WESTERN CONSTRUCTION

REVIEW

The Construction West in a Defense Economy

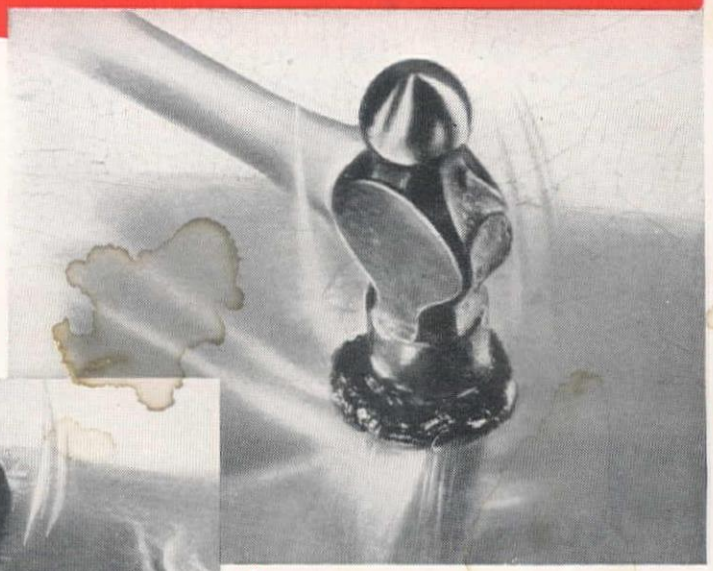
FORECAST

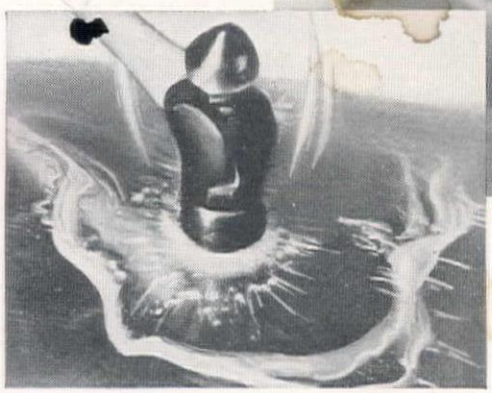
JANUARY 1952

STRIKE THIS BLOW FOR LOWER MAINTENANCE COSTS . . .

See why chassis parts last longer with TEXACO MARFAK

HAMMER TEST: Put a lump of *Texaco Marfak* about the size of a walnut on a smooth, solid surface. Then hit it as hard as you can with a good-sized hammer. See how *Texaco Marfak* cushions your blow, does not splatter. That's because *Texaco Marfak* is both adhesive and cohesive. It clings to the surface and *holds together* — a dramatic demonstration of how it stays in the bearings and protects chassis parts under the pounding of the roughest service.





TRY the "hammer test" with ordinary grease. Stand back and hit it! Note how it splatters, fails to hold together — proof that ordinary grease soon pounds out of chassis parts, leaves them unprotected, shortens their life. Fleet owners everywhere agree that *Texaco Marfak* gives the best protection under all conditions.

MORE THAN 400 MILLION POUNDS OF MARFAK HAVE BEEN SOLD!

Make the famous *Texaco Marfak* "Hammer Test" as described above. Note how *Texaco Marfak* cushions your hardest blows. The wonderful cohesive properties of *Texaco Marfak* prevent it from splattering like ordinary grease.

So it is in your chassis bearings. *Texaco Marfak* withstands the pounding of roughest roads . . . stays in the bearings for extra hundreds of miles . . . seals out dirt and moisture. *Texaco Marfak* stretches parts life because its tough, tenacious lubricating film gives better and longer lasting protection against wear and rust. Your maintenance dollars go farther.

In wheel bearings, use *Texaco Marfak Heavy Duty*. It seals itself in, seals out dirt and moisture for longer lasting protection. Will not leak onto brakes. No seasonal change required.

For Additional Economies

For engine economy, lubricate with *Texaco Ursa Oil X***. Fully detergent and dispersive, this oil keeps engines clean, assures full power, less fuel consumption, lower maintenance costs.

Protect crawler track mechanisms with *Texaco Track Roll Lubricant*. It guards against moisture, dirt and wear under all operating conditions.

Let a Texaco Lubrication Engineer help you simplify your maintenance lubrication . . . keep your equipment on the job and out of the repair shop. 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, New York.

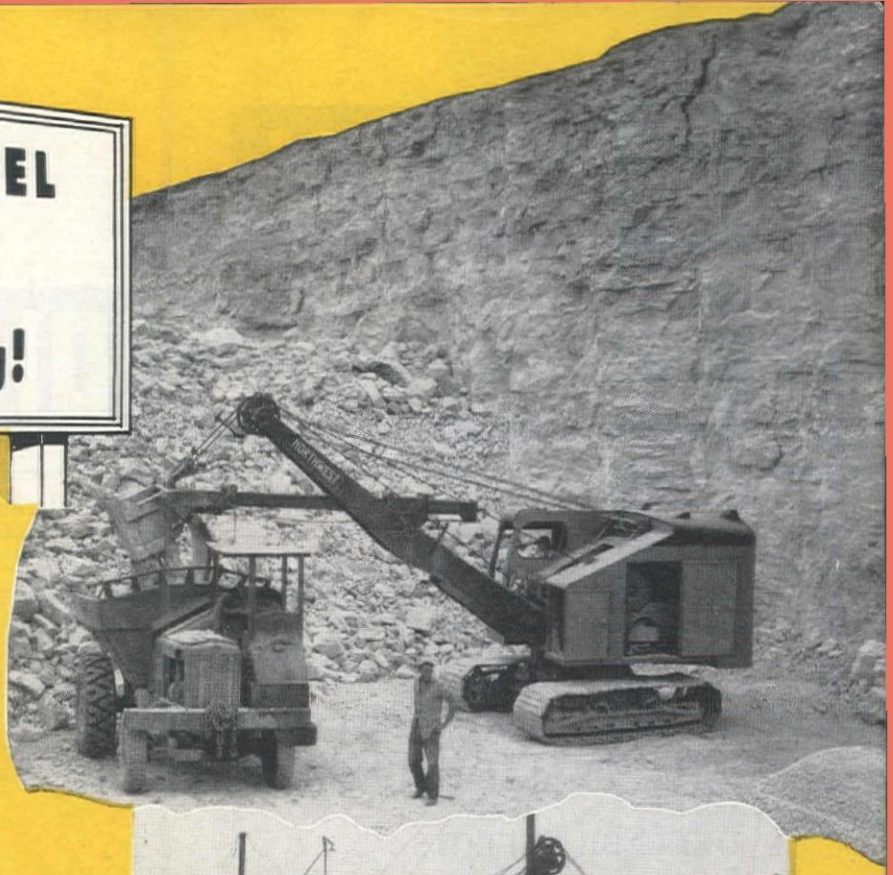
TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Faithfully yours 50 *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

A GOOD SHOVEL is *GOOD* in *ANY* digging!



TODAY'S job you know about—but, what are you going to hit tomorrow? Perhaps it will be easier digging but perhaps you'll hit rock you didn't expect. If you have a *real* Rock Shovel—a Northwest Rock Shovel—you are ready for any problem. It means real output in rock, and *greater* output in the easy digging. You are ready for any problem from a quarry job to ripping up pavement.

Northwests are built for the tough jobs. Cast Steel Bases and Cast Steel Machinery Side Frames give a foundation that stands the beating of tough "going." The Northwest Dual Independent Crowd utilizes force most other independent crowd shovels waste. The "Feather-Touch" Clutch Control makes handling the big ones easy. Uniform Pressure Swing Clutches give a smooth swing and reduce spotting delays. The Cushion Clutch reduces overloads on parts under power and Northwest Steering reduces maneuvering in changing location. These are real Rock Shovel advantages that mean money. A Good Shovel is Good in *Any* Digging!

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135 South LaSalle St., Chicago 3, Ill.

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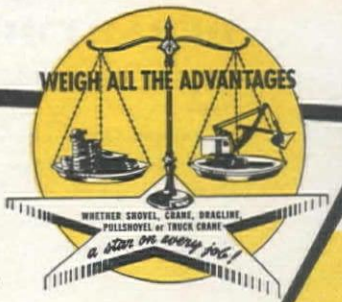

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WESTERN CONSTRUCTION

Volume 27 **JANUARY 1952** Number 1

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The Construction and Civil Engineering Publication of the West

★

Published Monthly by
KING PUBLICATIONS
609 Mission Street
San Francisco 5, Calif.
Telephone YUkon 2-4343

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The annual subscription rate is $4 in the United States and countries in the Pan American Postal Union. All other countries, $5 per year. Singles Copies, 35¢

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Send your new address along with old address, enclosing if possible your address label, to Circulation Department, Western Construction, 609 Mission St., San Francisco 5, Calif. Allow one month for the change to become effective.

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B.F.Goodrich

Why contractor chooses BFG tires for traction and long wear

TULLY AND DI NAPOLI, INC., of Corona, New York, is one of the largest general contractors in the New York area. They operate a fleet of 4 tractors, 4 low-bed trailers, 38 dump trucks, 9 scrapers, 17 automobiles and 14 station wagons, in addition to their 18 shovels, 16 truck cranes and other construction vehicles. The tires they use on these vehicles get extra punishment from sharp rocks and slag.

Long a user of BFG tires, they are particularly well pleased with the *all-nylon* Rock Logger truck tires. Since the purchase of their first set of 8, they have found that these all-nylon tires have 40% more mileage than similar tires without this nylon construction feature.

B. F. Goodrich tires were chosen by this firm because of their superior ability to withstand severe shocks and to resist cutting. They have this greater bruise resistance because they are built with the patented B. F. Goodrich *nylon shock shield*. Strong, elastic layers of nylon are built in between the tread rubber and the cord body. Under impact, these cords work together . . . absorbing and distributing the shock evenly. This special feature is found in all BFG tires of 8 or more plies at no additional cost. They have greater cut resistance because of special tread compounds.

See your local B. F. Goodrich dealer. Let him show you how you can get better service and lower operating overhead for every kind of off-the-road operation. *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

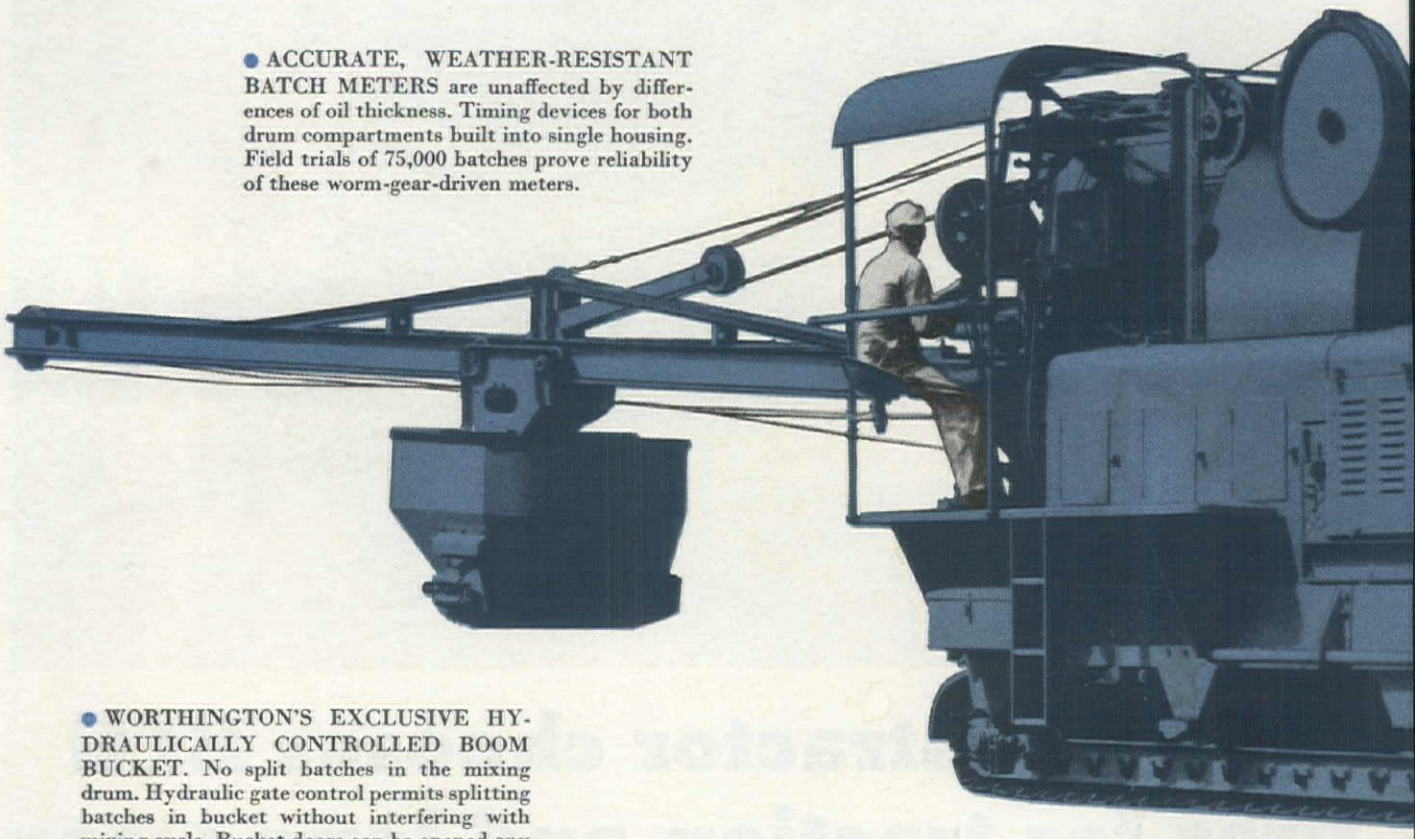
NEW! WORTHINGTON-—built to help you

It had to be built! Today's tight schedules and rigid specifications demand a new, better paver that can do a high-speed job without sacrifice in quality.

And it had to be built by Worthington-Ransome! It took 40 years of Worthington-Ransome paver experience and the unmatched facilities of their integrated engineering staff to make possible this new paver.

● INSTANT, POSITIVE RESPONSE WITH SMOOTH, EFFORTLESS CONTROL. Transfer and discharge chutes, water valves, boom swing, bucket travel and controllable bucket discharge, all easily operated with hydraulic control levers conveniently placed for rapid action.

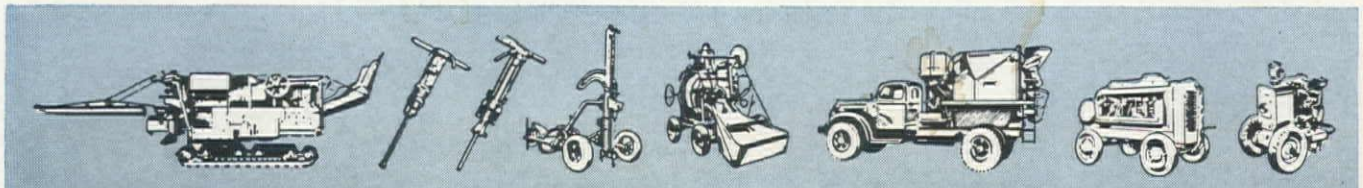
● ACCURATE, WEATHER-RESISTANT BATCH METERS are unaffected by differences of oil thickness. Timing devices for both drum compartments built into single housing. Field trials of 75,000 batches prove reliability of these worm-gear-driven meters.



● WORTHINGTON'S EXCLUSIVE HYDRAULICALLY CONTROLLED BOOM BUCKET. No split batches in the mixing drum. Hydraulic gate control permits splitting batches in bucket without interfering with mixing cycle. Bucket doors can be opened any distance required to regulate flow of concrete. Concrete can be spread across runways up to 25 ft wide while paver operates outside forms.

● RUGGED, RESPONSIVE BOOM-SWING MECHANISM. Mechanism is hydraulically controlled, piston operated, bull-wheel type. Hydraulic cushioning prevents bent booms. No worm gears to break.

● FAST, POSITIVE BOOM RAISING AND LOWERING. Worm-drive mechanism fully enclosed and running in oil; operates only when booming up and booming down.

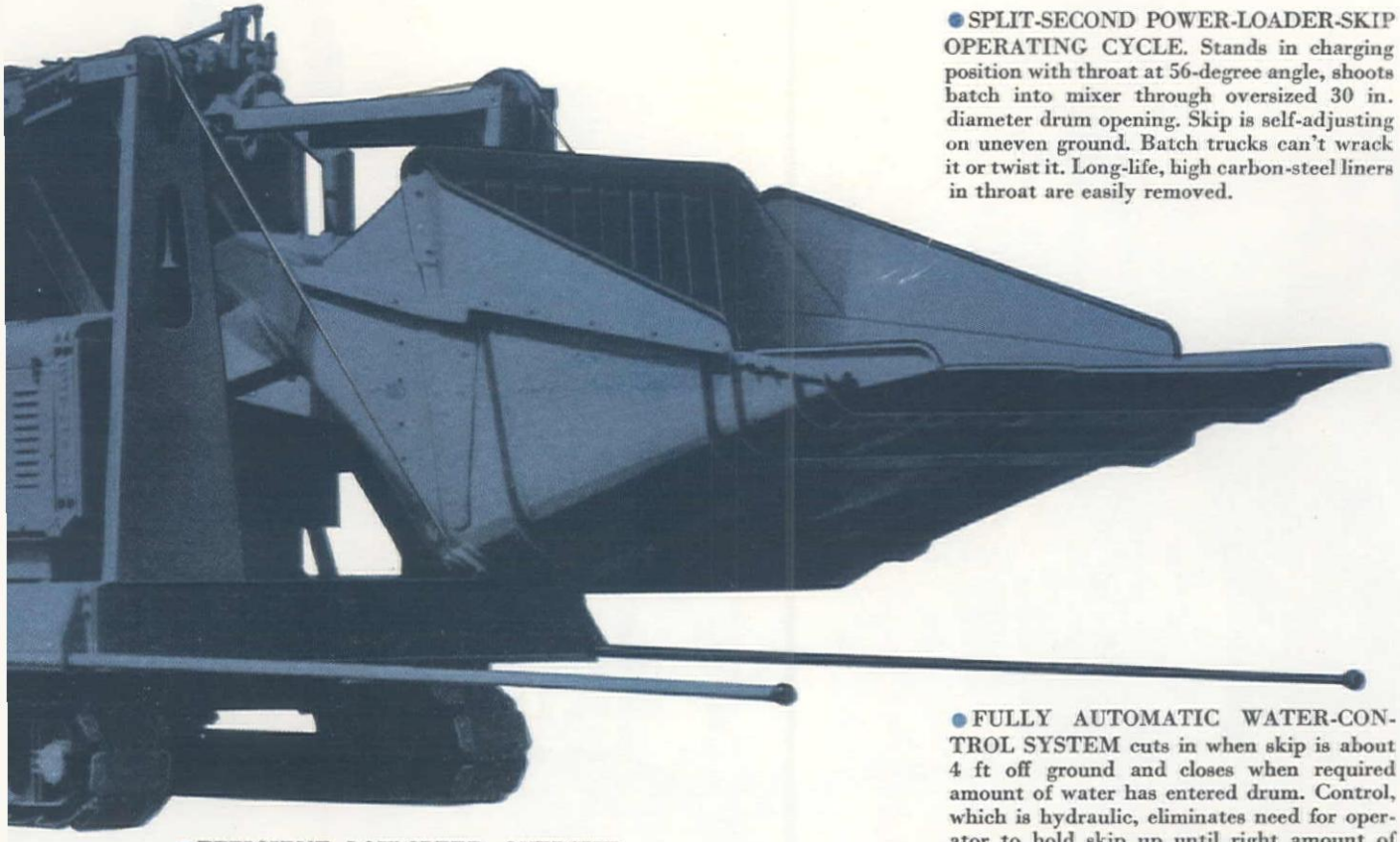


IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

RANSOME PAVER
set paving records

Check these features of this newest paver and see for yourself.

- Power loader skip takes only 6½ seconds from ground to discharge position of 56° on low slope
- Transfer from first compartment to second compartment approximately 6½ seconds, depending upon concrete consistency
- Discharge into boom bucket approximately 6½ seconds, depending on concrete consistency
- Boom bucket travel speed—256 ft per minute
- Hydraulically-controlled boom swing of 171°
- Can swing and spread simultaneously



● SPLIT-SECOND POWER-LOADER-SKIP OPERATING CYCLE. Stands in charging position with throat at 56-degree angle, shoots batch into mixer through oversized 30 in. diameter drum opening. Skip is self-adjusting on uneven ground. Batch trucks can't wrack it or twist it. Long-life, high carbon-steel liners in throat are easily removed.

● FULLY AUTOMATIC WATER-CONTROL SYSTEM cuts in when skip is about 4 ft off ground and closes when required amount of water has entered drum. Control, which is hydraulic, eliminates need for operator to hold skip up until right amount of water is discharged by using an adjustable automatic water cut-off delaying action.

● EFFICIENT, LOW-SPEED, OVERSIZE DIESEL. Cummins HBID-600. Engine speed only 1300 RPM. Experience has shown that this kind of power unit performs better, lasts longer, and costs less to run. Main power take-off speed-reduction unit has cut tooth, helical gears; sealed, self-aligning anti-friction bearings. Sealed, triple-width roller-chain coupling between speed-reduction unit and countershaft.

Get the complete story of this new Worthington-Ransome WP Paver through your Worthington Blue Brute Distributor or by writing direct to Worthington Pump and Machinery Corporation, Construction Equipment Division, Dunellen, N. J.

WORTHINGTON

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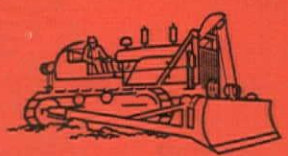
R.I.3

Keep 'em Working

in the big year coming up

MOVES MORE PAYDIRT PER DAY! That's International's Big Red TD-24—the most powerful crawler on the market—the crawler that gives you the fastest work cycle.



Here's help... where and when you need it... with your International Industrial Distributor's ready service and parts departments

Your crawler tractors have to pay off with more work done per day, more days worked per year.

That means speed and power. The ability to stay on the job. Minimum downtime.

And it also means fast maintenance service at your call, when and where you need it.

That's your International Industrial Distributor's service—service that includes

TRAINED "DIESEL DOCTORS"—factory-trained specialists in maintenance and overhaul.

PROMPT FIELD SERVICE at your job site to help keep your equipment working, to get it back to work faster, to cut costly downtime on the spot.

COMPLETE SHOP FACILITIES for major work—you're never far from an International Distributor's shop, no matter where your equipment goes.

QUICK PARTS SUPPLY from your distributor's fully stocked parts department, backed by International Harvester's network of strategically located parts depots (in size and scope, exclusive in the industry).

Isn't this *complete* service a mighty good reason to get International *"Power that Pays"* for the hard-working years ahead?

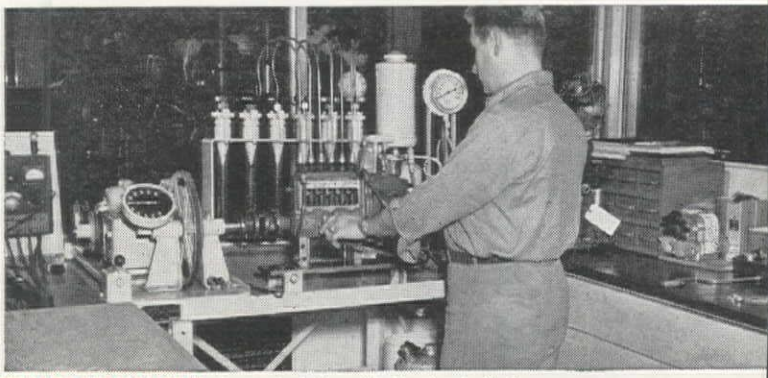
INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

INTERNATIONAL

INTERNATIONAL HARVESTER

POWER THAT PAYS

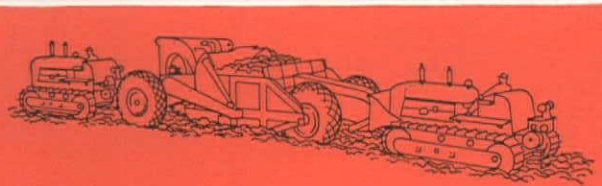
YOU NAME IT— your International Industrial Distributor has it in his big, efficient parts department. And if he hasn't, he can get it fast from his nearby International Parts Depot.

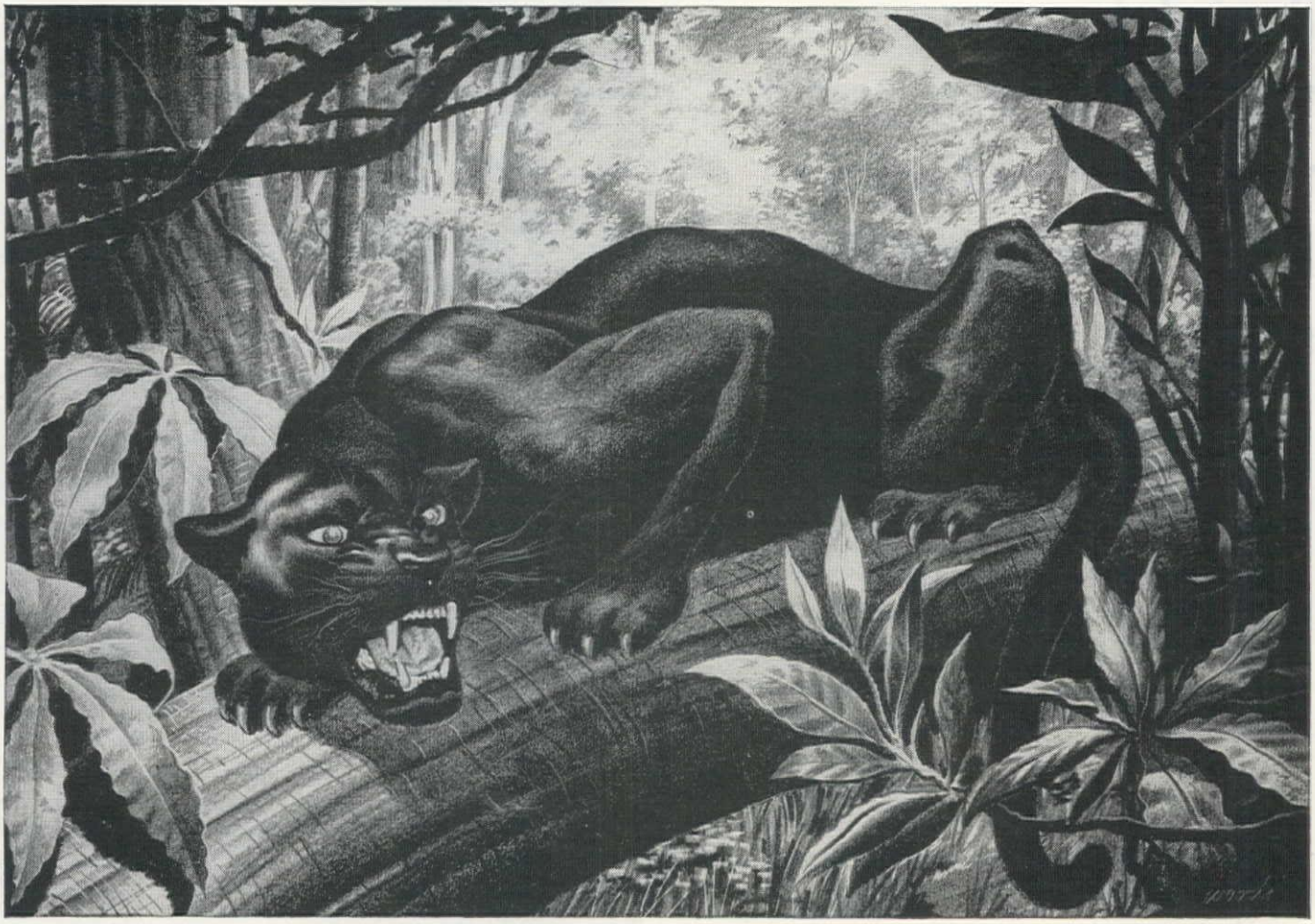


"HEART SPECIALIST!" A crawler's heart is its sturdy fuel pump. It seldom needs attention. When it does, this "diesel doctor" operates with precision instruments in a special dust-free room.

HERE'S HELP WHEN YOU NEED IT. Skilled, experienced mechanics equipped with the right tools for doing major maintenance fast at your International Distributor's shop.

ON THE JOB! Here are an International Distributor's field servicemen, on the job at the job site installing an overhauled transmission. A phone call gets this kind of service.





in WIRE ROPE, too it takes the RIGHT KIND of muscle

The long flat muscles of the black panther give him the spring and suppleness he needs to survive in his particular environment. They're ideal for the job they're called upon to perform.

So, too, with wire rope! Specific jobs call for the right kind of muscle; the right construction and lay of the rope; the right grade of steel and size of wire...to best withstand the destructive forces encountered.

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.

For additional information write or phone our nearest sales office.

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LOOK FOR THE YELLOW TRIANGLE ON THE REEL

WICKWIRE ROPE

CF&I

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

"Cat" DW20s move earth fast on Pennsylvania Turnpike Extension

Two of L. G. DeFelice & Son's "Cat" DW20s and W20 Wagons roll to the fill at 25 mph. with 20-yard loads. This $7,000,000 contract calls for moving 500,000 yards of earth.

