Operations and goes to Australia to head the Motor Truck Division there. E. W. LEWIS succeeds McStocker as manager at San Francisco. Lewis was originally district sales promotion manager at Oakland, Calif., and more recently branch manager at Glendale, Calif. In the Fresno, Calif. branch, Manager H. V. RYAN, who has been a reserve officer in the Tank Corps, returns to active service and reports to Ft. McArthur for induction as a Captain. R. L. THOMPSON, zone manager in Zone 4, succeeds Ryan as manager at Fresno. In Zone 1, H. F. KOELLING, manager, moves to Sacramento and succeeds

Continued on page 120

UNIT BID PRICES

Selected Bid Abstracts for Typical Western Projects

Water Supply . . .

Water System: Mains, Fire Hydrants, Service Connections

California—Calaveras County—County Water District. Calaveras Plumbing & Heating Co., with a bid of $20,527, was low before the Calaveras County Water District for construction of Hathaway's Mountain Pines Water System. Unit prices were as follows:

(1) Calaveras Plumbing & Heating Co. $20,527
(2) Glanville Plumbing Co. 20,684
(3) Pisano Bros. $20,892

		(1)	(2)	(3)
10,500	lin. ft. 4-in. diam. No. 10 gauge steel pipe	1.97	1.90	2.00
15	each fire hydrants	80.00	100.00	100.00
41	each Type 1 service connections	29.00	50.00	40.00
9	each Type 2 service connections	39.00	60.00	50.00
12	each Type 3 service connections	55.00	80.00	60.00
12	each gate valves	77.00	100.00	100.00

Waterway Improvement . . .

Dredging Navigable Channel in Coos Bay

Oregon—Coos County—Corps of Engineers. Pacific Dredging Co., Paramount, Calif., with a bid of $86,791, was low before the Corps of Engineers for dredging a channel of variable width in Coos Bay, to a least depth of 30 ft. at mean lower low water, and disposing of all excavated material. Unit prices were as follows:

(1) Pacific Dredging Co. ..... $ 86,791
(2) Manson Construction & Engineering Co. and Osberg Construction Co. 144,020
(3) Contracting Officer's estimate 87,170

		(1)	(2)	(3)
340,000	cu. yd. place meas. dredging to depth of 30 ft. at mean lower low water and disposal of material	.229	.38	.23
78,000*	cu. yd. place meas. dredging and disposal of material in over-depth	.1145	.19	.115

* Maximum allowable over-depth excavation.

Bank Protection Works on Willamette River

Oregon—Willamette River Basin—Corps of Engineers. G. D. Dennis & Sons, Portland, with a bid of $48,346, was low before the Corps of Engineers for construction of bank protection works, including a steel-rail drift barrier along the left bank of the Middle Channel Willamette River at John Smith Island. Unit prices were as follows:

(1) G. D. Dennis & Sons $48,346
(2) Ramsey Construction Co. 51,269
(3) R. A. Heintz Construction Co. 53,200
(4) C. J. Eldon, Contractor $63,420
(5) Groesbeck & Hickson 67,122
(6) Contracting Officer's estimate 48,302

		(1)	(2)	(3)	(4)	(5)	(6)
1	acre clearing	$1,500	$1,100	$1,600	$1,000	$1,000	637.00
4,210	cu. yd. bank excavation	.60	.73	.70	.50	.90	.48
6,570	cu. yd. toe-trench excav.	.95	.75	.98	.95	1.10	.81
7,390	cu. yd. dumped-stone revetment	4.00	4.25	4.25	5.74	6.00	4.29
7,630	lin. ft. install steel-rail piling and steel-rail brace piling	.95	1.15	1.25	1.00	1.20	.78
650	lin. ft. install steel-rail wales	1.00	2.58	1.00	5.00	2.00	3.56
31	ea. install steel-rail braces	20.00	10.00	20.00	25.00	10.00	11.45

Sewerage . . .

Sewer System for Myrtle Creek, Oregon

Oregon—Douglas County—City. H. C. Werner, Eugene, with a bid of $192,447, was low before the City Council of Myrtle Creek for construction of the Myrtle Creek sewer system. Unit prices were as follows:

(1) H. C. Werner $192,447
(2) State Construction Co. 193,068
(3) George W. Lind 214,807
(4) Co. Ventures $241,562
(5) Atlas Construction 272,238

		(1)	(2)	(3)	(4)	(5)
	Trench excav. and backfill, Class C—					
19,550 lin. ft.	0-ft. - 6-ft. deep	.55	.60	.70	.70	.70
20,790 lin. ft.	6-ft. - 8-ft. deep	.60	.80	.90	.90	.90
7,700 lin. ft.	8-ft. - 10-ft. deep	.75	1.00	1.00	1.10	1.05
2,240 lin. ft.	10-ft. - 12-ft. deep	1.00	1.20	1.10	1.30	1.40
1,480 lin. ft.	12-ft. - 14-ft. deep	1.25	1.40	1.20	1.65	1.65
260 lin. ft.	14-ft. - 16-ft. deep	1.60	1.70	2.30	2.00	1.90
200 lin. ft.	16-ft. - 18-ft. deep	2.50	1.90	3.00	2.50	2.15
100 lin. ft.	18-ft. - 20-ft. deep	3.00	2.10	4.50	2.50	4.00
	Trench excav. and backfill, Class D—					
1,780 lin. ft.	0-ft. - 6-ft. deep	1.20	1.60	2.10	1.00	2.40
1,340 lin. ft.	6-ft. - 8-ft. deep	2.00	2.40	2.30	1.20	2.50
720 lin. ft.	8-ft. - 10-ft. deep	2.20	3.00	2.50	1.35	3.45
320 lin. ft.	10-ft. - 12-ft. deep	2.50	3.70	4.50	1.60	3.60
450 lin. ft.	12-ft. - 14-ft. deep	3.00	4.40	4.60	2.00	4.85

(Continued on next page)

Memo

For men who watch production Costs!

High costs in loading will be reduced by using the Eimco 104. This heavy duty loading machine will load more rock, sand or gravel in less time and at lower cost. The 104 is easy to operate and maintain — it digs in the front and discharges overhead to the rear. Models are available with either Diesel or electric motive power.

Contractors and construction men are turning to the 104 for higher production at lower costs.

An Eimco Engineer is available to discuss your loading problem — write for information.

EIMCO

THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines

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

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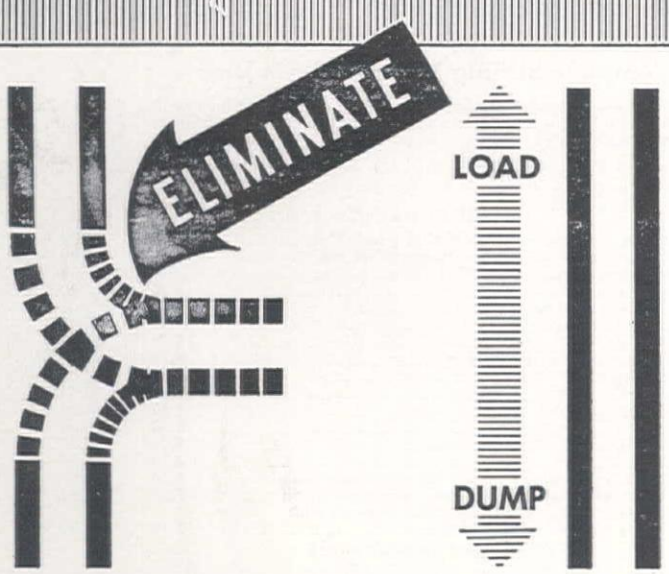
NEW YORK, 51-52 SOUTH STREET • CHICAGO, 3319 SOUTH WALLACE STREET
BIRMINGHAM, ALA., 3140 FAYETTE AVE. • DULUTH, MINN., 216 E. SUPERIOR ST.
EL PASO, TEXAS, MILLS BUILDING • BERKELEY, CALIFORNIA, P. O. BOX 240
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1, ENGLAND, 190 PICCADILLY

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



SAVE THREE WAYS:

1. Eliminate wasted time in turning to dump.
2. Eliminate track and roller wear in turning.
3. Speed up loading with Eimco Rocker-arm principle.

A350

NEWS of DISTRIBUTORS AND FACTORY BRANCHES

Continued from page 118

R. L. Thompson. C. KILBURN succeeds Koelling. In Zone 3, A. W. ROLFE, manager, transfers to retail sales at the Fresno branch. L. P. SWANSON, formerly in sales promotion and retail salesman work, succeeds Rolfe as manager of Zone 3.

☆ ☆ ☆

Oberlink

BOYD S. OBERLINK is a new vice president of *Allis-Chalmers, Tractor Division,* Milwaukee, Wis. Oberlink was formerly assistant to the vice president in charge of the division. He has been with the company since 1934.

☆ ☆ ☆

EDWARD J. BRICHTA becomes sales manager of the industrial air-cooled engine division of *Continental Motors Corp,* Brichta has been with the firm 15 years and in the sales department since 1948.

☆ ☆ ☆

Pettersen

RICHARD W. PETTERSEN is field representative in Idaho, Montana, Wyoming, Colorado and Utah for the *Douglas Fir Plywood Assn.,* Tacoma, Wash. Pettersen is a specialist in wood technology. His headquarters for traveling the Northwest territory are in Tacoma, Wash.

☆ ☆ ☆

Operations of the *Graco* organization got off to a good start recently with a grand opening of new facilities in Stockton, Calif. Graco is International Harvester dealer for San Joaquin County on motor trucks, farm implements and refrigeration equipment. The *W. R. Grace Co.* stores in Lodi and Tracy closed to permit complete attendance at Stockton. HARRY WARNER is general manager for the three stores and C. L. BRADFORD is assistant and C. H. MINAHEN as sales manager. Graco assumed ownership from *Inland Equipment Co.* in a transaction which cost around $1,250,000.

☆ ☆ ☆

Coast Equipment Company, San Francisco, Calif. construction, industrial and mining machinery distributors, are now exclusive sales and service representatives for the *Eagle Iron Works,* Des Moines, Iowa. The Eagle line of sand, gravel and ore washing equipment will be handled and serviced.

UNIT BID PRICES . . . CONTINUED

290 lin. ft.	14-ft. - 16-ft. deep	3.40	4.95	6.00	2.50	5.00
200 lin. ft.	16-ft. - 18-ft. deep	3.80	5.65	7.00	4.00	6.25
1,500 cu. yd.	rock excavation	9.80	10.00	5.00	15.00	10.00
57,420 lin. ft.	gravel base for pipe	.25	.15	.20	.20	.10
250 cu. yd.	gravel backfill, in place	2.00	3.00	5.60	1.75	3.50
50 cu. yd.	concrete backfill, in place	19.00	40.00	30.80	25.00	25.00
	Sanitary sewer pipe in place—					
36,800 lin. ft.	8-in. sewer pipe	1.20	.90	1.30	1.65	2.25
4,720 lin. ft.	10-in. sewer pipe	1.40	1.30	1.75	1.88	2.50
3,210 lin. ft.	15-in. sewer pipe	3.00	2.25	3.00	2.60	3.50
190 lin. ft.	8-in. cast iron pipe	5.00	4.90	6.00	5.00	5.00
	Service connections and cleanouts—					
12,500 lin. ft.	6-in. sewer pipe	1.00	1.65	1.25	1.25	2.10
500 each	6-in. x 6-in. x 6-in. wye, in place	3.00	8.00	4.36	5.00	6.30
445 each	8-in. x 8-in. x 6-in. wye, in place	4.00	8.10	5.60	6.00	6.75
47 each	10-in. x 10-in. x 6-in. wye, in place	5.00	9.50	7.75	6.60	8.50
8 each	15-in. x 15-in. x 6-in. wye, in place	10.00	15.00	15.00	7.20	10.50
500 each	6-in. - ⅛ bend in place	1.50	2.00	2.50	2.00	2.50
20 each	8-in. pipe plugs	.60	.75	.40	.40	.80
500 each	6-in. pipe plugs	.50	.50	.35	.25	.50
6 each	cleanout slabs	10.00	5.00	7.00	5.00	10.00
10 each	8-in. x 8-in. x 8-in. wye, in place	5.50	8.20	6.50	6.00	7.50
	Manhole Construction—					
152 each	Standard manhole 4-ft. deep	110.00	100.00	140.00	110.00	160.00
4 each	Standard drop manhole 4-ft. deep	150.00	240.00	200.00	150.00	220.00
590 lin. ft.	additional manhole depth	16.00	11.00	15.40	13.00	12.00
12 each	water tight manhole covers	40.00	20.00	25 20	20.00	40.00
5 each	connection to existing manhole	25.00	25.00	21.00	25.00	50.00
	Gutters, curbs and remov. and replace. of pave., side—					
950 cu. yd.	gravel removal and replacement	3.00	2.50	4.20	1.75	3.50
120 sq. yd.	asphal. conc. pave. remov. and replace.	10.00	6.00	7.00	6.00	5.00
40 sq. yd.	asphal. conc. pave. removal	1.20	1.00	2.80	1.00	2.00
150 sq. ft.	conc. sidewalk remov. and replac.	.60	.50	.70	.60	1.00
50 lin. ft.	conc. curb and gutter remov. and replace.	4.00	2.00	2.80	2.25	3.00
	Railroad crossings—					
1 lump sum,	main track, main 1 3+50 to 4+00	920.00	300.00	490.00	450.00	300.00
47 lin. ft.	spur track, main 1 10+10 - 10+57	38.00	30.00	28.00	375.00	40.00
	Myrtle Creek crossing—					
10 cu. yd.	structural excavation	30.00	35.00	12.60	10.00	50.00
26 cu. yd.	concrete, in place	70.00	80.00	70.00	75 00	90.00
4,000 lb.	reinforcing steel, in place	.14	.25	.15	.20	.20
1 lump sum,	steel pipe in place (16 ft.)	$1,050	$1,200	840.00	664.00	640.00
1 lump sum,	highway bridge crossing	400.00	500.00	220.00	100.00	500.00
1 lump sum,	Myrtle Creek overflow	180.00	250.00	266.00	160.00	250.00

Dam . . .

Earthwork for Power Facilities at Folsom Dam

California—Sacramento, El Dorado, and Placer Counties—Bureau of Reclamation. Guy F. Atkinson Co., South San Francisco, with a bid of $1,463,721 was low before the Bureau of Reclamation for earthwork for powerhouse, warehouse and penstock fabricating areas, at Folsom Dam, 2.5 mi. north of Folsom. Work includes clearing, blasting, excavation for power plant areas and tailrace channel, excavation for access road, gravel surfacing, and disposal of materials. Unit prices were as follows:

(1) Guy F. Atkinson Co. $1,463,721
(2) Macco Corporation & Morrison-Knudsen Co. Inc. 2,596,934
(3) H. Earl Parker, Inc. and Harms Bros. $2,695,159
(4) Peter Kiewit Sons' Co. 3,065,993
(5) Engineer's estimate 1,736,039

		(1)	(2)	(3)	(4)	(5)
307,000 cu. yd.	excav. for tailrace channel, first 307,000 cu. yd.	2.30	3.72	3.69	6.40	2.15
307,000 cu. yd.	excav. for tailrace channel, over 307,000 cu. yd.	1.00	2.20	2.89	2.00	1.85
121,500 cu. yd.	excav. for power-plant areas, first 121,500 cu. yd.	1.76	3.27	2.33	2.00	1.80
121,500 cu. yd.	excav. for power-plant areas, over 121,500 cu. yd.	1.30	2.35	1.88	1.25	1.70
43,600 cu. yd.	excav. for tailrace channel access road	1.15	1.60	2.86	1.50	1.50
3,900 cu. yd.	placing gravel surfacing	5.00	3.50	6.25	4.00	2.50
3.0 M.b.m.	furn. and erect. timber in guardrails and bulk head	350.00	530.00	545.00	300.00	350.00
511 lin. ft.	furn. and lay. 24-in. diam. corru. metal pipe	6.00	7.00	9.30	8.00	7.00
80 lin. ft.	furn. and lay. 36-in. diam. corru. metal pipe	10 00	22.00	18.75	15.00	12.00
1.71 mi.	furn. and constr. barbed-wire right-of-way fence	$2,500	$3,700	$3,875	$3,000	$1,200

Complete Stilling Basin at Davis Dam

Arizona—Davis Dam Project—Bureau of Reclamation. Grafe-Callahan Construction Co., Dallas, Tex., with a bid of $2,781,880, was low before the Bureau of Reclamation for completion of Davis Dam spillway stilling basin. Unit prices were as follows:

(1) Grafe-Callahan Construction Co. $2,781,880
(2) Donovan Construction Co. (Sched. 1 only) 2,911,372
(3) Engineer's estimate $1,928,175