L. G. DeFelice & Son, contractors on a 16-mile stretch of the western turnpike extension between Warrendale and Homewood, Pa., use eight "Caterpillar" DW20 Tractors and W20 Wagons for long-haul earthmoving. Handling 20 to 23 pay yards at a load, and making 2½ round trips per hour over a 1¼-mile haul route, the "big rigs" are operating 12 hours a day. That means the eight machines are hitting a daily average of close to 5,000 yards.

DeFelice's master mechanic likes the trouble-free operation of these husky wheel tractors. They outwork competitive equipment. And the fact that they're completely "Caterpillar"-built, including the engines, makes it easy to maintain and service them right along with the four D8s, six No. 12 Motor Graders and three No. 80 Scrapers that round out the "Caterpillar" fleet.

Wherever long, fast hauls call for wheels, the DW20 is making a reputation for big production and over-all economy. Owners who value such equipment take extra-good care of it these days. Proper maintenance will add to its long work life, and regular inspection by the "Caterpillar" service man will prevent down-time for repairs.

Your "Caterpillar" Dealer is the best friend your machines have. Make the most of all he has to offer.

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

CATERPILLAR

REG. U. S. PAT. OFF.

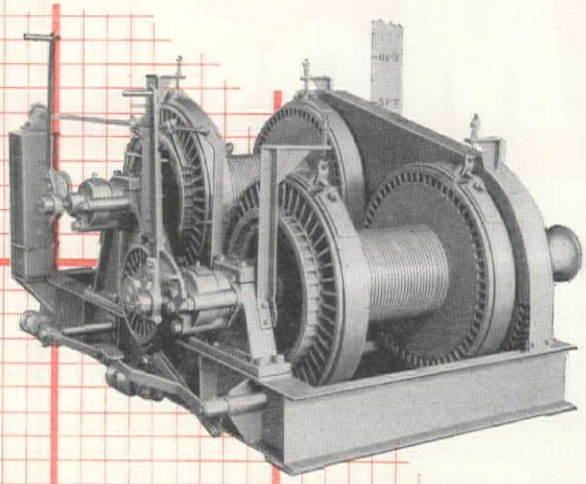
DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

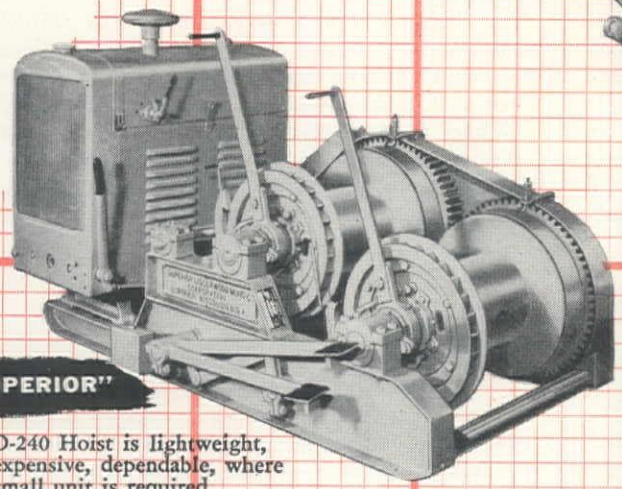
Make light work of heavy loads

with "SUPERIOR" hoisting equipment

"SUPERIOR"

Derrick Hoists—Line pull and speed to suit your needs. Single, double or triple drum—with or without attached swingers. Electric, Gasoline, Diesel or Steam powered.



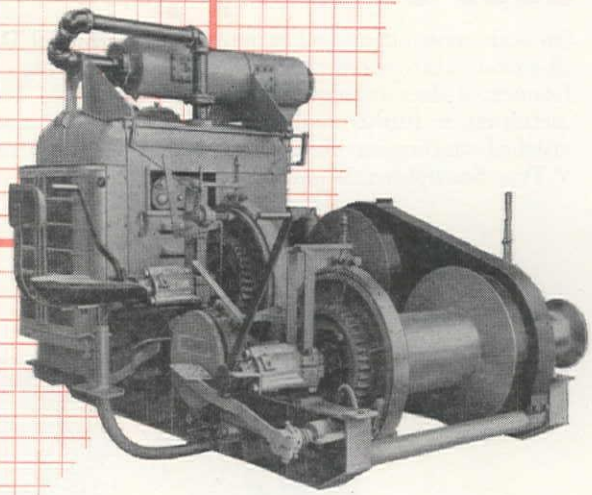


"SUPERIOR"

ND-240 Hoist is lightweight, inexpensive, dependable, where a small unit is required. Duty 5000 lb at 150 fpm.

"SUPERIOR"

Torque Converter Equipped Hoist. Lifts heavy loads and "floats" them into place. 100% speed and load control by single lever. Built in sizes from 75 HP to 150 HP, Gasoline or Diesel power units.



In addition to a complete line of standard hoists we also design and build hoists to meet your special requirements.

"SUPERIOR"

Electric Capstan Carpuller for barge and railroad car moving and spotting. Built in a variety of types and sizes.

Write for Bulletins

OVER 200 YEARS OF ACCUMULATED EXPERIENCE — SUPERIOR 1852 — LIDGERWOOD 1872 — MUNDY 1862

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of all low-cost graders and maintainers

Only the Allis-Chalmers Model D...

has Tandem Drive and other Big Grader features

The Model D is engineered from the ground up *as a motor grader* — with no compromises. It is streamlined and completely functional, without the objectionable features and handicaps of a converted machine.

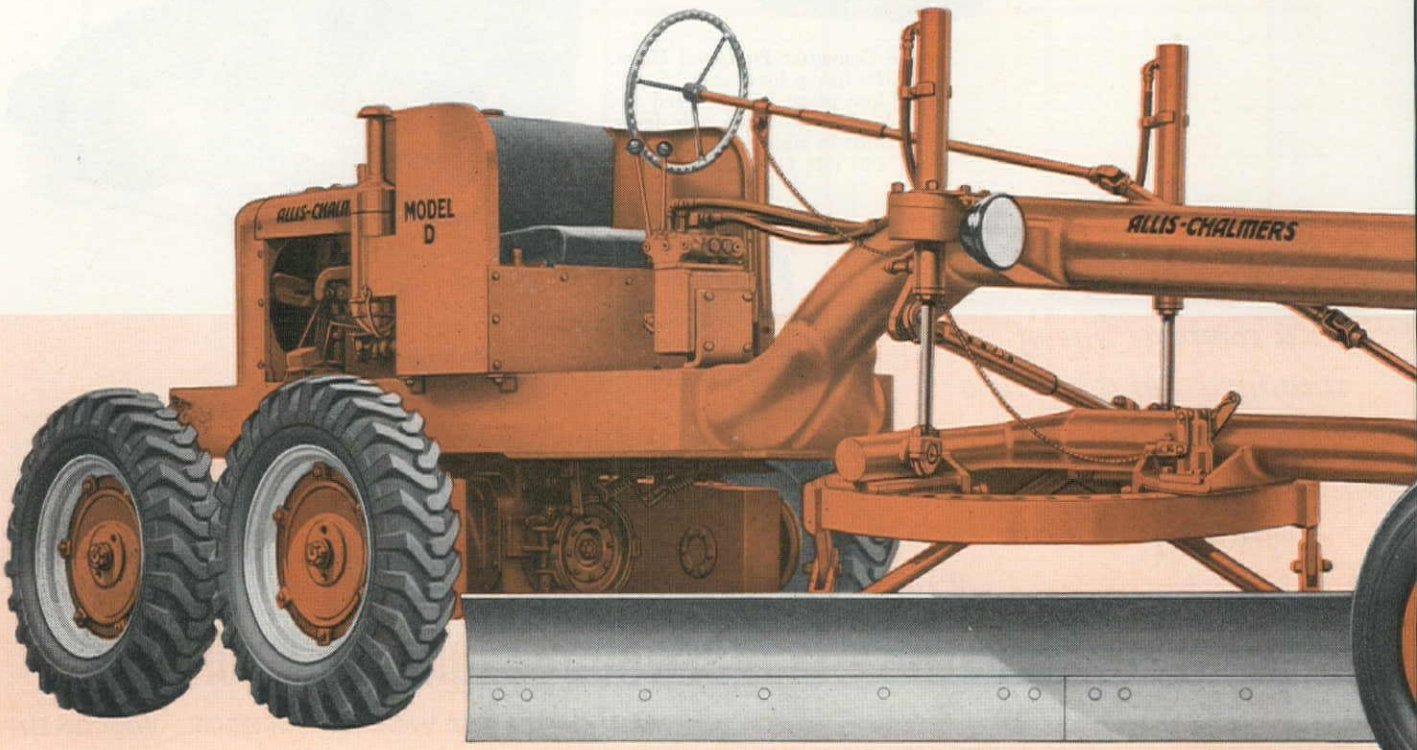
Tandem drive — with four ground-gripping contacts instead of two — gives the Model D greater driving power and stability, smoother blading. Its other BIG GRADER design and performance advantages include: shock-absorbing **Tubular Frame** — **ROLL-AWAY Moldboard** that *rolls* more material, faster and with less power — effort-saving **Hydraulic Controls** — **Engine Over Drive Wheels** for best traction — **More clearance** all the way — **Long Wheel Base** to give a smoother grade — **Simple Power Train** for best performance, easiest servicing — **Fully Visible Blade** for greater efficiency — Comfortable seat, "clean" platform, convenient controls.

ROLL-AWAY is an Allis-Chalmers trade-mark.

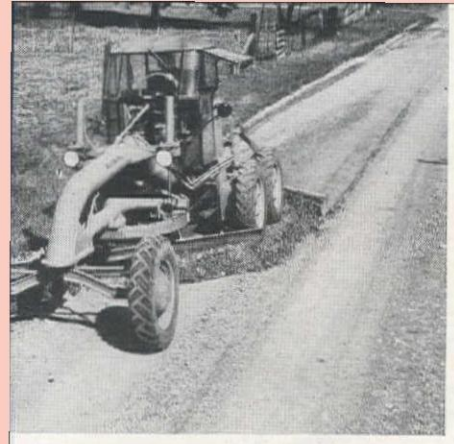
does so many jobs — so well

On both construction and maintenance, the Model D is an all-round, year-round machine. And with its big grader features, it does outstanding work on every job. The D's usefulness is further multiplied by these easily mounted, matched attachments: Rear-End Loader, Scarifier, Blade and V-Type Snowplows, Windrow Eliminator . . . All-View Cab, Heavy-Duty Front Tires, Other Special Accessories.

By performing a wide variety of jobs, the Model D releases larger graders for heavier work — effecting important economies. It operates economically, too — runs all day on a tank of gasoline. — And a price one-third that of large graders, makes the Model D the biggest value of all!



WEIGHT — 8,500 lb. (bare)
BRAKE HP. — 34.7 (famous high-torque A-C gasoline engine)
SPEEDS — four forward, 2.40 to 18.61 mph.; reverse to 2.9.



Maintains roads and streets.
Windrow eliminator feathers out windrow.

Finishes between forms,
levels subgrade, landscapes.

Handles light construction and
terracing, strips sod.

...ts and cleans ditches, builds up shoulders,
slopes banks up to 2:1.

handles ALL jobs for some users

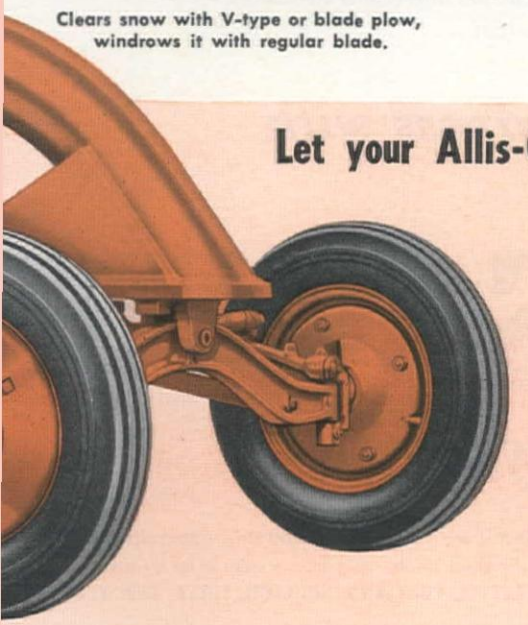
...SOME jobs for all users

Scarifies toughest surfaces,
mixes and spreads oil mix.

Clears snow with V-type or blade plow,
windrows it with regular blade.

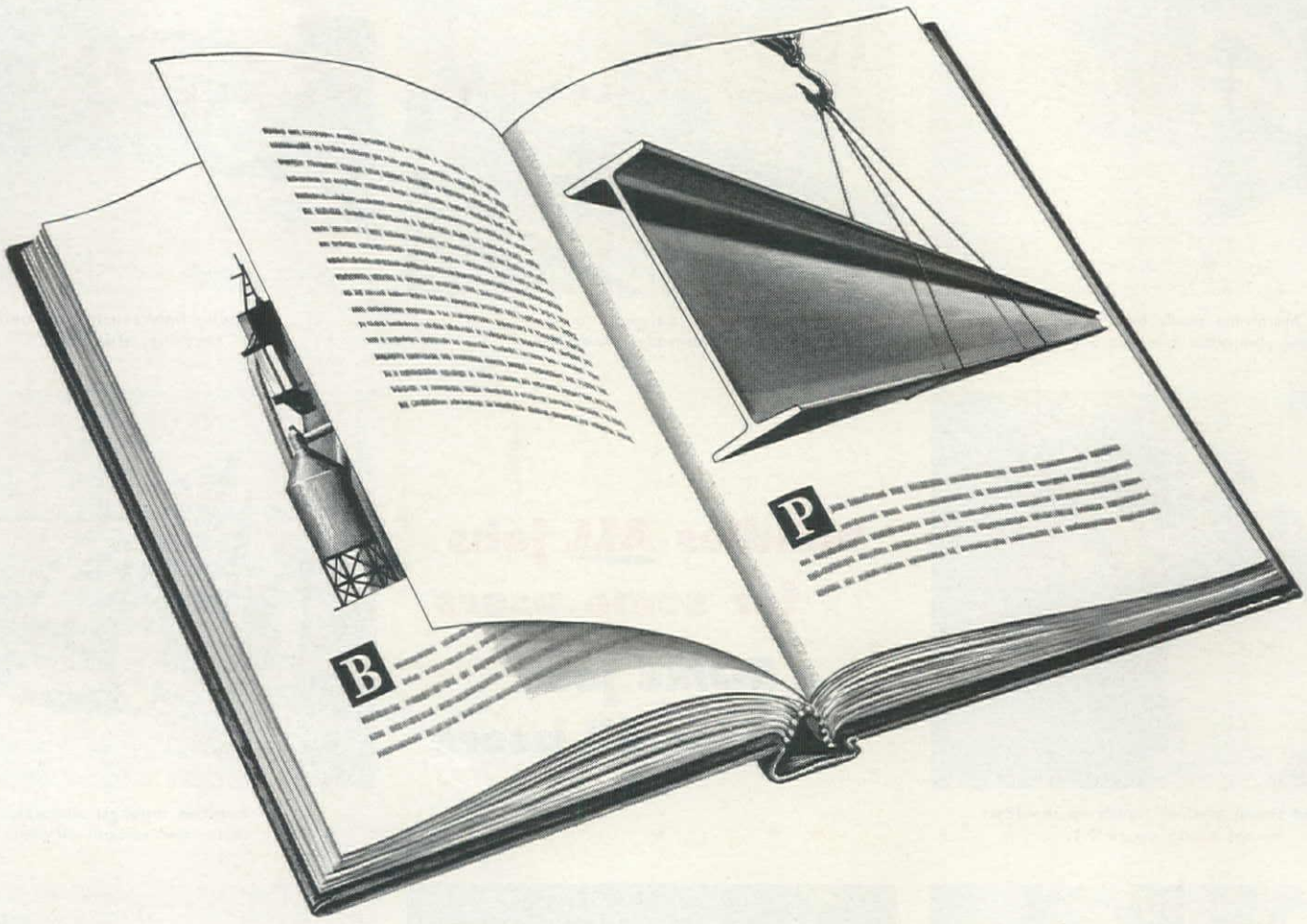
Maintains access roads, park drives,
parking lots, playground areas.

Loads sand, snow, any material.
Cleans up debris.



Let your Allis-Chalmers dealer demonstrate its usefulness to you

ARIZONA: Phoenix—Neil B. McGinnis Equipment Company. **NORTHERN CALIFORNIA: Oakland**—Buran Equipment Company; **Eureka and Willits**—Aikins and Williams Tractor Company; **Modesto**—J. M. Equipment Company; **Fresno**—Food Machinery and Chemical Corp.; **Salinas and King City**—Livingston Bros. Tractor Company; **No. Sacramento, Stockton, Redding**—Moore Equipment Company, Inc.; **Mountain View**—Redwine Tractor Company; **Visalia**—Tulare County Tractor Company. **SOUTHERN CALIFORNIA: Bakersfield** — San Joaquin Tractor Company; **Los Angeles, San Diego and Riverside**—Shaw Sales & Service Company. **IDAHO: Idaho Falls and Boise**—Southern Idaho Equipment Company. **MONTANA: Missoula**—Mountain Tractor Company; **Sidney**—Northland Machinery Company; **Billings**—Seitz Machinery Company, Inc. **NEVADA: Elko**—C. W. Paul Hardware and Machinery; **Reno**—Moore Equipment Company, Inc. **OREGON: Eugene, Roseburg and North Bend**—Farm and Industrial Equipment Company; **The Dalles**—Dielschneider Equip. Oreg. Ltd.; **Medford**—Tractor Sales and Service, Inc.; **Klamath Falls**—West Hitchcock Corp.; **Portland**—Wood Tractor Company. **UTAH: Salt Lake City**—Cate Equipment Company, Inc. **WASHINGTON: Seattle, Tacoma and Wenatchee**—A. H. Cox Company; **Spokane**—American Machine Company. **WYOMING: Casper**—Studer Tractor & Equipment Co.



Another chapter in the West's growth

Production of Wide Flange Beams by Kaiser Steel—first ever produced west of the Mississippi—not only helps meet critical defense needs, it provides a new source of supply for western builders.

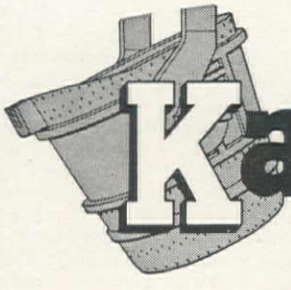
These Kaiser Wide Flange Beams are stronger than other beams of a similar type because they are larger in sectional area. Yet they are readily interchangeable in all normal structures with beams produced by other mills.

Two sizes produced in each group from 8 to 16 inches.

The addition of Wide Flange sections to the standard shapes produced by Kaiser Steel widens the extensive line of popular structurals which can be efficiently employed in the design and construction of modern structures.

More evidence that . . .

It's good business to do business with

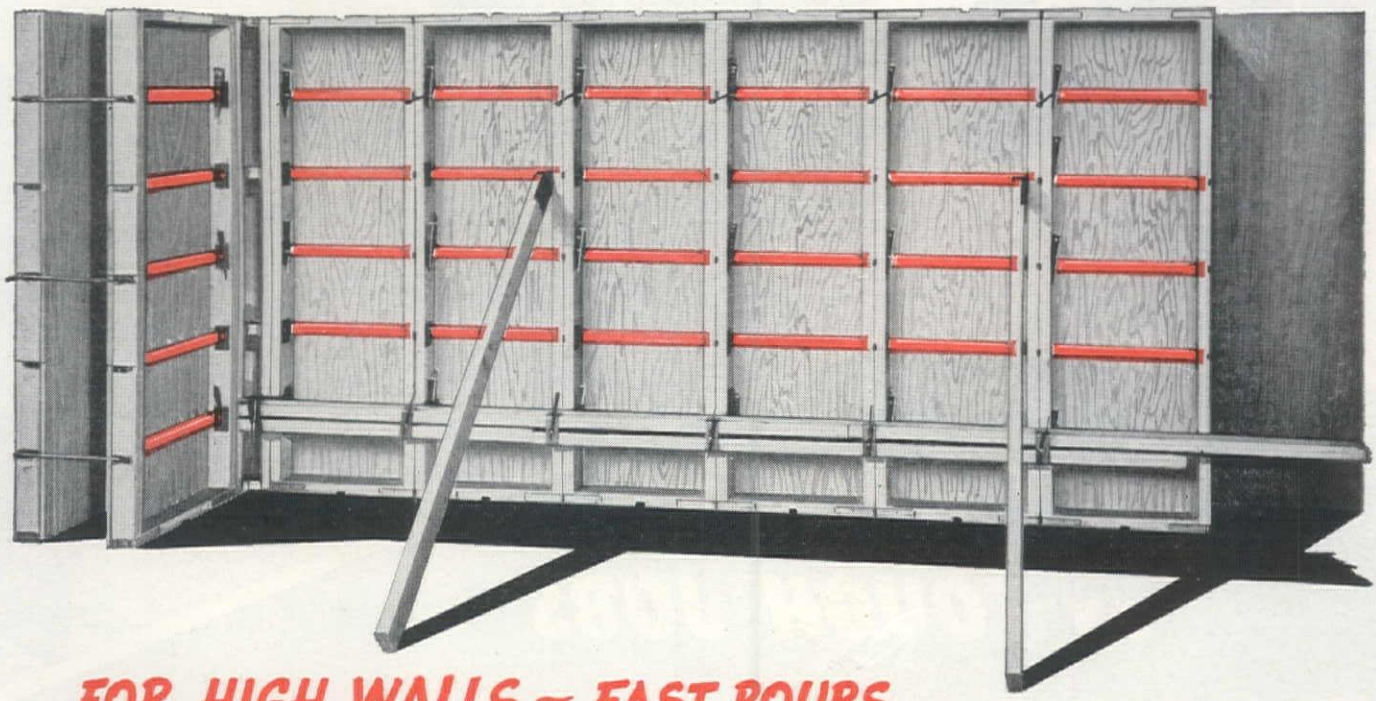


Kaiser Steel

built to serve the West

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

SYMONS FORMS with STEEL RIBS



FOR HIGH WALLS — FAST POURS

For pouring concrete walls with pressures of 650 to 1500 pounds per square foot, we recommend Symons ¾" Plywood Forms reinforced with steel ribs every 12". These heavy-duty forms allow the use of additional ties where the pressure is greatest.

Strength is combined with speed. Setting-up and stripping are finished in half the time due to the Symons Forming System of securing forms and ties in one operation. The life of the forms is increased many times due to reinforcement of vital parts. The forms are adaptable for all types of jobs. Being modular, the forms may be combined vertically and horizontally for any height.

Weight of forms averages five pounds per square foot allowing one man to easily carry any panel.

The Symons Clamp & Manufacturing Company will prepare a form layout for your next job without charge—Send in your plans.

Forms may be rented with rentals applying on the selling price.

Sears Roebuck Store, Chicago, Illinois
James Stewart Corporation, General Contractor
Gateway Engineering Co., Concrete Contractor

Symons

CLAMP and MFG. COMPANY

4295 West Diversey Avenue · Chicago 39, Illinois

Please send me the items checked:

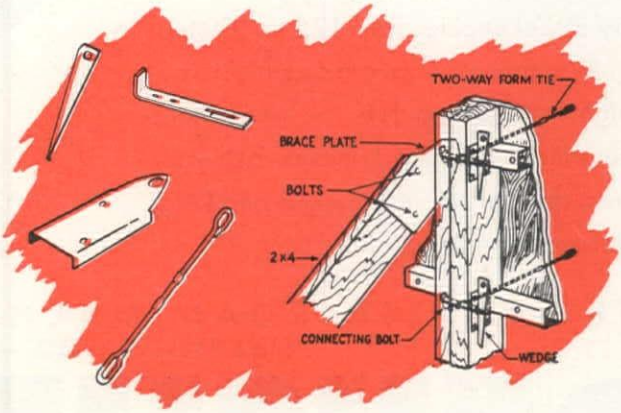
☐ Information regarding Symons Panel Forms

☐ Information regarding Column Clamps, Shores, Bar Ties

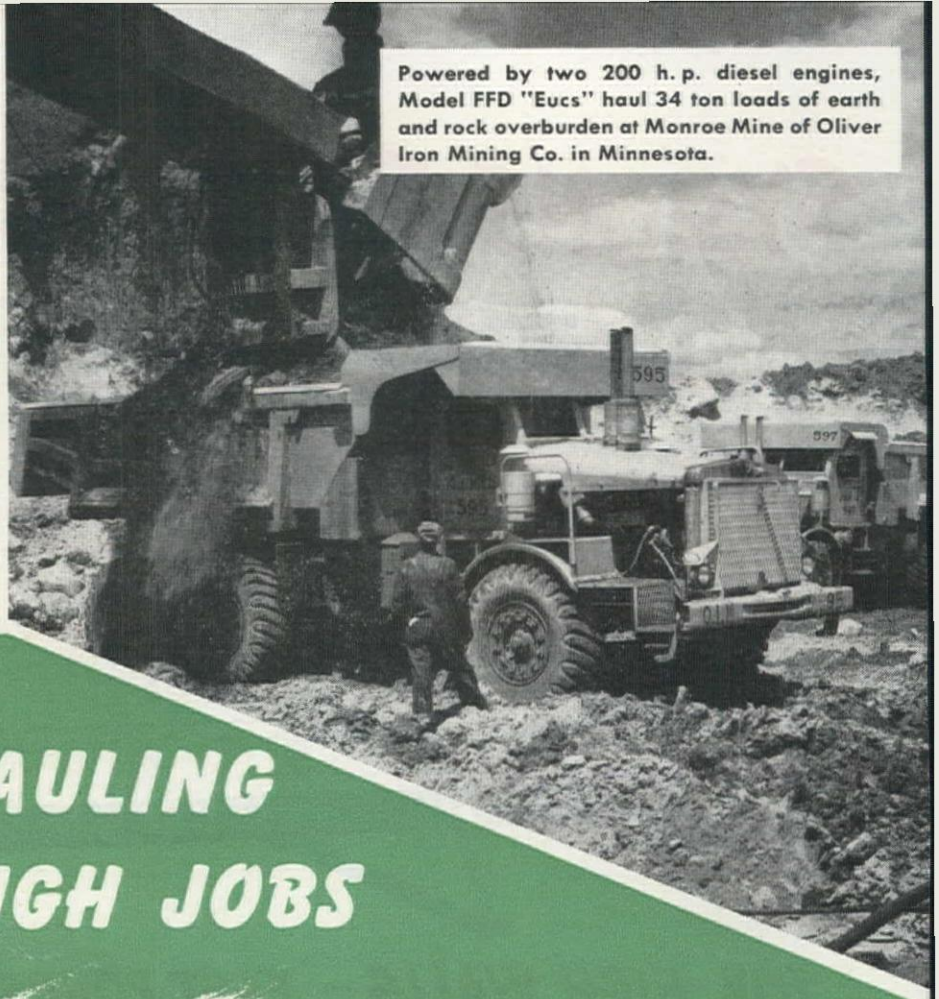
Name_____

Address_____

City_____ Zone____ State_____



"EUCS" for



Powered by two 200 h. p. diesel engines, Model FFD "Eucs" haul 34 ton loads of earth and rock overburden at Monroe Mine of Oliver Iron Mining Co. in Minnesota.

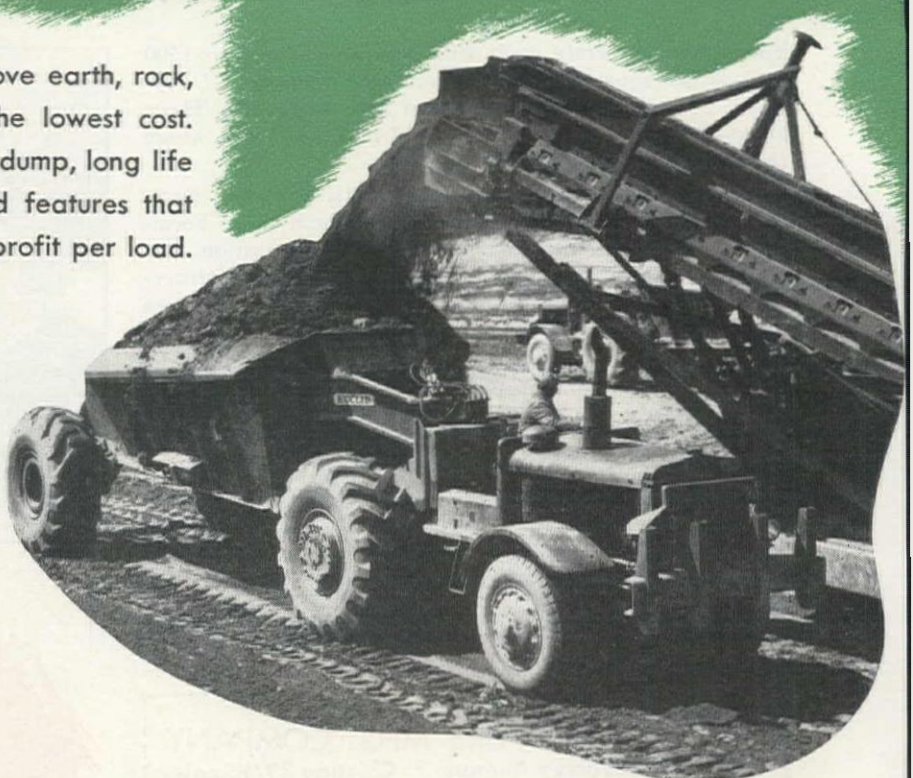
LOW COST HAULING ON TOUGH JOBS

Euclids are designed and built to move earth, rock, coal, ore and heavy excavation at the lowest cost. Large capacity, speed on the haul and dump, long life in heavy duty service, these are Euclid features that assure more loads per hour and more profit per load.

They haul big loads! Bottom-Dump Euclids have capacities of 13 to 25 cu. yds., Rear-Dump "Eucs" from 10 to 34 tons.

"Eucs" are fast! Top loaded speed of the Bottom-Dump is 34.4 m.p.h. Rear Dumps travel up to 36.3 m.p.h. with full payloads. They're powered by diesel engines from 125 to 400 h.p.

Whether you have a tough off-the-highway hauling job, or one where conditions are good, Euclids are your best bet for low cost hauling and long, dependable service.



A Bottom-Dump receives a heaped load of about 18 cu. yds. from a Euclid Loader during construction of an access road to a Hydrogen Bomb Plant site in South Carolina. Contractor: R. B. Potashnick.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

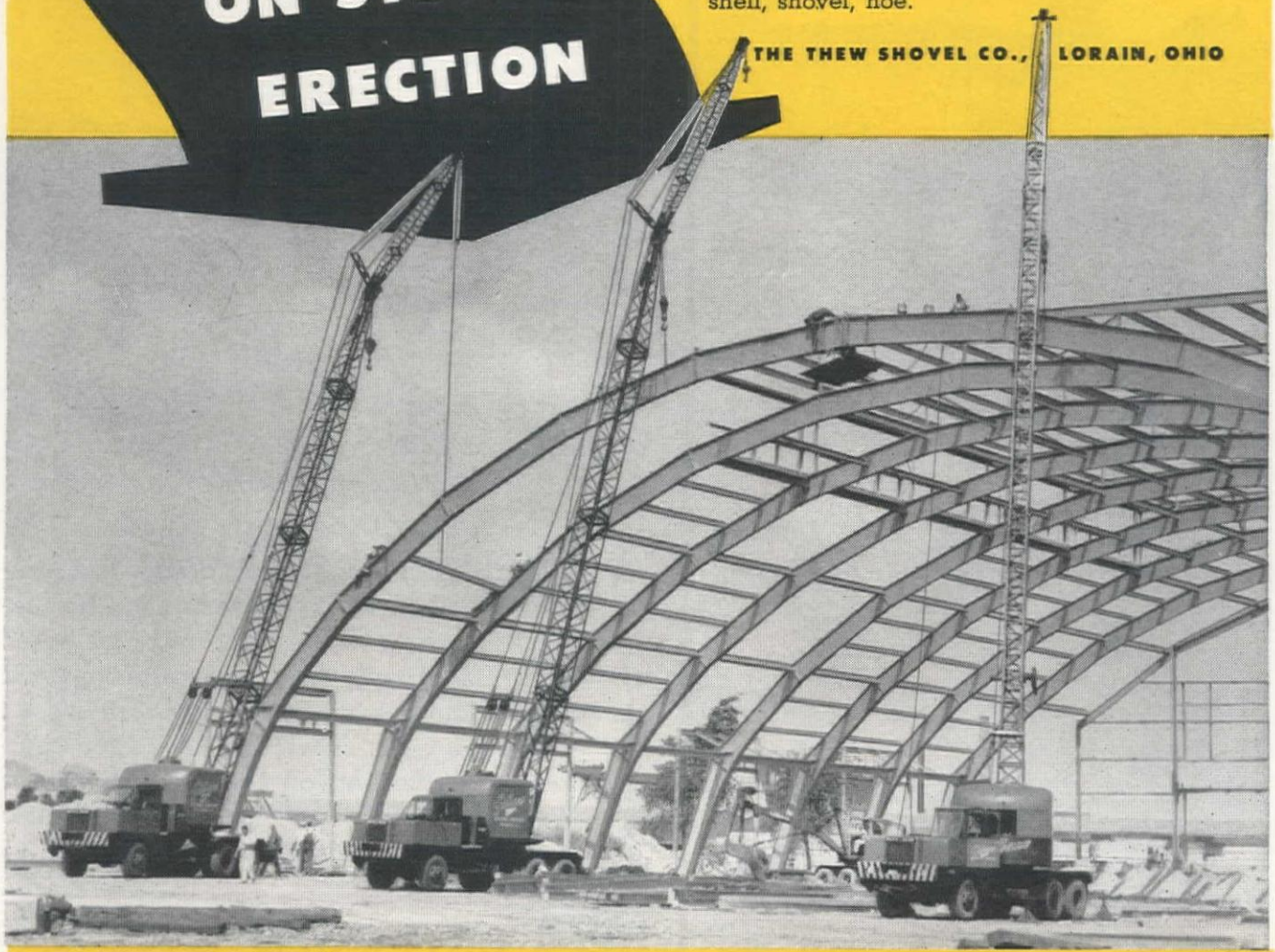
CABLE ADDRESS: YUKLID — CODE: BENTLEY

EUCLIDS *Move the Earth*

LORAIN MC-504W PACESETTER ON STEEL ERECTION

■ Here's steel erection at its best! Smooth . . . accurate . . . fast . . . maneuverable! And you get them all with a Lorain 25-ton Moto-Crane, Model MC-504W. *Smooth* — because of throttle control of load made possible by the hydraulic coupling power take-off. No jerks, no jolts, no slam-bang. *Accurate* — pin-point precision with infinite range of raising and lowering speeds. *Fast* — big, 220 H.P. carrier engine moves special Thew-designed, Thew-built carrier quickly to cover lots of territory, through 10 travel speeds up to 30 M.P.H. *Maneuverable* — with the power, tractive effort and rubber-tire "flotation" for covering the job from start to finish — unloading, distributing, erecting. Fully convertible from crane to dragline, clamshell, shovel, hoe.

THE THEW SHOVEL CO., LORAIN, OHIO



GET THE MC-504W STORY FROM YOUR THEW LORAIN DISTRIBUTOR

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BID INTO PROFITS

With The

BUCYRUS-ERIE

51-B

Here a 51-B shovel, owned by DeLillo Construction Co., Woodside, L. I., excavates apartment cellars in Kew Gardens.

Digging fill for R. R. grade crossing elimination at Rockville Center is the job for this 51-B dragline owned by Hendrickson Bros., Valley Stream.

WHETHER on shovel, crane, dragline or clamshell assignments, the capacity, power, durability, and "full-feel" controls of this 2-yd. excavator pay off handsomely in output . . . in economy . . . in dependable service. Ask us for complete information on the 51-B and other gasoline, diesel and single-motor electric excavators in the Bucyrus-Erie ⅜ to 4-yard line.

264E51

SEE YOUR BUCYRUS ERIE DISTRIBUTOR

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EXC-4

SHOVELS • DRAGSHOVELS • DRAGLINES • CLAMSHELLS • CRANES

Announcing

THE V. A. O. BLASTING METER

manufactured by Roller-Smith Company, Bethlehem, Pennsylvania

A combination voltmeter, ammeter, and blasting galvanometer for practical field use

The V. A. O. (volts-amperes-ohms) Blasting Meter, embodying design features suggested by Hercules explosives engineers, marks a major development in the field of blasting instruments. Important features of the V. A. O. Blasting Meter are:

1. It contains the necessary electrical components, adjusted to specific ranges, for checking stray currents and voltages around blasting operations.
2. It is equipped with a rectifier and, therefore, can be used for detecting either alternating or direct current and voltages.
3. It can be used as a blasting galvanometer for checking the circuit of individual electric detonators or detonators connected in series.

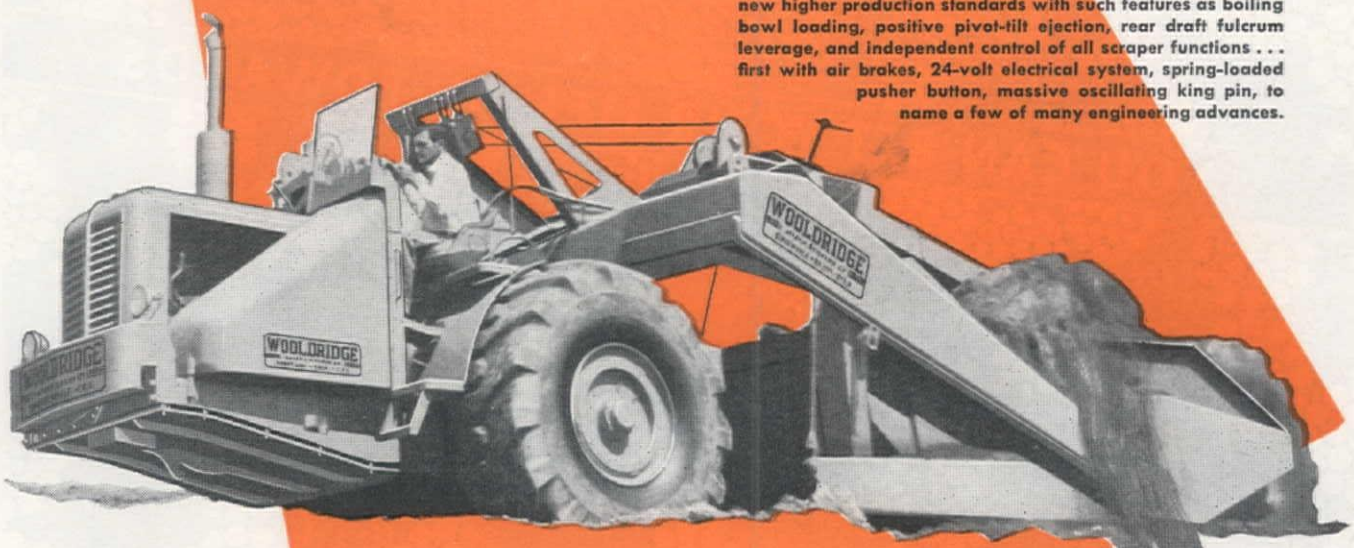
See booklet, which will be furnished on request, describing the V. A. O. Blasting Meter and giving instructions regarding its use. This instrument is now available through Hercules representatives.

HERCULES POWDER COMPANY INCORPORATED *Explosives Department, 973 Market Street, Wilmington, Delaware*

YR52

First* in the Field and still the Best

*In self-propelled scrapers, Wooldridge was first to introduce positive hydraulic steering and air-operated power unit with fingertip remote controls—achieving new speed and ease of operation and eliminating jack-knifing hazards . . . first to set new higher production standards with such features as boiling bowl loading, positive pivot-tilt ejection, rear draft fulcrum leverage, and independent control of all scraper functions . . . first with air brakes, 24-volt electrical system, spring-loaded pusher button, massive oscillating king pin, to name a few of many engineering advances.



Since the first Terra Cobra revolutionized earthmoving practices through introduction of entirely new design principles, each year has brought new Wooldridge engineering improvements. Pioneering developments, the result of long specialized job study and experience, have been incorporated to bring greater owner satisfaction and lower hauling costs. That's why the new TC-S142 Terra Cobra is today the ruggedest, simplest, easiest to maintain, most productive machine in the field. Watch its faster loading and dumping, get the operator's story on its easy handling, compare its true pay load capacity, and check its low down time records. We think you'll rate the Terra Cobra best in the field—by far! Why not get all the facts today from your Wooldridge Distributor.

WOOLDRIDGE TERRA COBRA

model TC-S142

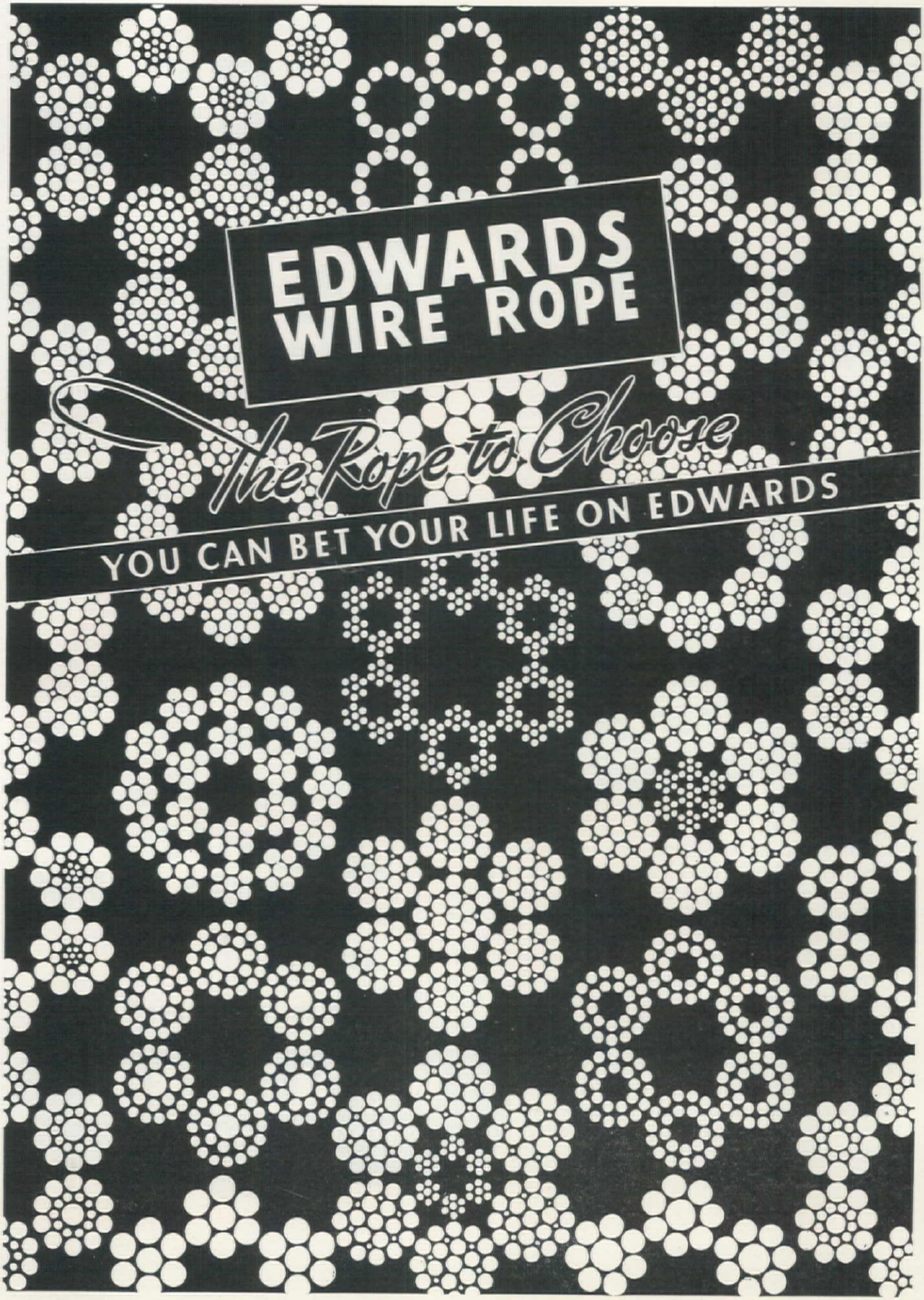
17.5 cu. yds. heaped

WOOLDRIDGE

WOOLDRIDGE MANUFACTURING COMPANY

Sunnyvale, California • 5345 N. Winthrop Ave., Chicago 40, Ill.

BUILT FOR MORE PRODUCTION PER HOUR—MORE HOURS OF PRODUCTION



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IT CAN BE DONE!

...with faster drilling CARSET JACKBITS

Because they are tipped with Carboloy inserts—one of the hardest metallic substances known to man—Carset Jackbits drill the hardest rock with a *speed* and *efficiency* which cannot be approached by the finest steel bits.

For instance, Carset Jackbits drill 50% faster—last from 50 to 400 times longer—practically eliminate bit changes and double the life of drill steel. They eliminate tapered holes saving up to 30% on dynamite—permit longer steels and feeds—require much less maintenance—and boost tonnage as much as 50% or more.

These advantages all add up to a tremendous increase in footage per shift—*without increasing your drilling crews*. Remember Ingersoll-Rand offers a complete line of equipment and service for rock drilling. Take advantage of our highly trained and skilled personnel. There is an Ingersoll-Rand branch office and distributor near you. Write or call today.

CARSET JACKBIT

SET WITH CARBOLOY INSERTS

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ROCK DRILLS • COMPRESSORS • AIR TOOLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL & GAS ENGINES

LET REPUBLIC SUPPLY YOUR INDUSTRIAL NEEDS!

We said (to the customer on the other end of the phone): "Where are you located?" *He said:* "In the Pacific, about five fathoms deep." *We said:* "We'll send a man right down." *The moral:* Let Republic Supply your industrial needs.

Come diving bell or high water—wherever you are, whatever you do, you'll do better with Republic Supply's friendly, helpful service.

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Pipe, valves and fittings • abrasives • shop supplies and tools • rigging materials • mechanical rubber goods • machinery • oil field supplies

ONE TRAXCAVATOR®

The T4 TRAXCAVATOR, at right, went to work for Pennsylvania Supply Co., Harrisburg, Pa., in 1939. The machine did its work well, handling many tasks on the company's building contracts. Its performance — and profits — topped all expectations. For ten busy years the T4 took care of grading, loading and stockpiling. Increased business then required a second tractor-shovel.

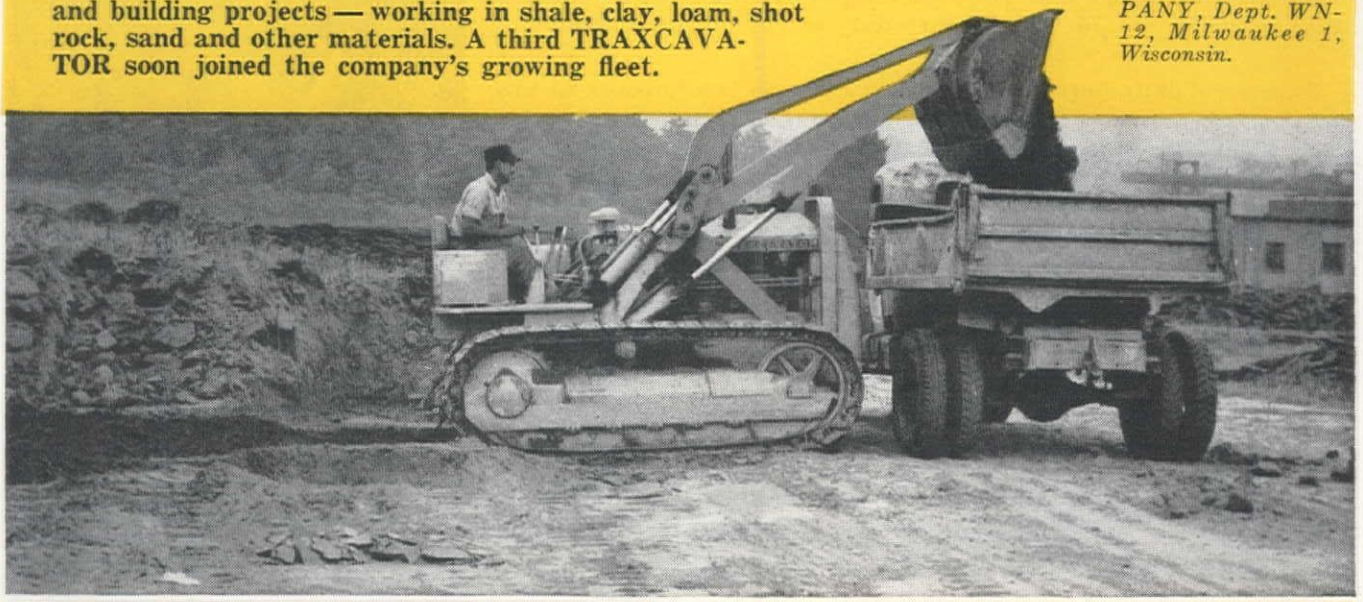
SELLS ANOTHER

The record of the original T4 made another TRAXCAVATOR the choice. Pennsylvania Supply Co. was sold on the TRAXCAVATOR'S ability to stand-up . . . to do all types of construction work — digging, loading, spreading, backfilling, 'dozing . . . to work at low cost. A new HT4, hydraulically-controlled TRAXCAVATOR was bought to assist the old T4.

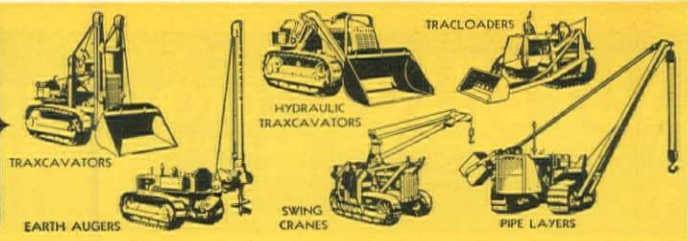
AND STILL ANOTHER!

The two TRAXCAVATORS handled tough jobs on highway and building projects — working in shale, clay, loam, shot rock, sand and other materials. A third TRAXCAVATOR soon joined the company's growing fleet.

You, too, will be sold on TRAXCAVATOR performance and profits. Ask your TRACKSON - "Caterpillar" Dealer to show you one at work . . . or write TRACKSON COMPANY, Dept. WN-12, Milwaukee 1, Wisconsin.



TRACKSON
TRACTOR EQUIPMENT



SUPERIOR

CONTINUOUS THREADED COIL RODS . . .

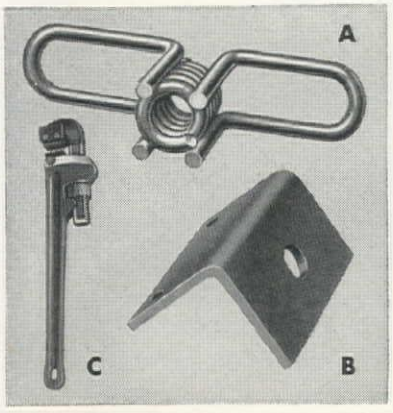
. . . MAKES DIFFICULT TYING JOBS *Easy* . . . . .

Superior Continuous Threaded Coil Rods, with or without Coil Wing Nuts and Corner Brackets, are a valuable supplement to Superior Coil Ties and standard working parts when job conditions are unusual or difficult.

In three typical applications, shown at the right, these Continuous Threaded Rods are used; (1) to tie form corners; (2) as an anchor rod tie down and as coil bolts; and (3) as a coupling for two coil ties providing an adjustable form tie.

Available in ½", ¾", and 1" diameters and in any length up to 10 ft., Superior Continuous Threaded Coil Rods in quantities can be cut to length on the job with a heavy-duty hand Coil Rod Cutter.

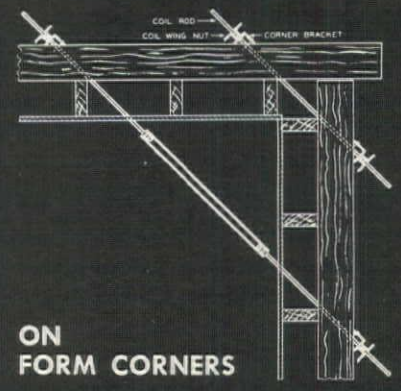
Superior Continuous Threaded Coil Rods are the answer to unusual or difficult tying problems. When you use Superior you are assured of the *best* in design, material, and workmanship.



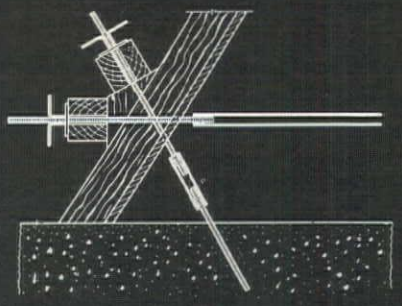
A-COIL WING NUTS
Coarse helix coils form the threads. Easily applied and removed from rod. Develops maximum capacity of rods.

B-CORNER BRACKET
An *exclusive* Superior feature. Provides simple, efficient method of tying form corners and bulkheads.

C-SPECIAL COIL ROD WRENCH
Heavy-duty Stillson type wrench with special jaws for gripping and turning Coil Rods with least damage to threads.



ON FORM CORNERS



FOR ANCHORAGE

AS AN INTERNAL TIE
Two Coil Ties and a length of Coil Rod make an adjustable form tie and spreader.

SUPERIOR CONCRETE ACCESSORIES, INC.
4110 Wrightwood Avenue, Chicago 39, Illinois
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REQUEST A COPY OF OUR NEW CATALOG 500 . . .
It contains a valuable table for spacing studs, wales, and form ties.

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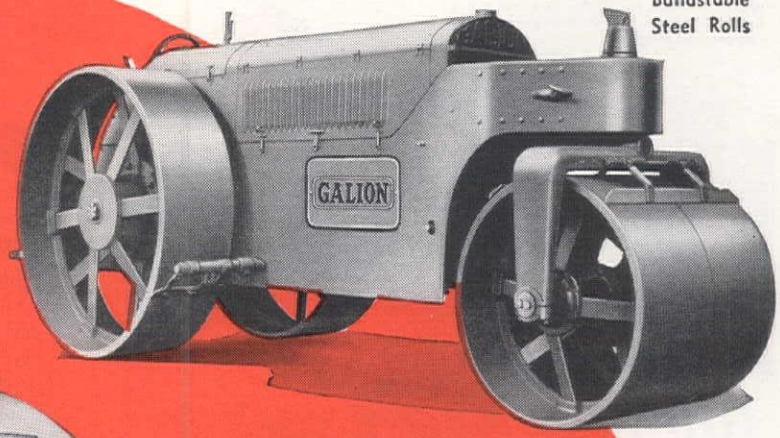
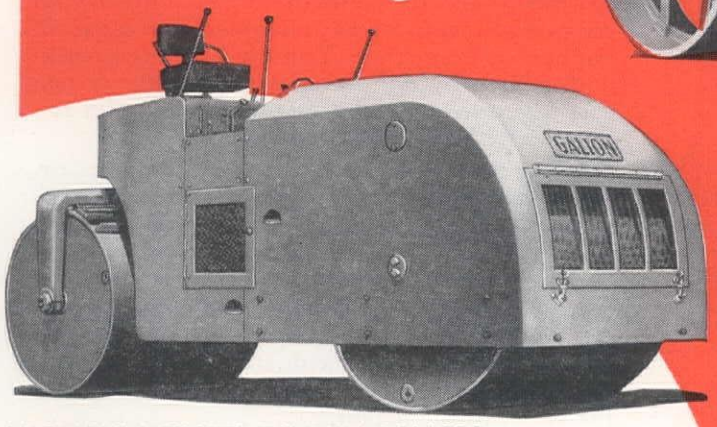
THREE-WHEEL ROLLERS
6, 7, 8, 10 and 12 Ton Sizes

With Cast or Variable Weight Ballastable Steel Rolls





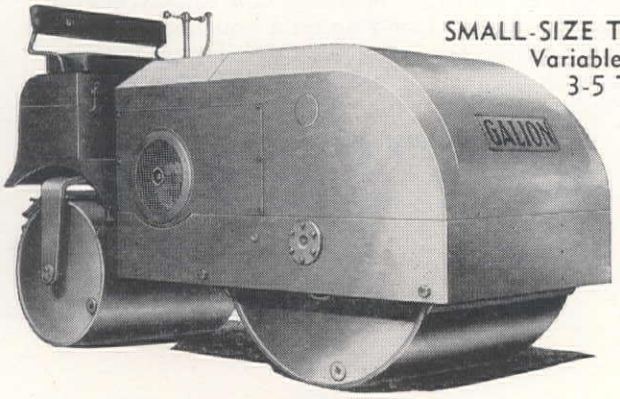
VARIABLE WEIGHT TANDEM ROLLERS
5-8, 8-12, and 10-14 Ton Sizes

and

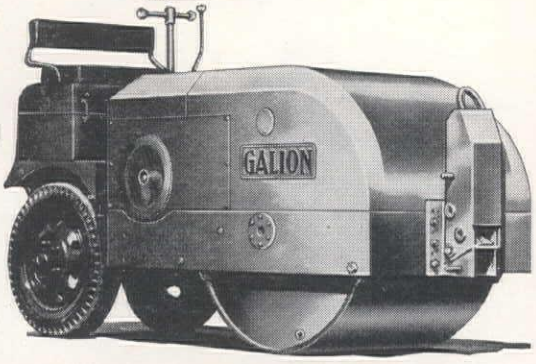
MORE-

CONTRACTORS, HIGHWAY and STREET DEPTS. ARE USING GALION ROLLERS

SMALL-SIZE TANDEM
Variable Weight
3-5 Ton Size



PORTABLE ROLLERS
Variable Weight
7100 to
9765 lbs.



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

Equip for ANY POURING JOB!

WALLS

Your Standard MultiFoote HighLift Boom will pour up to 23 ft. (we have built booms up to 59 ft.). Do away with crane, ramps and stages.