SCHEDULE No. 1	(1)	(2)	(3)
Lump sum, credit allowed to the Government for existing pile bridge	—1.00	—1.00	—$80,000
Lump sum, credit allowed to the Government for existing cofferdam	—1.00	—1.00	—$65,000
Lump sum, unwatering foundation of spillway stilling basin	$580,000	$911,000	$470,000
Lump sum, removal of existing piling	$5,900	$2,000	$12,000
32,000 cu. yd. excav. for spillway stilling basin	6.60	5.65	5.00
500 cu. yd. excavation of lean concrete fill	34.00	39.80	10.00
2,800 cu. yd. excavation for cut-offs	15.00	12.00	12.00
66,000 cu. yd. excavation for spillway outlet channel	3.70	4.21	2.50
7,500 cu. yd. rock fill back of gravity wall	2.80	2.00	1.50
23,000 cu. yd. impervious fill	2.25	2.63	1.00
21,500 cu. yd. compacting impervious fill	2.10	1.16	1.50
550 cu. yd. area surfacing	6.30	10.00	3.00
2,000 cu. yd. gravel blanket	5.20	6.25	4.00
8,700 cu. yd. rip-rap	8.50	7.40	5.00
800 lin. ft. const. 6-in. diam. sewer-pipe drains with uncemented joints	6.50	.66	1.75
1,200 lin. ft. const. 8-in. diam. sewer-pipe drains with uncemented joints	7.00	.92	2.00
100 lin. ft. const. 8-in. diam. sewer-pipe drain, cradled in conc. with uncemented joints, covered with gravel	3.10	31.29	2.75

(Continued on next page)

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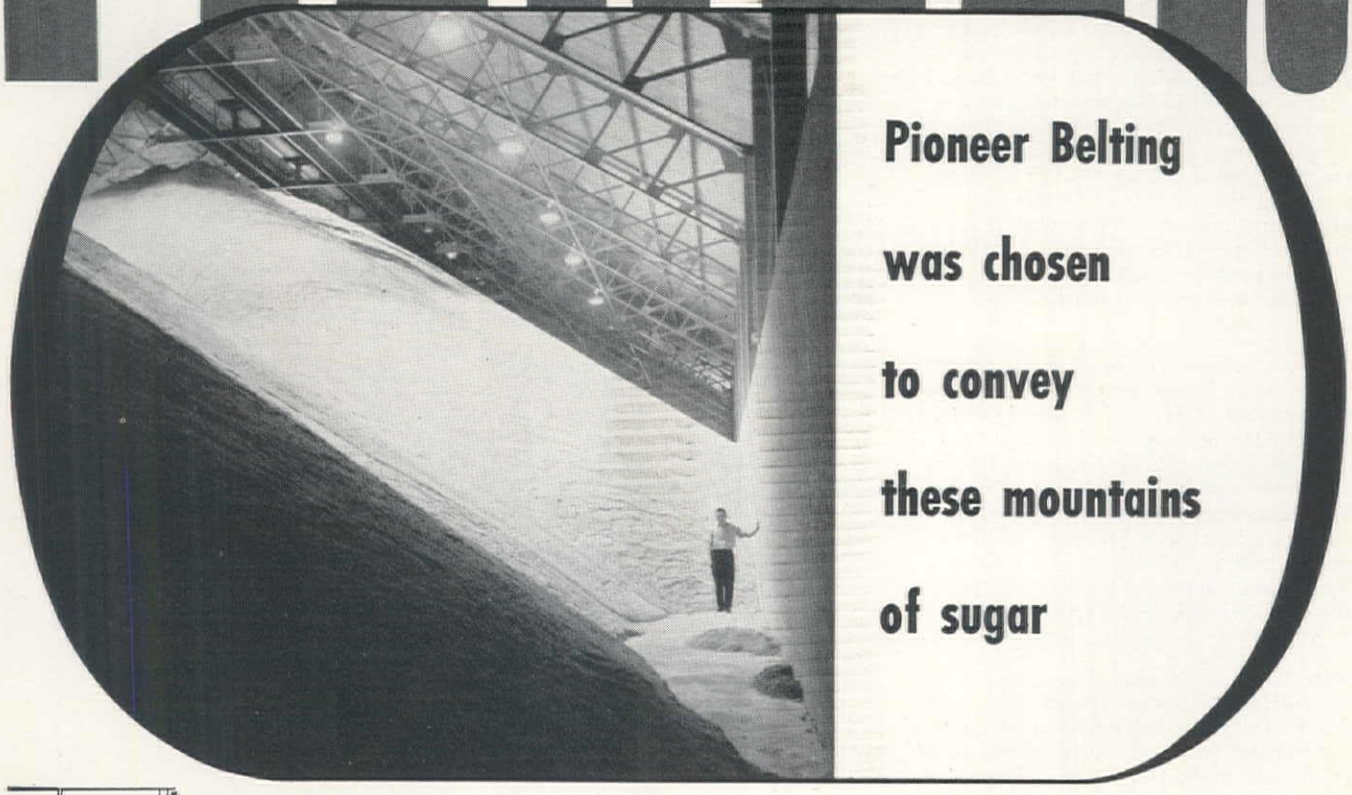

Pioneer Belting was chosen to convey these mountains of sugar

The sugar you used this morning may well have had a quarter-mile ride on Pioneer Belting. That doesn't make it sweeter—but it makes for a sweet operation at the new million-dollar Lihue bulk loading plant in Hawaii. This new plant is nearly a quarter-mile long, and handles the sugar before refining on the mainland. The conveyor system is so efficient that one man can now load as much sugar as *twenty-one* men load in a conventional plant!

Selection of belting for such an operation was critical indeed; the decision to use PIONEER belting is evidence again of the *extra service* industrial men know they get from PIONEER products. Get this *extra service* yourself when you buy your next belting, hose, fire hose, packing, or other industrial rubber products. Call the PIONEER RUBBER MILLS main office, branch or distributor located nearest you:

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NEWS of MANUFACTURERS

COLONEL WALTER F. SIEGMUND retires as general sales manager of Olin Industries, Inc. He will function in an active advisory capacity. GEORGE M. DAVIS, sales manager of the Firearms and Ammunition Division of *Western Cartridge Company* and *Winchester Repeating Arms Company*, Olin divisions succeeds Colonel Siegmund.

☆ ☆ ☆

Preventive maintenance is the object of a new program underway by the *General Motors Truck & Coach Division*. As a result of a two-year survey across the country to determine what truck owners and operators needed in the maintenance line, the program will offer factory instructors to explain the program to company field service personnel in a series of 25 meetings throughout the U. S. and service experts will, in turn, present it to the dealers. It is hoped that the system will be of valuable aid in this period of material shortages and impending emergency conditions.

☆ ☆ ☆

PAUL WAYMAN, vice president in charge of operations, becomes a director as well of *American Lumber & Treating Co.*, Chicago, Ill. He replaces J. GARDNER COOLIDGE, vice president, who requested to be relieved of his duties as director of the wood preserving firm. Coolidge continues as vice president and American Lumber's Eastern District Manager. Wayman was at one time in charge of West Coast operations at Weed and Wilmington, Calif.

☆ ☆ ☆

WILLIAM G. PETERSON is now vice president and general manager of *Thermoid Western Co.*, Nephi, Utah. Peterson, who was promoted from plant superintendent at Nephi, also supervises a small Thermoid plant near Los Angeles, Calif.

☆ ☆ ☆

S. E. BIGGS, vice president in charge of manufacturing for *The Trailmobile Company*, Cincinnati, Ohio, becomes a member of the advisory committee on truck-trailer manufacture, National Production Authority.

☆ ☆ ☆

White Motor Company acquires the business and assets of *Sterling Motor Truck Company, Inc.*, and assumes all the obligations of the latter.

☆ ☆ ☆

GEORGE R. VETTER is now assistant to FRITZ VON SCHLEGELL, president of *The Tractor Sales Corp.*, Los Angeles, Calif. Vetter is a graduate of the University of Southern California.

☆ ☆ ☆

Pacific Wire Works Co., Seattle, Wash., celebrates its sixtieth birthday. The firm has developed from a small ornamental iron shop in 1891 to its present position as a prominent manufacturer of woven wire products. The firm is celebrating its anni-

Continued on page 124

UNIT BID PRICES . . . CONTINUED

160	lin. ft. laying 60-in. diam. corrugated-metal pipe	4.50	7.70	10.00
3,000	lin. ft. drilling holes for anchor bars and grouting bars in place	7.90	1.83	2.25
260,000	lb. placing reinforcement bars and fabric	.10	.077	.08
21,000	bbl. furn. and handling portland cement	8.90	6.97	5.50
800	ton furnishing and handling pozzolan	50.00	31.00	21.50
25,500	bbl. furn. and handling portland-pozzolan cement	——	——	5.20
2,800	cu. yd. conc. in spillway stilling basin cut-off	23.50	34.15	25.00
6,200	cu. yd. conc. in spillway stilling basin floor	26.00	37.35	25.00
18,000	cu. yd. conc. in spillway stilling basin gravity walls	28.00	39.50	22.00
90	cu. yd. conc. in drainage struct.	60.00	57.64	75.00
250	cu. yd. concrete in rip-rap	29.00	22.00	40.00
400	lin. ft. furn. and placing metal seals, Type 2	3.70	4.25	2.00
600	lin. ft. saw cutting outline of repair recesses	2.40	1.10	5.00
60	cu. yd. excav. of conc. in repair recesses	52.00	70.00	50.00
92	cu. yd. conc. in blockouts and repair recesses	185.00	53.20	85.00
120	sq. ft. removal of surface offsets	17.00	17.50	5.00
100	lin. ft. repair of existing metal seals, Type Z	10.00	3.79	2.00
27,600	sq. yd. preparation of sub-grade for bituminous surfacing	.05	.12	.25
30	M. gal. watering roadways and parking areas	5.30	6.00	5.00
34	ton liquid asphalt prime coat	75.00	60.00	50.00
40	cu. yd. furn. additional aggre. for road-mix surfacing	7.50	6.00	3.50
135	ton furn. liquid asphalt for bituminous surfacing	75.00	54.00	50.00
27,600	sq. yd. constructing road-mix surfacing	.28	.48	1.20
30	ton liquid asphalt for seal coat	85.00	60.00	50.00
160	cu. yd. sand for seal coat	13.00	9.60	4.00
670	sq. yd. constructing concrete sidewalk	9.50	12.35	4.00
	SCHEDULE No. 2			
75,000	cu. yd. excav. for channel improvement, first 75,000 cu. yd.	2.35	——	1.75
130,000	cu. yd. excav. for channel improvement, over 75,000 cu. yd.	1.58	——	.80

Revetment Test Channel at Dorena Dam

Oregon—Lane County—Corps of Engineers. Gaylord Construction Co., Portland, with a bid of $25,606, was low before the Corps of Engineers for construction of revetment test channel at Dorena Dam, approximately 7 mi. east of Cottage Grove. Unit prices were as follows:

(1) Gaylord Construction Co. ..... $25,606 (2) Contracting Officer's Estimate $21,596

		(1)	(2)
830	cu. yd. salvage derrick stone revetment	1.65	.54
90	cu. yd. salvage pervious material	.70	.54
670	cu. yd. excavation	.90	1.30
13,500	cu. yd. embankment from borrow	.80	.55
50	hr. additional compaction	7.00	12.50
200	M. gal. sprinkling	3.50	2.00
20	hrs. processing	7.00	12.65
310	cu. yd. pervious material, in place	.80	3.50
360	cu. yd. structural backfill, in place	2.05	2.15
550	cu. yd. dumped stone revetment, Class A	4.50	4.10
200	cu. yd. dumped stone revetment, Class B	4.50	4.10
210	cu. yd. dumped stone revetment, Class C	4.50	4.10
300	cu. yd. dumped stone revetment, Class D	4.50	4.10
80	cu. yd. sand-cement grout, in place	32.00	27.50
1	job install two 24-in. diam. culverts	850.00	800.00
80	cu. yd. stockpile revetment, Class A	4.00	3.35
80	cu. yd. stockpile revetment, Class B	4.00	3.35
100	cu. yd. stockpile revetment, Class C	4.00	3.35
100	cu. yd. stockpile revetment, Class D	4.00	3.35
100	cu. yd. stockpile pervious material	.75	2.95

Highway and Street . . .

P.C.C. Paving on Cement-Treated Subgrade

California—San Diego County—State. Cox Bros. Construction Co., Stanton, Calif., with a bid of $637,345, was low before the State Division of Highways for construction of a State highway between points 0.7 mi. south of San Marcos Creek and 2.2 mi. south of Carlsbad, about 3.2 mi. in length; constructing a graded roadbed adjacent to the existing highway, and constructing portland cement concrete pavement on cement-treated subgrade; surfacing the existing pavement with plant-mixed surfacing and applying seal coats thereto; and construction of 3 reinforced concrete bridges and 1 double-reinforced concrete box culvert. Unit prices were as follows:

(1) Cox Bros. Construction Co. ..... $637,345 (2) Griffith Co. $641,997

		(1)	(2)
55	cu. yd. removing concrete	5.00	7.00
Lump sum,	clearing and grubbing	$5,000	$5,200
216,000	cu. yd. roadway excav.	.43	.41
2,800	cu. yd. structure excav.	2.50	2.70
1,365	cu. yd. structure excav. (bridges)	4.00	3.00
140	cu. yd. ditch and channel excav.	2.50	2.00
10,600	sq. yd. compacting original ground	.05	.06
1,610,000	sta. yd. overhaul	.006	.005
250	cu. yd. rock backfill	4.00	6.00
13,000	sq. yd. cultivating (prep. landscaping)	.10	.07
23,500	sq. yd. preparing slopes (eros. control)	.05	.07
8	ton fertilizer (top soil)	105.00	120.00
70	ton straw cover mtl. (eros. control)	70.00	70.00
Lump sum,	devel. water supp. and furn. watering equip.	$8,500	$4,000
5,200	M. gal. applying water	1.80	1.80
170	sta. fin. roadway	15.00	11.00
3,800	bbl. portland cement (C.T.S. and C.T.B.)	4.30	4.00
33,000	sq. yd. mix. and compact. (C.T.S.)	.27	.26
13,700	sq. yd. mix. and compact. (C.T.B., 0.5-ft. thick)	.30	.41
5,400	sq. yd. mix. and compact. (C.T.B., 0.67-ft. thick)	.48	.55
180	ton asph. emuls. (cur. sl., paint bind. and sl. cts.)	40.00	45.00
195	ton sand (sl. ct.)	5.50	4.00
720	ton screenings (sl. ct.)	6.50	5.00
58	ton liq. asph. SC-2 (prime ct.)	22.00	25.00
1,480	ton pav. asph. (P.M.S.)	5.25	6.00
21,100	ton min. aggr. (P.M.S.)	5.25	6.00

(Continued on next page)

to aid peak defense production

Collect and Sell your Iron and Steel Scrap

Mr. Q-Check says *dig* for scrap metal—*search* every nook and corner of your pipe yard—*scrape* the bottom of the barrel! For iron and steel scrap is critically needed to aid peak defense production in steel mills and iron foundries.

The average pipe yard has some or all of the following sources of scrap metal, according to whether pipe is used for water, gas, sewerage or industrial service:

Obsolete fittings; cut pipe (short pieces of distribution or service pipe); damaged hydrants, valve boxes, manhole covers, etc. It all adds up to a vital contribution to defense production.

Collect your scrap now. Phone your nearest scrap dealer. He wants what you have *but quick*, and pays good cash prices.

CAST IRON PIPE RESEARCH ASSOCIATION . . . CHICAGO

NEWS of MANUFACTURERS

Continued from page 122

versary by announcing the completion of a new addition to its plant which provides increased facilities to handle several defense contracts as well as the regular manufacture of its many products.

☆ ☆ ☆

CARL F. CLAUSEN, manager of manufacturing research for *Portland Cement Association,* Chicago, Ill. is a consultant in the Building Materials Division of the National Production Authority's facilities and construction bureau. Clausen has had many years of service in the cement industry. He was a member of the Portland Cement Industry Advisory Committee of the War Production Board during World War II. He then joined *Pacific Portland Cement Company* as assistant to the president and remained in that post until 1947 when he joined the Portland Cement Association.

☆ ☆ ☆

GORDON L. CHAPMAN is newly elected president of the *Carver Pump Company,* Muscatine, Iowa and ROY J. CARVER, founder, becomes the chairman of the board of directors. Chapman was formerly vice president and director.

☆ ☆ ☆

WILLIAM A. BUCKMAN joins *Pabco Products Inc.,* Oakland, Calif. as assistant to the vice president in charge of marketing. He will concentrate on specific marketing problems for the various Pabco sales divisions.

☆ ☆ ☆

LESTER F. COX becomes a senior vice president of the *Thermoid Co.,* Trenton, N. J. He will be in charge of all Thermoid plants and manufacturing operations. The firm manufactures automotive and industrial rubber, friction and textile products. Cox was formerly vice president in charge of rubber manufacturing.

☆ ☆ ☆

Flexible Tubing Corporation, Guilford, Conn., makers of special problem ducts, opens a new division for the manufacture of defense products. This inflatable products divsion will concentrate on the manufacture of life rafts, sleeping bags, etc. FREDRIC ROSENTHAL heads production for the new division.

☆ ☆ ☆

The Thew Shovel Co., Lorain, Ohio has shipped the 3,000th Lorain TL Series shovel-crane. The equipment was one of a number built for the Army Corps of Engineers. This series was an entirely new post-World War II development by Thew. The company is also engaged in looking ahead toward any sort of disaster which might affect the company plants. Adequate assistance of both men and equipment in the event of emergency or disaster has been assured by retaining Griffith Trucking Co., Lorain to supply necessary men and equipment for immediate use.

Continued on page 130

UNIT BID PRICES . . . CONTINUED

200	lin. ft. raised traffic bars	1.00	1.25
7,700	lin. ft. placing P.M.S. dikes	.15	.18
7,500	cu. yd. P.C.C. (pavem't)	14.95	14.50
5,000	ea. pavement tie bolt assemblies	.65	.65
1,367	cu. yd. Class "A" P.C.C. (struct.)	53.00	53.00
820	lin. ft. conc. railing	6.50	5.50
1,656	lin. ft. furn. conc. piling	4.00	4.20
60	ea. driving piles	165.00	160.00
530	cu. yd. light stone rip-rap	11.50	13.00
1,050	cu. yd. Class "A" P.C.C. (curbs and gutters)	32.00	34.00
800	ea. curb dowels	.90	.70
37	ea. right-of-way monuments	10.00	6.00
1,600	lin. ft. metal plate guard railing	3.00	3.40
177	ea. culv. mrkrs., clear. mrkrs. and guide posts	6.00	6.00
18	ea. horiz. reflector units	7.00	9.00
3	mi. new property fence	$1,170	$1,900
7,200	lin. ft. chain link fence	1.95	1.75
138	lin. ft. 18-in. C.M.P. (16 ga.)	3.50	3.50
1,492	lin. ft. 24-in. C.M.P. (14 ga.)	5.50	5.00
400	lin. ft. 30-in. C.M.P. (14 ga.)	6.00	6.00
40	lin. ft. jacking 30-in. C.M.P.	40.00	21.00
4	ea. spillway assemblies	35.00	30.00
112	lin. ft. 8-in. C.M.P. down drains (16 ga.)	2.75	2.00
2	ea. spillway assemb. down drain slip joints	20.00	20.00
15	sq. yd. placing P.M.S. down drains	2.50	3.00
3	ea. manhole fr. and cov. (D.I. and junct. box.)	40.00	35.00
255,200	lb. bar reinf. steel	.11	.11
430	lb. misc. iron and steel	.50	.40
162,000	ea. ice plant cuttings	.03	.03

Grade Widening and Paving on Central Oregon Highway

Oregon—Lake, Harney and Deschutes Counties—State. Babler & Rogers, Portland, with a bid of $591,811, was low before the State Highway Commission for construction of the Hampton-Gap Ranch section of the Central Oregon Highway, including grade widening and paving. Unit prices were as follows:

(1)	Babler & Rogers	$591,811	(5)	Acme Construction Co.	$661,920
(2)	Warren Northwest, Inc.	613,575	(6)	Parker Schram Co.	674,939
(3)	Peter Kiewit Sons' Co.	640,395	—	J. N. Conley	717,868
(4)	J. C. Compton Co.	655,535	—	Central Heating Co.	746,074

		(1)	(2)	(3)	(4)	(5)	(6)
170	cu. yd. struct. excav., unclassified	4.00	4.00	2.50	3.00	3.00	4.00
10,000	cu. yd. borrow excav., unclassified	.40	.30	.40	.50	.50	.30
40,000	yd. mi. truck haul on borrow	.15	.12	.12	.30	.14	.16
600	hrs. blade grader	8.00	8.50	10.00	8.00	9.00	9.35
300	hrs. bulldozer	10.00	15.00	12 00	12.00	15.00	14.60
170	lin. ft. 18-in. concrete pipe	3.30	4.50	4.00	4.00	4.50	4.60
50	lin. ft. 24-in. concrete pipe	4.60	7.00	6.00	5.50	6.40	6.40
130	lin. ft. 36-in. concrete pipe	9.00	13.00	10.00	9.00	10.50	11.75
43,000	cu. yd. pit-run cinder in shoulders	1.20	1.25	1.35	1.20	1.25	2.00
5,000	ton asphaltic conc. mixture in patching	5.00	5.00	5.65	6.00	6.22	5.35
49,800	ton asphaltic concrete mixture	4.40	4.50	5.30	5.50	5.20	4.20
7,600	ton 86-100 asphalt in mixture	33.00	35.00	32.00	33 00	35.00	40.00
330	ton RS-1 emulsified asphalt in seal coat	45.00	48.00	45.00	40.00	55.00	51.00
2,000	cu. yd. aggregate in seal coat	5.00	4.00	5.50	4.00	5.25	4.75

Grading, Gravel Surfacing, and Drainage Structures

Montana—Richland County—State. Riggin-Nelson Construction Co., Harlem, with a bid of $86,247, was low before the State Highway Commission for grading and gravel surfacing of the Girard-Fairview highway, about 7.3 mi. in length, and construction of small drainage structures. Unit prices were as follows:

(1)	Riggin-Nelson Construction Co.	$ 86,247	—	G. E. Marshall	$107,629
(2)	Norgaard & Hilling	87,747	—	S. Birch & Sons Construction Co.	108,169
(3)	Inland Construction Co.	98,286	—	Albert Lalonde	109,435
(4)	Dillsworth & Pumnea	99,668	—	Peter Kiewit Sons' Co.	114,321
(5)	A & W Construction Co.	101,291	—	Long Construction Co., Inc.	119,196
(6)	Walling Construction Co.	101,958			

		(1)	(2)	(3)	(4)	(5)	(6)
154,977	cu. yd. uncl. excav. and borrow	.19	.177	.198	.21	.22	.19
875	cu. yd. cullvert excav.	1.00	1.50	1.95	2.00	2.50	1.50
205,440	sta. yd. overhaul	.01	.01	.02	.015	.02	.01
26,583	cu. yd. sel. surfacing material	.90	1.08	1.00	1.07	1.19	1.37
418	lin. ft. 15-in. C.M.P. culvert	3.27	3.30	3.30	3.50	3.45	3.25
568	lin. ft. 18-in. C.M.P. culvert	3.65	3.90	4.00	4.25	4.10	3.75
246	lin. ft. 24-in. C.M.P. culvert	5.50	6.20	6.20	6.00	5.50	5.50
28	lin. ft. 30-in. C.M.P. culvert	7.50	8.00	8.15	7.00	6.95	7.00
44	lin. ft. 36-in. C.M.P. culvert	11.00	12.00	12.05	11.00	9.85	10.00
94	lin. ft. 84-in. C.M.P. culvert, 8 gauge	45.50	42.00	53.30	48.00	40.26	45.00
446	lin. ft. 72-in. C.M.P. culvert	32.00	29.00	36.65	36.00	30.70	35.00
50	lin. ft. relay pipe culverts	2.00	2.00	2.00	2.50	2.50	3.00
200	unit rolling sel. surf. matl.	6.00	8.00	6.50	8.00	7.50	8.50
800	M. gal. watering sel. surf. matl.	2 50	2.00	2.00	2.50	2.20	2.50
2,400	cu. yd. binder	.25	.30	.40	.25	.40	.60
6,000	mi. yd. overhaul on binder	.20	.10	.25	.20	.12	.15
2	each concrete project markers	20.00	25.00	25.00	25.00	25.00	20.00
86	each concrete right-of-way monuments	5.00	6.00	7.00	5.00	5 50	5.00
Lump sum, rem. strs. and M. Tr. Sta. 49+08, 76+04 and 147+05		350.00	300.00	$1,800	$1,200	450.00	750.00

Asphalt Cement Repair Work

Washington—Cowlitz, Lewis, Wahkiakum and Pacific Counties—State. D-H Paving Co., Vancouver, with a bid of $93,936, was low before the State Department of Highways for highway work about 34.5 mi. in length on State highways Nos. 12, 1-P, 1-Q, 1-R, and 12-E. Unit prices were as follows:

(1)	D-H Paving Co.	$93,936	(3)	Diesel Oil Sales Co.	$101,319
(2)	Doolittle Construction Co.	95,037			

		(1)	(2)	(3)
131	stas. (100 ft.) finishing roadway	10.00	2.50	10.00
395	M. gals. water in place	4.00	1.50	3.00
430	cu. yd. cr. stone surf., top course from stockpile	1.10	1.70	1.60

(Continued on next page)

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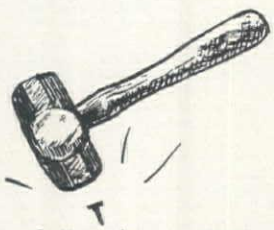

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CLARK COUNTY MERCH. CO.	Las Vegas, Nevada
LIVELY EQUIPMENT CO.	Albuquerque, New Mexico
HOWARD-COOPER CORP.	Portland, Oregon, Seattle, Wash.

UNIT BID PRICES . . . CONTINUED

	LIGHT BITUMINOUS SURFACE TREATMENT—METHOD A			
9.70	mi. preparation, construction, finishing	300.00	300.00	350.00
374	ton asphalt cement MC-3 in place	40.00	36.00	44.00
680	cu. yd. placing cr. cover stone from stockpile	2.75	2.50	1.60
2,000	cu. yd. furn. and place. cr. cover stone ⅝-in. - 0	5.75	6.50	8.00
	NON-SKID SINGLE SEAL TREATMENT—SCHEDULE A			
299	ton asphalt cement RC-5 in place	43.00	42.00	45.00
3,035	cu. yd. mineral aggregate in place from stockpile	2.00	2.50	1.60
585	cu. yd. furn. and placing min. aggr. ⅝-in. - ¼-in.	7.00	6.50	7.00
140	cu. yd. furn. and placing min. aggr. ¼-in. - 0	7.00	6.50	7.00
	NON-SKID SINGLE TREATMENT—SCHEDULE D			
184	ton asphaltic cement MC-5 in place	40.00	36.00	44.00
2,590	cu. yd. mineral aggre. in place from stockpile	2.00	2.00	1.60
8.50	mi. construct and finish leveling treat. sched. D	600.00	$1,000	800.00
	NON-SKID SINGLE SEAL TREATMENT—FOG COAT			
47	ton asphalt cement HC-3 in place	43.00	36.00	46.00
375	cu. yd. mineral aggregate in place from stockpile	2.75	2.00	1.95
	BITUMINOUS PENETRATION MACADAM—TYPE D			
2.50	mi. preparation of untreated roadway	400.00	300.00	300.00
35	ton asphalt cement MC-3 in place	42.00	36.00	44.00
141	ton asphalt cement 201-300 penetration in place	41.00	42.00	44.00
40	ton asphalt cement RC-5 in place	44.00	42.00	50.00
3,040	cu. yd. mineral aggregate in place from stockpile	1.55	1.70	1.80

Road-Mixed Bituminous Surfacing

Utah—Utah and Wasatch Counties—State. L. T. Johnson, Ogden, with a bid of $298,681, was low before the State Road Commission for construction of a 3-in. road-mixed bituminous surfaced road between Soldier Summit and Colton, about 6.5 mi. in length, U. S. Highway No. 6 and 50 in Utah and Wasatch Counties. Unit prices were as follows:

(1) L. T. Johnson $298,681
(2) Strong Company 303,835
(3) J. M. Sumsion 304,390
(4) Parson & Fife Construction Co. 317,450
(5) W. W. Clyde & Co. 319,344
(6) Engineer's estimate $297,881
— LeGrand Johnson 338,073
— Gibbons & Reed Co. 342,679
— Floyd S. Whiting 345,999

		(1)	(2)	(3)	(4)	(5)	(6)
249,000	gal. bituminous matl., Type SC-3	.115	.12	.11	.13	.12	.12
36,000	gal. bituminous matl., Type MC-1 or MC-2	.135	.14	.13	.14	.13	.13
33,500	gal. bituminous matl., Type RC-4	.14	.14	.13	.15	.14	.14
1,700	ton cover material	3.50	3.00	3.50	4.00	4.00	3.00
6.494	mi. scarifying and mixing	700.00	$1,000	900.00	800.00	900.00	$1,500
45,000	ton cr. rock or cr. gravel surface crse.	.99	1.12	1.00	1.10	1.05	.90
98,500	ton gravel or cr. rock base course	.94	.98	.90	1.00	1.05	.85
175,000	cu. yd. unclassified excav.	.24	.22	.25	.25	.28	.30
600,000	sta. yd. overhaul, Class "A"	.015	.015	.015	.02	.015	.015
53,000	yd. mi. overhaul, Class "B"	.15	.15	.18	.15	.15	.15
2,800	hr. rolling	5.00	3.50	8.00	5.00	5.00	5.00
4,600	1,000-gal. watering	1.50	1.00	1.50	1.50	1.50	1.00
486	lin. ft. 18-in. concrete pipe	4.50	4.00	4.50	4.00	4.00	3.90
460	lin. ft. 24-in. concrete pipe	6.00	5.00	6.00	5.00	5.25	5.20
222	lin. ft. 36-in. concrete pipe	11.50	11.50	11.50	10.50	11.00	10.90
415	lin. ft. 30-in. C.G.M. pipe	6.50	7.00	7.00	5.90	6.00	5.90
169	lin. ft. 36-in. C.G.M. pipe	11.00	11.50	10.00	9.50	11.20	9.20
146	lin. ft. 48-in. C.G.M. pipe	15.00	17.50	15.00	15.00	15.60	12.50
80	lin. ft. 60-in. C.G.M. pipe	20.00	30.00	24.00	24.00	28.00	21.50
42	lin. ft. relaying 18-in. conc. pipe	3.00	2.50	2.00	2.00	3.00	1.00
88	lin. ft. relaying 30-in. C.G.M. pipe	4.00	2.50	3.00	2.00	4.00	1.50
32	lin. ft. relaying 36-in. C.G.M. pipe	8.00	3.00	4.00	3.00	5.00	1.50
900	lin. ft. 8-in. underdrains	2.00	1.50	1.50	1.10	1.20	1.25
2,000	cu. yd. excav. for structs.	2.00	3.50	2.00	2.50	2.00	1.50
175	cu. yd. gravel backfill	2.00	4.00	2.00	3.00	3.00	1.50
20,000	lin. ft. right-of-way fence, Type "B"	.325	.28	.30	.30	.28	.30
40	ea. 14-ft. gates	40.00	37.50	35.00	40.00	35.00	35.00
30	ea. right-of-way markers	6.00	6.00	5.00	7.00	6.00	5.00
Lump sum,	furnish water equipment	$1,000	$1,500	500.00	500.00	500.00	$4,600
Lump sum,	furn. construction signs	$1,000	$1,000	500.00	500.00	300.00	500.00

17.7 Mi. New Construction on Yosemite All-Year Highway With Riprap and Grouted Rock Toe Walls

California—Mariposa County—State. Piombo Construction Co., San Francisco, with a bid of $1,212,424, was low before the State Division of Highways for construction of a State highway in Mariposa County between Briceburg and Yosemite National Park boundary, about 17.7 mi. in length; grouted rock toe walls and rip-rap to be constructed, portions of the project to be graded and plant-mixed surfacing to be placed over existing surface and untreated rock base. Unit prices were as follows:

(1) Piombo Construction Co. $1,212,424
(2) Eaton & Smith 1,299,085
(3) United Concrete Pipe Corp. $1,288,288

		(1)	(2)	(3)
65,000	cu. yd. roadway excav.	2.65	2.20	2.35
12,600	cu. yd. struct. excav.	5.50	3.20	4.00
17,000	cu. yd. ditch and channel excav.	2.50	2.50	2.70
26,200	cu. yd. drilling and blasting rock obstructions	1.30	2.00	2.15
3,027,000	sta. yd. overhaul	.007	.01	.01
10,500	lin. ft. shaping embankment slopes	.13	.15	.50
18,250	cu. yd. selected rock slope protection	.83	4.20	4.00
3,060	cu. yd. imp. subbase material	4.00	3.00	4.50
Lump sum,	dev. water supply and furn. watering equip.	$2,000	$10,000	$3,000
1,330	M. gal. applying water	3.00	2.00	2.50
933	sta. finishing roadway	14.00	8.00	7.00
8,700	ton U.R.B.	2.60	5.00	3.75
20	ton liquid asph. SC-2 (pr. ct.)	35.00	40.00	50.00
51	ton sand (pr. ct.)	15.00	10.00	8.00
17,170	ton min. aggregate (P.M.S.)	5.00	7.00	6.50
858	ton paving asph. (P.M.S.)	26.00	30.00	33.00
290	ton asph. emuls. (sl. ct. and pt. bdr.)	35.00	45.00	40.00
2,490	ton screenings (sl. ct.)	6.50	10.00	6.00
1,205	cu. yd. rubble masonry	28.00	37.00	36.00
26,450	cu. yd. light stone rip-rap	6.80	8.00	10.00