FOOTINGS

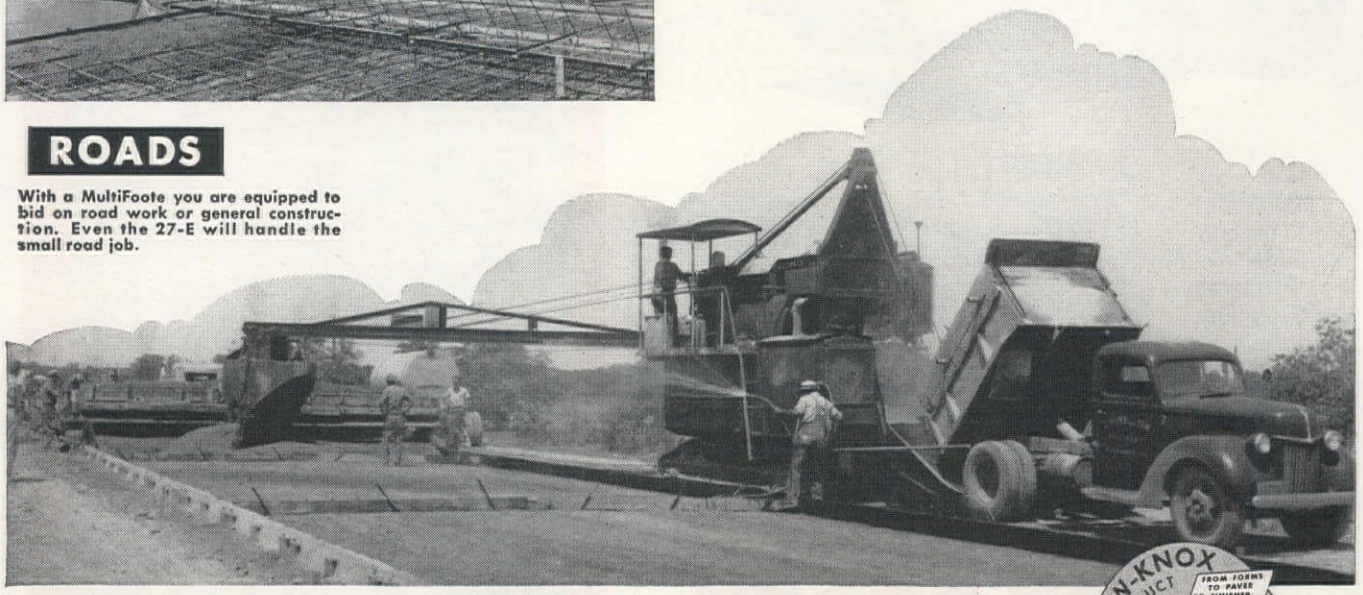
Crawlers take the MultiFoote where wheels would need matts, between footings and over the rough going of the usual construction job.

FLOORS

The MultiFoote works with either a flat boom or HighLift without rereeving cable. Plenty of clearance under the bucket. Big bucket capacity.

ROADS

With a MultiFoote you are equipped to bid on road work or general construction. Even the 27-E will handle the small road job.



THE MultiFoote brings you *paver speed* to *all* your concrete pouring jobs. Paver mixing gives you mixing control! With the HighLift Boom you can pour direct to forms or buggies. You can feed hoppers or Pumpcrete. You can load high truck bodies. The HighLift Boom eliminates the crane, cuts waste, reduces the number of buggies required and frees labor for other work.

Lower the boom and you are ready for floors, or on housing work you can pour walls, walks and curbs, practically in one operation. Crawler traction takes you over "rough going" for pouring footings or retaining walls.

And, there is a size MultiFoote for any job. If the 27-E, with its 50 batches isn't big enough, there is the 34-E Single with 50 batches (34 cu. ft. to the batch), or the DuoMix with 86 batches (34 cu. ft. to the batch).

They're fast. Big, open-end skip takes the batch truck without bumping; big buckets with ample clearance beneath them. Easy control, fast charge and discharge. Don't figure a pouring job without finding out what the MultiFoote will do. Get *all* the facts! Don't be misled by theoretical capacities.

THE FOOTE COMPANY, INC.

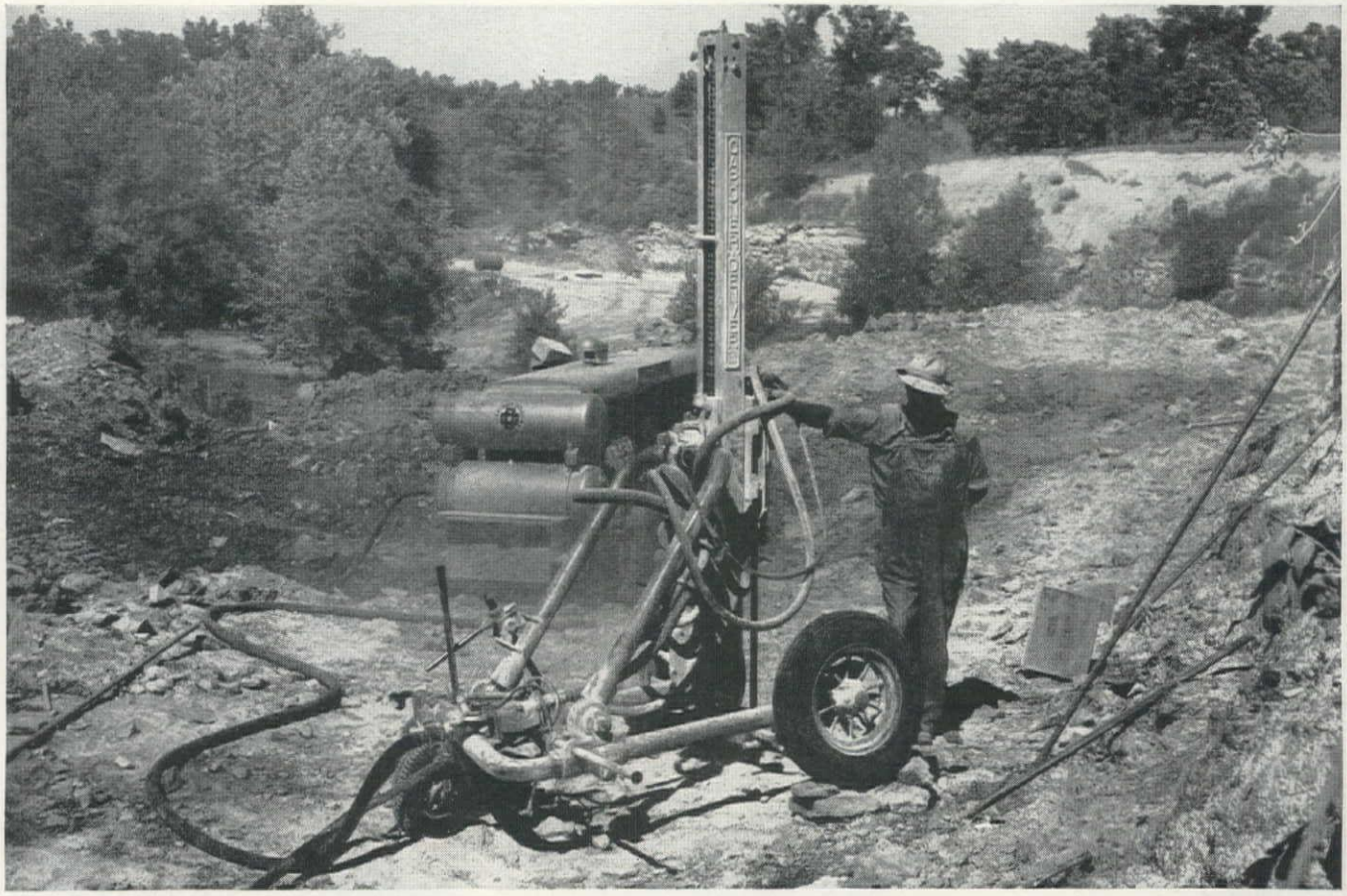
Subsidiary of Blaw-Knox Co.

1940 State Street • Nunda, New York

MULTIFOOTE HIGH LIFT TRADE MARK BOOM

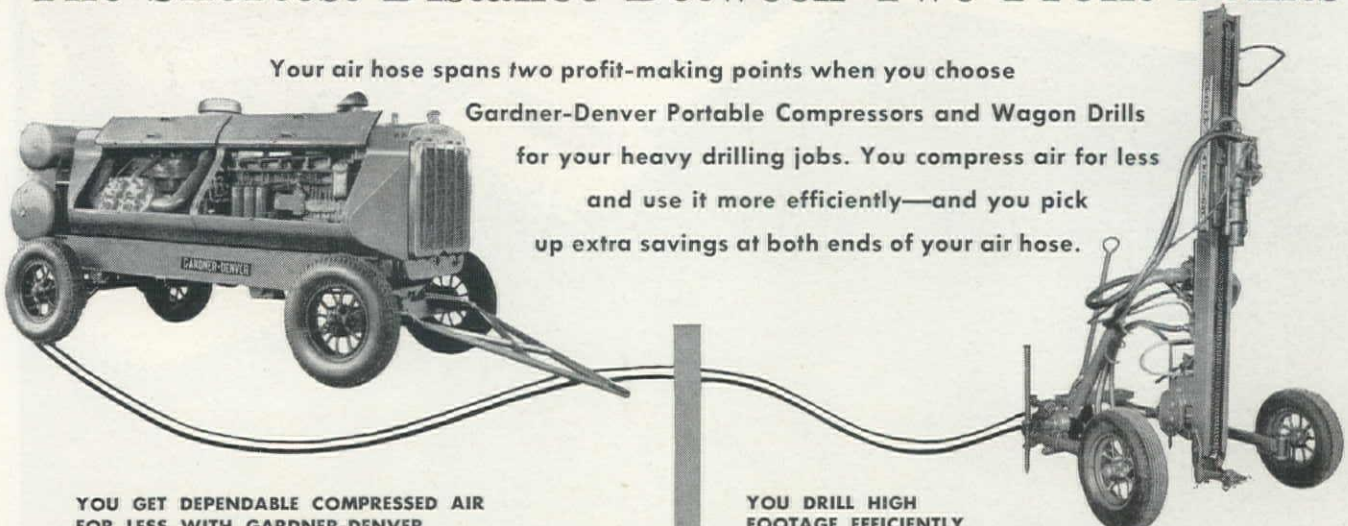
A BLAW-KNOX PRODUCT — FROM FORMS TO PAVER TO FINISHER... ALL YOUR PAVING EQUIPMENT — IN ONE PACKAGE from BLAW-KNOX

FOR EVERY PLACE CONCRETE MUST BE POURED



The Shortest Distance Between Two Profit Points

Your air hose spans *two* profit-making points when you choose Gardner-Denver Portable Compressors and Wagon Drills for your heavy drilling jobs. You compress air for less and use it more efficiently—and you pick up extra savings at both ends of your air hose.



YOU GET DEPENDABLE COMPRESSED AIR FOR LESS WITH GARDNER-DENVER WATER-COOLED PORTABLES

- Fully water-cooled compressor cylinders assure proper lubrication in cold weather—cooler operation in hot weather.
- Two-stage compression delivers full capacity at any altitude.
- High efficiency air cleaners protect against wear.
- Deep oil sumps in engine and compressor provide positive lubrication on hills.

YOU DRILL HIGH FOOTAGE EFFICIENTLY WITH GARDNER-DENVER WAGON DRILLS

- Very flexible — easily adjusted for faster hole spotting.
- Handy controls enable the operator to drill more efficiently.
- Powerful automatic blowing keeps the deepest holes clean—encourages more frequent cleaning for faster drilling.
- Long steel changes reduce steel handling time.
- Write for further information.

SINCE 1859

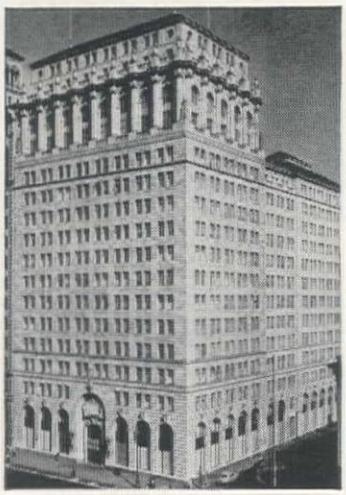
GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

Western Branch Offices: Butte, Mont.; Denver, Colo.; Los Angeles, Calif.; Salt Lake City, Utah
San Francisco, Calif.; Seattle, Wash.; Wallace, Idaho; El Paso, Texas

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

PACIFIC TELEPHONE AND TELEGRAPH BUILDING—(1925) Hot and cold water supply, vacuum and fire lines, drainage, drinking water and pump lines.



PACIFIC GAS AND ELECTRIC BUILDING—(1925) Cold water supply and fire lines.

In these San Francisco skyline structures

maintenance is kept "down to earth" with

Byers Wrought Iron Pipe

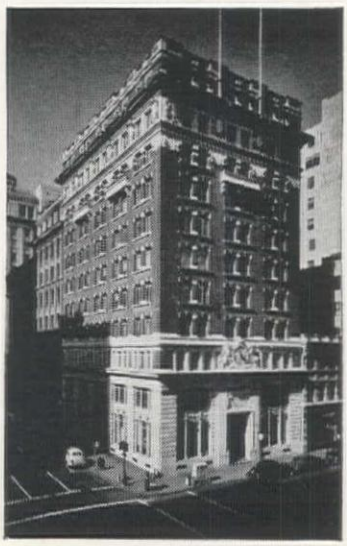
Although the designers of these eye-appealing San Francisco skyline buildings had different ideas on architectural treatment, they followed the same proven practice in safeguarding against premature failure and excessive maintenance by specifying genuine wrought iron for corrosive services. The photograph captions tell the story of the selective use of this time-tested material, and the wide variety of services it protects. Proof of the wisdom and soundness of these specifications is evidenced by the outstanding durability records established by the material since installation.

The reason for the unusual durability of genuine wrought iron comes from its unique composition. Tiny threads of glass-like silicate slag, threaded through the body of high-purity iron, halt and disperse attack, and so discourage local pitting. The fibers also anchor the initial protective scale, which shields the underlying metal.

You'll find some helpful information in our bulletin, WROUGHT IRON FOR PIPING SYSTEMS. Write for a copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Division: New York, N.Y.

BALFOUR (GUTHRIE) BUILDING—(1920) Plumbing and heating.



ROYAL INSURANCE BUILDING—(1909) Hot and cold water lines.

STATE BUILDING—(1923) Heating, cold and hot water supply, vacuum and fire lines, drainage and vents.

STANDARD OIL BUILDING—(1923) Steam, return and water piping; roof leader lines, soil and waste lines 2" and larger; vent lines 4" and larger, 3½" and smaller; vacuum lines; gas piping; hot and cold water lines.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

TREATED WOOD *lasts longer!*

Make construction last . . . build with *Penta* -PROTECTED wood!

Wood that is PENTA*-PROTECTED *lasts* up to four times longer than untreated wood. PENTA-PROTECTED wood is safe from termites and rot.

Plan to use PENTA-PROTECTED wood not only for construction timber, but in building flooring, roofing and trim. PENTA leaves wood clean and easy to handle . . . will not leach. Installations built with PENTA-PROTECTED wood need less maintenance, making PENTA-PROTECTED wood less costly in the long run.

Make your wood a profitable investment! Use PENTA-PROTECTED wood.

(*PENTA is a popular abbreviation of the name of the chemical, PENTAchlorophenol.)

Write Dow, Dept. PE-69, for further information and free booklet, "Pointers on PENTA."

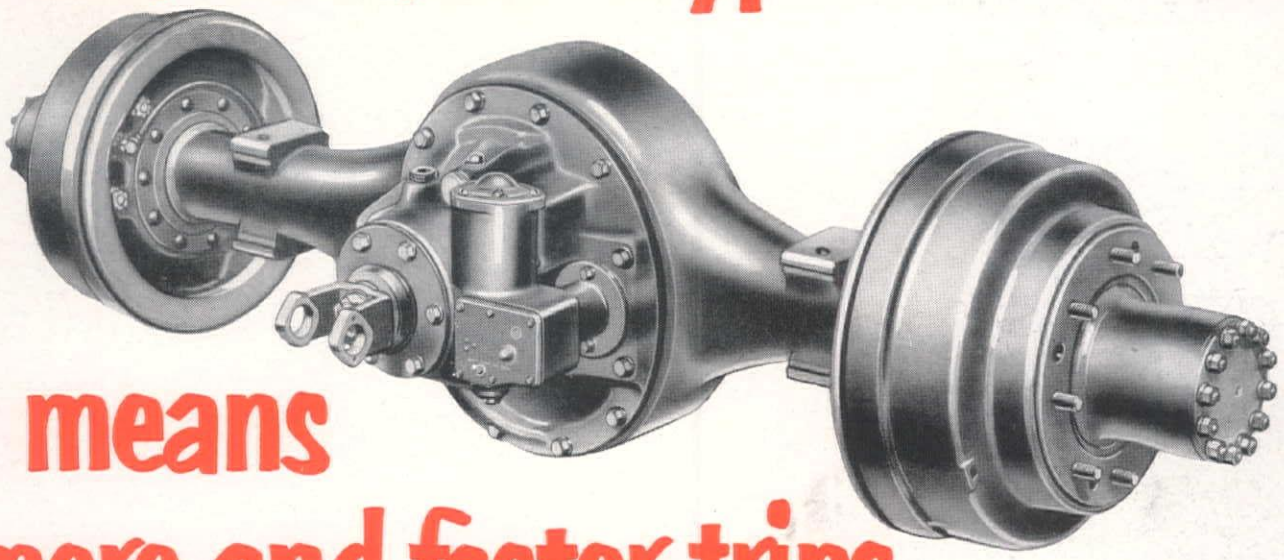
THE DOW CHEMICAL COMPANY • *Midland, Michigan*

DOW

Penta

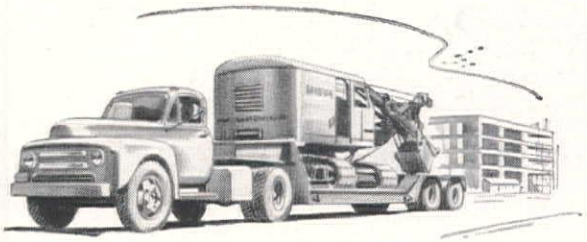
chlorophenol

the RIGHT gear ratio for load, road, and type of service



means more and faster trips, lower cost, longer truck life

EATON 2-Speed Axles *double* the conventional number of gear ratios, giving drivers a *right* ratio for every operating condition—on the highway, or off, starting out under full load, climbing grades, highballing, quick shifting in traffic. Engines run in the most efficient and economical speed range, reducing stress and wear on engines and power transmitting parts; adding thousands of miles to vehicle life. And Eaton Axles last longer because exclusive planetary gearing better distributes gear tooth loads. The exclusive Eaton forced-feed oiling system provides positive lubrication at all vehicle speeds. Ask your dealer to show you how Eaton 2-Speeds will help *your* trucks haul more, faster, longer, at lower cost!



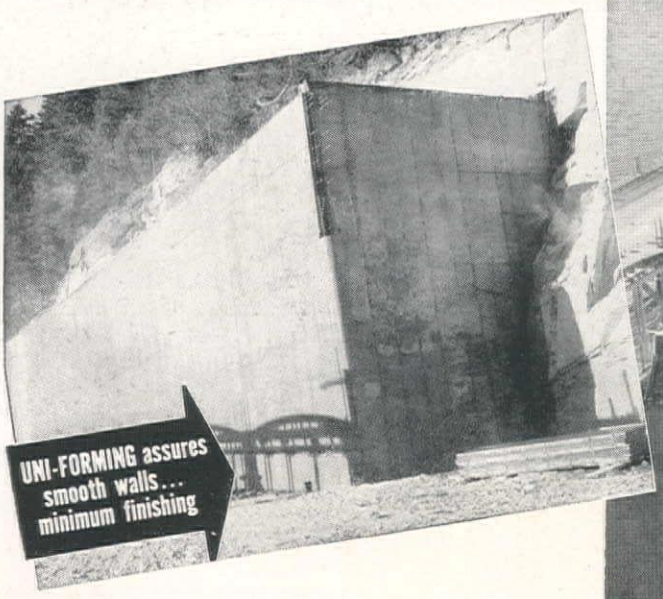
EATON 2-Speed Truck AXLES

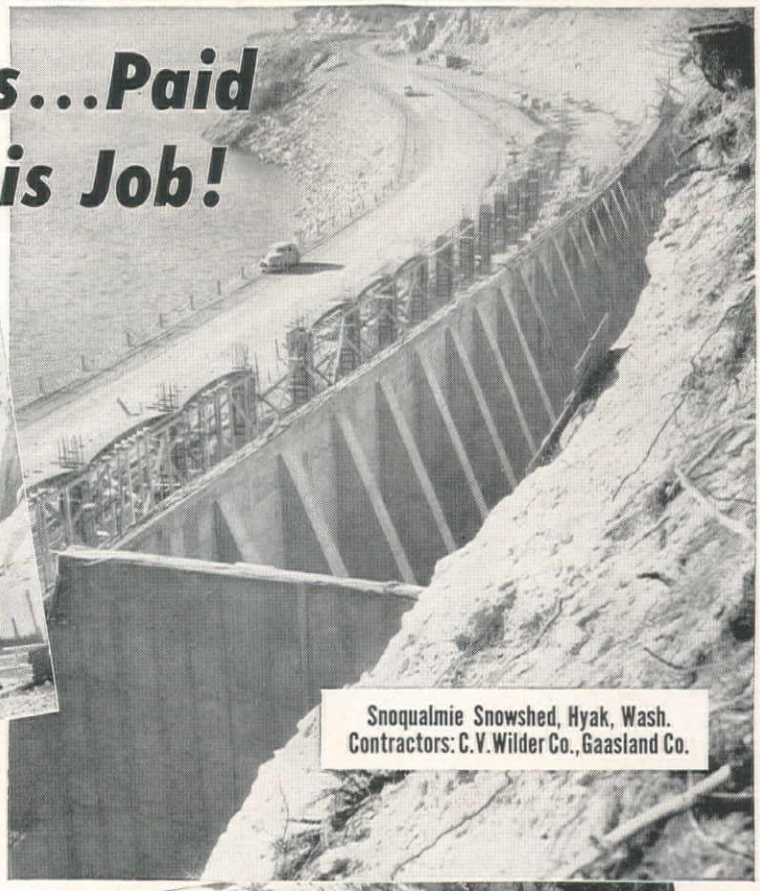
Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

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

UNI-FORMS' Versatility...Speed..

Material Savings...Paid Dividends On This Job!




Snoqualmie Snowshed, Hyak, Wash.
Contractors: C.V. Wilder Co., Gaasland Co.

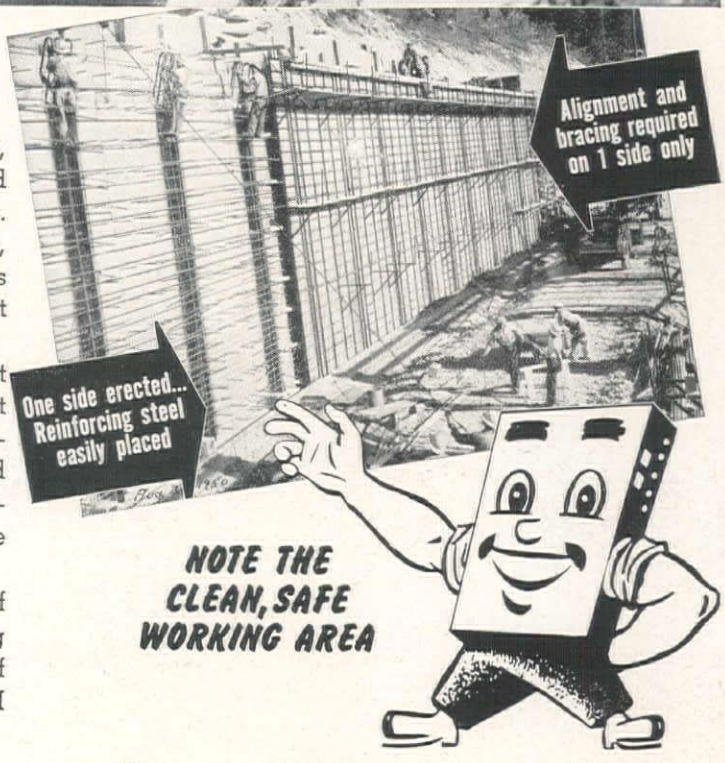
UNI-FORMS Form 95% of Concrete on Snoqualmie Snowsheds IN RECORD TIME

UNI-FORMS guaranteed great savings in time, material and labor on the Snoqualmie Snowshed projects in spite of complex forming requirements.

The retaining walls and counterforts, portals, pads, beams and columns involved countless variations and presented a seemingly difficult and costly forming problem.

Universal engineers, assigned to the project without cost to the contractors, demonstrated that standard UNI-FORMS would handle every forming requirement. The simplified assembly and easy handling of UNI-FORMS provided fast erection, pouring and stripping cycles to keep the job well ahead of schedule.

UNI-FORMS can bring the same savings of material, time and labor to your concrete forming problems. Why not investigate the advantages of UNI-FORMS today? Write for the UNI-FORM Catalog. There is no obligation.



Universal FORM CLAMP CO.
Concrete Form Specialists Since 1912

General Offices and Factory • 1236-38 NORTH KOSTNER • CHICAGO 51, ILLINOIS • CAPITOL 7-1600

West Coast Branch and Warehouse: 2051-59 Williams St., San Leandro (San Francisco), Calif., Phone: Lockhaven 2-2051, Enterprise 1-0132

TWO TS 300 MOTOR SCRAPERS MOVE 247,000 YARDS in ten weeks!

You can get production like this with LaPlant-Choate MOTOR SCRAPERS

HERE are a few of the reasons why you can be sure of big-production profits when LPC Motor Scrapers are on the job:

- Big capacity . . . 14-yds. struck and 18-yds. heaped . . . to haul bigger pay loads.
- Over 22 mph for speed on the haul road.
- Your choice of a 280 HP Buda or a 275 HP Cummins diesel for fast acceleration and extra power when you need it.
- Easy loading characteristics that cut valuable seconds off your cycle time.
- Big interchangeable tires for extra traction and flotation.
- Extra high apron lift and positive forced ejection for faster, smoother spreading.

Your LaPlant-Choate distributor can show you other Motor Scraper features that keep you ahead of schedule with lower over-all costs. See him before you bid on your next job.

That's the record of

CONCRETE MATERIALS & CONSTRUCTION COMPANY'S

two LaPlant-Choate Motor Scrapers on a stripping job near Cedar Rapids, Iowa.

The normal work week of the two TS 300s was 20 hours a day per unit, 6 days a week. Material moved consisted of sandy clay. Hauls started at 500 ft. and gradually lengthened to 1000 ft. as the job progressed. Grades varied, running as high as 30% at the start of the job.

No wonder Concrete Materials is sold on Motor Scraper performance. They originally bought two TS 300s in September of 1947, worked each unit 18,000 hours on the toughest kind of jobs, and were so well satisfied with the performance records they traded the original units for two new TS 300 Motor Scrapers.

Since February of 1951 when these new rigs went into service, they have worked a total of 6200 hours, with only 430 hours of downtime. *That's 93% efficient,* another reason why there are so many repeat orders for LaPlant-Choate Motor Scrapers.

LAPLANT CHOATE

MANUFACTURING CO., INC. ® CEDAR RAPIDS, IOWA, U. S. A.

Get the facts from your nearest LPC distributor

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COLUMBIA EQUIPMENT CO.
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RTLAND 14, OREGON — SEATTLE, WASHINGTON

WESTERN CONSTRUCTION EQUIP. CO.
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BILLINGS, MONTANA — MISSOULA, MONTANA

ENGINEERING SALES SERVICE, INC.
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STUDER TRACTOR & EQUIP. CO.
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GENERAL EQUIPMENT COMPANY
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EQUIPMENT SALES CO.
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ARNOLD MACHINERY CO., INC.
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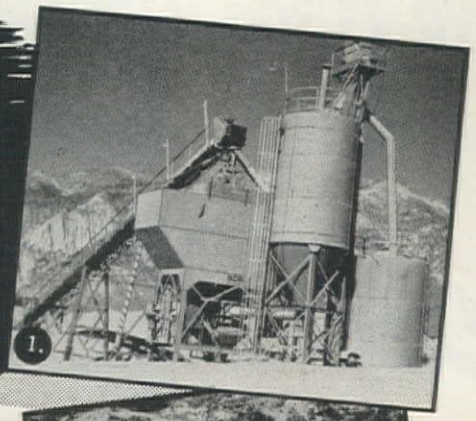
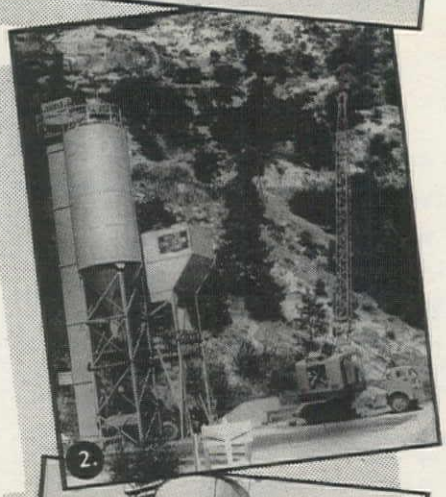
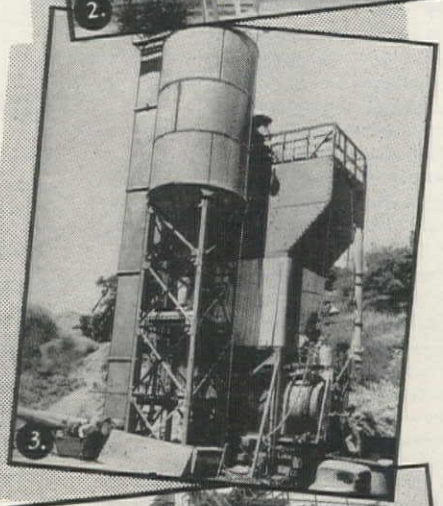
N. C. RIBBLE CO.
1304 N. Fourth St. — ALBUQUERQUE, NEW MEXICO

WHY SO MANY LEADING CONTRACTORS SELECT NOBLE BATCHING PLANTS







ADAPTABILITY . . . ACCURACY . . . LABOR SAVING . . . EASY ERECTION . . . QUICK SERVICE . . . these five important points briefly tell why leading contractors batch the NOBLE way.