(Continued on next page)

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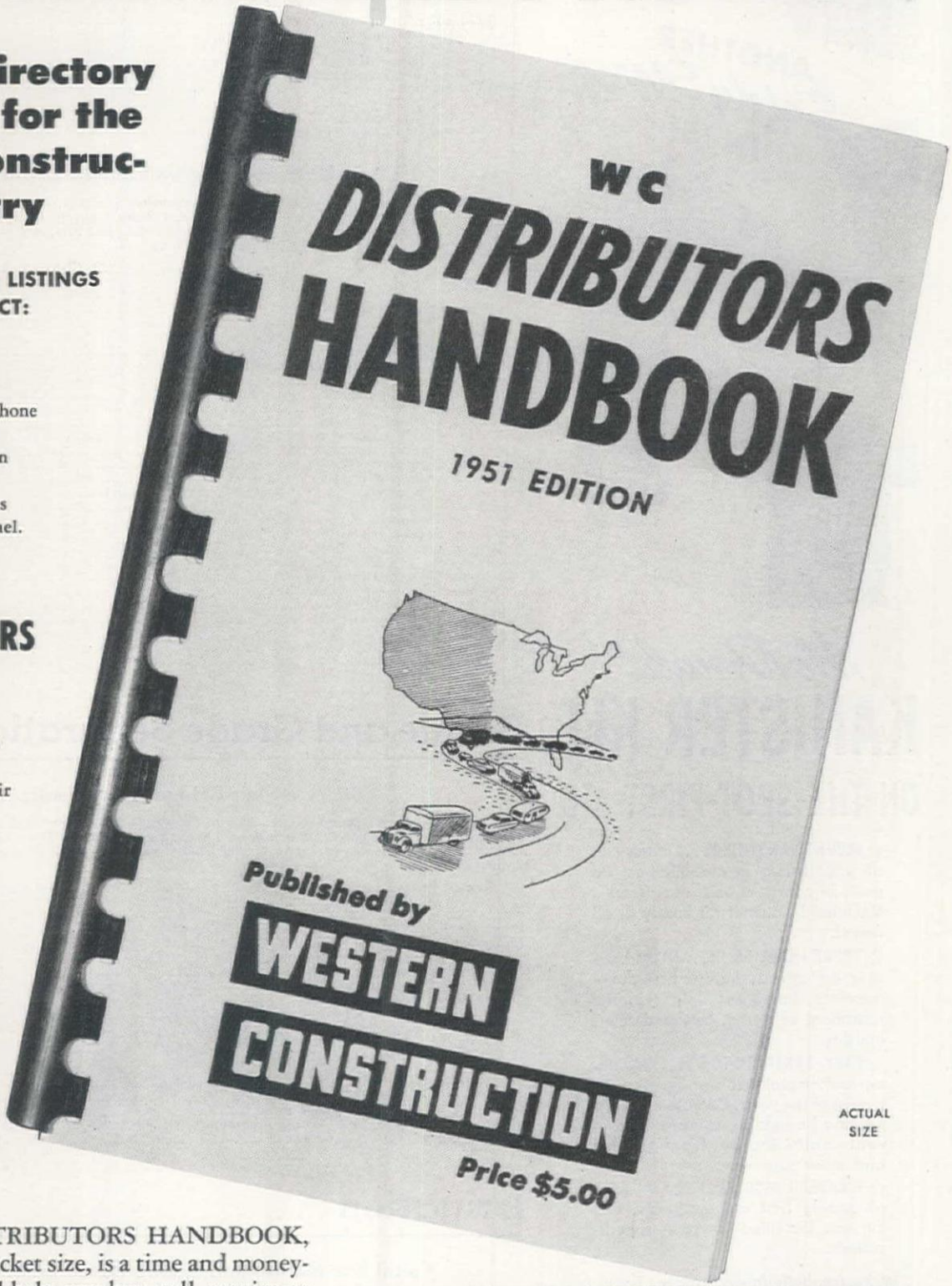

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UNIT BID PRICES . . . CONTINUED

8,220 cu. yd. rock toe	9.50	9.00	9.00
17,500 ton min. aggregate (conc. grout)	15.90	10.00	9.40
13,300 bbl. portland cement (conc. grout)	5.50	5.00	5.50
680 lin. ft. reconstr. cable guard railing	4.00	3.00	3.00
672 ea. culv. markers and guide posts	6.00	7.00	5.00
350 lin. ft. 18-in. C.M.P. (16 ga.)	4.70	4.50	5.00
330 lin. ft. 24-in. C.M.P. (14 ga.)	7.00	5.25	7.00
80 lin. ft. 30-in. C.M.P. (14 ga.)	8.70	7.00	10.00
35,000 mi. traffic control car	.35	.06	.50

Plant-Mix Surfacing on Cement-Treated Subgrade

California—Glenn County—State. C. V. Kenworthy, Stockton, with a bid of $139,687, was low before the State Division of Highways for construction of a State highway between points 1.1 mi. south of Walker Creek and Walker Creek, about 1.1 mi. in length; grading and surfacing with plant-mixed material on cement-treated crusher-run base. Unit prices were as follows:

(1) C. V. Kenworthy.....$139,687 (2) Clements & Co.....$152,918

	(1)	(2)
175 cu. yd. removing concrete	10.00	10.00
32 acre clearing and grubbing	100.00	400.00
75,000 cu. yd. roadway excav.	.39	.60
380 cu. yd. struct. excav.	2.00	3.00
6,500 sq. yd. compacting original ground	.05	.06
93,000 sta. yd. overhaul	.01	.01
Lump sum, dev. wat. sup. and furn. wat. equip.	$4,000	$2,000
2,550 M. gal. applying water	3.00	2.00
61 sta. finishing roadway	10.00	10.00
10,000 ton C.R.B. (cement treated)	4.00	3.50
1,080 bbl. portland cement (cem. tr. C.R.B.)	6.00	5.00
25 ton liquid asph. SC-2 (pen. tr. and pr. ct.)	35.00	30.00
80 ton sand (pen. tr., pr. ct. and sl. ct.)	6.00	4.00
8 ton asph. emuls. (Cl. "C" coarse sl. ct. and pt. bdr.)	50.00	50.00
5 ton asph. emuls. (Cl. "D" sl. ct.)	70.00	50.00
100 ton screenings (Cl. "C-Course" sl. ct.)	6.00	5.00
4,200 ton mineral aggre. (P.M.S.)	6.75	6.00
190 ton paving asph. (P.M.S.)	33.50	25.00
4 cu. yd. Cl. "A" P.C.C. (struct.)	100.00	100.00
260 cu. yd. sacked conc. rip-rap	15.00	30.00
24 ea. right-of-way monuments	10.00	10.00
4 ea. install. culv. markers	5.00	10.00
0.42 mi. new property fence	$2,000	$2,000
108 lin. ft. 18-in. R.C.P. (std. str.)	6.00	5.00
124 lin. ft. 24-in. R.C.P. (std. str.)	10.00	6.00
120 lb. bar reinf. steel	.20	.20

Bridge and Grade Separation . . .

Concrete Slab Bridge Near Visalia, California

California—Tulare County—State. Rex B. Sawyer, Visalia, with a bid of $43,676, was low before the State Division of Highways for construction of a State highway across Deep Creek about 5.4 mi. east of Visalia; a reinforced concrete slab bridge to be constructed and a detour to be graded and surfaced. Unit prices were as follows:

(1) Rex B. Sawyer.....$43,676 (2) Thomas Construction Co.....$47,785

	(1)	(2)
Lump sum, removing existing bridge	$2,500	$3,500
Lump sum, clearing and grubbing	800.00	$2,500
240 cu. yd. roadway excavation	2.00	2.00
500 cu. yd. channel excavation	2.00	2.00
935 cu. yd. structure excavation	2.00	3.00
1,200 cu. yd. imported borrow	1.50	1.20
175 ton untreated rock base	4.00	5.50
135 ton P.M.S.	8.00	12.10
264 cu. yd. Cl. "A" P.C.C.	56.00	58.00
31,200 lb. bar reinf. steel	.12	.105
1,572 lin. ft. furn. concrete piling	4.50	4.55
39 ea. driving piles	150.00	150.00
110 lin. ft. corr. metal bridge railing	7.00	6.00
104 lin. ft. corr. metal guard railing	6.00	4.00
66 ea. guide posts and clearance markers	5.00	8.00
0.09 mi. new property fences	$3,000	$3,000

Irrigation . . .

Canal Excavation and Lining on Columbia Basin Project

Washington—Columbia Basin Project—Bureau of Reclamation. Minnis and Shilling and United Concrete Pipe Corp., Baldwin Park, Calif., with a bid of $1,424,952, was low before the Bureau of Reclamation for earthwork, asphaltic membrane lining, pipe lines, and structures, East Low Canal, Columbia Basin Project. Unit prices were as follows:

(1) Minnis and Shilling and United Concrete Pipe Corp.....$1,424,952
(2) Intermountain Plumbing Co. and Henry L. Horn 1,433,248
(3) Collins Concrete and Steel Pipe Co...$1,621,221
(4) Western Contracting Corps. 2,085,833
(5) Engineer's estimate 1,160,044

	(1) (1)	(2) (2)	(3) (3)	(4) (4)	(5) (5)
393,000 cu. yd. excav., common, for laterals	.225	.24	.60	.25	.20
26,000 cu. yd. excav., intermediate, for laterals	.35	.75	.60	1.60	.70
17,500 cu. yd. excav., rock, for laterals	2.25	1.50	2.50	1.60	1.40
279,000 cu. yd. excav. from borrow pits	.17	.40	.40	.23	.25
41,000 cu. yd. excav., common, and backfill of pipe trenches	.50	.55	.77	1.00	.50
500 cu. yd. excav., intermediate, and backfill of pipe trenches	1.25	2.00	.77	5.10	2.00

(Continued on next page)

Grand Coulee Spillway—

. . . Continued from page 71

seat frame was at that time dismantled for storage on the bank above the drydock. After all preparations had been made for removal of the floating caisson from a spillway bucket, the contractor elected to gamble that the river would not rise above the danger point and the caisson was allowed to remain in place. The river peaked on February 17 but the floating caisson sustained no damage from the turbulent water. Floating-caisson repair operations were delayed about a week and a half as the result of this rise. After the river's subsidence, it was decided to continue with the interrupted side frame setting. The side frame alone was assembled on a barge, towed out to the spillway, and the side frame lowered into place by a derrick barge. After the usual setting and grouting operations were completed, the side frame was brought into drydock, dismantled, and stored for the duration of the high-water season.

Installing wearing plate

Scheduled for installation also during the past season was the wearing plate for block 64 at the east end of the spillway. A falsework was erected on the upper walkway of the drydock and on it assembled the plate for this block. For checking the exact amount of erosion in the area to be covered, the contractor designed and installed on the side of the east training wall a rigid steel frame, from which a steel sweep was swung at the bucket radius point. Divers measured from the bottom edge of the sweep to the concrete surface at various points along the radius to check clearance and to spot high points for removal. A second rise of the river forced discontinuance of this work and before the sweep could be removed, it was carried away by high water. Because of the uncertain time available before the normal spring rise of the river, attempts to install the block 64 plate were abandoned for this season and the plate and its falsework dismantled. Also significant was the fact that, as long as river flow remained above normal, it was necessary to discharge water over this end of the spillway because of floating-caisson and seat-frame operations at the other end. It is anticipated that both plates can be installed during the next working season.

Divers remove concrete

In order to conserve time, however, a second steel frame and sweep was constructed and installed on the west training wall. A survey made of the surface of block 31 indicated that concrete would have to be removed for about 10 ft. down from the upstream edge of the plate location. Divers, operating chipping guns and a bushing machine designed specially for this work, began its removal and were able to complete it the day before the normal spring rise of the river forced the contractor to stop all river activities.

Scheduled for next season is continuation of the spillway face repair program. Cracks and spalls have occurred on the 0.8:1 slope of the spillway, particularly at construction "slip" joints. Over the past 10 years most have been repaired, the majority by government force account. Some areas were excavated and replaced during the Pacific Bridge Company's first contract and the balance will be repaired under the present contract.

For the Bureau of Reclamation, H. A. Parker is District Manager of the Columbia River District and A. F. Darland is Supervising Engineer at Grand Coulee Dam. D. S. Davis is resident engineer in direct charge of this work; V. J. Peterson, office engineer; W. I. Morgan, river equipment engineer; and H. C. Bowman, chief inspector.

Field forces for the Pacific Bridge Company are headed by Charles Bisordi, project manager.

Lookout Point Dam—

. . . Continued from page 83

and clearing 3,500 acres of timber and brush. This work is being carried out by several other contractors.

The new cableway at the dam was designed by Construction Improvements, Ltd., Toronto, Canada. Design and erection of towers, installation of power plant, and rigging of cableway was carried out by Consolidated Western Steel Co., under the supervision of I. W. (Jack) Delaye. Aggregate plant and conveyor system were supplied by the Conveyor Co., Inc., Los Angeles, and erected by the contractor's forces. The batching plant is by C. S. Johnson Co., Champaign, Ill. Conveyor belting was made to specification and supplied by Raybestos-Manhattan, Inc., Passaic, N. J.

Personnel

L. E. Steelman is project manager for Morrison-Kiewit-Macco with D. "Wally" Lutes as project engineer and Harold I. Maxwell acting as assistant project manager. Other key personnel include: Ray Foster, assistant engineer, Floyd Mercer, electrical superintendent, Ray Travis, excavation superintendent, A. J. Smithies, concrete superintendent, Leonard Kenyon, master mechanic, D. M. Drugan, office manager, John Erickson, carpenter superintendent, S. Brown, plant superintendent, Gordon Marquise, rigging superintendent, Jerry Cannon, quarry superintendent, and Jim Boyd, warehouseman. The dam is scheduled for completion in July 1954.

NATIONAL Production Authority permission was granted the San Francisco, Calif., Recreation and Park Commission to build the St. Mary's Square Public Parking Garage. The four-level, 220,000 sq. ft. garage is estimated to cost $2,228,000.

NEWS of MANUFACTURERS

Continued from page 124

LES BISHOP takes over ownership of the *J. E. Berkheimer Manufacturing Co.* of California with offices and facilities at 2828 Ford St., Oakland, Calif. The firm will carry the name *L. K. Bishop & Company.* Bishop was formerly product sales manager of *The Paraffine Companies, Inc.*, and more recently manager of the Berkheimer firm.

☆ ☆ ☆

ROBERT T. BROOKS, retired executive vice president of *American Institute of Steel Construction,* died July 2 in Minneapolis, Minn. He had been associated with the steel fabricating and construction industry for more than 40 years prior to his retirement in 1946.

☆ ☆ ☆

RENE D. WASSERMAN, director of research and president of *Eutectic Welding Alloys Corp.,* Flushing, N. Y., is appointed to the Research Committee of the National Association of Manufacturers.

☆ ☆ ☆

DALE MCKEE is appointed chief engineer of *Lull Manufacturing Co.,* Minneapolis, Minn. McKee has had over 11 years' experience in the aircraft industry specializing in projects involving handling equipment.

☆ ☆ ☆

International Harvester Co. motor truck retail branches and dealers are participating in a nation-wide truck conservation program which began July 1 and will continue for a 90-day period. Free-of-charge inspection service for the nearly 1,000,000 International trucks in the nation will be offered by the organization's 5,000 sales and service outlets.

☆ ☆ ☆

MAJOR W. MCKEAN WHITE, JR., vice president of *White Manufacturing Co.,* Elkhart, Ind., is recalled to active duty with the Air Force. W. MCKEAN WHITE, SR. will cover the work of his son with the company. He will direct production of White asphalt plants, concrete vibrators, railway switch heaters, etc.

☆ ☆ ☆

GORDON L. CHAPMAN is the new president of *Carver Pump Co.,* Muscatine, Iowa. ROY J. CARVER, founder of the company, is elevated to chairman of the board. Chapman joined the firm in 1948 as comptroller and soon became vice president and a director. ALEXANDER A. ZUBER, plant manager, became vice president and a director.

☆ ☆ ☆

Plans for the immediate construction of a large new plant addition have been announced by *Republic Rubber Division, Lee Rubber & Tire Corp.,* Youngstown, Ohio. The new plant will produce exclusively military needs during the emergency and therefore received the certificate of necessity of $1,841,102 from the Defense Production Administration.