NOBLE adaptability is pictured in these installations, each built from standard CA154 units, yet each adapted to exact job needs.

1. Guy F Atkinson & Bressi-Bevanda plant with two 2000 cu. ft. silos, one for storage, one for batching; two scales, one for cement, one for aggregates on Owens Gorge tunnel.

2. Walsh Construction Co. semi-automatic batcher and 2500 cu. ft. cement silo handling both dry batch and mixer trucks on P G & E. Feather River Project.

3. Utah Construction Co. plant designed to batch directly into concrete mixer at P G. & E.'s Lake Tabeau project, Calif.

4. Peter Kiewit Sons' "twin" batching plants with five cement silos to insure fast and continuous batching; used on three Friant-Kern Canal locations, then moved to a Los Angeles project.

Like these contractors, you, too, can profit from NOBLE batching plants. Exclusive photo relay control is unaffected by heat or humidity; you get automatic weighs to exact specifications. Centralized controls save labor—give you one-man operation, minimize fatigue and the chance of errors. Plant erection is easy, because all units are shop-fitted and correctly marked for field assembly. Four men can erect a CA154 plant in 3 to 4 days. Parts and service are within a few hours of any Western job.

Put all these NOBLE advantages to work on your operations. Call or write us for help . . no obligation, of course.

50

DESIGNERS AND BUILDERS OF
CEMENT AND AGGREGATE BATCHING PLANTS . . . BULK CEMENT PLANTS . . . AGGREGATE BINS AND CEMENT SILOS . . . STEEL FORMS FOR CONCRETE CONSTRUCTION JOBS . . . TUNNEL AND DRILL JUMBOS CONVEYORS AND ELEVATORS . . . WEIGH METERING DEVICES

NOBLE CO.

1860-7th STREET • OAKLAND 20, CALIFORNIA • TEMPLEBAR 2-5785

Los Angeles Office. 411 WEST FIFTH STREET • PHONE MUTUAL 8314

Star Machinery Co., Seattle 4, Wash.; Loggers & Contr. Machinery Co., Portland 14, Ore.; Tri-State Equipment Co., Spokane 6, Wash.; Intermountain Equipment Co., Boise, Ida.; Borchert-Ingersoll, Inc., St. Paul 4, Minn.; Sierra Machinery Co., Reno, Nev.; Davis, Hancock, Inc., Dallas 15, Texas; Western Constr. Supply Co., Chicago 12, Ill.

MACK TRUCKS

Keep Pace...

WITH YOUR STEPPED-UP PRODUCTION

Today's conditions call for trucks that can keep pace with accelerated production schedules. More and more truck owners are realizing that trucks are really "Tools of production"... that intensified service makes doubly important the extra durability and sustained reliability they get from hard-working Macks.

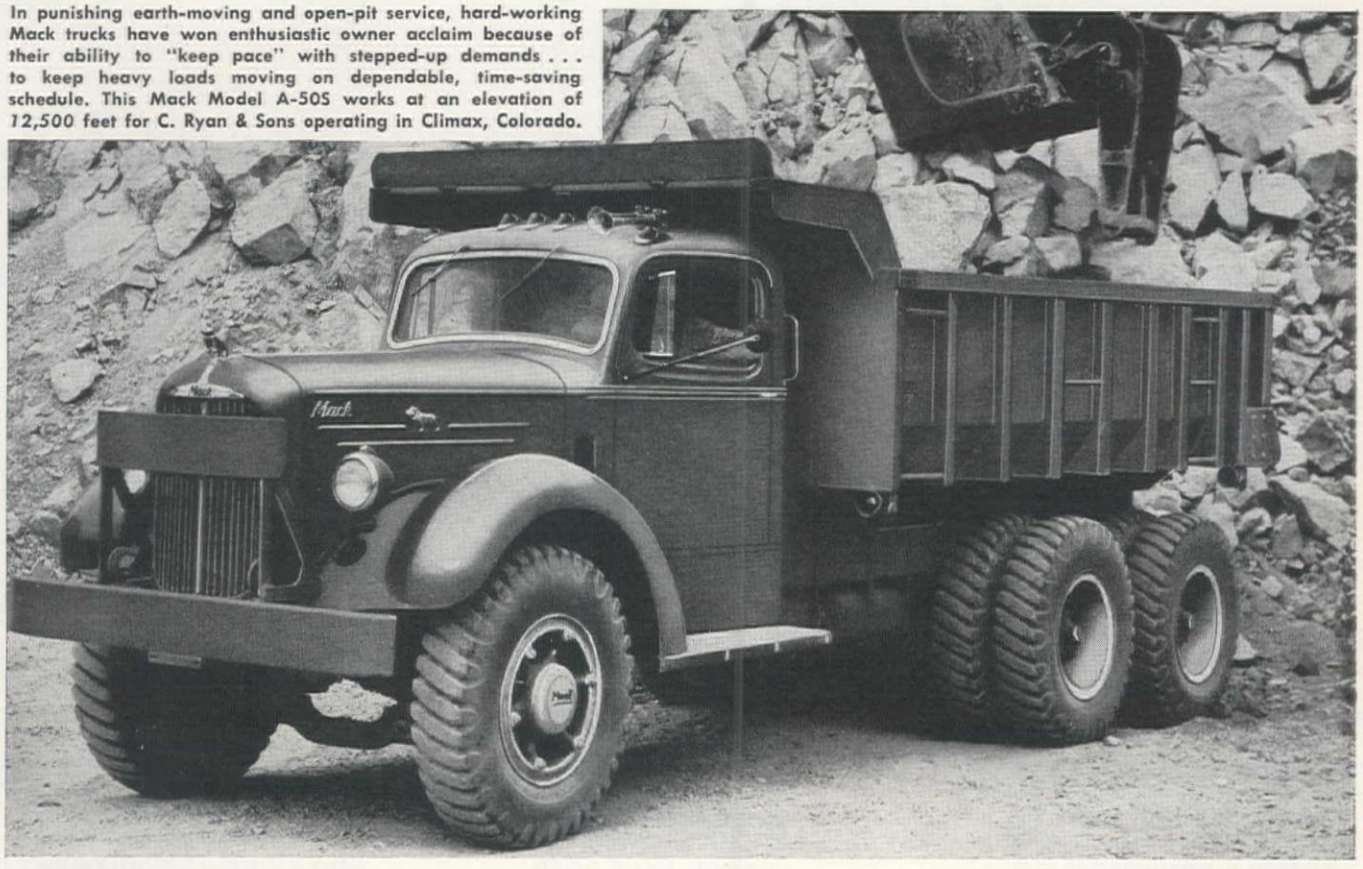
Make sure *your* truck equipment measures up to the rigors of present-day demands. See your nearest Mack branch or distributor for the right truck for your particular job. Prove to your own satisfaction that "Built Like A Mack" means uninterrupted production... extra long life... more tonnage moved at lower cost for many years to come.

Mack TRUCKS

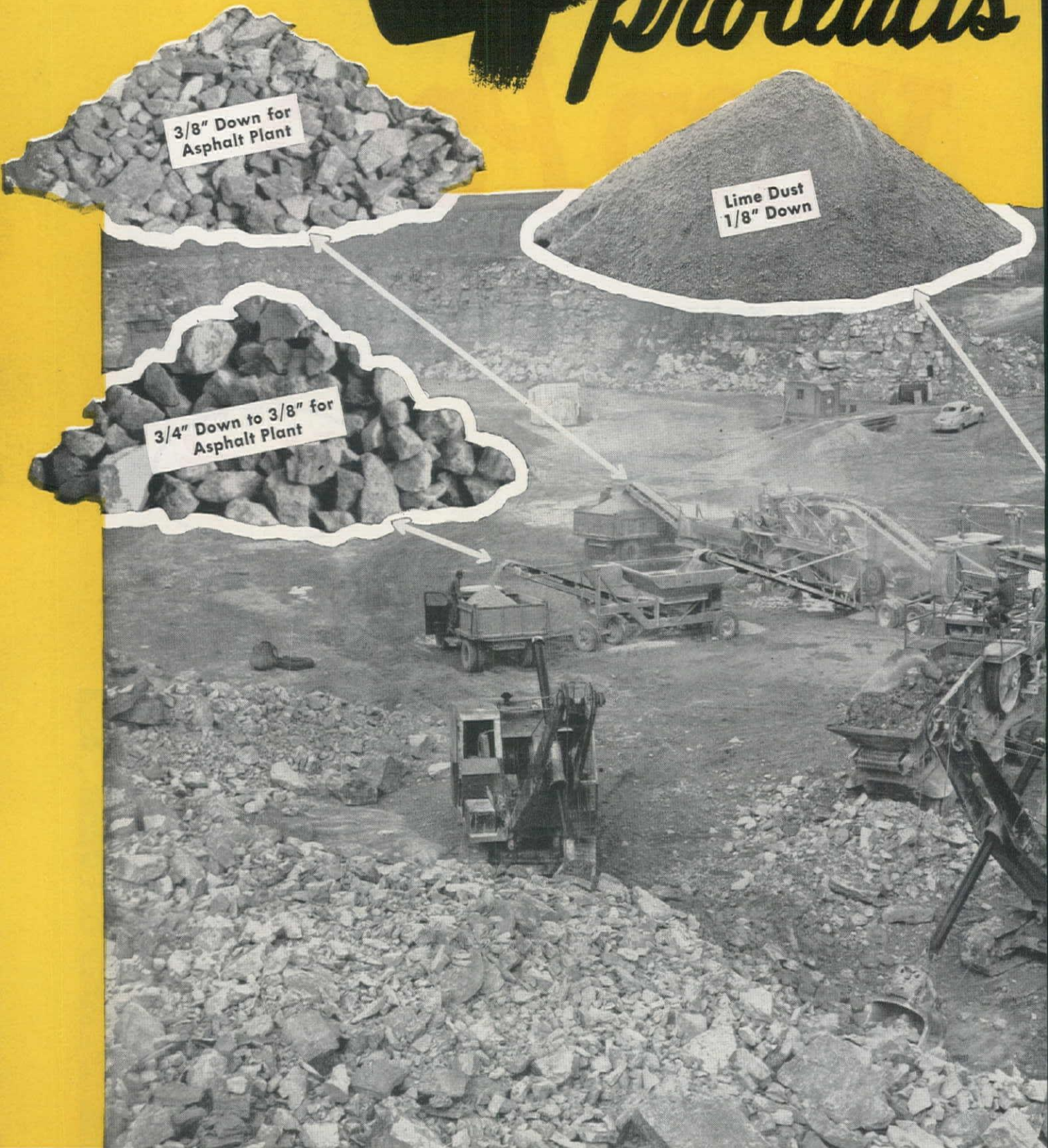
outlast them all

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

In punishing earth-moving and open-pit service, hard-working Mack trucks have won enthusiastic owner acclaim because of their ability to "keep pace" with stepped-up demands . . . to keep heavy loads moving on dependable, time-saving schedule. This Mack Model A-50S works at an elevation of 12,500 feet for C. Ryan & Sons operating in Climax, Colorado.



"4 products"*



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SIERRA MACHINERY CO.
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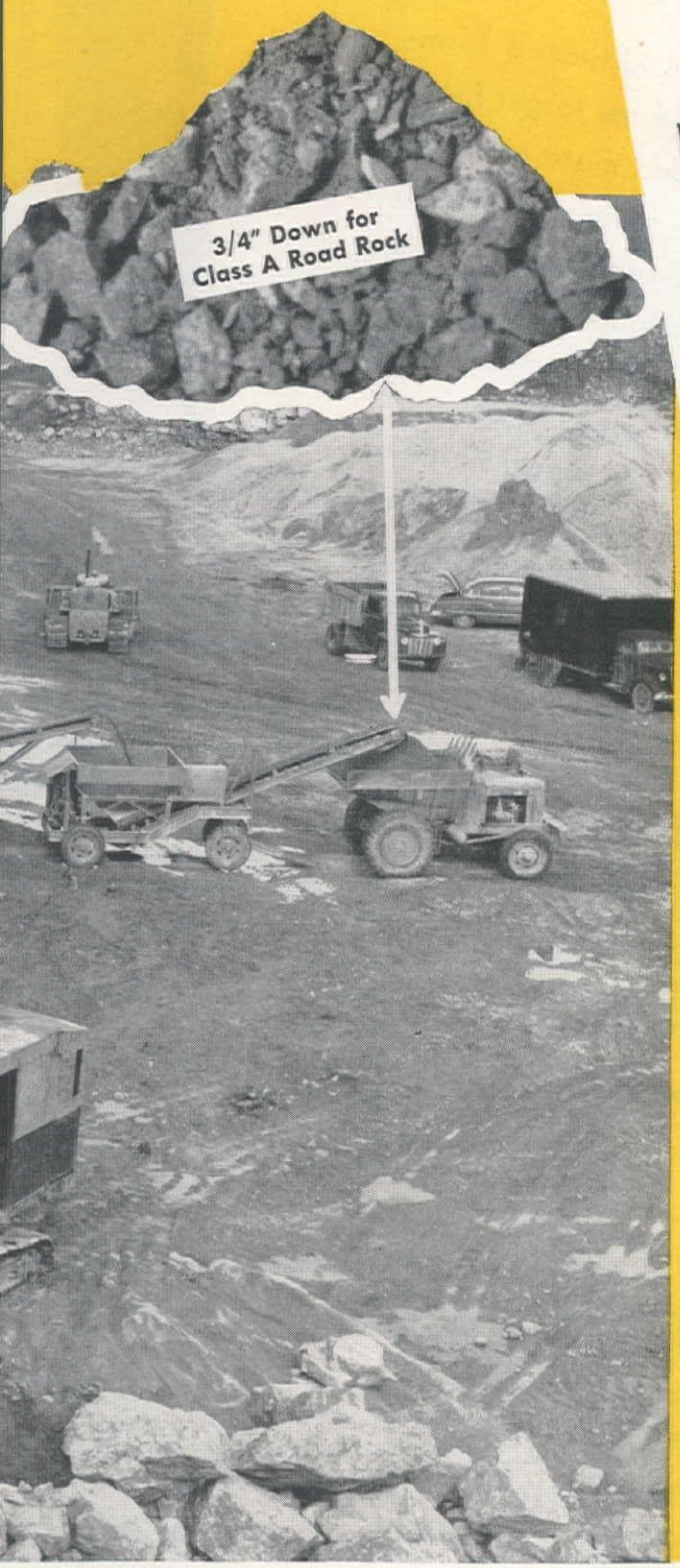
BROWN-BEVIS EQUIPMENT CO.
P. O. Box 174 Vernon Station, Los Angeles 58, Cali

at a time and 210 TONS PER HOUR

from one of my UNITIZED PLANTS!

That's why I buy CEDARAPIDS"

Says B. L. Anderson
Cedar Rapids, Iowa



*Lime dust from 1/8" down, *3/4" Class A Road Rock for county roads, *3/8" minus and *3/8" to 3/4" aggregate for black top... that's what B. L. Anderson's Unitized Plant is producing *in one operation,* at a rate of 210 tons per hour!

And that's not all! When Mr. Anderson wants to meet specifications for other jobs, the basic units of his Unitized Plant can be combined in any way to produce any size products in volumes up to 250 tons per hour, with real economy in operating costs and maintenance.

Mr. Anderson's Unitized Plant illustrated here consists of a 2236 Primary Unit, a Screening Unit with 4' x 12' Horizontal Screen, a 4033 Hammermill Secondary and four Portable Bins. The rock crushed for black top is being mixed in a Cedarapids Model ECW Asphalt Plant operating at the same location. B. L. Anderson also has two other quarry operations each using 2236 Portable Primaries and 4033 Hammermill Secondaries.

More and more contractors are insisting on the advantages of Cedarapids equipment... single units or complete portable plants... to meet today's stepped-up demands for low-cost aggregate and black top. Your Cedarapids distributor can give you *all* the reasons why... ask him for full details.

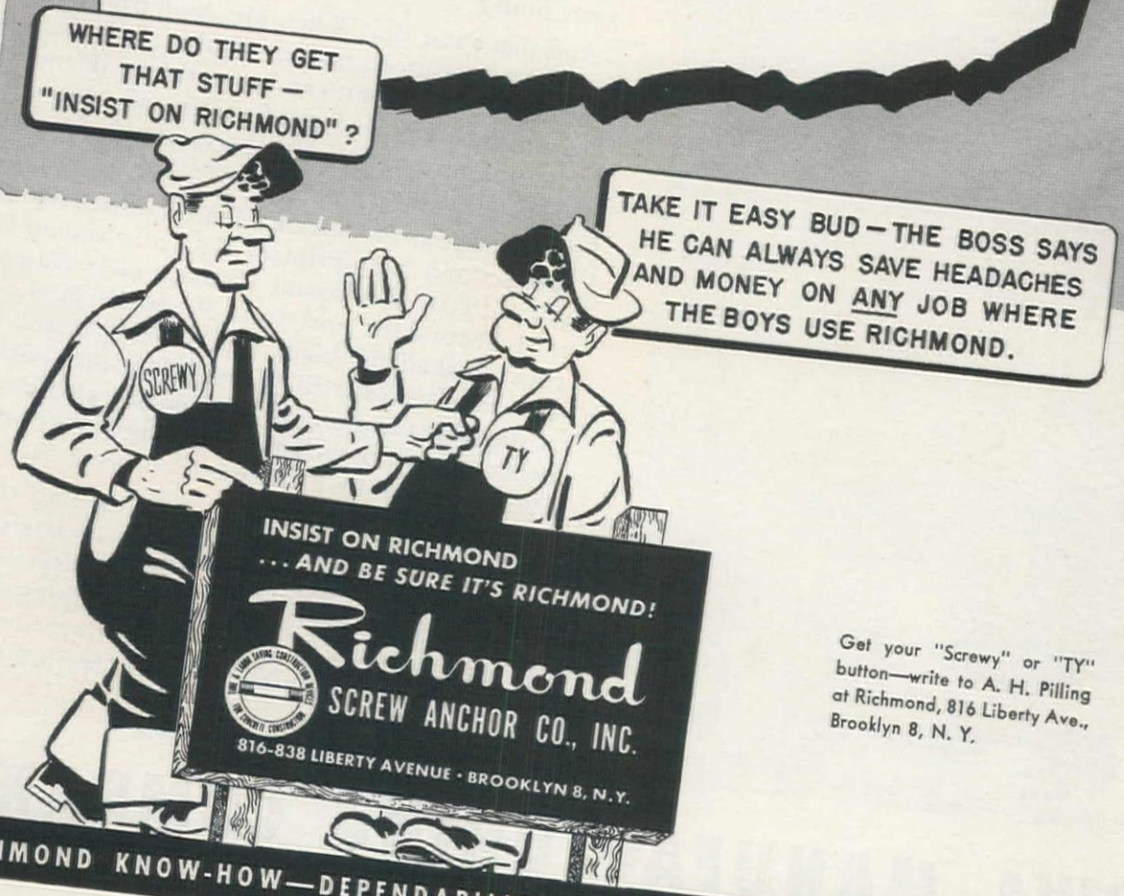
IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

ENGINEERED TYING DEVICES, ANCHORAGES and ACCESSORIES for CONCRETE CONSTRUCTION

"WHY DO I INSIST ON RICHMOND?"

"Because I've tried them all—and Richmond form-tying and anchoring devices enable me to get forms built and stripped faster, better and more economically—with substantial additional savings in lumber and nails. The Richmond line is complete. They've developed every type of time-and-labor saving device you can think of. And there are no unexpected hitches when you use Richmond products—they're obviously designed by engineers who know the practical side of the problems we're up against in the field. Richmond plays ball with us on their charges, too. I get special tools and reusable working parts from them as a loan—all returnable when the job is finished."



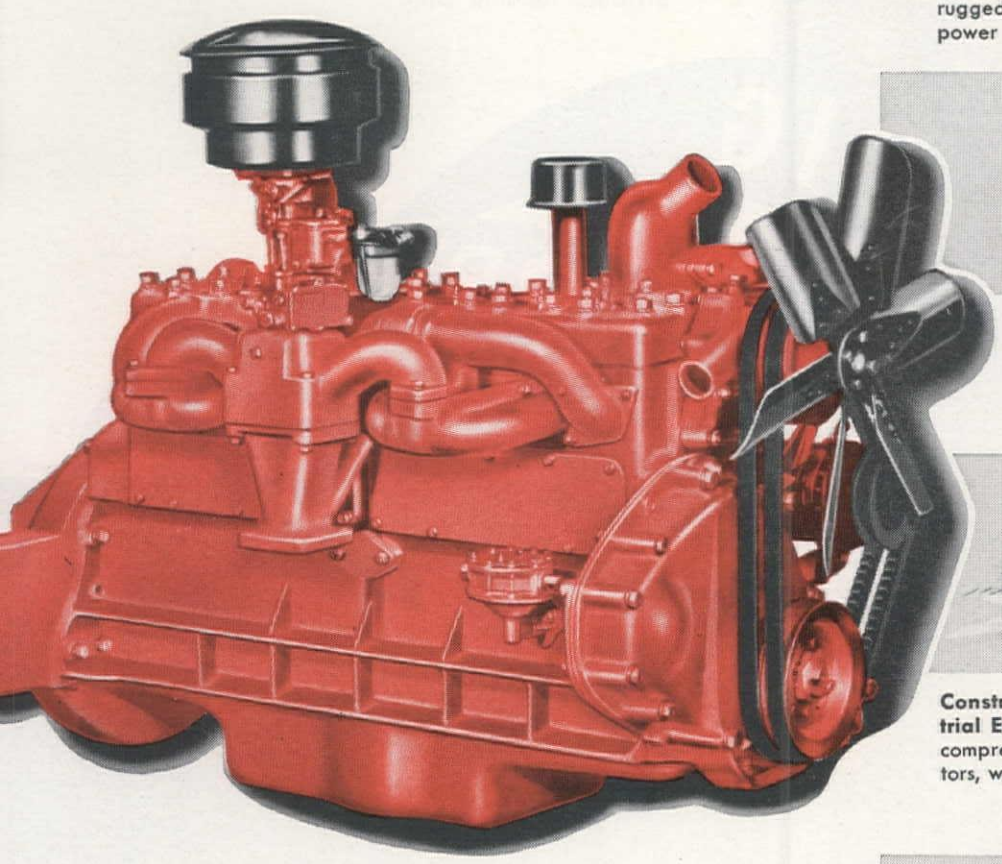
Get your "Screwy" or "TY" button—write to A. H. Pilling at Richmond, 816 Liberty Ave., Brooklyn 8, N. Y.

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

FAVORED POWER PLANT

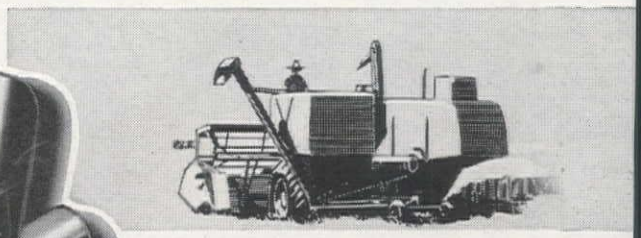
...For Original Equipment

...For On-The-Job Applications



Operators specify Chrysler Industrial Engines because they are more dependable under extreme loads; offer smooth operating power, serve with less down time—are easily serviced.

Industrial Equipment users specify Chrysler Industrial Engines because they are longer lived, ruggedly built; and they can standardize their power needs with variations of the basic engine.



Agricultural users specify Chrysler Industrial Engines because they are economical, compact, powerful. They are engineered to take hard usage and weather without breakdown.

Construction people specify Chrysler Industrial Engines because they are high speed, high compression engines—operate pumps, generators, welders at high output, lower operating cost.

Your power needs are served better by dependable Chrysler Industrial Engines

Wherever there is need for a truly superior gasoline power plant, designers and operators alike *specify* Chrysler. For *this* high speed, high compression Industrial Engine is engineered specifically to your needs. Compact, clean design makes it easy to install, easier to service.

Feature after feature give the manufacturers and on-the-job operators performance records unequalled by other industrial engines. They operate day in, day out with little attention, practically no down time.

A trained staff of industrial power engineers at Chrysler travel the field constantly; finding ways to improve their product—helping solve unusual power problems.

When you have a power problem, see your Chrysler Industrial Engine Dealer or write: **Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.**

CHRYSLER

Industrial Engines and Power Units

HORSEPOWER WITH A PEDIGREE

EFFICIENCY IN LOADING

Your loading job can be efficient. The Eimco 104 will dig, carry and load at a much faster rate than other types of equipment.

Consider the savings in time and maintenance in this straight line loading. Consider the heavy duty construction of this machine — built to load rock — but equally efficient in easy loading materials.

The Eimco 104 loads at the rate of 4 to 6 yards per minute in rock or 6 to 8 yards per minute in lighter material.

Write today for more information on this efficient loading unit.

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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AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD

FOR

LONG, TOUGH LIFE

Maintain Equipment

WITH

VICTOR

HARD-FACING ALLOYS

VICTOR ALLOY

for

tools subject to abrasion and severe impact

TYPICAL APPLICATIONS

Tractor rollers and idlers; dredge pumps and cutters; bucket lips and teeth; rock crushers; steel mill wobblers; sheepsfoot tampers; etc.

Electric AC

VICTOR TUNGSMOOTH

for

thin and smooth cutting edges

TYPICAL APPLICATIONS

Hand shovels; coal cutter bits; auger points; shredder knives; screw conveyors; pug mill blades; ensilage knives; plow shares; drill bits; etc.

Gas and Electric AC-DC

VICTOR TUBE

for severe abrasion

TYPICAL APPLICATIONS

Bulldozer tips; grader blades; scarifier teeth; posthole augers; ditcher teeth; oil drilling bits; pug mill knives; asphalt mixer blades; etc.

Gas and Electric AC-DC

VICTOR Hard-Facing Alloys give you faster application, smooth deposits, longer wear. Order from your VICTOR dealer TODAY.

Write for NEW DESCRIPTIVE LITERATURE

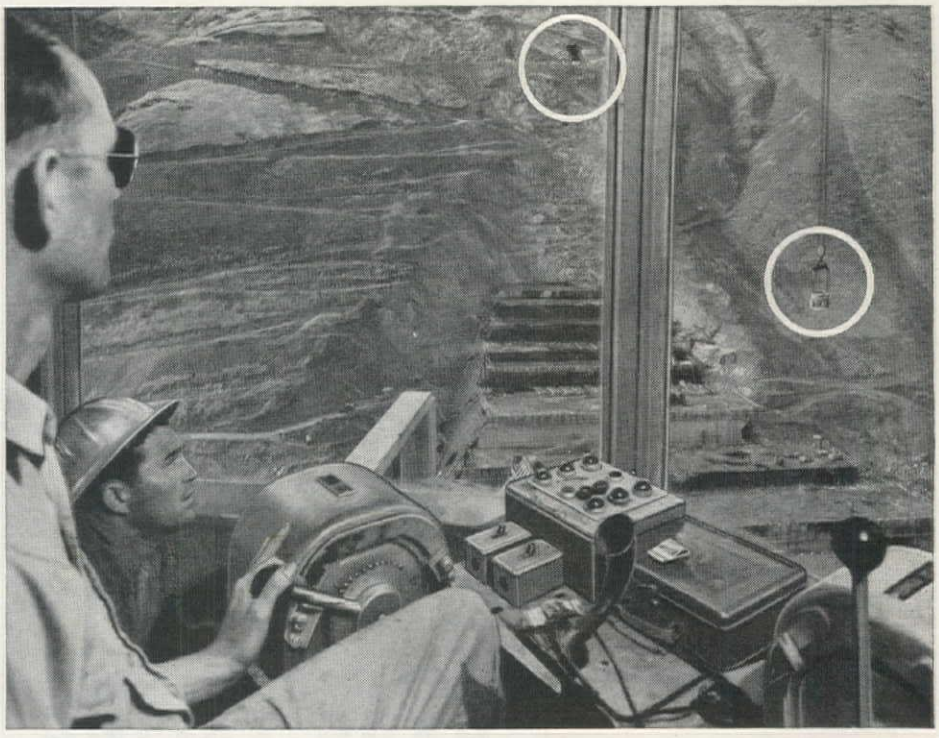
VICTOR EQUIPMENT COMPANY

3821 Santa Fe Ave.
LOS ANGELES 58

844 Folsom Street
SAN FRANCISCO 7

1312 W. Lake St.
CHICAGO 7

You're looking at the dam from the cableway operator's control station. The track cable extends from the head tower 2420 feet across the river canyon to the tail tower (upper circle). The 8-yard bucket (lower circle) is loaded at a dock beneath the control station. G-E amplidyne control provides fast operation and flexibility, needs only minimum maintenance.