UNIT BID PRICES . . . CONTINUED

250	cu. yd. excav., rock, and backfill of pipe trenches	5.00	4.50	4.00	5.10	4.00
2,900	cu. yd. compacting backfill in pipe trenches	2.50	2.00	2.50	5.30	1.60
4,800	mi. cu. yd. overhaul	.50	1.00	2.00	.75	.30
3,500	cu. yd. compacting embankments	.90	.20	.17	.75	.30
51,000	sq. yd. dragging and rolling subgrade under memb. lining	.07	.20	.125	.18	.07
35	M. gal. sprinkling of subgrade	7.00	5.00	8.00	5.40	5.00
290	ton furn. and applying asphalt for membrane lining	60.00	62.50	70.00	110.00	65.00
18,000	cu. yd. placing earth cover for membrane lining	.40	.30	.375	.58	.30
20,000	cu. yd. furn. and placing gravel blanket	1.30	3.00	.50	4.40	2.00
155,000	mi. cu. yd. hauling gravel for gravel blanket	.15	.12	.10	.30	.20
56,000	cu. yd. excav., common, for structures	.85	.80	2.25	1.20	.80
200	cu. yd. excav., intermediate, for structures	1.85	2.00	4.00	5.20	2.00
850	cu. yd. excav., rock, for structures	5.00	4.50	4.00	5.20	4.00
37,000	cu. yd. backfill about structures	.30	.25	.90	.47	.40
21,000	cu. yd. compacting backfill about structures	3.00	2.00	2.25	5.70	2.00
2,500	sq. yd. dry rock paving	5.00	4.50	6.00	9.90	5.00
1,000	cu. yd. rip-rap	7.00	9.00	6.00	10.80	5.00
3,785	cu. yd. concrete in structures	85.00	69.00	80.00	107.00	60.00
170	cu. yd. plain concrete	37.00	55.00	50.00	100.00	40.00
5,115	bbl. furnishing and handling cement	5.80	6.00	5.30	6.70	5.60
315,000	lb. placing reinforcement bars in structs.	.07	.08	.09	.15	.07
70	sq. ft. furn. and placing ½-in. elastic filler matl. in joints	2.00	2.00	2.00	3.60	2.00
100	lin. ft. placing rubber water stops in joints	2.00	1.00	2.00	2.10	1.50
30.2	M.b.m. furn. and erecting treated timber in structs.	375.00	290.00	300.00	384.00	300.00
62	M.b.m. furn. and erecting untreated timber in structs.	300.00	275.00	275.00	360.00	250.00
12	lin. ft. furn. and install. 6-in. diam. std. conc. irrigation pipe for air vents	1.50	1.50	1.50	2.50	1.00
11,000	lin. ft. furn. and laying 12-in. diam. std. conc. irriga. pipe	1.60	1.71	1.65	2.20	1.15
3,120	lin. ft. furn. and laying 15-in. diam. std. conc. irriga. pipe	1.85	2.00	2.50	2.70	1.55
5,040	lin. ft. furn. and lay. 12-in. diam. std. str. conc. culv. pipe	3.00	3.10	2.25	3.80	2.35
1,800	lin. ft. furn. and lay. 15-in. diam. std. str. conc. culv. pipe	3.50	3.60	2.75	5.40	2.90
2,020	lin. ft. furn. and lay. 18-in. diam. std. str. conc. culv. pipe	4.25	4.50	3.50	6.50	3.45
1,220	lin. ft. furn. and lay. 21-in. diam. std. str. conc. culv. pipe	6.00	6.60	4.15	8.30	4.15
2,710	lin. ft. furn. and lay. 24-in. diam. std. str. conc. culv. pipe	6.25	6.60	4.95	8.70	4.90
500	lin. ft. furn. and lay. 27-in. diam. std. str. conc. culv. pipe	7.00	6.90	5.60	9.70	5.60
1,480	lin. ft. furn. and lay. 30-in. diam. std. str. conc. culv. pipe	8.00	7.75	6.65	9.90	6.40
302	lin. ft. furn. and lay. 36-in. diam. std. str. conc. culv. pipe	11.50	9.85	8.90	15.00	8.00
78	lin. ft. furn. and lay. 39-in. diam. std. str. conc. culv. pipe	12.50	10.35	9.80	16.20	9.50
480	lin. ft. furn. and lay. 42-in. diam. std. str. conc. culv. pipe	13.50	11.70	11.90	18.80	10.20
260	lin. ft. furn. and lay. 48-in. diam. std. str. conc. culv. pipe	14.50	11.90	14.50	20.00	12.25
72	lin. ft. furn. and lay. 54-in. diam. std. str. conc. culv. pipe	22.00	17.15	17.10	28.20	14.50
320	lin. ft. furn. and lay. 60-in. diam. std. str. conc. culv. pipe	26.00	20.30	19.20	30.50	16.50
84	lin. ft. furn. and lay. 72-in. diam. std. str. conc. culv. pipe	31.00	40.00	26.80	39.00	21.00
210	lin. ft. furn. and lay. 24-in. diam. ex.-str. conc. culv pipe	6.50	6.10	6.35	9.20	5.40
36	lin. ft. furn. and lay. 42-in. diam. ex.-str. conc. culv. pipe	14.00	11.65	13.15	19.50	11.00
100	lin. ft. furn. and jacking 24-in. diam. ex.-str. conc. culv. pipe under Northern Pacific r.r. tracks	35.00	24.10	25.00	41.00	22.00
60	lin. ft. furn. and jacking 48-in. diam. ex.-str. conc. culv. pipe under Northern Pacific r.r. tracks	50.00	34.00	40.00	59.00	40.00
210	lin. ft. furn. and threading 24-in. diam. std. str. conc. culv. pipe through corru.-metal pipe	7.50	12.20	10.00	27.00	7.00
36	lin. ft. furn. and threading 42-in. diam. std. str. conc. culv. pipe through corru.-metal pipe	16.00	22.40	15.00	39.00	13.00
72	lin. ft. furn. and threading 60-in. diam. std. str. conc. culv. pipe through corru.-metal pipe	28.00	31.00	100.00	62.00	25.00
3,200	lin. ft. furn. and lay. 12-in. diam., 25-ft. hd. conc. pr. pipe	3.50	3.20	2.20	6.20	2.00
4,700	lin. ft. furn. and lay. 15-in. diam., 25-ft hd. conc. pr. pipe	4.20	3.60	2.80	7.30	2.65
5,250	lin. ft. furn. and lay. 18-in. diam., 25-ft. hd. conc. pr. pipe	5.00	4.60	3.60	8.50	3.20
4,100	lin. ft. furn. and lay. 21-in. diam., 25-ft. hd. conc. pr. pipe	6.00	5.40	4.25	10.00	3.85
6,000	lin. ft. furn. and lay. 24-in. diam., 25-ft. hd. conc. pr. pipe	6.75	6.00	5.05	11.50	4.50
700	lin. ft. furn. and lay. 27-in. diam., 25-ft. hd. conc. pr. pipe	8.00	7.00	5.70	13.50	5.20
570	lin. ft. furn. and lay. 36-in. diam., 25-ft. hd. conc. pr. pipe	12.00	10.00	9.10	15.50	7.20
2,940	lin. ft. furn. and lay. 54-in. diam., 25-ft. hd. conc. pr. pipe	20.00	16.15	16.75	28.00	12.60
1,200	lin. ft. furn. and lay. 60-in. diam., 25-ft. hd. conc. pr. pipe	25.00	19.30	20.45	36.00	14.75
420	lin. ft. furn. and lay. 15-in. diam., 50-ft. hd. conc. pr. pipe	4.30	3.75	3.00	7.40	2.75
620	lin. ft. furn. and lay. 18-in. diam., 50-ft. hd. conc. pr. pipe	5.20	4.70	3.50	5.60	3.30
1,300	lin. ft. furn. and lay. 21-in. diam., 50-ft. hd. conc. pr. pipe	6.20	5.45	4.55	9.90	3.90
2,500	lin. ft. furn. and lay. 24-in. diam., 50-ft. hd. conc. pr. pipe	7.00	6.35	5.40	11.50	4.60
750	lin. ft. furn. and lay. 36-in. diam., 50-ft. hd. conc. pr. pipe	12.50	10.60	11.75	21.00	7.30
1,220	lin. ft. furn. and lay. 54-in. diam., 50-ft. hd. conc. pr. pipe	25.00	20.15	26.17	34.40	12.65
200	lin. ft. furn. and lay. 60-in. diam., 50-ft. hd. conc. pr. pipe	28.00	22.30	29.45	40.00	14.85
560	lin. ft. furn. and lay. 36-in. diam., 75-ft. hd. conc. pr. pipe	13.00	10.90	12.50	18.50	8.00
180	lin. ft. furn. and lay. 18-in. diam., 25-ft. hd. conc. culv. pr. pipe	5.00	4.55	3.95	8.40	3.45
100	lin. ft. furn. and lay. 60-in. diam., 25-ft. hd. conc. culv. pr. pipe	24.00	18.90	22.85	35.00	16.50
37	jts. furn. and install. expan. jts. in 12-in. diam. conc. pipe	15.00	40.00	25.00	30.40	50.00
22	jts. furn. and install. expan. jts. in 15-in. diam. conc. pipe	15.00	55.00	30.00	38.40	60 00
2	tapers furn. and lay. reinf. conc. pipe taper 54-in. - 60-in.	150.00	110.00	75.00	154.00	95.00
1	taper furn. and lay. reinf. conc. pipe taper 24-in. - 27-in.	75.00	60.00	60.00	63.50	30.00
4	tapers furn. and lay. reinf. conc. pipe taper 21-in. - 24-in. and smaller	60.00	60.00	50.00	60.00	26.00
70	jts. furn. and install. metal band jts. for 24-in. diam. conc. pipe	18.00	19.00	15.00	29.00	10.00
17	jts. furn. and install. metal band jts. for 42-in. diam. conc. pipe	30.00	25.00	23.00	44.00	20.00
52	lin. ft. furn. and laying 18-in. diam. corru. metal pipe	4.00	3.75	3.50	6.10	4.00
46	lin. ft. furn. and laying 24-in. diam. corru. metal pipe	6.00	5.40	5 50	8.70	6.00
210	lin. ft. furn. and jacking 36-in. diam. corru. metal pipe	50.00	26.00	27.00	62.50	40.00
36	lin. ft. furn. and jacking 60-in. diam. corru. metal pipe	90.00	55.00	40.00	102.00	70.00
72	lin. ft. furn. and install. 78-in. diam. corru. metal pipe	110.00	90.00	75.00	61.00	90.00
13	unit furn. and install. pipe drain units	150.00	180.00	200.00	142.00	150.00
1	unit furn. and install. air valve units	150.00	75.00	200.00	158.00	150.00
10,200	lb. furn. and install. gate valves	.80	.80	.90	.83	.75
2,300	lb. furn. and install. flap gates	.85	.75	.83	1.20	.70
33,000	lb. furn. and install. screw-lift circular gates	.65	.75	.57	.75	.60
10,000	lb. furn. and install. screw-lift orifice gates	.60	.75	.56	.75	.60
13,600	lb. furn. and install. adjustable weirs	.55	.75	.57	.71	.55
3,200	lb. furn. and install. radial gate and hoist	1.25	.90	.50	.82	.50
43,400	lb. furn. and install. miscl. metal work	.55	.65	.50	.67	.50
22,950	lb. furn. and install. pump discharge pipes and manifolds	.50	.80	.40	.79	.34
1,020	lb. furn. and install. elec. metal conduits 1½-in. diam. and less	2.00	.60	2.00	.76	1.00
270	lin. ft. furn. and install. elec. metal conduits 3-in. in diam.	3.00	5.00	3.50	4.50	3.50
2,200	lb. furn. and install. elec. conductors and gd. wires	1.50	8.00	1.25	3.00	2.00
43,400	lb. installing pumps, motors, and motor control equipment	.18	.30	.20	.15	.20
Lump sum.	installing 36-in. propeller-type water meter	500.00	100.00	350.00	133.00	100.00
2	units installing 18-in. deflection-type water meter	300.00	50.00	300.00	66.00	18.00
2	units installing 12-in. deflection-type water meter	275.00	50.00	175.00	66.00	12.00
9	units furn. and installing float valves	150.00	150.00	50.00	150.00	100.00

NEW BOOKS . . .

An Introduction to the Design of Underground Openings for Defense—Colorado School of Mines, Department of Publications, Golden, Colo. 304 pages, 6 x 9 in. Price $3.00.

With great importance being placed upon civilian defense and proper protection against air attacks, this book offers the most up-to-date study so far to aid industries and cities investigating bomb shelter construction. Since the field of underground protection against air raids is a new problem in the United States, this book attempts to pull information from other forms of underground construction and examine the suitability and conversion possibilities which may be offered by mining shafts, for example. In the hope that careful study now will prevent costly failures and loss of life in the future, the book discusses mining techniques which may be applicable as well as the characteristics and effects of bombs; damage from impact; high explosive characteristics; the properties of rock and overburden of importance in underground construction and rock and rock openings. Fully illustrated with diagrams and photographs, the study can well be of service to engineers interested in this important design problem.

* * *

Simplified Mechanics and Strength of Materials—By Harry Parker, M. S. Published by John Wiley & Sons, Inc., New York, N. Y. 275 pages, 5 x 8 in. Price $4.00.

In the belief that engineering is based on the science of mechanics, the author of this book feels that a basic knowledge of this subject is important to the engineer regardless of which phase of the field he seeks to enter. A study of mechanics and strength of materials will bring about a more thorough understanding of the theory of design of structural members regardless of the material involved. The book is a simplified study aimed at those who have had limited preparation, and the material is served in a palatable form for easy understanding. The chapters deal with forces and their action on bodies, moments of forces, stresses and deformations, properties of sections, shearing stresses in beams, bending moments in beams and many more relevant headings carefully divided into sections with pertinent diagrams and tables included. This is a well-prepared reference work especially for students in the field.

* * *

Soil Testing for Engineers—By William Lambe, M.I.T. Published by John Wiley & Sons, Inc., New York, N. Y. 165 pages, 9 x 11 in. Price $5.00.

In an effort to provide a textbook for the relatively young field of soil mechanics, the author has written this splendid book, which can also be used as a reference work by practicing engineers. The book begins with a section on terms needed in the field for complete understanding of the subject, and then the study begins with a chapter on the specific gravity test—what it is and how to proceed with it. Each chapter is a complete lesson on its subject, and each is sprinkled with valuable reference charts and photographs which serve to make the text understandable. Chapter titles include: Atterberg Limits and Indices; Grain Size Analysis; Compaction Tests; Permeability Test; Capillary Head Test; Capillary-Permeability Test; Consolidation Test; Direct Shear Test on Cohesionless Soil; and Triaxial Compression Test on Cohesionless Soil.

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.

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801

Two-wheel scraper for diesel tractor

Features claimed: A new 2-wheel, hydraulically-controlled scraper for use with the John Deere "R" Diesel tractor is announced. This new 6-yd. scraper, Model H-62, will work at speeds up to 12 mph. A special hitch, mounted under the tractor rear axle, eliminates the front wheels of the scraper and transfers a portion of the scraper load to the tractor driving wheels for greater pulling power. This combination of tractor and scraper is in effect a self-propelled scraper that digs, carries and spreads. Big pneumatic tires on the tractor and scraper enable the user to haul over

pavement and move from one job to another without trucking or freighting. Like the ATECO conventional 4-wheel scrapers, this new model has a low center of gravity, a high road clearance that permits easy hauling, an independent front apron and a rear apron that wipes the scraper bowl sides clean as the load is dumped. Cutting edge width for the H-62 scraper is 7 ft.; turning radius of tractor and scraper combination is 15 ft. 6 in.; weight of scraper, complete with hitch assembly, about 7,670 lb.

Manufacturer: American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland, Calif.

802

Sterilizer purifies contaminated water

Features claimed: Pure drinking water problems for farms, construction camps, rural and suburban homes are solved by this automatic, electrically-operated ultra-violet water sterilizer. The Sepco requires no attention, uses no chemicals and adds no taste or odor to the water. Purification is accomplished by powerful ultra-violet radiation utilizing the same principle frequently employed for atmospheric purification in laboratories, etc. The Sepco consists of a stainless steel tank 72 in. high by 12 in. in diameter. Four specially-constructed ultra-violet ray tubes inside the tank extend vertically through the water. Patented baffles at various levels guide the incoming water close to the constantly flowing tubes, thus assuring complete destruction of dangerous bacteria. The Sterilizer purifies water at the rate of 400 gallons an hour.

Manufacturer: Sepco Corporation, Pottstown, Penn.