WORLD'S FASTEST CABLEWAY speeds dam construction . . . electrically!

G-E powered rig at Pine Flat Dam hoists and hauls at same time; has poured 4000 yards in single day!

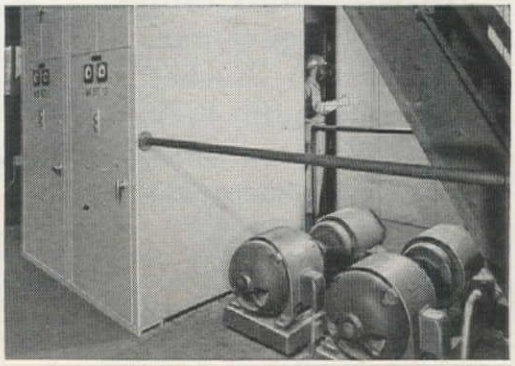
At Pine Flat Dam on the Kings River near Fresno, California, the General Electric powered cableway—fastest in the world—is setting new pouring records to help build the world's ninth highest dam. A Corps of Engineers project, the dam is being built by Pine Flat Contractors Associated Companies.

The Pine Flat rig, built by Willamette Iron and Steel Co., is the first ever designed with G-E amplidyne control—for faster acceleration, greater precision, smoother operation. In addition, a new concept of power application permits hoisting and hauling at the same time. Automatic braking makes operation safer. Smoother acceleration lessens wear on cables and other equipment. And power losses during acceleration and deceleration are reduced.

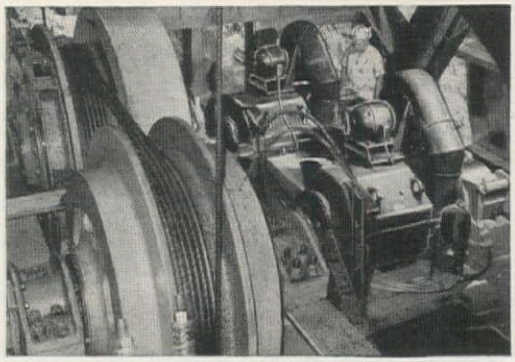
For faster, safer, easier operation of *your* construction equipment, electrify with G-E drives and power distribution systems—backed by G-E engineering help in application, installation, and service. *General Electric Co., Schenectady 5, N. Y.*

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

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



Key to rig's speed—G-E amplidynes in head tower for hoist and haul drives provide smooth adjustable voltage control by limiting current during acceleration.



Carriage drive motors are built by G.E. for extra-tough applications like this. The completely separate two-motor hoist drive is also located in the head tower.

GENERAL ELECTRIC

664-20

FROM SAND TO STONE, GRAVEL TO COAL

YOU MOVE IT FASTER, EASIER WITH A CASE INDUSTRIAL TRACTOR

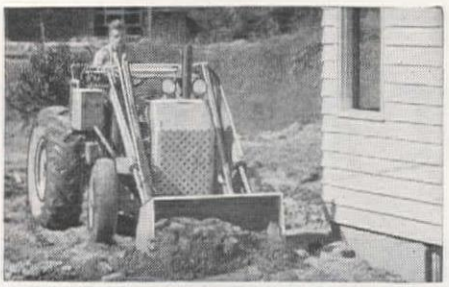
The performance of a front end loader largely depends on the tractor on which it is mounted. Proper tractor weight distribution must counterbalance the front end load to deliver traction to the rear tractor wheels. High leverage steering is required to permit easy turning with the increased load on the front wheels. Front axles, wheels and steering spindles must be sturdy enough to withstand the added weight of heavily loaded buckets. The tractor engine must deliver steady pushing and loading power—the kind of power that hangs on and keeps the tractor moving when slowed down by heavy loads.

In the Case "SI" Industrial Tractor, you get all these advantages. Time and again, it has proved itself on hard loading jobs, moving a greater yardage of material in a working day. Talk it over with your Case Industrial Dealer. J. I. Case Co., Racine, Wis.

CASE

SEE YOUR NEARBY DEALER

Superior Equipment Co., Phoenix, Ariz.; Hayward Equipment Co., Los Angeles, Calif.; Contractors Machinery Co., San Francisco, Calif.; Growers Equipment Co., Salinas, Calif.; Lake County Equipment Co., Lakeport, Calif.; E. O. Mitchell, Inc., Bakersfield, Calif.; J. S. Otey, Bishop, Calif.; Liberty Truck & Parts Co., Denver Colo.; Western Equipment Co., Boise and Idaho Falls, Idaho; Hilton's, Inc., Las Vegas, New Mexico; Electric Tool & Supply Co., San Bernardino, Calif.; Growers Tractor & Impl. Co., Sacramento, Calif.; Farmers Machinery & Supply Co., Reno, Nevada; Foulger Equipment Co., Salt Lake City, Utah; Wortham Machinery Co., Cheyenne, Sheridan and Greybull, Wyoming; Montana Powder & Equipment Co., Helena, Montana; Columbia Equipment Co., Portland, Oregon.



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.

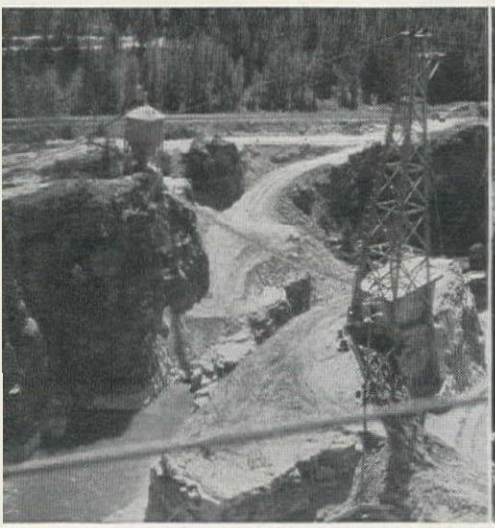
COAL YARDS. Compact, maneuverable Case "SI" helping load a 16-ton coal truck in Lakewood, Ohio. Moves quickly from one coal pile to another.

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.

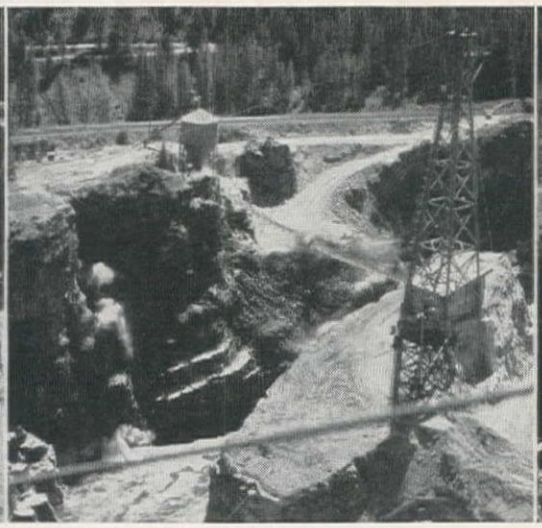
QUARRIES. Moving heavy loads of cut stone at Lannon, Wisconsin. Owners say Case "SI" Industrial Tractor stands up well on this hard, gruelling work.

ENGINEERING WITH ATLAS EXPLOSIVES

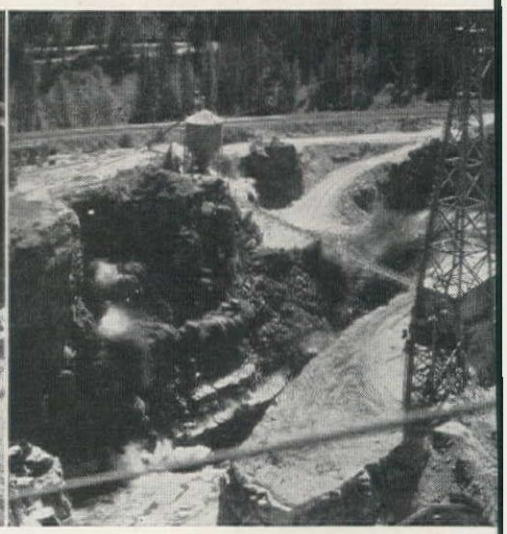
ONE ROCKMASTER® BLAST dams a river gorge



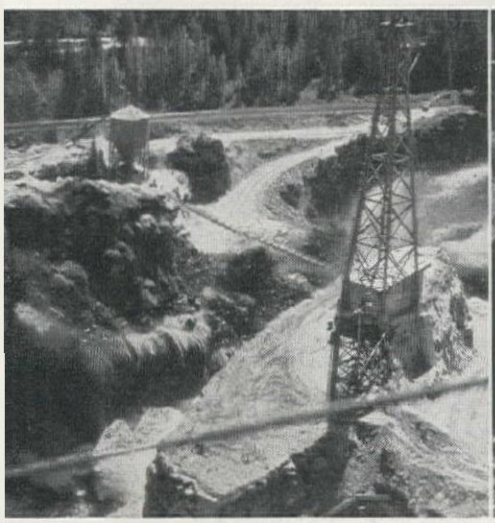
1. *The sheer walls of Cabinet Gorge in Idaho rise 350 feet above the swift Clark Fork River. Morrison-Knudsen Co., Inc. had to throw a cofferdam across waters 70 to 80 feet deep—too tough a job for truck dumping or sheet piling. So M-K used explosives.*



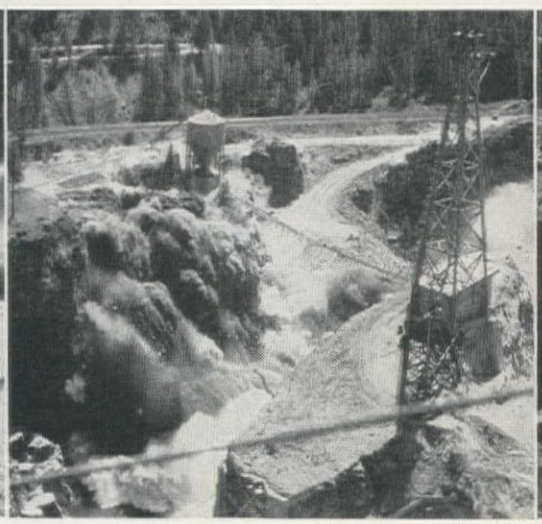
2. *The blast starts. Nearly 65,000 pounds of Atlas Flo-dyn #4 (40% free-flowing dynamite) were used.* ROCKMASTER *milli-second delay detonators Nos. 0 to 11 were used for accurate control of throw across the river.* ROCKMASTER *timing fired forward end first.*



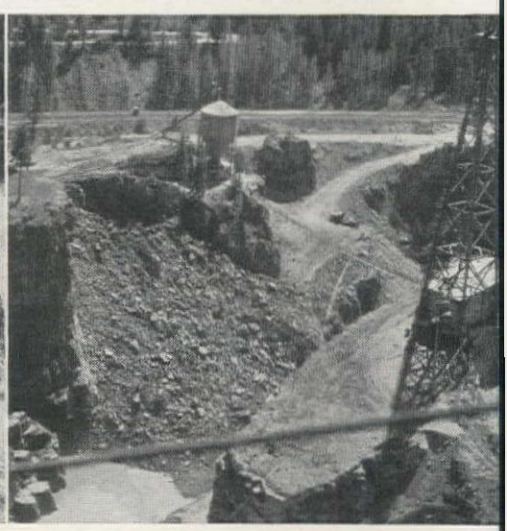
3. *The two lower benches move riverward —an example of how milli-second delay timing is used to throw rock to a designated spot. Vibration and overbreak were not factors in this blast, but note that the cement silo is undamaged and the foot-bridge remains up.*



4. *A second after detonation the front burst is over; bottom and top falling fast. This was a coyote-tunnel blast. But the multiple one-two punches of* ROCK-MASTER *give the same control with well or wagon drill holes.*



5. *Water splashes high in displacement. Success was evident immediately after the blast when water started flowing through two tunnels prepared to divert stream. Atlas sales-technical men cooperated with Morrison-Knudsen.*



6. *Dust has settled. More than 90,000 cubic yards of rock, thrown directly across the stream as aimed, are ready for final grading and will serve as basis for further cofferdam installations.*

This was a *big* job. But even on small jobs you can profit by ROCKMASTER control. Find out how milli-second delay timing can work for *you*—send for free 20-page book, with diagrams, outlining the control possible with ROCKMASTER blasting.

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY • WILMINGTON 99, DELAWARE

Offices in principal cities

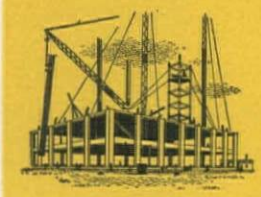
SAN FRANCISCO 4, CAL. • SEATTLE 1, WASH.

For logging

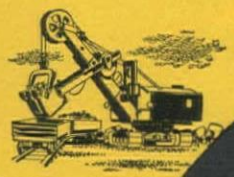
For sand and gravel

For aircraft

For marine



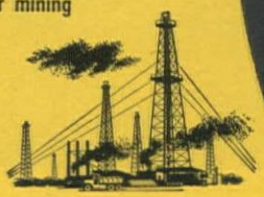
For construction



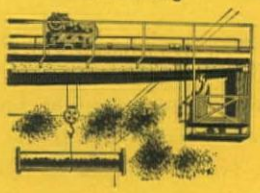
For stone quarries

For elevators

For mining



For drilling



For industrial

For better service and more economy . . . use

MACWHYTE WIRE ROPE

PREformed and Internally Lubricated

A THOUSAND AND ONE

to order from assures the right rope for your equipment

There is a Macwhyte Wire Rope that has been specially engineered and job-proved for any particular type of equipment you operate. That's why it pays to specify Macwhyte. Over the years, ropes for all types of equipment in every field have been developed by Macwhyte. Recommendations are promptly available either from Macwhyte distributors or Macwhyte Company.

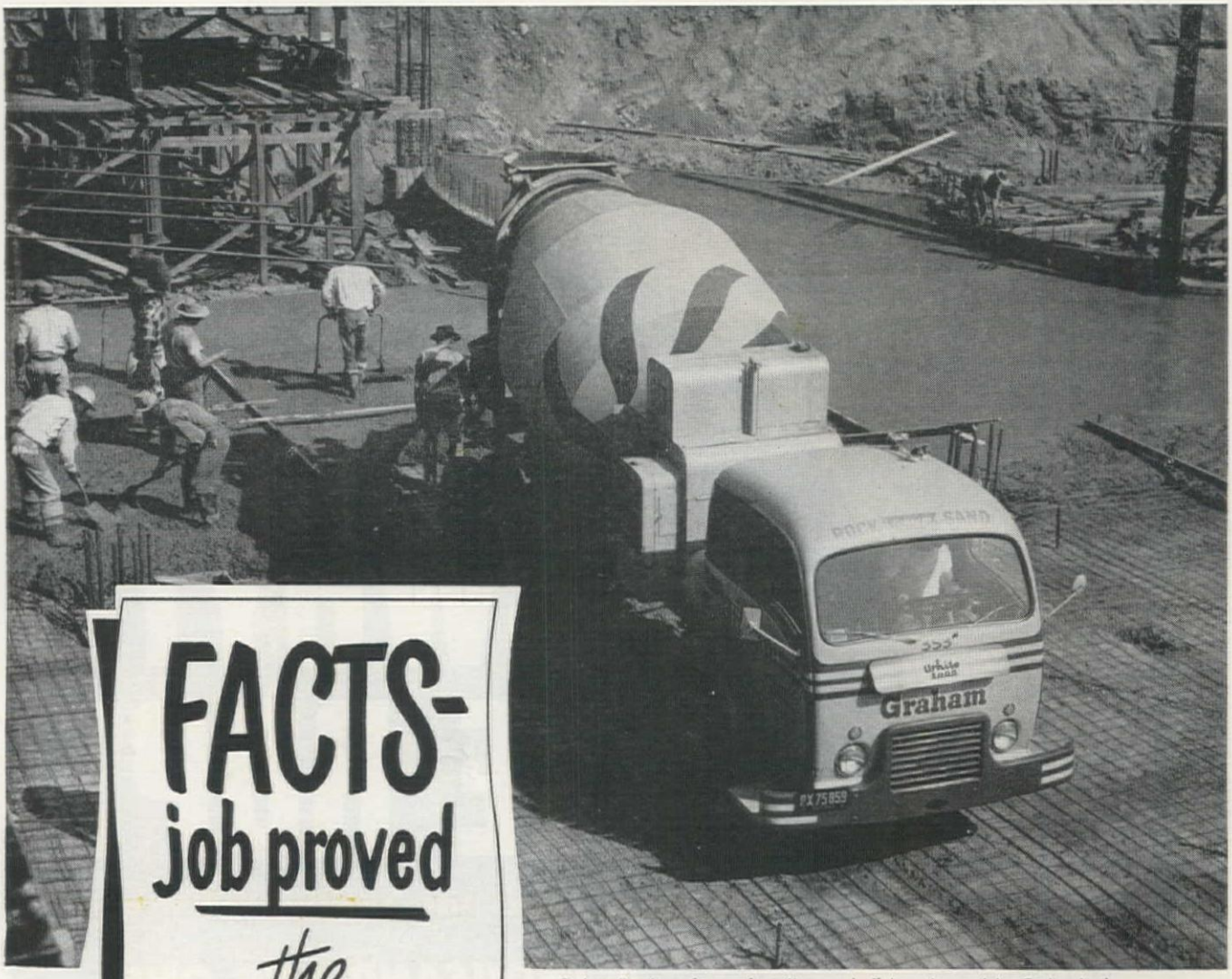
Ask for these helpful bulletins:

"Wire Rope—So What?" (No. 5134)—Illustrated exclusive interview with veteran wire rope engineer who talks straight from the shoulder about saving hundreds of wire rope dollars.

"How to Order Wire Rope" (No. 5025)—Tells exactly what to consider. Also includes convenient table of sizes, constructions, strengths and weights of Improved Plow Steel Wire Ropes.

LOS ANGELES 21, 2035 Sacramento St., Ph: TRinity 8383 **PORTLAND 9,** 1603 N.W. 14th Ave., Ph: BRoadway 1661
SAN FRANCISCO 7, 141 King St., Ph: EXbrook 2-4966 **SEATTLE 4,** 87 Holgate Street, Ph: MAin 1715

1010-L



FACTS- job proved the WHITE 3000

...does more work ...in less time ...at less cost

Graham Brothers, famous for split-second efficiency in supplying Grahamixed concrete, takes advantage of White's new 3000 design which permits far greater legal capacity than is possible on conventional trucks of similar wheelbase.

Extra Carrying Capacity... extra capacity for *work*—solid reasons for the sensational performance of White's 3000 on rugged construction jobs! This *new idea* in motor transportation means timesaving maneuverability and money-saving ease of maintenance. It will pay you to investigate—*to get the facts of White.* See for yourself how the 3000 design permits greater payload, makes better time through traffic, moves quickly in and out of spots that stymie ordinary trucks! Your local White representative is ready to demonstrate the 3000's superiority —in terms of *your* operation. Why not plan to give him a call today?

WHITE 3000's PROVED COST-SAVING ADVANTAGES

1. Saves driver time and energy ...gets more work done.
2. Complete front end accessibility cuts maintenance costs. Makes service easier.
3. New safety features.
4. New weight distribution permits longer bodies...more payload.
5. Saves space on the street...in the garage...better maneuverability.

KEEP YOUR WHITES in BEST WORKING CONDITION

White Emergency Service Corps

THE WHITE MOTOR COMPANY
CLEVELAND 1, OHIO, U.S.A.
Factory Branches, Distributors and Dealers Everywhere

Tips its cab to service

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

STANDARD ENGINEER'S REPORT

DATA

PRODUCT: Chevron Starting Fluid

UNITS: Diesel engines

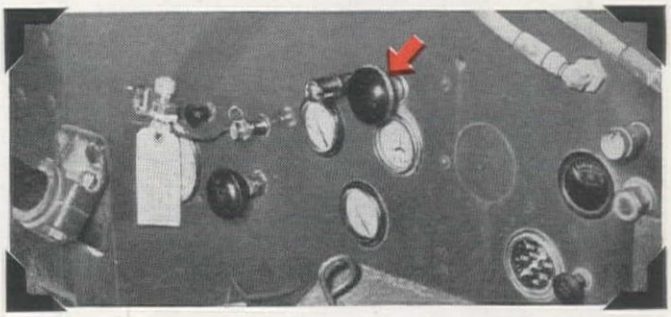
CONDITIONS: ~~Sub-zero temps~~ — high altitudes

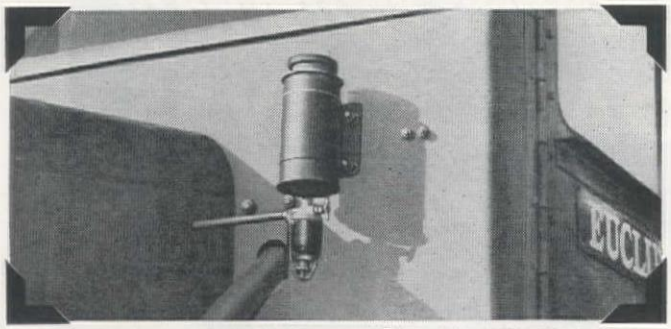
EQUIPMENT: Permanent primers with atomizers on manifolds

FIRM: The Utah Construction Co. Cedar City, Utah

Four hours saved daily starting 13 diesels!

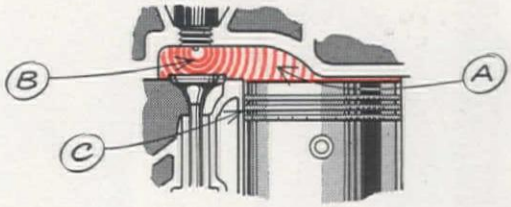
TRUCKS LIKE THIS, when primed with Chevron Starting Fluid last winter, averaged only a minute and a half starting time in temperatures down to 26° below zero. Previously, it took 20 minutes to start each of the 13 units operated by the Utah Construction Co. at mile-high Cedar City, Utah. This meant a saving of four hours a day in starting time alone. A dash-mounted pump (arrow) in each unit forces Chevron Starting Fluid through atomizers into the manifold and primes the engine for fast starting.





STORAGE TANK for bulk Chevron Starting Fluid is here mounted near the engine. The fluid also comes in 7- and 17-CC gelatin capsules. These capsules are placed in a puncturing tool and fluid is pumped into intake manifold the same way as from the central bulk tank shown. Each type of dispensing equipment is suitable for both diesel and gasoline engines and is available from your starting fluid supplier. Chevron Starting Fluid is approved by leading engine manufacturers.

How CHEVRON Starting Fluid Starts Gasoline and Diesel Engines Instantly



A. Atomizes in lowest temperatures and provides powerful, easily ignited vapor in combustion chamber.

B. Pressure, or the weakest spark, fires mixture—turns engine and heats air for regular fuel mixture.

C. Contains lubricant and additives—inhibits cylinder wear and ice formation in primer equipment.

HOT NEWS FOR COLD ENGINES

FREE BOOKLET gives you more facts on Chevron Starting Fluid—shows where it should be applied in different type engines. Write or ask for it today.

CHEVRON STARTING FLUID

TRADEMARK REG. U.S. PAT. OFF.

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

36 Beamed Waterway GATE VALVES 24 YEARS ON THE LINE!

...and still going strong!

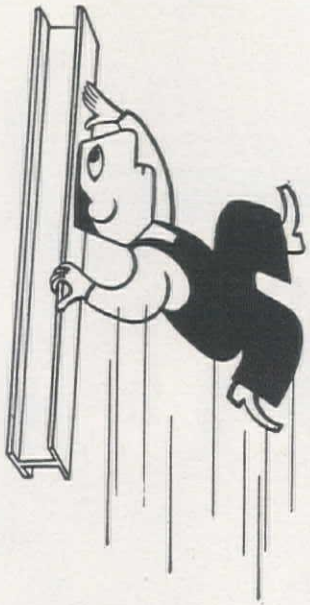
Replacing standard double-disc gate valves on the wash-water lines of a large filtration plant, these 24-inch Chapman Beamed Waterway Valves show practically no wear after 24 years of service under throttling conditions. And they have been free from the trouble commonly encountered with double-disc valves ... uneven wear on seat rings. For this exclusive Chapman design provides extra bearing contact for the downstream disc, reducing wear and preventing it from tipping into the waterway. This extra contact is provided by vertical downstream-beams that are faced with bronze and opposed by bronze strips on the downstream disc.

Many installations of these unique valves in filtration plants, in sizes from 6" to 36", have given results that cannot be matched by any other type of valve. See what they can do for *your* operation. Send for Catalog No. 45.

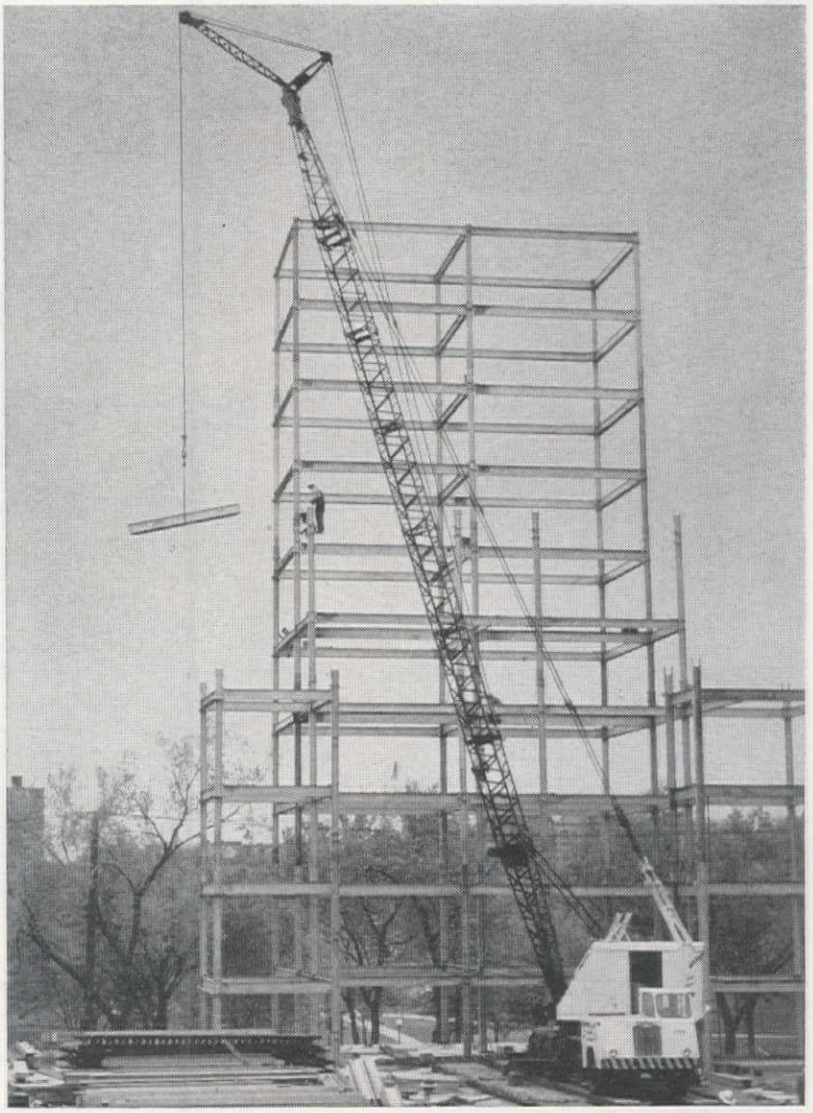
Send for your copy of illustrated Catalog No. 45.

THE CHAPMAN VALVE MFG. CO.

INDIAN ORCHARD, MASSACHUSETTS



All lifts are easier with a BAY CITY CRANEMOBILE



CHECK THESE FEATURES

- √ 20-25 Ton Capacity
- √ Pin-Connected Boom
- √ Hi-Collapsible Gantry
- √ Independent Power Boom Hoist
- √ Precision Power Load Lowering
- √ Removable Counterweight
- √ Specially Designed Carrier
- √ High Road Speeds

Many contractors run into jobs they can't handle unless they buy new equipment. But those owning a BAY CITY CraneMobile have bought versatile, flexible performance to handle long booms for high reach or short booms for heavy lifts.

The BAY CITY CraneMobile is made in several sizes having crane ratings to 25 tons—will go right to the job at speeds up to 35 m.p.h. and is packed with mechanical refinements and operating advantages. Consider the boom hoist—independently operated—with power-up and power-down for precision erection. Then there is the power load-lowering device for handling heavy loads easily and of course the Hi-collapsible gantry which gives an overall height of 11'9" or less when travelling. Why not get complete information from your nearest BAY CITY dealer or write today for catalog.

BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN

BAY CITY

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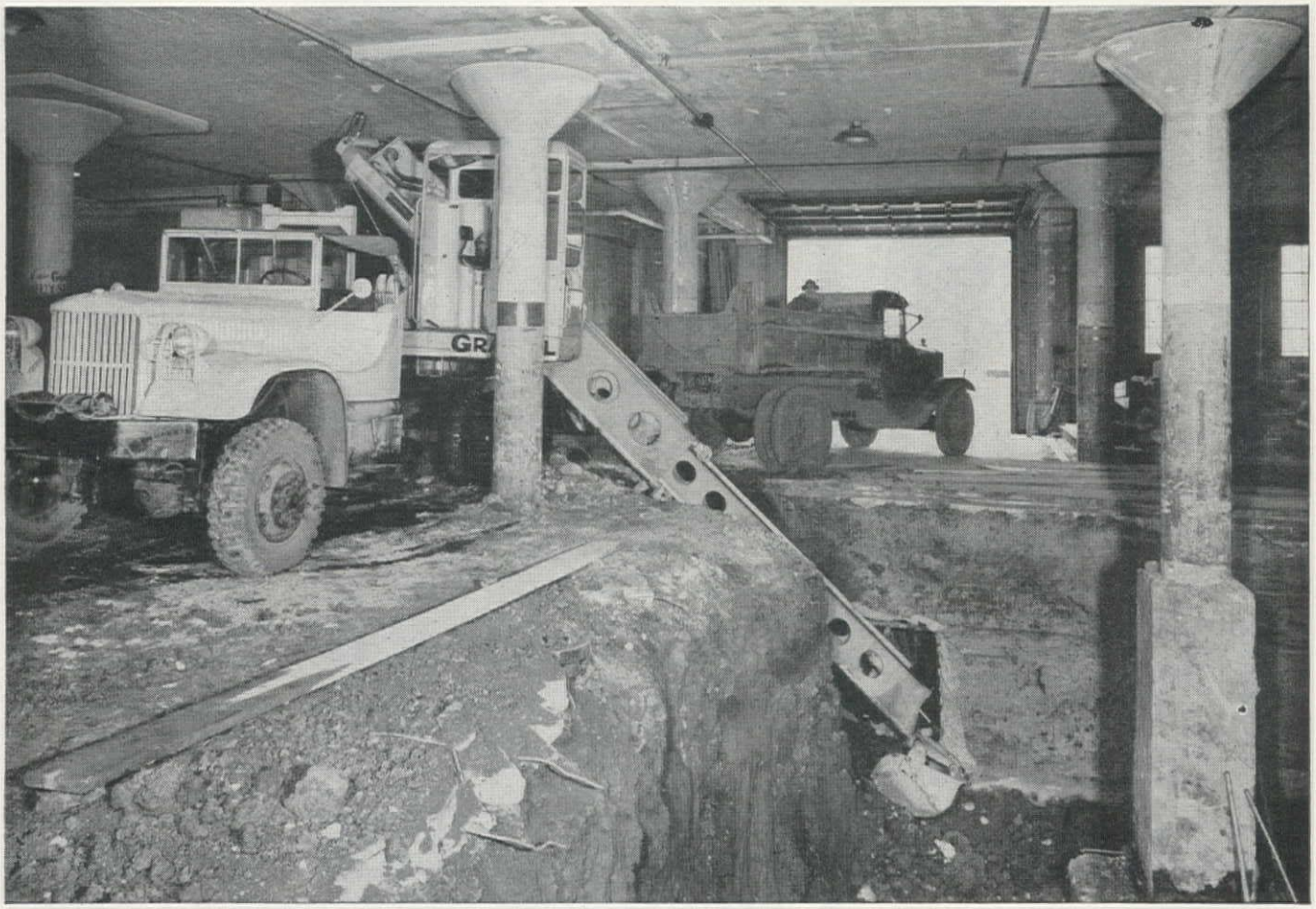

The Gradall works easily in many a tight spot!

WHEN YOUR CONSTRUCTION WORK must be done in "tight" places such as this, there's one machine you can count on to do the job quickly—the Gradall.

Its "arm-action" boom actually reaches out, twists and turns, to do its work in areas very little larger than the machine itself. And the Gradall's powerful hydraulic "down pressure" and exacting tool control make it easy to dig excavations to blueprint specifications—with clean-cut vertical or sloping sides, precise square corners, and perfectly graded floors. It practically eliminates costly hand labor.

But take your own construction problems to your nearest Gradall Distributor. He'll be glad to show you how this versatile machine can cut costs for you, too.

Gradall—the multi-purpose construction machine *with controlled down pressure*

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American's industrial rubber products are designed for the specific job. Resulting in . . .

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There is no substitute for *experience* in acquiring the "know-how" to recognize industrial problems and manufacture the right product for the specific job. That's why so many industrial users of mechanical rubber goods have been American Rubber Company customers for nearly half a century.

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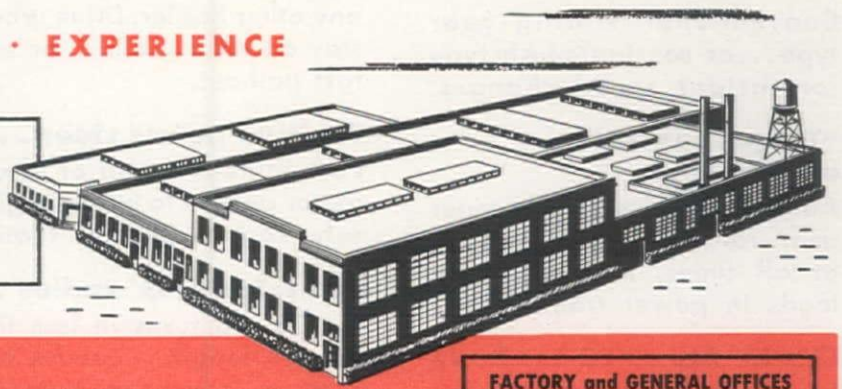
Having a close-at-hand factory is one of the vital reasons why so many western manufacturers are permanent American customers. American's Oakland factory is centrally located and quickly accessible to all western industry. Expanded facilities plus expert technicians make American *the* key plant west of the Mississippi.



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Increase your production

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Check this 50-ton rear-dump

50-ton, 41-yd. capacity...
Custom-built for your needs... capacity from 35 to 50 tons ... bodies to fit your job.

Power to fit your job ...
Engines from 275 h.p. Diesel to 450 h.p. Butane... will fit your grade haul conditions.

Choice of transmissions ...
Conventional sliding-gear type... or constant-mesh type for instant speed changes.

***Torque converter available ...**
Automatically selects proper gear ratio, maximum power at all times, removes shock loads in power train.

17′x13′ top on 50-ton body
Speeds up shovel or dragline loading, cuts spill at loader, reduces delays for spotting.

30.00x33 low-pressure tires ...
Give extra traction and flotation, longer tire life... absorb shock, help compact fills.

Power-proportioning differential ...
Delivers 4 times more power to drive wheel on firmest footing, pulls through mud, snow.

Fast, over-the-bank dump
Far more brake per ton than any other hauler. Drive wheels stay on solid ground for safe, fast pull-out.

Positive power steer ...
Push-button control of electric motor geared to king-pin gives safe control in any footing.

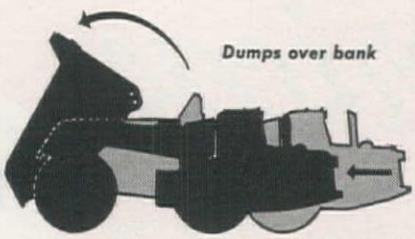
90° turns in 15′ radius ...
Big 36′ rig turns in less than its own length ... saves time spotting...saves time dumping.

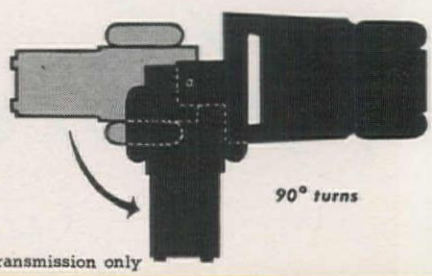
Reinforced steel grid bowl
Floored with ¾″ tool steel over grid of 3″ steel billets on 8″ centers over ½″ high carbon steel plate.

Complete self-cleaning ...
Body dumps with floor at 58° angle...induction heating available for winter work.

Simplified, rugged construction ...
No frames, sub-frames, springs, drive shafts, or hydraulic systems to maintain, repair, delay.

4-wheel air brakes ...
Multiple-disc ... 4792 sq. in. total braking surface, far more than other heavy haulers.





*Torque Converter for Constant-Mesh Transmission only

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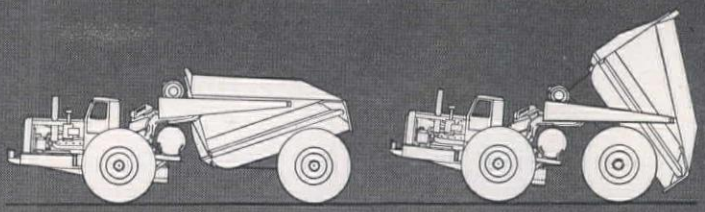

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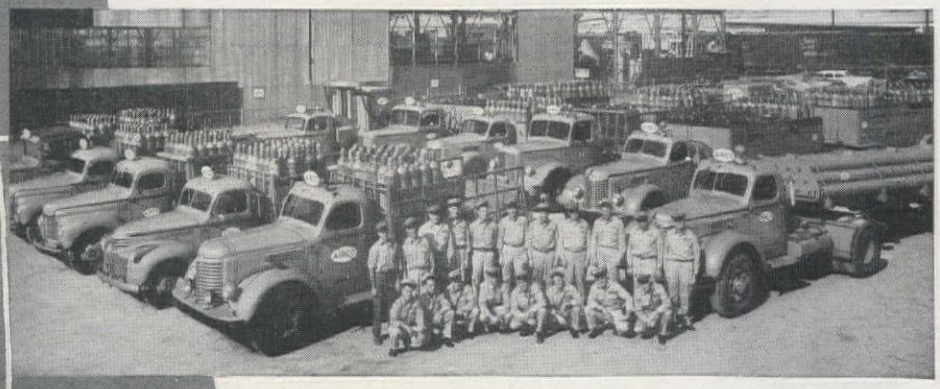

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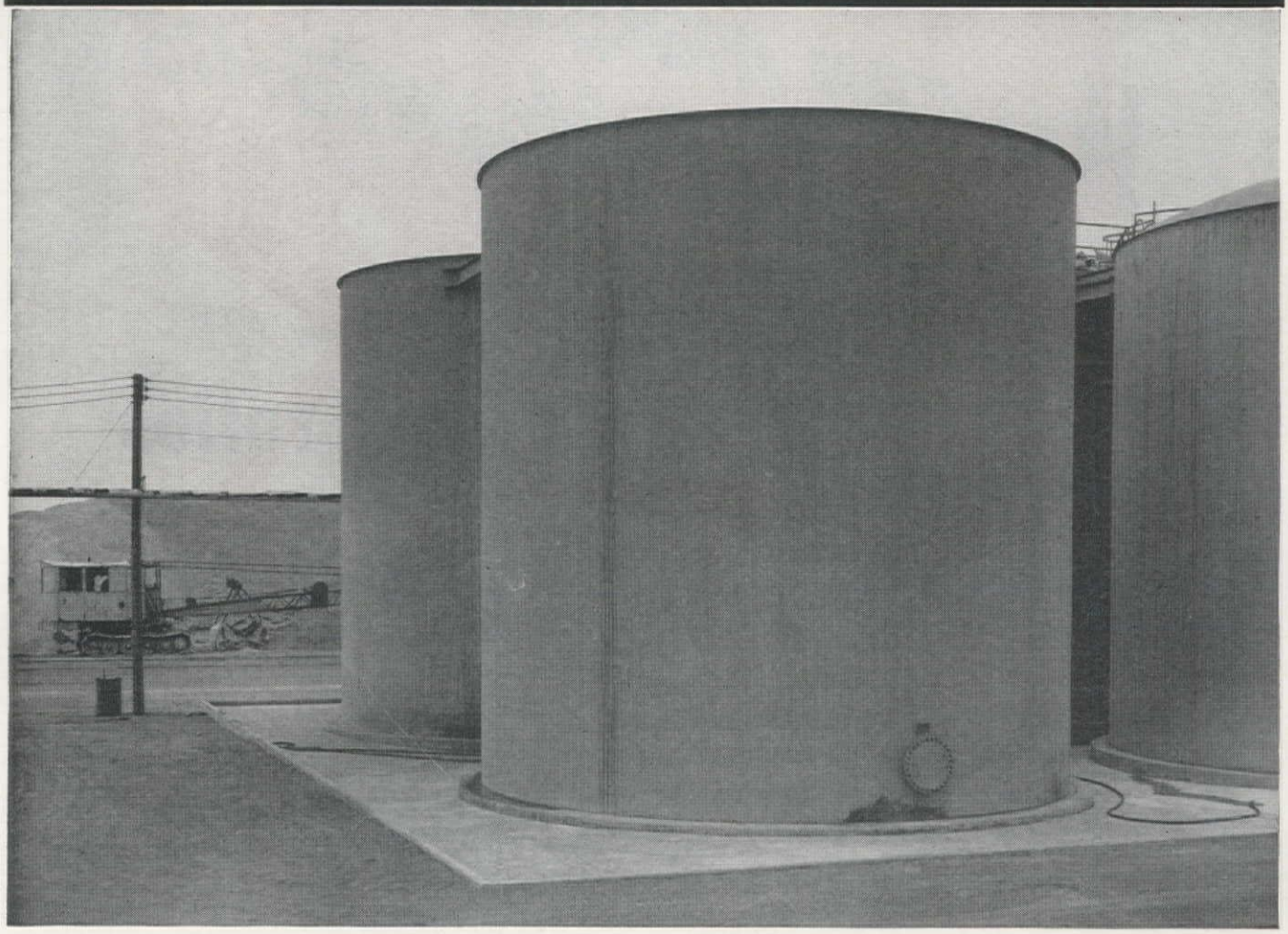

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San Francisco 4	1569—200 Bush Street
Seattle 1	1355 Henry Building
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WESTERN CONSTRUCTION

January 1952 Vol. 27, No. 1

A prediction for 1952

ANY ATTEMPT to estimate construction volume in the West during the year just beginning must be compounded with elements of conjecture and supposition. Normally, any prediction contains elements of uncertainty, but the pattern of the previous year tends to establish a base for the application of assumed deviations. At the start of 1952, however, the pattern of 1951 is not strictly applicable and the variables are multiplying. The national economy, which is always a background factor, is neither all-out war or peace—the word "defense" is most elastic in its effect on construction activity, and can vary by directives or edicts. Not to mention that 1952 is an election year, with all that that implies on the over-all picture. But a prediction is customary:

Construction activity in the West—engineering construction not including residential, farm, or minor types—will equal or exceed the work carried out during the past year.

Such an estimate includes all types of work classed as "defense" and also projects in the strictly military category. In other words, engineering and contracting operations will not decline, although there may be rather important zigs and zags in types of work, location and geographic concentrations. Some of the work may never get into any tabulation of present or future volume, at least as to type or definite location. For example, such construction as radar stations and their supporting facilities in Alaska and other areas will never be identified, but will represent work in 1952 for engineers, contractors, construction men, as well as requiring equipment and materials.

. . . in the West, more people

The basic factor of population growth still maintains its accelerating pressure on needed normal construction. The deferments, which may be necessary during the current year, will only build up this pressure into a larger backlog. Facilities demanded by increased population have a multiplying effect on construction.

Predictions of population growth for the 1950's made a couple of years ago may now be exceeded as a result of military build-up and Western industrial expansion. It could reach the rate of the 1940's, and would be starting from a larger base population. This condition is a factor of safety for the construction industry and will tend to take up any slack resulting from sudden decline in defense preparations, with corresponding availability of materials.

Highway work remains in an atmosphere of uncertainty. Several months ago it received a serious setback with the classification as "non-essential" from NPA authorities who are in a controlling position but lack vision or an adequate understanding of the simplest facts concerning highway needs of the nation, and particularly the West in the present emergency. Today, there is evidence that the picture is changing from the top down, in the matter of official understanding, although the resulting ease-up on materials may require months. In theory there is much Western highway work involving only grading and surfacing, but it is difficult to find projects with this type of work that do not involve culverts, a bridge or two, or an overhead structure. There is beginning to develop a few ideas for going around the hurdle with the use of substitute materials, but many highway departments may decide to wait-and-see in regard to the outlook for steel a few months hence.

Of the more normal types of construction, the general run of municipal improvements, public buildings, recreational facilities and certainly housing not required for defense industry areas will be in declining volume. The "blueprint on the shelf" stage of advanced planning will be proper for this part of the construction backlog.

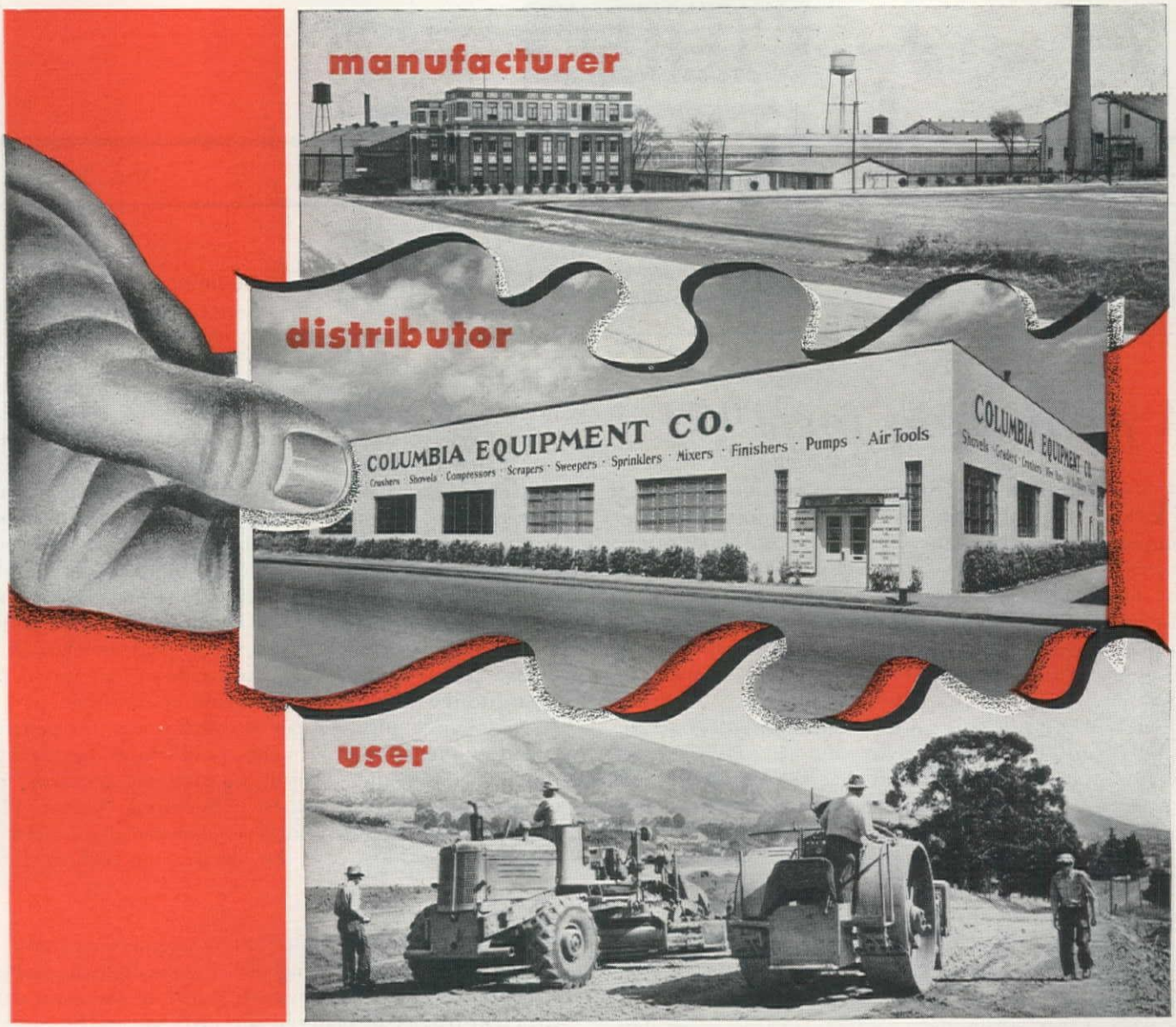
. . . and the materials

Manpower shortage, especially in engineering ranks, is having its effect on moving projects through the design stage, but is only a preliminary hurdle to the main construction barrier of material shortage. When the history of this period is finally written facts may reveal the truth of steel supply as compared to real demand, and the resulting fact of true or false scarcity. There appears some fragments of evidence to indicate that demands are lower, and some elements of supply are more plentiful than official edict would show.

Even for the tonnage allotted, regulations are such that much time is lost and duplication of effort required. Government offices in control of the steel supply are unfamiliar with production and plant requirements for the metal. Sufficient time is not allowed and as a result the schedule of rolling at the mills is not in step with allocations.

. . . and so no chart

With a definite proportion of 1952 construction activity in the West shrouded in military secrecy and subject to the uncertainty of appropriations to be made during the year, combined with the opposite factor of probable increase in steel, there appears no reason to try to add and subtract these factors into a final figure. However, the effect of defense additions will more than counterbalance the losses caused by material restrictions, with the final result showing a switch in types of work but a volume that will add up to more than the past year.



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It has been said that America has solved the problem of low-cost production of machines and goods, but that the problem of efficient, economical distribution remains largely unsolved. However true this may be in other fields, we sincerely believe that it is not true of the construction equipment industry, where the Distributor has enjoyed the confidence of his customers in times of peace, and has more than justified that confidence during troubled and uncertain periods when wars and "rumors of wars" bring about shortages of men and machines.

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WESTERN CONSTRUCTION

Construction volume in the West during 1952 will grow both because and in spite of defense activity, depending upon one's particular field of work. Every contractor and engineer, however, will face the various problems that comprise . . .

DEFENSE EFFECTS in the Construction West

AS THE CONSTRUCTION PROGRAMS of the West begin to accelerate for the rush of the 1952 season, there occur both the opportunity and the need for a comparison of current prospects with the achievements of the year just passed. Although 1951 was entirely "post-Korea" and the wheels of defense were beginning to turn, there was a lot of slipping and lost motion. The new year should see the defense program really take hold. To complete the analogy, then, it should be possible to say that the heavy construction industry will speed up in a corresponding manner. But is this so?

During 1951 national construction volume of all types (including residential and farm) amounted to nearly $30,000,000,000; but during the last two quarters, as the flood of defense contracts mounted, there came the materials squeeze that seemed destined to slow the entire industry. Despite the materials situation, more work was piled on in the form of Congressional appropriation of over $4,000,000,000 for military and allied construction. On the one hand, materials shortages appeared to doom many urgent civilian projects; on the other, federal defense volume would provide plenty for everyone to do.

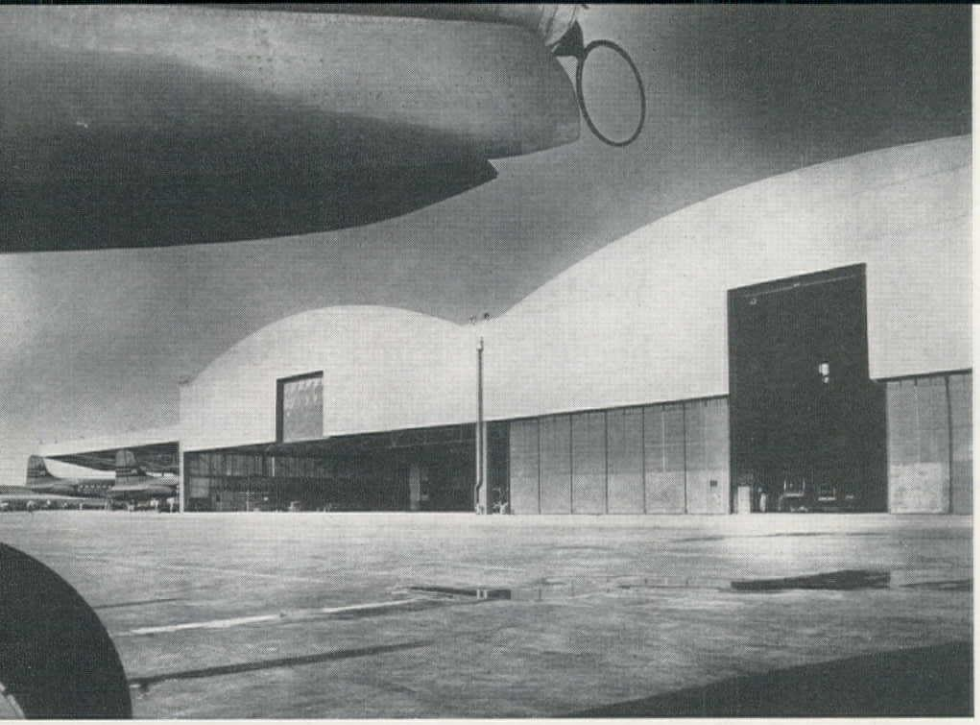
Ups and downs within the industry

Predictions for 1952 seem to settle on a total national construction volume about 10% less than that for 1951. Naturally, the cut is not across the board; rather, trends established in 1951 will continue to govern. For instance, 1951 saw public-industrial and military construction increase, respectively, 383% and 531%. Federally financed airports alone, exclusive of hangar and other building facilities, rose in volume 419%. And these figures include fourth-quarter estimates made last year by comparison of totals then with those of the first three quarters of 1950.

In compensation, other portions of the construction industry have found themselves cut back. Among the larger divisions, private residential construction seems to have taken the most disproportionate cut, September 1951 being down 33% from September 1950. In every case, it seems obvious, these variations from a natural economic trend are the result of controls dictated by the nation's defense and security needs. Housing has suffered from credit controls, while highway and other programs have been curtailed by controls on materials.

The Western picture is still good

Principal effect of the defense effort on construction activity, then, is the shift in emphasis, with military construction taking the fore, in urgency if not in dollar volume. The West has not suffered hereby, and military expenditures that never become part of normal construction statistics will maintain the volume. There are reasons, among them the established Western metropolitan centers and industrial areas producing, for instance, aircraft. But the physical character and expanse of the West have attracted millions more in construction money as the mili-



". . . The West has not suffered, and military expenditures will maintain the volume. There are reasons, among them the established metropolitan and industrial centers producing, for instance, aircraft."

tary has sought the sites it needs for conduct of training and test programs. These require great areas and varied terrain available only in the West. And the end result is the construction not alone of bases, but of complete communities and improved access routes. Dugway Proving Ground in Utah is an example.

Strategic and industrial frontiers

An added impact on Western construction in 1952, not present in an earlier circumstance of national crisis, is the strategic value of the Territory of Alaska. Once categorized a far-flung outpost, it is now rapidly becoming an integral part of the Western economic scheme. Private construction expenditures in Alaska jumped from $280,000,000 in 1950 to an estimated $500,000,000 last year. Defense construction is now the principal activity; compare the $500,000,000 spent during the years since the last war for this purpose to a like amount needed for the present program.

The hydroelectric potential of the West, including little-exploited British Columbia, has resulted in the recent location of many industrial ventures, notably aluminum refining. But even the unprecedented programs of the Bureau of Reclamation have not satisfied the power need, as was illustrated painfully last summer when depleted reservoir storage threatened the Pacific Northwest with a brown-out. Presently in various stages of processing with the Federal Power Commission are applications for permit or license covering 51 Western dam sites totaling over 2,000,000 installed horsepower.

Generally, heavy construction programs in the West (except highways, the fate of which is not yet decided) will continue to have governmental blessings guaranteeing their continuance, though there will be frustrations for all who are involved. These must be passed off as unavoidable elements of a nationwide defense program.

These "fringe" elements of frustration will be represented as that last fraction of a per cent of materials, or labor, or equipment. Regardless of priority, they will be short, and will cause gray hairs for construction men high and low. The year 1952, if it brings no volume increase to the construction industry of the West, will nonetheless bring increasing problems and worry to those who plan and execute the programs ahead.

MATERIALS

Aluminum production will improve, copper remaining tight; but there are all sorts of answers for steel

There are at present three controlled materials—steel, copper, and aluminum; short because they are needed, and controlled because they are short. It has been suggested, in the case of steel, that the material is controlled simply because it is needed, and that there is no actual shortage in the picture. If this is true, then the shortage that the industry is experiencing is artificial, created (however inadvertently) as a by-product of a system of allocation whereby steel quantities are "tied" to those of the more scarce commodity, copper. The reason and reasoning for such linkage is that steel is used in a more or less direct proportion to copper.

Yet, during the first nine months of 1951 the construction industry received direct shipments of over 7,000,000 tons of structural, reinforcing, and other types of steel. This figure, furnished by the American Iron and Steel Institute, is 12.7% above the comparable 1950 quantity and indicates a total for last year of over 9,000,000 tons, a record consumption by the nation's construction jobs.

One man's opinion

With data of this nature in mind, President A. B. Homer of Bethlehem Steel Co. in mid-November labeled the steel shortage a "myth": "It isn't a shortage of steel that's the trouble, it's bad distribution. There's all the steel the country needs." This was spoken in particular reference to a government statement that construction of 15 ships was being delayed by a lack of steel; but Homer went on to decry the government's handling of the steel situation, and the abnormal business relationships that have resulted: "Instead of ordering steel, customers file 'requests.' Instead of consuming industries, we have 'claimant agencies.' Instead of distribution being shaped by natural economic factors, it is shaped by unrealistic demands, claimant agency pressures and overall cutbacks."

With much of the steel shortage apparently created "outside" the steel industry, a partial solution to the problem, one that would permit the most general easement of restrictions on steel, would be extensive substitution of other metals for copper. This has been done before, during the last war, when national reserves of silver were employed on a temporary basis in manufacture of bus bars for large electrical installations.