803

Caterpillar introduces two industrial diesel engines

Features claimed: Scheduled for production soon are two new Caterpillar industrial diesel engines, the D337 and D326. The 6-cylinder D337 engine is an industrial version of the 5⅛-in. by 6-in. engine developed as a power source for the DW20 and DW21 tractors. The D326, although quite similar in design will be offered with a lower horsepower. New feature on the two models is the fuel system with fuel pumps mounted adjacent to the cylinders they serve. This results in standard, identical, short fuel lines for each cylinder. Pistons in the new models are cooled by an oil stream sprayed from a nozzle that is solidly attached to the engine block. This spray lubricates the piston pin, as well as cooling the piston, which makes oil grooves unnecessary in the connecting rod.

Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

804

Open-end splice caps for easy installation

Features claimed: Buchanan Splice Caps for "pigtail" splicing of electrical wires are now available in an improved open-end construction which facilitates installation and

inspection. The caps insure that wire insulation is always flush with the cap for maximum circuit protection and that wires are always inserted to the full depth of the splice cap for maximum joint efficiency. Only two sizes are required for all most frequently used combinations of two or more wires ranging all the way from two No. 18 to three No. 8. Quickly applied snap-on insulators of fixed insulating value eliminate necessity for taping of joints and insure against insulation breakdown in service. The hand operated "pres-Sure-tool" which installs both sizes of splice caps also installs manufacturer's Termend lugs on all wire sizes from No. 16 to No. 8. This tool insures permanent connections of maximum electrical and mechanical efficiency.

Manufacturer: Buchanan Electrical Products Corp., Hillside, N. J.

805

New cement distributor for bulk or sack cement

Features claimed: This two-wheeled, rubber-tired cement distributor, for use with bulk cement trucks or sack cement, is attached directly behind the cement truck.

Cement is dumped into the hopper on the distributor and by means of a calibrated rotary vane is metered onto the windrow. Windrow is automatically troughed by an axle-high V-spreader on the front of the distributor, which protects the cement from blowing. The machine has an adjustable capacity of 15 to 80 lb. per lineal foot. It is easily attached to the truck and can be maneuvered on the job by one man.

Manufacturer: Wood Manufacturing Co., Box 620, North Hollywood, Calif.

806

Pneumatic nailer flattens nailing costs

Features claimed: Something new under the sun is the first Nu-Matic Nailer, completely portable, ready for contractor and builders use. The machine will nail a minimum of 5,000 sq. yd. per day (1 x 6 on 16-in. centers). The device weighs in at 30 lb. and is available to builders and contractors on a rental plan. The company furnishes the machine, air compressor, hose and all maintenance and repairs at a flat hourly rate based on the 8-hr. working day.

Manufacturer: Nu-Matic Nailer, Inc., 2900 Rowena St., Los Angeles, Calif.

807

New elevator features rigid triangular tower

Features claimed: This latest addition to the line of steel scaffolding and hoisting towers is an elevator featuring a rigid triangular tower and automatic reverse control. No operator is required. The device can be powered by either gasoline or electricity and is designed to support its entire load on its four rubber tire wheels.

Manufacturer: Wilson-Albrecht Co., Inc., 3565 Wooddale Ave., Minneapolis, Minn.

808

Rust preventative that gets under moisture

Features claimed: Powerfilm is a rust and corrosion preventative long used by state highway departments and now available for commercial use. The coating is used for all metal surfaces and is designed to get under and displace any moisture present. The new

coating can be either sprayed, brushed or wiped on the surface and dries to form a tough, non-oily protective film that will not crack or chip and is dust and dirt resistant. Powerfilm thins down when stirred, but thickens when left standing, so that it goes on easily without running or sagging. Use of the coating is recommended for machinery which stands out in all weather, and for parts that are subject to rust or corrosion. Paint is not damaged when covered with substance and removal can be accomplished with naptha. Powerfilm is shipped in 15-, 30-, and 55-gal. drums and 5-gal. pails.

Manufacturer: The Thomas Company, Chemical Coatings Division, 1645 Hennepin Ave., Minneapolis, Minn.

809

Portable earth auger is highly maneuverable

Features claimed: Light in weight and easily portable, this new gasoline engine earth auger can be used in any terrain by construction and maintenance crews. The machine is made with new magnesium alloy

castings and equipped with 30-in. augers in either 6-, 9- or 12-in. diameters. The digging unit quickly converts to chain sawing, with saw assemblies available in cutting capacities from 18 in. to 7 ft. With this dual-purpose machine, post and pole timber can be felled, cut to size and placed in the ground faster and more economically. This unit can also be used to saw large building timbers on the job or clear rights-of-way and building sites of trees.

Manufacturer: Mall Tool Company, 7725 So. Chicago Ave., Chicago, Ill.

810

Salt tablet dispenser fights worker fatigue

Features claimed: Holding 750 ten-grain salt tablets and designed to hang near drinking fountains for worker convenience, this new salt tablet dispenser helps the worker fight fatigue on hot days when efficiency ordinarily declines. The dispenser itself costs $2.50 and one thousand salt tablets cost 75 cents with discounts for quantity orders.

Manufacturer: General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia, Pa.

811

Larger horsepower added to electric power drives

Features claimed: These new Speed-Trol Electric Power Drives are designed to meet growing demand for variable speed drives of 20- and 25-hp. ratings. Sterling's Drip-Proof model prevents liquids or any foreign material from falling into the motor. Motor housing and variable speed transmission

case are made of rugged gray iron castings which provide utmost protection against corrosion from moisture-laden or chemical atmosphere. Positive adjustment of pulleys, infinite speed variation and accurate control of speed under varying loads.

Manufacturer: Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Rd., Los Angeles, Calif.

812

Cover plate protects welding helmet windows

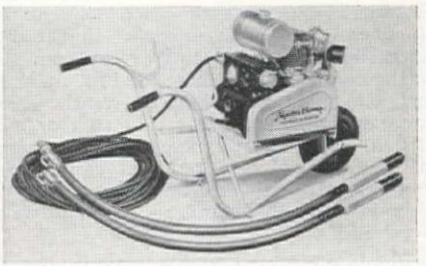
Features claimed: Made from special thermosetting plastic, this new plate is clear, hard and almost colorless. The material offers high resistance to pitting, will not discolor under ordinary welding conditions, and will not peel, crack, blister or shrink in service.

Manufacturer: American Optical Company, Southbridge, Mass.

813

Portable vibrator power unit and light plant

Features claimed: This new vibrator, called the Master Champ Hycycle, provides 10,300 vibrations per minute under normal load. The machine weighs 172 lb. and can provide vibration anywhere within 300 ft. Two single phase outlets are provided for 1,200 watts of lighting and if only one of the two vibrator cables is used the machine will provide 600 watts of light at the same time. All power connections are watertight and fuses are easily replaceable. The device



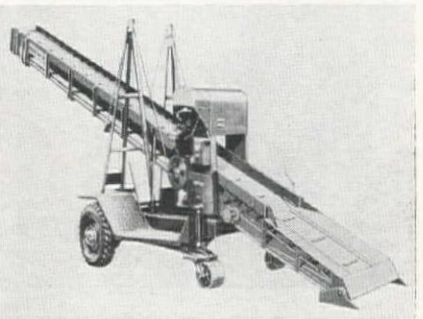
is powered by a Wisconsin gasoline single cylinder 4.4-hp. engine at 3,200 rpm. Conductor cables are furnished in 50-, 100- or 150-ft. lengths with watertight connectors and operating vibrator cables are available in 5-, 10- or 21-ft. lengths.

Manufacturer: Master Vibrator Co., 200 Davis St., Dayton, Ohio.

814

Troughed belt conveyor tailored for construction

Features claimed: Designed especially for construction field operations the new Model 638 Power Moved Troughed Belt Conveyor



offers economy and high handling speeds. Simplified drive and controls, improved maneuverability of individual wheel steering and the hydraulically operated boom hoist are some advantages on the new model. Stockpiling jobs will be aided by the heavy-duty frame and chassis.

Manufacturer: Fairfield Engineering Company, 342 Chicago Ave., Marion, Ohio.

815

New form clamp combines floating nut and bracket

Features claimed: Hex-Lock Form Clamps, combining into a single unit an adjustable Hex-Lock floating nut and bracket, make it unnecessary to turn a metal casting on wood and make it possible to turn metal on metal. This means that some of the difficulties of turning in concrete form work are eliminated and the friction is considerably reduced.

Manufacturer: Williams Form Engineering Corporation, 1501 Madison Ave., Grand Rapids, Mich.

816

Quick coupler for industrial pipe lines

Features claimed: One man can lay as much as 1,000 ft. of pipe per hour as a result of the instant hook-up without tools, and other advanced features of this new coupler. The coupler is expected to be valuable in construction operations, for handling both air and water under pressure. Easy-access outlets for connecting air lines, lateral hoses, etc., are provided on each coupler for running hose and other lines. "Quick-Lok"

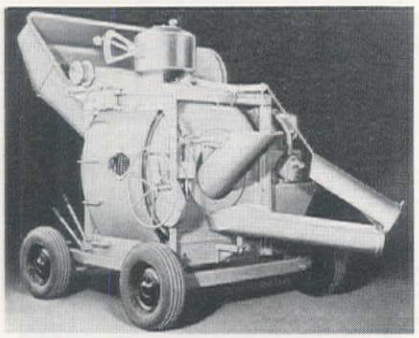
coupler works efficiently for oil or gas lines, chemicals or fuel oils. Blow-out proof sealing is assured by a unique "Loks-in" gasket in either rubber or neoprene. Couplers are tested to handle 300 psi. Coupler is separate from pipe, providing double flexibility at each connection.

Manufacturer: R. M. Wade & Co., Portland, Ore.

817

Big drum mixer offers speed and economy

Features claimed: This new half-yard "Non-Tilter" of modern design offers a drum big in diameter, narrow in length and extra large drum openings. A wider skip nose and a wider discharge spout add to



the speed of operation. The machine is equipped with 4-cylinder air-cooled gasoline engine, siphon-type water measuring tank and oversize pneumatic tires. It can also be equipped with 4-cylinder radiator-cooled engine or electric motor, if desired. Among the other features are: channel section welded supporting frame; universal acting spring suspension; adjustable, shock-absorbing V-belt drive and reduction gears enclosed in oil-tight case.

Manufacturer: T. L. Smith Co., Milwaukee, Wis.

818

New sealer applies over rusted surfaces

Features claimed: This new penetrating and sealing anti-rust paint can be applied right over rusted surfaces on interior or exterior jobs. The new paint will prevent rust on new metal and stop rust action on present rusted metal. No extensive preparations are necessary before application. The paint is suitable for either brush or spray application. PCA-100 comes only in black and should be used as a finish coat.

Manufacturer: Paint Corporation of America, Fidelity Bldg., Cleveland, Ohio.

819

Break-resistant blade for masonry cutting

Features claimed: Dropping, twisting in the cut, or bending will not damage this new break-resistant abrasive blade. It is manufactured in layers of glass fiber cloth impregnated with resins and Silicon Carbide. Main usage of this new blade is in the cutting of softer range of materials such as limestone, sandstone, light aggregate concrete products and dry press refractories. The blade is especially effective on small hand-power tools where it is impossible to maintain a true cutting level, and bending and twist frequently snap the blade. The characteristics of this blade eliminate this costly damage.

Manufacturer: Clipper Manufacturing Company, 2800 Warwick, Kansas City 8, Missouri.

820

Motor grader for low cost maintenance

Features claimed: The Road Maintainer is designed for low cost maintenance of unsurfaced roads and road shoulders. Rural roads are the chief target for this road maintainer which provides many features found in heavy graders. Powered by a Ford tractor, the Maintainer is capable of numerous construction operations in addition to its grading and leveling uses. The 8-ft. blade is operated by a separated hydraulic mechanism powered directly by the Ford engine crankshaft, freeing the Ford Tractor hydraulic mechanism to operate accessory equipment. The blade can be operated in three pitch positions and nine angle positions and can be lifted 9½ in. above the ground. Maximum blade pressure is 3,500 lb. at a 90 deg. angle to the frame. Complete with tractor, the Maintainer weighs 6,900 lb., is 18 ft. long and 6 ft., 8 in. wide.

Manufacturer: Dearborn Motors Corporation, Birmingham, Mich.

821

Centrifugal pump line capacities up to 90,000 gph.

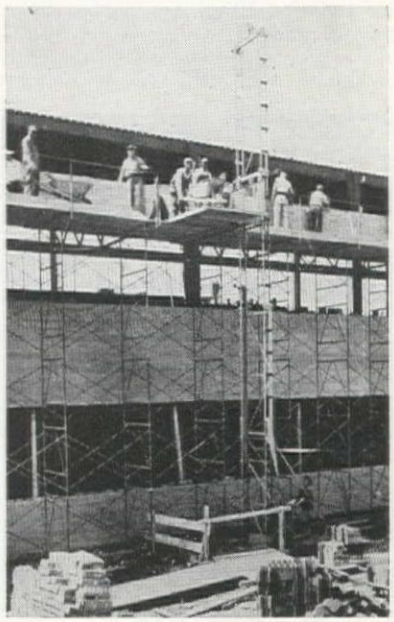
Features claimed: Ranging from the small 1½-in. Model 4M up to the 6-in. Model 90M, this new line of self-priming centrifugal pumps offers capacities from 4,000 gal. per hour to 90,000 gal. per hour. Rex Pump is designed for easy and inexpensive replacement of wearing parts. The patented high carbon steel air peeler and the open type impeller assures maximum water handling ability. Especially important is the Impeller Shaft Seal, which means that the seal is never subjected to pumping pressure with the result that considerably longer seal life and more trouble-free pump operation is obtained.

Manufacturer: The Chain Belt Company of Milwaukee, 1600 W. Bruce St., Milwaukee, Wis.

822

One man controls portable hoisting tower

Features claimed: A time-saver, money-saver and man-saver, this new portable hoisting tower offers a much needed answer to many construction problems. The tower



can be hitched and unhitched, folded and unfolded, raised and lowered by one man. Only 40 lb. of energy is necessary on the hand winch to raise the tower and retract the wheels in one operation. Erecting time for one man is ½ hour, and the two-wheelbarrow, 5½-ft. by 6½-ft. safety platform has a 1,000-lb. capacity, 25-ft. unloading height and extra sections are available. The machine is powered by a 7-hp. air-cooled single cylinder gasoline engine with roller chain drive, and weighs a total of 2,500 lb.

Manufacturer: The Finn Equipment Co., Cincinnati 8, Ohio.

823

Hammer drives steel sheet piling in close quarters

Features claimed: Particularly designed for work in restricted space, the Model 6.5 double-acting pile hammer can drive one steel sheet pile between two adjacent sheets. Operating on either compressed air or steam, the hammer is suitable for 8- to 15-in. steel sheet piling, or 6- by 12-in. wood sheeting or its equivalent in timber piling. The ram weighs 600 lb., imparts 3,200 ft. lb. per blow at a rate of 280 blows per min. Shipping weight of the hammer assembly is 4,620 lb., length 74⅜ in., width 25⅞ in.

Manufacturer: McKiernan-Terry Corporation, 15 Park Row, New York City 38.

824

Vertical sump pumps in four basic units

Features claimed: Four basic units, 4610, -20, -30 and -40, of these new vertical sump pumps are available in a range of sizes from 1- to 10-in. discharge with capacities from 10 to 3,000 gpm., and heads up to 140 ft. Pumps are regularly equipped with standard fluid ends but can be furnished with

fluid ends for handling sewage in the 2-, 3- and 4-in. discharge sizes. Pumps come with electric motors from ½ to 75 hp., or for steam turbine drive. Close tolerance doweling fits from motor to impeller and the positive alignment of all rotating and guide bearing parts are noteworthy features of the pumps.

Manufacturer: The Deming Company, 42 Broadway, Salem, Ohio.

825

New cable models for A-C tractors

Features claimed: A new cable-control mounting has been announced to operate Baker bulldozers, gradebuilders, and root rippers on Allis-Chalmers tractor models HD-9, HD-15, and HD-20. Designed to give improved visibility and streamlined appearance, the mounting and cable frame are built as a unit together with the radiator guard. Further protection is afforded the cable by its location, under the fender, close alongside the tractor.

Manufacturer: Baker Manufacturing Co., Springfield, Ill.

826

Versatile crawler tractor weighs only 4,400 lb.

Features claimed: The GT 30 Terratrac is a versatile crawler tractor powered by the four-cylinder Continental F-140 engine and designed for a wide range of construction and industrial applications. When fully

equipped with hydraulically activated bulldozer and angle dozer, the GT 30 weighs less than 4,400 lb. This light weight means that by using its second speed of 3 mph. in most operations, the Terratrac accomplishes with speed and impact what much larger tractors do with weight and creeper speeds. Special rubber track shoes have been developed to permit this tractor to take full advantage of its 4.98 mph. third speed. These shoes facilitate indoor operations with the GT 30.

Manufacturer: American Tractor Corp., Churubusco, Ind.

827

Device will pump light oils and asphalts

Features claimed: These pump units are the smallest available for their size (pipe sizes—2-in., 2½-in., 3-in.) and capacity (90-gpm. to 300-gpm.). Choice of bronze bearings with oversize oil reservoir, or self-aligning ball bearings. One motor operates as many as four pumps for handling different kinds of material either singly or all at once. Top quality flexible coupling links motor and pumps. Individual oversize manually operated clutches. No priming or bleeding required to get either the first or the last drop from a tank.

Manufacturer: Granberg Corp., 1308 67th St., Oakland, Calif.

828

Heavy-duty boom for lifting and loading

Features claimed: Designed for lifting and loading with the 5-ton truck-mounted Bantam shovel-crane and available in 25-ft. length, with 5-ft. extensions, the new Bantam boom has approximately 4 times more rigidity than standard booms. Approximately 200 lb. more steel strength is achieved with heavy duty angles, together with additional braces along the lower section for protecting boom when dropped or bumped against other objects. The new boom is especially adaptable for logging, pipe handling and steel erection operations. Estimated capacity is 10,000 lb. at 10 ft. with outriggers, 1,000-lb. counterweight.

Manufacturer: Schield Bantam Co., Waverly, Iowa.

829

Sleeve pulling, installing set offered for pulling system

Features claimed: This special sleeve pulling and installing set is offered as a part of the Power-Twin Hydraulic Pulling System. The set will pull and install cylinder liners on more than 200 different makes and models of trucks, tractors and power units. The device is adjustable to center perfectly over the bore and provide clearance over cylinder head studs. It removes and installs sleeves from 3 in. to 6 in. without damage or distortion.

Manufacturer: Owatonna Tool Co., 389 Cedar St., Owatonna, Minn.

830

Compact power saw is easy to handle

Features claimed: The 8-in. Maxaw is a compact, precision-engineered power saw, built for added utility and extra capacity for every cut with plenty of blade to spare. It cuts 2⅝ in. on a square cut and at 45 deg. it cuts through lumber 2-3/16 in. thick. Easy handling is assured by its light, 14-lb. weight. The new Maxaw has a sturdy frame of die-cast aluminum alloy, AC-DC universal motor, 115-120 volt special with a no-load speed of 4,600 RPM.

Manufacturer: Fred W. Wappat Division, Cummins Portable Tools, Mayville, N. Y.

831

Larger earth augers for boring machines

Features claimed: Three larger sizes of the Pengo twin-helix earth auger for use with heavy-duty power earth boring machines are now in production. With diameters of 42 in., 48 in., and 54 in., respectively, the three new augers are designed for use with all popular makes of earth boring machines. Design features result in fast cutting with minimum power requirements, permitting the boring of holes up to three sizes larger than the maximum possible with old-style augers. These augers also bore a clean hole of specified diameter, eliminating wasted concrete on poured-in-place piers and footings.

Manufacturer: Petersen Engineering Co., Santa Clara, Calif.

832

Instantly adjustable dado tool

Features claimed: This instantly adjustable tool cuts up to one inch in widths from ¼ in. to 1-1/16 in. The tool can be set for any width dado by merely loosening the arbor nut and turning the graduated dial. The tool does not have to be removed from the arbor. Cutting action is from 12 high speed tool steel blades which slice through hardwoods without vibration, chatter, burning or chewing. This 9-in. Quick-Set Dado has a size and capacity which make it suitable for commercial use on table and radial saws. It is bored for a 1-in. shaft and ¾-in. and ⅝-in. bushings are also available.

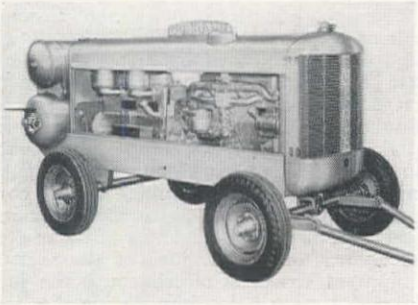
Manufacturer: Consolidated Machinery and Supply Co., Ltd., 2031 Santa Fe Ave., Los Angeles, Calif.

833

Fewer parts in new Schramm compressor

Features claimed: With an actual air delivery of 210 cu. ft. per minute, this six cylinder engine and six cylinder compressor

unit is designed for continuous heavy-duty twenty-four hour service. One of the important features of the 210 Unistage Compressor is the fact that 90% of the engine parts are interchangeable with the com-



pressor. This simplified design eliminates two-staging and inter-coolers, also requires fewer parts. "Pneumastat" control cuts fuel costs up to 50%. Electric starting, speed control, cam operated mechanical intake valves, dual fan belts, are some more of the many features.

Manufacturer: Schramm Inc., Westchester, Pa.

834

Precision drill designed for hard masonry materials

Features claimed: Cycle-Core drill bit offers precision drilling in hard masonry materials using a rotary type drill with

pressure applied, for holes of ¾-in. diameter and up. A removable "Cyclo-Center" eliminates the necessity of using a wood template to start holes by locating and starting holes when inserted. This removable center does away with walking of the bit or marring of the surface being drilled. Dust is removed from the hole by the machined-in spiral threads running the full length of the body. Each bit has a port opening for cleaning out the core.

Manufacturer: New England Carbide Tool Co., Auburn and Brookline Sts., Cambridge, Mass.

835

British tractor line makes U. S. debut

Features claimed: An important addition to the diesel crawler tractor market is a new line of British-made models now making their first appearance in the United States. Produced by two prominent British firms of long-standing reputation in heavy duty equipment, the new tractor line offers a power range from 95 hp. down to 20 hp. The Challenger crawler, which is the largest tractor in the line, features 6 forward speeds with a range up to 5.67 mph., and 4 reverse speeds extending to 5.13 mph. Attachment can be added to give six more forward speeds and four more in reverse. Ready for use, the unit weighs approximately 12 tons. Prompt delivery is assured in the United States.

Manufacturers: John Fowler & Co. (Leeds) Ltd., and Marshall Sons & Co., Ltd., England.

Distributor: John M. H. Shline Company, 342 Madison Ave., New York, N. Y.

836

Wood welder speeds bonding of wood, plastic and metals

Features claimed: This wood welder operating on a set frequency of 27.12 megacycles is a new vacuum tube, self-excited type. It increases the speed of bonding wood, formica, plastic or their combination with metal components. The new wood welder offers a penetration range from ⅛ to 2 in., and provides tight bonding in a matter of seconds on materials which would ordinarily require hours. The device is powered by a small generator which offers flexibility and movement by the operator. A three-position power selector switch determines energy to be supplied in proportion to depth of material to be bonded. Automatic or semi-automatic operation is provided by an instant setting timer when the device is used for repetitious operations. The complete unit weighs 140 lb., is 24 in. high, 20 in. wide and 17 in. deep; power is 1½ kw. input; operates on 115 volts AC. The hand gun weighs only 3 lb.

Manufacturer: Wood Welder Manufacturing Company, 2758 Whittier Blvd., Los Angeles, Calif.

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.

★★★★★★★★★★★★★★★★★★★★★★★★★★

837

How to get long life from rubber belting and hose

A "must" for maintenance libraries is a free booklet published by **Pioneer Rubber Mills**, San Francisco. The booklet outlines a maintenance schedule that, if followed, can double, triple or even further lengthen the useful life of conveyors, belting, hose and other rubber products. First pages tell what elements to consider in choosing the right product to do the right job and how to prevent the waste of over-building or under-building. Later pages tell how to protect your products on the job from the natural enemies of rubber (oils and greases, acids, sunlight, etc.). Remainder of the booklet is divided into sections containing maintenance tips for the different types of rubber products. Each section gives some general do's and dont's, then tells how to install the product to reduce later maintenance and other costs, continues with pointers for best operation and concludes with a trouble-shooting guide. Humorous drawings in three colors make the booklet easier to read and the most important maintenance factors easier to remember. Free copies may be obtained by writing *Western Construction*, 609 Mission St., San Francisco 5, Calif.

838

Hard surfacing electrode

Complete information on a new hard surfacing electrode just introduced by **Rankin Manufacturing Company**, Los Angeles, is contained in bulletin B-X. This new electrode, called Ranite B-X, has increased welding speed which is said to decrease the heat induction into the parent metal by one-third, thereby minimizing heat strains and helping to preserve the original physical characteristics of the metal. Price information is also included in the new booklet.

839

Spreader booklet

The Jaeger Machine Company, Columbus, Ohio, offers a new book on its paver-type self-propelled spreader. Closeup photographs of spreading operations, specifications and additional information make this 12-page catalog interesting reading for those concerned with spreading operations.

840

Forest board facts

"How and Where to Use Forest Board" is the title of a new brochure prepared by **Forest Fiber Products Company**, Forest Grove, Ore. The usage and application of hardboard is explained to give a better understanding of the product and its uses. Step by step application instructions with illustrations are given with information on bending and painting. Carpenters, contractors and home owners are urged to write for copies.

841

Lubing guide catalog

Two classifications of Graco Convoy Lubers are clearly described in a new 25-page catalog released by **Gray Company, Inc.**, Minneapolis, Minn. Aimed at contractors to whom field lubrication is an important consideration, the new booklet tells of Graco Lubers "completely assembled and ready to work" and "job-planned units," selected and assembled by the contractor to meet his particular greasing needs. Pictures and diagrams of parts give the contractor a clear idea of the sort of equipment Graco is offering and the job-planned section helps him decide the best selection for his particular field problem. There is a section on the component parts of job-planned grease rigs, along with an informative series of pictures and descriptions of available accessories.

842

Anti-friction bearing design for movable span bridges

A limited number of copies of this well-illustrated, cloth-bound book are now available to bridge engineers who request a copy on their company letterhead. The application of anti-friction bearing to all types of movable span bridges is covered in this book, published by **The Torrington Company, Bantam Bearings Division**, South Bend, Ind. Bearing applications to vertical lifts, double bascule, single bascule, retractile bridges and even floating bridges, such as the one at Lake Washington, are discussed. Western bridges covered by the

book include the Lewiston-Clarkston Bridge, Wash. and Idaho; Heim Bridge, Los Angeles, Calif. and the Mossdale Highway Bridge, Mossdale, Calif. The informative drawings and charts which appear throughout the book coupled with the clear, concise presentation of textual material make this a valuable reference work for bridge engineers.

843

Shaker conveyor loading head

A short, lightweight loading head for shaker conveyors, the "Duckling," is described in bulletin CC-515 released by **Goodman Manufacturing Company,** Chicago, Ill. The one-page bulletin gives the length, weight, effective extension and general qualifications for the loading head, which easily loads out 30 to 35 tons per hour.

844

Trackson tractor equipment

Descriptions of the complete line of Trackson tractor equipment are presented by **Trackson Company,** Milwaukee, Wis. manufacturer of tractor equipment for Caterpillar diesel tractors, in a new brochure. Products described and illustrated include the well-known Traxcavators, Pipe Layer, Earth Augers, TracLoaders, swing cranes and land clearing equipment. Photographs of the equipment are included.

845

Steel drafting tables

In an illustrated bulletin, **Stacor Equipment Corp.,** Brooklyn, N. Y., gives complete details on its 4-post steel drafting tables. All models, in hard baked grey enamel finish, have all-steel 4-post base, all-steel foot rest and 2-all-steel adjusting devices. Each feature of the table can be seen in the several photographs included in the bulletin.

846

Transmission drives described

New HY-VO power transmission drives are thoroughly described and illustrated in a new **Morse Chain Company,** Detroit, Mich., catalog. The catalog includes a basic discussion of the operating principles behind chain drives; highlights of the new design principles incorporated in HY-VO drives; high speed, heavy-duty power transmission capabilities, HY-VO capacities, speed ranges and service factors for selecting drives, and installation and lubrication procedures.

847

Crushing without rubbing

A new folder, #47, is offered by **Straub Manufacturing Co., Inc.,** Oakland, Calif. which clearly shows the difference and advantages of the Kue-Ken principle of "crushing without rubbing." A self-addressed mailing card is included with an offer to assist the user in solving his crushing problem.

848

Towing winch guide

In line with the national movement to maintain and preserve equipment and cut down on needless replacement of parts, **Hyster Company** of Portland, Oregon, is offering a new 12-page operator's guide and general information bulletin for the Hyster D7N towing winch designed for the Caterpillar D7 diesel tractor. The manual is in four sections which describe mechanical components of the winch; fundamentals and advanced operating instructions; typical winch operations and rigging methods; a summary of efficiency reminders and a glossary of winching terms. Photos and drawings are included to facilitate complete understanding of the problems and their solution or prevention.

849

Wiring cost cutters

In a new folder just released by **Republic Steel Corp.,** Cleveland, Ohio, the results of a study into the cause of wiring defects and breakdown are presented to the reader. Fumes, gases and other corrosive materials and their effects on wiring systems are discussed, and the advantages of a new electrical metallic tubing called Electrunite are outlined. This new tubing which offers high resistance to corrosion is illustrated and a series of pictures is included to show the simple process for the use of Electrunite.

850

Hose clamps, tools, fittings

In a new 12-page catalog **Punch-Lok Company,** Chicago, Ill. offers detailed descriptions and illustrations of the Punch-Lok method and its many applications, and lists the standard clamps, locking tools, and special fittings available.

851

Stud welding booklet

Helpful information on applying studs and other fasteners to steel surfaces is contained in a new booklet released by **K S M Products, Inc.,** Merchantville, N. J. The booklet is packed with data on how stud welding eliminates drilling, tapping and hand welding. It shows the fundamental operating principles of the stud welding process, and typical applications. It also contains information for K S M studs and stud welding equipment. Catalog 451 is designed as a guide for engineers, purchasing agents, and welding superintendents.

852

9-lives for "Cats"

In a new booklet called "Quality At Work Through The Years with 'Cat' Motor Graders," **Caterpillar Tractor Co.,** Peoria, Ill., points out that more than 90% of all motor graders manufactured by the firm are still in service. This long-life is partially due to the parts and service available throughout the country for even the oldest machine. The booklet features the long history of research and engineering, of testing and on-the-job experience, of manufacture and inspection behind the Cat Motor Grader. Illustrations show these machines in action on many grading jobs.

853

Utility truck for mines

The capabilities and advantages of the Goodman Tractor Tread Utility Truck are described in bulletin CG-513, issued by **Goodman Manufacturing Company,** Chicago, Ill. The truck designed especially for short haul service in underground mines is thoroughly diagramed in this four-page release, and each point of design is explained for complete understanding of operation.

854

Portable air compressor

Worthington Pump and Machinery Corporation, Harrison, N. J. is issuing bulletin H-850-B73 describing the Blue Brute 160-ft. portable air compressor. This bulletin,

together with one covering the 105-ft. portable air compressor which is forthcoming, shall supercede bulletin H-850-B69 which covered both the 105 and 160 air compressors. The new bulletin gives a thorough profile of the 160-ft. model with specifications, photographs, and a feature check list. The bulletin is letter-size, ready for insertion in a loose-leaf notebook.

855
"Fifty Years of Fine Masonry"

William A. Rainey & Son, San Francisco, Calif., oldest masonry contracting firm in Northern California, marks its golden anniversary with the publishing of "Fifty Years of Fine Masonry." Here is a history of masonry techniques including a half dozen material and installation processes pioneered by the firm. Masonry progress is clearly shown in the 20 pages of this anniversary publication. Copies are available for architects, engineers, general contractors and other prospective users of masonry construction.

856
Dragline bucket facts

"ESCO Dragline Buckets for Every Digging Condition" is the title of a new catalog now available from **Electric Steel Foundry Co.,** Portland, Ore. The catalog illustrates and gives specifications for all five types of ESCO draglines. An effort has been made to strip the catalog of all unnecessary advertising and superfluous material so that just the important facts are left for the reader. Each set of specifications is clarified by a model view of the representative bucket, and recommendations are given with each set of specifications.

857
Wedge-lock couplings

An illustrated bulletin describing a line of heavy-duty Wedge-Lock Couplings is now available from **Naylor Pipe Company,** Chicago, Ill. The bulletin points out that speed and simplicity of connection are chief advantages of the coupling as well as the fact that only a hammer is required to effect the connection. Complete specifications on this one-piece positive-type coupling are included in range of light-weight pipe sizes from 8-in. to 30-in. diameter.

858
Mobile gravel plant

For counties, townships and small crushing contracts where mobility counts, **Diamond Iron Works, Inc.,** offers its Single Pass Gravel Plant. This machine is thoroughly described in one-page bulletin offered by the Minneapolis, Minn. firm. Three plants with a capacity range from 20 to 65 tons per hour are included in the bulletin, called CP-1. A complete description of its applicability, the basic units comprising the plant, outstanding features and full specifications are covered.

859
Protective aluminum paint

Prufcoat Aluminum, a ready-mixed, all-purpose paint for use inside or outside to fight corrosive conditions, is fully described in a bulletin issued by **Prufcoat Laboratories, Inc.,** Cambridge, Mass.

860
Aggregate handling equipment

Featuring a description of this line of aggregate crushing, screening and washing equipment, bulletin No. SMD-1 is offered by **Diamond Iron Works, Inc.,** Minneapolis, Minn. The bulletin covers basic production units as well as portable and stationary crushing plants and portable primary crushing plants in the Diamond line. Each unit is clearly described and illustrated, and a convenient business reply card is included with each bulletin so further information on any unit may be requested from the company.

861
Bucket loaders

Three models of Pettibone Mulliken bucket loaders are described, pictured and diagrammed in a new bulletin just issued by **George Hais Mfg. Co., Inc.,** division of **Pettibone Mulliken Corp,** Chicago, Ill. In addition to a description of every phase of the machine's operation, a series of pictures shows the various models in operation on particular jobs.

862
Sprocket chain maintenance

"Installation, Operation and Maintenance of Chain Drives and Conveyors" is the title of a new booklet offered by **Chain Belt Company** of Milwaukee, Wis. The text in the bulletin is straight to the point and the illustrations offer graphic information on the correct and incorrect ways of solving chain installations, operation and maintenance problems.

863
Digger-crane-shovel

Badger Machine Co., Winona, Minn. is offering a new bulletin describing the Hopto (hydraulically operated power take-off) trailer type digger-crane-shovel for use on all standard trucks. Illustrations and photographs show all three attachments in action and specifications are included for each

device. The Hopto offers hydraulic operation on trenching, excavating, loading, shovel work, rigging, grave digging and crane work.

864
"Drive-it Data"

This new bulletin released by **Powder Power Tool Corp.**, Portland, Ore., explains the new improved model fastening tool for use in concrete, masonry or steel. Photographs which show the Drive-it in action on difficult construction assignments appear in the four-page bulletin.

865
Insulating lighter and stronger

In a compact and attractive fully-illustrated booklet, **Kaylo Division, Owens-Illinois Glass Company,** Toledo, Ohio offers the complete history of its Kaylo, building and insulating material. Kaylo is a hydrous calcium silicate which is lighter than wood, stronger than most insulating materials and offers many possibilities in the construction field. Each step in the making of Kaylo is described and diagrammed in this booklet. Pictures are used effectively in showing the rare properties of the new material, which makes it a versatile construction aid.

866
High strength bolts

The latest issue of the publication released by the **Industrial Fasteners Institute,** Cleveland, Ohio, offers the story of the high tensile structural bolt and an approved specification for its use. Information is given on the research and development which stands behind the introduction of these high strength bolts, which offer a new method to the structural engineer. The complete story of this development and its potentialities makes interesting reading and the specifications for assembly of structural joints using high tensile steel bolts provide a valuable source of reference in a relatively new technique.

867
Centralized lubrication study

Four ways to increase production and lower operating costs are explained in an 8-page folder called "Studies in Centralized Lubrication," released by **Farval Co.,** Cleveland, Ohio. Production time saving, man power saving, lubricant saving and bearing saving through centralized lubrication systems are described with photographs and diagrams showing various methods.

868
For safer personnel

Around construction camps and other industrial projects, workers need protection from machines and accidents. **Wicx-Merit Glove Co.,** Oakland, Calif. offers its 1951 catalog of gloves, mitts, jackets, sleeves and aprons to guard against personal injury. All items described and shown in the catalog are manufactured for rugged service and long life.

869
Hose and fittings

In loose-leaf form to permit future additions, this new **Aeroquip Corp.,** Jackson, Mich., folder offers complete information about Aeroquip industrial products and how to order them. It includes the construction principles of Aeroquip hose lines and detachable, reusable fittings. A convenient index tells the reader how to find information on accessories, adapters, couplings, assembly, hose, hose assemblies and hose fittings.

870
International TD-9 tractor

In a 32-page, two-color catalog, **International Harvester Company,** Chicago, Ill., tells the complete story of its TD-9 crawler tractor. Many illustrations and photographs point out the features of the tractor. Detailed specifications and information on how the TD-9 develops and applies its 40.5 drawbar hp. are included in the brochure. Job application photographs highlight the textual material.

871
Insulating roof fill

In a new 8-page illustrated brochure just released by **Great Lakes Carbon Corporation,** New York, N. Y. the use of Permalite aggregates in concrete, as a lightweight insulating roof fill is fully described. Various features of Permalite/Concrete along with mix designs and other technical data are included along with a typical specification.

872
Conditioning steel by welding

"Surface Conditioning of Structural Silicon Steel by Welding" is the title of a new pamphlet just released by **Bethlehem Pacific Coast Steel Corp.,** San Francisco, Calif. This report covers laboratory and beamyard weld tests to determine the susceptibility of three grades of steel to underbead

cracking. Test methods, scope of tests, diagrams and photographs are included to make the text easily readible. Three conclusions are drawn from the information brought forth in the testing process. This convenient pamphlet is a valuable source of reference on an important element of steel conditioning.

873

Synthetic coatings

Characteristics, properties, uses and methods of application of synthetic rubber resin based coatings are contained in a new brochure just issued by the **Casey & Case Coating Co.**, Maywood, Calif. Machinery enamels, damp-wall enamels, stucco-masonry coatings and scuff-free floor finishes are all discussed in the new brochure. Corrosion and maintenance engineers will find this booklet particularly helpful.

874

Lubrication chart

Available from **Hyster Company** of Portland, Oregon, is a 26-point lubrication chart covering eight Hyster industrial truck models. Designed to fold into pocket-size for handy reference, the chart numbers all service points of the eight models, and tells when they should be serviced. Recommendations for certain types of oils and greases are included. Form 11-2 comprises information on the Hyster-Salsbury Turret Truck power unit, the Hyster 20, 40, 75 and 150 fork lift trucks, Karry Krane and M3 and MH3 Straddle Trucks.

875

Removable column forms

A complete profile of removable steel column forms is included in a new 6-page folder just released by **Bethlehem Pacific Coast Steel Corp.**, San Francisco, Calif. Pictures, diagrams and on-the-job installations help to explain how the column head reduces vertical seams and insures perfect alignment.

876

Hydraulic puller

In a new 8-page bulletin, **Owatonna Tool Company,** Owatonna, Minn. offers the description of the versatile and effective new Power-Twin Hydraulic Puller (capacity 17½ tons, weight 10 lbs.). Time-saving methods are illustrated for installing and removing cylinder sleeves, shafts, gears, wheels and many other usages. Conversion sets are also shown along with new bench presses and Hydratote, portable storage for all parts.

877

"Electricity as Required"

Contractors and many others will find "Electricity as Required" a booklet of considerable interest. Released by **Caterpillar Tractor Co.**, Peoria, Ill., the new 16-page booklet illustrates the wide usage of Caterpillar Diesel Electric Sets on various power applications, and briefly outlines specifications of its models ranging from 21 kw. to 314 kw. A chart for self-regulated and externally-regulated sets is included. The types of attachments are also described.

878

Hose fittings and line oilers

The first in a series of bulletins to supersede the Blue Brute Accessories Catalog has been announced by **Worthington Pump and Machinery Corp.**, Harrison, N. J. Bulletin H-1200-B44 discusses Blue Brute hose fittings, includes sizes, parts numbers and applications. The second, Specification Sheet H-1200-B45 pictures and describes the Blue Brute 2 qt. Line Oiler, giving detailed specifications.

879

Heavy-duty 'dozer

An interesting folder on the new Caterpillar No. 8SR Bulldozer, a heavy duty machine specially built to withstand the roughest kinds of 'dozing jobs, is now available from **Caterpillar Tractor Co.**, Peoria, Ill. Pertinent word and picture descriptions of the 'dozer and specifications are included in the folder.

880

Electric brush-off

A new booklet on carbon brushes for electric equipment is now available from **General Electric,** Schenectady, N. Y. Bulletin GEA-5597 is designed to familiarize users with the methods employed to determine proper brush application. The special engineering services offered by G-E to help solve specific brush problems are also discussed.

881

250-volt dynamometers

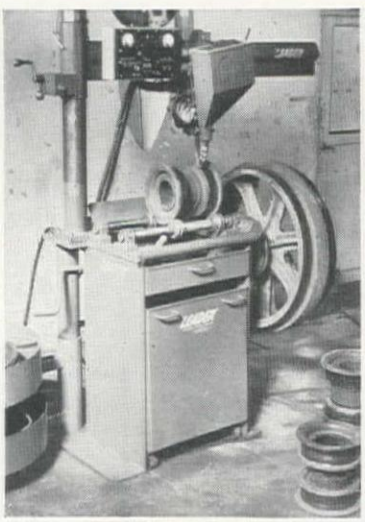
A new pamphlet on 250-volt dynamometers for direct connection testing of internal combustion engines, electric motors, pumps, blowers and compressors, is now available from **General Electric,** Schenectady, N. Y. The illustrated bulletin describes the Type TIC dynamometer's applications and operation. A table of full-load hp. and speed ratings and a chart of performance curves are also included.

Wide Range for Automatic Submerged Arc Welding

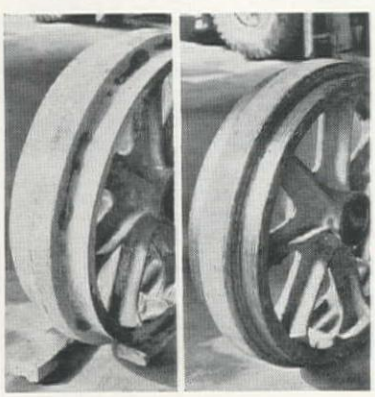
NOW THAT CONSERVATION has entered the picture again, automatic welding machines have entered the fields of repair and reconditioning. Simplified controls and elimination of costly fixtures have reduced the price to the point where many Western distributors can profitably afford the investment.

For example, problems concerning the conservation of track rollers and idlers on Caterpillar equipment are now solved by the installation of an automatic submerged arc welding machine in dealer and distributor shops.

For a number of years, manufacturers alone have been using the submerged process in the fabrication of structural members. Essentially the same as the more familiar arc welding accomplished by hand, the submerged arc process uses bare (uncoated) wire electrodes producing an arc with the base metal under a protective coating of molten flux. In either instance the molten metal is protected from the atmosphere.



Many Caterpillar dealers use this machine manufactured by The Leader Welding and Manufacturing Co., Berkeley. Note roller and idler positioning. Sample rollers below.



Badly worn tractor idler, showing holes in the rim (at left), while at the right is same idler after holes were filled with weld patch on inside and then placed on the automatic welder for weld overlays.

Accomplishments of automatic welding machines are unlimited. Worn track rollers, idlers, carrier rollers, wear plates, cutting edges, bits, etc., can be very successfully restored to size in record time and with surprisingly low cost.

Submerged arc welding is extremely fast: 20 in. of weld per min. can easily be accomplished. Because the welding head controls the arc voltage, current and rate of electrode feed, welds are very uniform in width and depth of penetration as well as very smooth in appearance.

Plan Improved Irrigation In Central Utah Area

AN IMPROVED irrigation water supply is in the offing for approximately 25,000 acres of farm land near the towns of Huntington, Castle Dale and Orangeville in east-central Utah. Bureau of Reclamation plans for the Emery County project include 3,630 acres of land in the Green River Basin now irrigated and 20,450 acres now only partially irrigated.

The proposed project would increase crop and livestock production in the area. The Emery County Project is one of the participating projects in the Bureau of Reclamation program for comprehensive development and multiple-purpose use of the water resources in the Upper Colorado River Basin. The plan has already been approved and referred to Basin States for review and recommendations prior to submittal to Congress.

882
Soil testing catalog

In a new, fully-illustrated 12-page catalog, **Soil Testing Services, Inc.**, Chicago, Ill., offers a description of soil testing equipment which does not appear in the brochure recently issued by the firm. The catalog also mentions other items and groups of items which are available for engineering, chemical and agricultural tests of soils in both laboratory and field.

883
Heavy-duty lubricant

D-A Lubricant Co., Indianapolis, Ind., is now offering a condensed, pocket-size description of its lubricant designed for use on heavy-duty equipment. Features of the product are thoroughly explained in this convenient little folder.

884
Mighty mortar tool

A 1½-lb. all-aluminum tool for applying mortar is now available from the **Kakest Co.**, Curwensville, Pa., and the tool is fully described in an illustrated booket just released by the firm. Pictures of the tool in action explain its economy and the claim that it pays for itself in one day.

885
GM "Master Parts Catalog"

A new loose-leaf, easy-to-use Master Parts Catalog has been compiled by **Detroit Diesel Division** of **General Motors.** For release exclusively to Detroit Diesel's authorized distributors and dealers, this new catalog, covering the entire range of Series 71 GM diesel engines from the two-cylinder engines through the 24-cylinder "Quads" and including all optional accessory equipment, is the second step in a carefully considered program of publications covering replacement parts. The loose-leaf format of the catalog permits release monthly of new and revised pages, which will assure the continued timeliness of the catalog as a whole and avoid out-of-date material.

886
Low-pressure couplings

A new folder illustrating and describing the Low-Pressure Wedge-Lock Coupling has been released by the **Naylor Pipe Co.**, Chicago, Ill. Designed for connecting lightweight pipe in ventilating and similar low-pressure service, this coupling features speed and simplicity of constuction, fully explained in the folder. Included in data are complete specifications on pipe sizes from 8 in. to 30 in. in diameter.

887
Applications of crawler tractors

Fleet applications of International TD-24 diesel crawler tractors are presented pictorially in an 8-page folder just published by the **International Harvester Co.**, Chicago, Ill. In addition to the fleet scenes in the earth moving, mining, pipelining and lumbering fields, the folder also contains a brief listing of the mechanical features of the 148-drawbar-hp. International crawler.

888
Reducing rural road costs

Calcium Chloride Association, Washington, D. C., announces the release of "Calcium Chloride for Unpaved Roads." The bulletin describes the way in which this process reduces dust and gravel loss on unpaved roads.

Space is sold as advertisers' inches. All advertisements in this section are ⅛ in. short of contracted space to allow for borders and composition.

CLASSIFIED SECTION

Rates are $6.50 a column inch. Copy should be sent in by the 10th of preceding month if proofs are required; by the 15th if no proofs are required.

889
Concrete masonry recommendations

This well-organized brochure is now available from the **Concrete Products Association of Washington,** Seattle. It offers a thorough study of concrete masonry which should be of great aid to builders and designers. Section 1 deals with concrete masonry units, Section 2 with construction details, Section 3 with architectural details and Section 4 with specifications. In addition to the material collected in the booklet, a source-of-information section offers opportunities for further reading into phases of the subject. As suggested in the preface, this booklet is well worth keeping in the files for reference.

890
Air entrainment in concrete

"What Air Entrainment Means to You" is the title of a new booklet just issued by the **Dumpcrete Division** of **Maxon Construction Co., Inc.,** Dayton, Ohio. The case for air entrainment is briefly and effectively stated, and a diagram outlines the Dumpcrete system for hauling and placing air-entrained concrete.

891
New rear-dump Euclids

Just released by **The Euclid Road Machinery Co.,** Cleveland, Ohio, is a new 16-page catalog in two colors describing two new rear-dump Euclids. The catalog contains specifications of the engines, transmissions, drive axle, frame, body, etc. Both of the new models offer 22-ton capacity.

892
'Round it goes

Masonite Corporation is distributing 30,000 of its new combination Dial-It-Right and Nail-It-Right wheels to lumber dealers, wholesalers, contractors and architects. The wheel is especially designed to provide a compact, handy guide for sellers and users of Masonite brand hardboards. The Dial-It-Right side, printed in yellow and brown, instantly discloses the correct type and thickness of hardboard for these common end uses: exterior signs, exterior walls, interior ceilings, interior walls, underlayment, wainscots, bench tops, case-backs, case-ends, counter tops, doors, drawer bottoms and floors. The reverse side gives nailing instructions for interior walls and ceilings, concrete forms, lap siding over sheathing, panel siding, finish flooring and underlayment. Eleven types of nails are illustrated and keyed for identification in the die-cut windows.

893
Tar-enameled steel pipe

The advantages and longer life of tar-enameled steel water pipe are pointed out in a new folder just issued by the **Bethlehem Pacific Coast Steel Corp.,** San Francisco, Calif. Flow capacity is the main topic of the folder, and an informative table titled "Flow Coefficients for Enamel-Lined Steel Pipe" is included.

894
Versatile Wisconsin engines

An 8-page bulletin has been released by **Wisconsin Motor Corp.,** Milwaukee, Wis., which tells the whole story of Wisconsin versatility in all climates and on all power jobs. The bulletin is completely illustrated and diagrammed, and a list of dealers in the United States, Canada and other countries is included.

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