Copper substitution brings problems

Conservation of copper is getting serious consideration by electrical equipment manufacturers, the largest users, and National Production Authority officials. This is important, for despite expansion programs being implemented within the copper producing industry, the metal will remain in shortest supply for five years or more. Manufacturers struck an encouraging note last October when, in conference with government officials, they emphasized that copper substitution can be effected on a long-term basis to as much as 25%. In fact, means of achieving 5% to 10% substitution (using aluminum instead) are presently under consideration.

At the same time, it was noted that substitution of aluminum for copper tends to lag for several reasons, among them a lack of assurance that aluminum will be made available in quantity to support the substitution program. A shift from one metal to another requires engineering study and redesign both of products and producing facilities. This in turn necessitates retooling, thereby involving another critical phase of U. S. industry.

With copper genuinely short, and despite some indications of artificiality in the overall steel shortage, there are "areas" of steel production that are short. For example, structural steel has been particularly critical on account of requirements within the industry for expansion of facilities. Further back in the steel picture is the matter of raw materials: during the winter steel furnaces depend in large part on accumulated scrap. And this source has not been satisfactorily exploited.

The drive for scrap must continue

As late as November of last year, it was announced that 1,000,000 tons of automobile scrap was needed to avoid steel shutdowns during the winter. There was proposed a limitation that would restrict auto wreckers to a 90-day inventory. The wreckers balked, saying that this would serve the more significant and undesirable purpose of forcing prices up; their counter-proposal included a 150-day inventory and 500-car limit. NPA officials, however, insisted that government condemnation and requisition of wreckers' stocks might be necessary if the 1,000,000 tons did not appear.

The scrap drive, nationwide in every industry, has continued, but has run into weather difficulties. Seriously curtailed was a scheduled farm-scrap drive; delayed until harvesting and marketing were completed, the initial date was then preceded by first snows that virtually put the farmers indoors for the winter.

During this critical period, the shift in emphasis continues, non-essential work being prohibited in favor of defense construction and supply. The brakes on construction control were applied in October to the tune of $68,000,000 in the Rocky Mountain region; 400 commercial projects were slowed or stopped by the NPA's "sweeping rejections." And in November the NPA announced it had denied 63% of construction applications in the fourth quarter of 1951. There were indications that matters wouldn't improve right away for the commercial constructor: "It is unlikely that approval will be given to any project not at least 20% completed," said NPA officials, citing the fact that fourth-quarter provisions represented only 15% of steel requested, 3.6% of copper, and none of aluminum.

But by mid-1952, what then? One Wyoming official, E. C. Rothwell, secretary for the state's board of supplies reported in November that NPA officials in Washington were reassuring: "Production officials who regulate allocations of the basic metal are of the opinion steel companies will catch up with orders by next June and thus be able to release more steel for civilian projects."

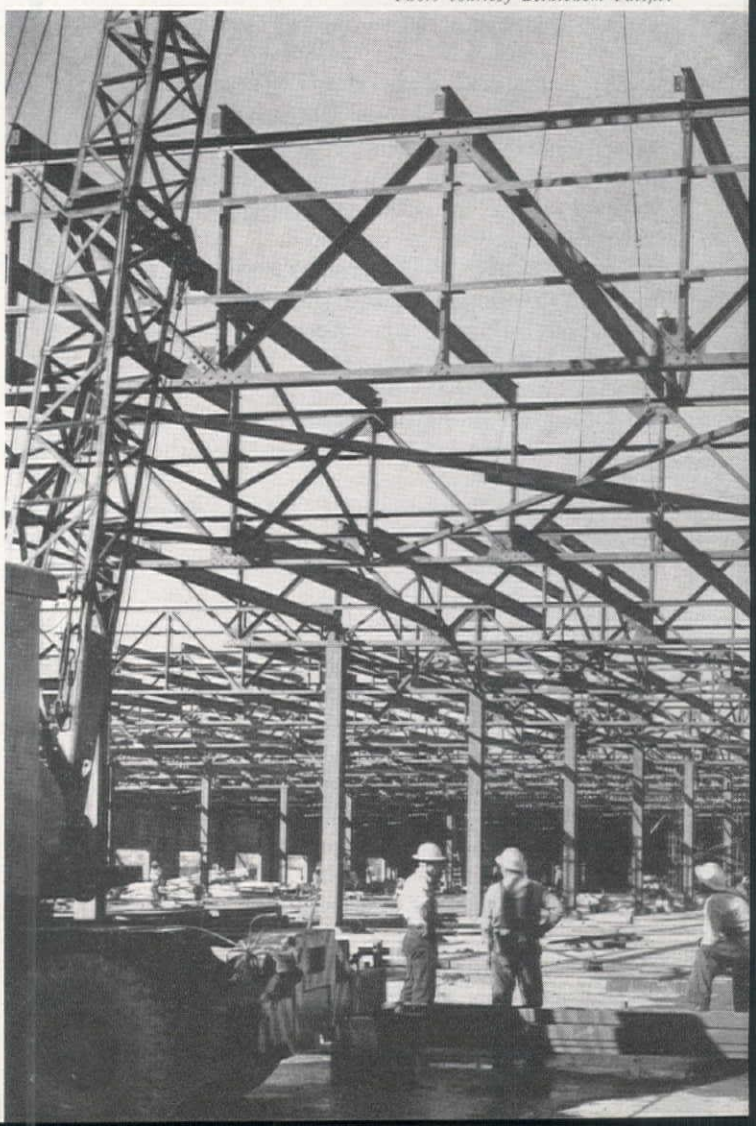
Highway steel has many spokesmen

Despite the extent of current cutbacks, and whatever the nature of the shortage in steel, it nevertheless remains all too true that some vital aspects of defense are being neglected as a result. School needs could be cited, but these needs are local or, at most, regional. Highways, however, must be accorded the proper national evaluation.

Among the lessons learned in the last war—and still being paid for—is that highways cannot be even adequately preserved by maintenance alone. Our highway plant is not fixed in nature; it is geared to the rest of the nation's

". . . during the first nine months of 1951 the construction industry received over 7,000,000 tons of structural, reinforcing, and other types of steel."

Photo courtesy Bethlehem Pacific.



" . . . Highways are links in assembly lines that sometimes extend hundreds of miles. We must feed, clothe and house 'defense' workers and the rest of our population. The safety and economy of our nation depend on how well we do our work."

business and must expand with it. This is just as true in times of emergency as at other times. California alone is currently $3,000,000,000 behind its needs in highway construction; a prolonged period of "maintenance only" would create a financially insoluble situation for the future. Yet, with needs of 20,000 tons of highway steel quarterly, the state received only 11,000 in the fourth quarter of 1951 and was told by NPA to expect only 3,500 tons per quarter in 1952.

Highways need 2% of all steel

Realizing this, those who speak for the nation's highways are currently viewing with justifiable alarm the possible results of NPA thinking as expressed last year by Manly Fleischmann, who said, "highway modernization and reconstruction are not essential undertakings . . . of our national defense . . . severe curtailments of such construction involving steel is in order." The voices that have been raised following this statement represent nearly every Western state in addition to the American Road Builders' Association and the American Association of State Highway Officials. Among the single phases of heavy construction, it would appear that highways have the most spokesmen.

At the annual meeting of the latter association, held in October, J. A. Anderson, Commissioner of the Virginia Department of Highways and then association president, emphasized the importance of U. S. highways:

"While we will be short of steel and other materials we firmly believe, yes—we know—that keeping our highway plant in order is absolutely essential. While we are building no new roads we must continue our program of rebuilding and modernization.

"Our leaders in the highway field are determined that the essential role of highway transport shall not be overlooked or cast aside. When materials and equipment are sorely needed we will not take 'no' for an answer. Work with us, work together and our needs will be met.

"It would be folly to permit our highways to deteriorate. Highways are links in assembly lines that sometimes extend hundreds of miles. We must feed, clothe and house 'defense' workers and the rest of our population. The importance of our work cannot be over-estimated. The Safety and Economy of our Nation depend on how well we do our work."

It was at this time that the American Association of State Highway Officials went ahead to adopt a resolution that well summarized the Association's views. Noting that highway facilities are still inadequate due to prewar depression and World War II restrictions, the preamble states that "preservation of an adequate highway system is imperative" in national and civil defense and overall economy. There follow resolutions providing: "that (1) the essentiality of highways be given proper recognition by increasing the allotment of steel for highway purposes to at least 2% of the total national production . . . (2) that this Association voices complete confidence and satisfaction in the work of the Bureau of Public Roads as claimant agency . . . and (3) since highway equipment is now being classified in a low position of priority in relation to other equipment, it is urged that the classification of such equipment be raised to its proper relationship . . . "

In November, Gen. Eugene Reybold, executive vice president of the American Road Builders' Association presented a striking illustration of highway essentiality, citing production of the Walker military tank by General Motors in Detroit: 2,000 suppliers in 23 states contribute parts and materials to the manufacture of this tank, 77.65% of them by means of highway transport. General Reybold deplored the fourth-quarter delivery in 1951 of only 250,000 tons of highway steel where 482,000 tons had been ordered: "I can foresee nothing but major failure for our highway system and slow-downs and delays for the defense mobilization which depends so heavily upon it."

Western highway views differ

In the meantime, with ambitious programs already laid out, the states by and large are proceeding as before, awaiting developments. The state of Washington is, perhaps, typical: "In view of the uncertainties that now exist in relation to materials, labor and costs, we have concluded that the best procedure is to carry on as best we can until

something stops us." This statement, by W. A. Bugge, Washington's Director of Highways, is particularly significant in that it points to other factors than steel as already affecting conduct of highway programs.

It may also be said that Washington's procedure is, in common with some other states, dictated by the pressures resulting from larger population, traffic, and highway mileage. Its projects would not be feasible if designed to lower standards, and the defense effort has increased, rather than decreased, highway needs. More lightly traveled states would seem better able to introduce compromise into their designs and construction. Arizona has come up with some special designs calculated to save steel; these are noted in the following statement from R. C. Perkins, State Highway Engineer:

"The shortages in steel allocation have necessitated some changes in design. Unreinforced concrete arches, up to ten feet, are being substituted for the smaller culverts . . . In the case of the Cutter-Peridot project, which is the initial phase of the relocation of U. S. 70 on the north side of San Carlos Reservoir, dips are being specified in place of structures. This expedient is regarded as stage construction, with plans for structures held in abeyance pending the easing of priorities on steel. I am sure that you all feel as we do, that the placing of highway steel allocation at such a low level priority, is an extremely short sighted measure . . . We shall continue, however, to attempt, through sound programming and effective maintenance, to keep our roads bearing traffic, and our engineers at work."

Some states will "make do"

In New Mexico, State Highway Engineer B. G. Dwyre is redirecting his highway program to avoid conflict with the materials problem:

"We do not wish to sacrifice quality for quantity during this period of shortages, so we are planning projects on our federal aid primary and federal aid secondary systems that do not require extensive bridge construction. [Two state bridges across the Rio Grande, at Belen and at Albuquerque, have already been delayed a year by the lack of steel.] . . . The steel situation, being what it is, and the difficulty in obtaining treated timbers, have been the only noticeable material shortages so far, so we believe our programs will not be materially delayed. We do not wish to redesign projects to fit conditions, nor do we intend to emphasize maintenance to get by existing conditions. We hope to continue on, as best we can, until such time as relief in the construction business is reached."

It seems fair to say that the materials shortage has most seriously hit highways, among the many phases of heavy construction in the West. In the structural field the general type of work has survived, although there has been a shift in emphasis to military construction. Warehouses, for instance, are now being built for Uncle Sam and have his priority in guarantee of reasonable speed to completion.

During 1952, the effective and righteous voices of highway interests should gain for this activity its proper national recognition. Statistical support for highway programs will come also with increased steel production.

At least in highway work, costs appear to loom as a problem equal in importance to that of materials; this has been noted above for the state of Washington. However, despite good bidding competition, there have been gradual increases in unit prices submitted in the state of Oregon also. In Arizona this same trend has been so marked that there have been three rejections in recent months, the low bids being 17, 23, and 33% over the engineer's estimates. Most lately, however, bidding has been more realistic, with a leveling off indicative of growing bid confidence.

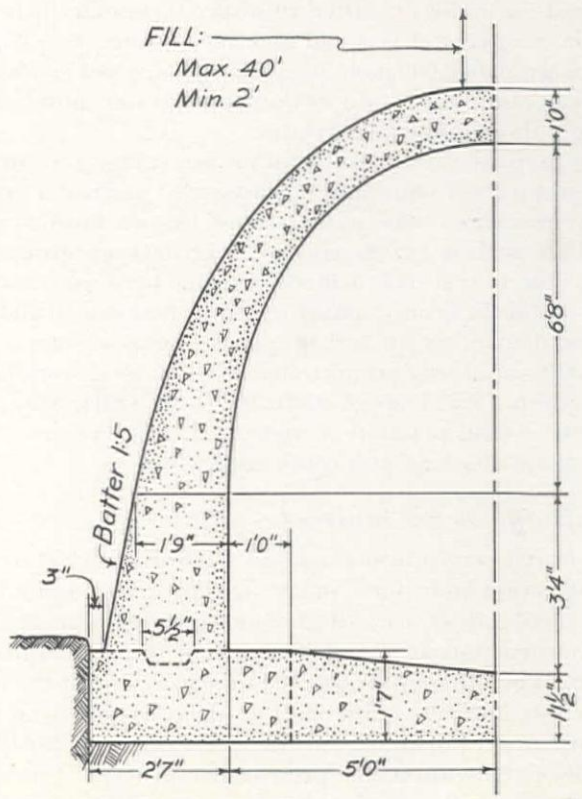
Cost indices compiled by the Bureau of Public Roads bear out indications of continued increases. The composite mile of the Bureau rose 1.9% from the second to the third quarter of last year, with the sharpest rise within the composite being that shown by structural steel costs, up 7.7%. In California, the index maintained by that state's Division of Highways showed a 6.9% drop during the same period, not, however, enough to undercut the first-quarter figure. The drop is considered insignificant, reflecting only recovery from an abnormal or artificial peak reached in the second quarter as a result of the spring surge to use up remaining federal funds before the end of the fiscal year. The third-quarter point is in line with trends of the first quarter and earlier.

The situation could be worse

Costs in construction, like costs elsewhere, are some indication of demand for the materials and labor involved. It is perhaps surprising that no sharper rise has been experienced during this period of only partial mobilization. However, speaking primarily of industrial production, *Business Week* voiced some thanks that moderation had so generally been maintained: "From an economist's viewpoint, things have worked out almost ideally. The civilian economy stepped gracefully aside for the military. Had the consumers got in there and fought for their share, the whole economy by now would either be busting at the seams or completely straightjacketed with controls."

ARIZONA HIGHWAY EXPEDIENT

"Unreinforced concrete arches, up to ten feet . . . for the smaller culverts."



LABOR

Some trades will not be absorbed by defense work, but may look for renewed civil effort in 1953

To appraise effects of the defense effort on labor supply and availability in the West, it is necessary to note two things: (1) the national need as it compares to the national working force and (2) the percentage distribution of the U. S. population in various significant age groups.

At the end of last year the national labor force, including military personnel, stood at about 67,500,000, according to figures of the U. S. Department of Labor, Bureau of Employment Security. At that time also, defense employees numbered 6,000,000, an increase of about 2,000,000 since June and of about 3,300,000 since the last quarter of 1950. During the months to come, another 2,500,000 people must move to defense work if production goals are to be maintained.

The labor force serves more people

The greatest squeeze on the labor supply will therefore occur late this year or early in 1953. The situation will not be intolerable, for a number of reasons: the principal personnel draft of the Armed Forces will be complete; also, much of the 2,500,000 increase exists only on paper. An individual will not change jobs; rather, his organization will change its product. In the case of construction men, the switch from private to military projects moves them automatically into so-called defense work.

Census figures for 1950 reveal startling changes in the distribution of U. S. population since 1940, changes which are significant in these days of guns and butter. The national total rose 20,600,000, or 15.6%, to a new high of 152,300,000; but the growth was very uneven as our improved technology resulted in disproportionate increases in the numbers of very old and very young. As a result, there are 20,000,000 more people to be supplied goods and services, but not a proportionately greater number to supply those goods and services.

In particular, there has been no percentage gain in the age group 19-25 years, and it is upon this particular group (at census time) that we must draw for our military and civilian workers as time goes on. The next age group "in line," the 18-year-olds, actually declined between censuses, and so did the group comprising those between 10 and 17. Thus, demand is up and supply is down—in some cases actually, in others, proportionately. The total work-force age group, 19-54 years, grew 10.3% in ten years, while the country's total population went up 15.6%. Here is a significant example of proportionate decline.

Draft effects are indirect

Selective service is not a particular direct threat to the construction labor force of the nation. A year and a half ago, men of draft age (19-25) comprised less than 15% of all construction men, and half of these were veterans already. The indirect threat of selective service to the construction industry is its effective delay imposed on the young men who would normally be taking up building trades. Even without the present emergency, the median age of construction workers has risen steadily for fifty years, from 38.6 years in 1900 to a little less than 43 in 1940. In 1947 about 30% of construction workers were over 45.

". . . Labor shortages will exist in some centers, but should not be critical in the West as a whole."

During 1952, productivity in construction can be in some measure stepped up where necessary by adoption of a longer work week. In the West this is particularly feasible; in fact, the entire work "season" is already longer than in other parts of the country, being the full calendar year in most areas.

This and other factors of suitability in the West have contributed to the heavy work load now building up here, with the result that there is concern over the development of individual critical trades, those that are in especially short supply. Generally, to date, these labor shortages are restricted to metropolitan areas that are already critically short in other respects as well. And in those areas, all trades, rather than just one or two, are short. San Diego is an example, and others are developing.

All in all, the West has an edge

In summary, the defense effort has affected construction labor supply in that it is calling for more and more workers in defense activity. But for the individual, this means only that he will be working on government rather than private projects. Labor shortages will exist in some military construction centers, but should not be critical in the West as a whole. The trends within the industry are mixed as a result of the change in emphasis from private to government character and sponsorship. During 1951 (first six months) average nationwide construction employment was 2,430,000—an increase of 360,000 over the corresponding period in 1950, and despite a slackening of commercial construction.

Yet it is doubtful that all concerned trades will survive the switch in emphasis. Thus, according to the Department of Labor, "By the middle of 1952, total construction employment may well be slightly under current levels."

It would seem, however, that beyond that point and in 1953 construction employment should rise again. The effects of non-replacement within the ranks of construction trades will tighten the supply; yet at the same time, national defense chiefs hope, the impact of the defense build-up will be complete and the nation can look once more to a broadening of civilian production, including commercial construction. Thus, the West can point to another construction boom: still a growing community of the United States its growth has been accelerated by defense work but its expansion of usual commercial facilities curtailed. It will work fast to catch up.

EQUIPMENT

Military orders scattered both as to equipment type and manufacturer; industry at 75% of capacity

The prospects for the manufacture of construction equipment requiring large quantities of a controlled material—steel—have been a cause of concern among contractors and engineers in planning their 1952 operations. According to the Construction Industry Manufacturers Association, however, the outlook is not so bleak as might be expected: the beating taken by construction equipment is still largely the one it takes in the field during the normal course of work.

No criteria for equipment needs

Some general predictions for equipment availability have been made for *Western Construction* by Julien Steelman, president of the Association, whose preliminary observations and assumptions are worthy of note:

"The present situation is one in which both material for construction itself and material for construction equipment are under controls administered by NPA. Since there are no standards or criteria to use in establishing how much equipment is needed for a given amount of construction, we have had considerable imbalance during the past year between the amount of construction work authorized and the amount of material made available for equipment to do this work. It seems inevitable that this imbalance will continue through 1952 and will probably be somewhat aggravated during 1952. If we assume that the load of construction work to be done in 1952 will be approximately the same that it was in 1951, then the following situations will probably exist in various segments of construction equipment.

"The overall picture for construction equipment will be that somewhat less equipment will be available for civilian consumption in 1952."

Within the equipment industry, impliedly, there are areas of sufficiency. For example, the supply of hand tools, air tools, and pumps is expected to balance the demand; and equipment used primarily in residential construction should be readily available.

Where a tight supply, or a shortage, exists, the cause of course is heavy government consumption. But the use of such equipment, depending upon its intended assignment and geographical distribution by the government, is still not completely lost by the commercial contractor. In Alaska alone, the Army Engineers maintain a pool of more than 1,500 items of construction equipment for use on a rental basis by contractors doing government work there.

The availability of an item of equipment from a single manufacturer, Mr. Steelman points out, is not representative of the position of all other manufacturers. Expanding this point, neither is the supply within the industry regarding one type of road maintenance equipment, for instance, representative of the supply of other types. Government contracts for the purchase of equipment have been awarded in such a manner as virtually to corner one manufacturer's entire output, leaving others free to supply civilian demands. Furthermore, again speaking of road maintenance equipment, graders and rollers have been in heavy demand by the government whereas loaders and the smaller crawler tractors have not.

The foregoing illustrates the imbalance suggested by Mr. Steelman. Nevertheless, CMP restrictions will operate as somewhat of a corrective force, limiting output of concrete paving and road building equipment (at least until the official view as to the essentiality of their application, highways, is altered). "If the road building program in 1952 is cut below the 1951 program, it is expected that the supply of new equipment plus existing equipment that can be made to do the job will be adequate."

Carryover of 1951 orders into 1952

In addition to graders, rollers, and scarifiers, etc., the government is contracting for a large percentage of heavy crawler tractor output. If 1952 civilian requirements are as high as 1951, there will not be enough equipment to satisfy them. Military orders for cranes and shovels also have been particularly heavy, there being at present a carryover of shipments that were scheduled for last year.

This carryover was doubtless caused by latter-1951 confusion in the materials situation. Alarm from this cause was so great in September that an industry spokesman declared shutdowns imminent at that time. The end result was indeed that the construction industry's operating rate for 1951 was estimated at 70% to 75% of capacity. And, according to Steelman, "There is no reason to expect that the industry will operate at any better than this rate in 1952 unless material allocations are increased.

". . . graders and rollers in demand by the government . . . military orders for cranes and shovels heavy."

WESTERN CONSTRUCTION

Progress in construction is not marked alone by the departure of the last man from the job, or by the ribbon-cutting ceremonies. It is a continuous process, the daily result of ideas coming from office and field that add up to . . .

NEW DEVELOPMENTS in the Construction West

IDEAS OF TODAY may develop into accepted practice tomorrow or fail to meet the test of feasibility and go into the discard. Only by continuing study of new ideas, their immediate use, or adaptability to other types of engineering-construction is it possible to add the annual increment of progress to the advance of the industry.

During the past year or more there has been a wealth of contributions by Western engineers and contractors relating to new uses of materials, field procedures and equipment. Most of these have been reported in detail through articles in the issues of *Western Construction* during the past twelve months.

CONCRETE

A basic engineering material is constantly being improved and finding new uses in construction

In the field of concrete design and construction the interest in water control has gradually taken second place as the experts' attention has been transferred to matters of aggregate grading and the effect of admixtures. There is no decrease in the field man's desire for a simple mix that will "flow," contrasted to the experts' insistence on a final product that can best be achieved with a dry mix using admixtures.

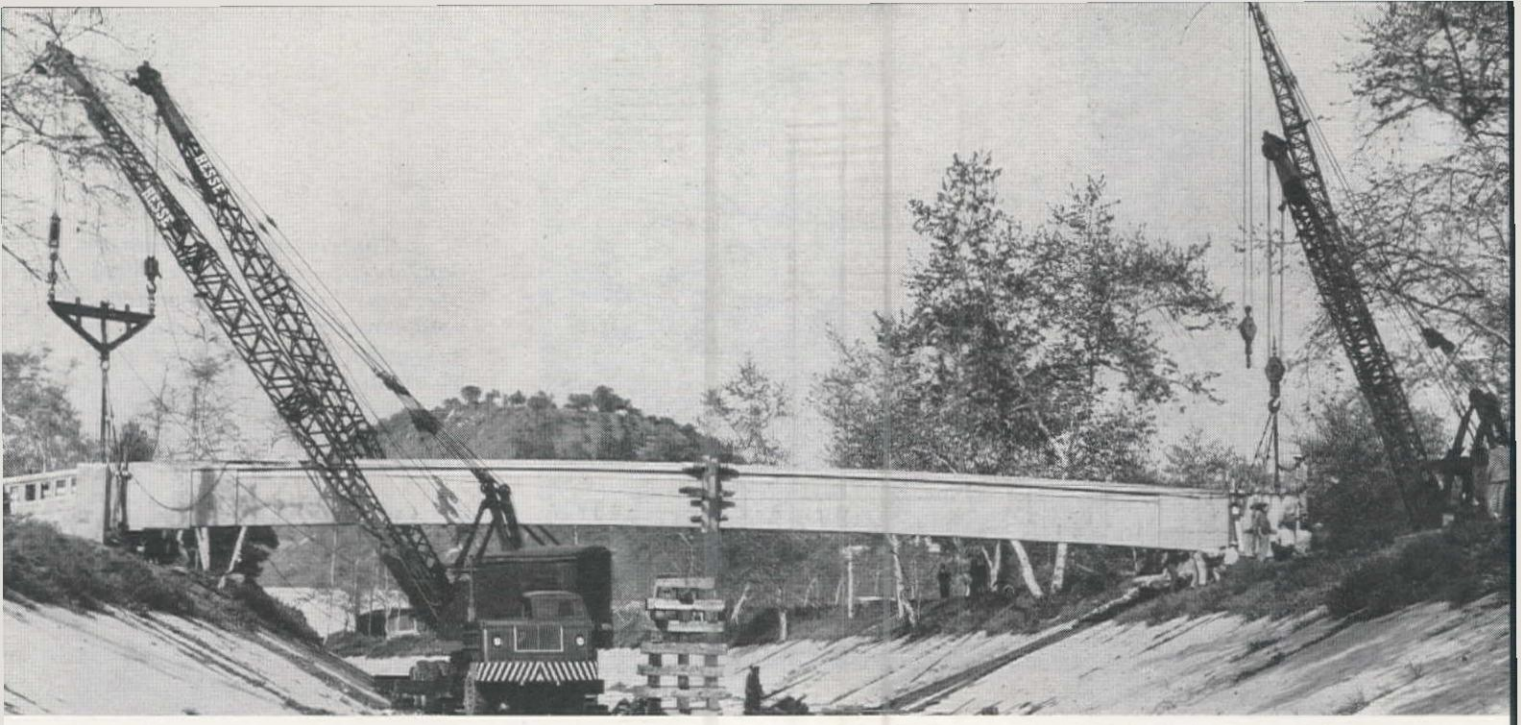
Cracks are frequently the measure of results, as observed in the field, which strengthens the position of the expert in the demand for drying up the mix. Too often other factors intervene to counteract the best intentions in complying with such a specified mix. Economy demands standardization in mixes that are provided by a central plant, whereas concrete is the type of complex product that should be designed for each separate use and set of conditions.

The end is not in sight, and any open discussion between those who specify the materials for the mix and those who direct its placing in the forms will emphasize long-standing differences which are only gradually being reconciled. In spite of all differences of opinion and conflict, concrete continues to be the universal engineering material, which maintains a record of distinguished service.

Developments in the field of concrete construction that have been notable in the West during the past year are outlined briefly.

PRECAST CONCRETE

Advancing far beyond the original precast products of building blocks and small pipe, this field of concrete has made rapid strides in the structural field during the past year, with particular acceleration in Southern California. The term "precast" is relatively loose and covers a wide variety of concrete units and uses. Dismissing those elements which are "un-reinforced" as not involving features of engineering technique, the units range all the way from



". . . From precasting to prestressing represents but one step . . . Up to the present time the 110-ft. bridge built over a flood channel near Los Angeles is the only important use of this process in the West."

pipe of 15-ft. diameter weighing 65 tons to complex wall sections complete with window openings for single story buildings. In the building field, the "tilt-up" procedure continues to get major recognition, as the practice of casting on the job with direct lifting into position from the casting bed has become fairly standard procedure. A further refinement is the method of handling the units with a vacuum-lift, which provides advantages of eliminating stresses developing from the conventional top lift.

In these two fields—pipe and structural elements—the former has advanced further with corresponding standardization in design and casting. Except for continuing development in the design of joint details, usually consisting of rubber gaskets compressed into joint grooves, current casting and handling practice do not feature any startling developments. Up to medium hydraulic heads, the inside pressure on these concrete sections is sustained by one or two cages of reinforcing steel. In the permanent plants and for large jobs this steel is usually wound on a collapsible mandrel and welded to longitudinal spacers. For higher heads conservative engineering design dictates the use of a cylindrical steel shell, although many concrete experts contend that reinforced concrete pipe without the steel shell can be designed for higher working pressures.

Structural units grow in size

In the use of precast concrete for structural elements there has been an accelerating volume of construction. Interest has been shared by structural engineers in developing new designs, and casting companies in improving the characteristics of the units as well as the processes of field connections. During the past twelve months, these developments have maintained their lead in Southern California, but the general principles have recently been expanded to include jobs in other areas of the West. Single-story structures such as warehouses and industrial buildings are now built completely with such precast units, including walls, columns and roof girders. A review of one of these ultimate precast jobs appeared in the issue of October 1951, p. 70. A special development in precast technique was included in the plans for the underground garage in Los Angeles where heavy columns 30 ft. long

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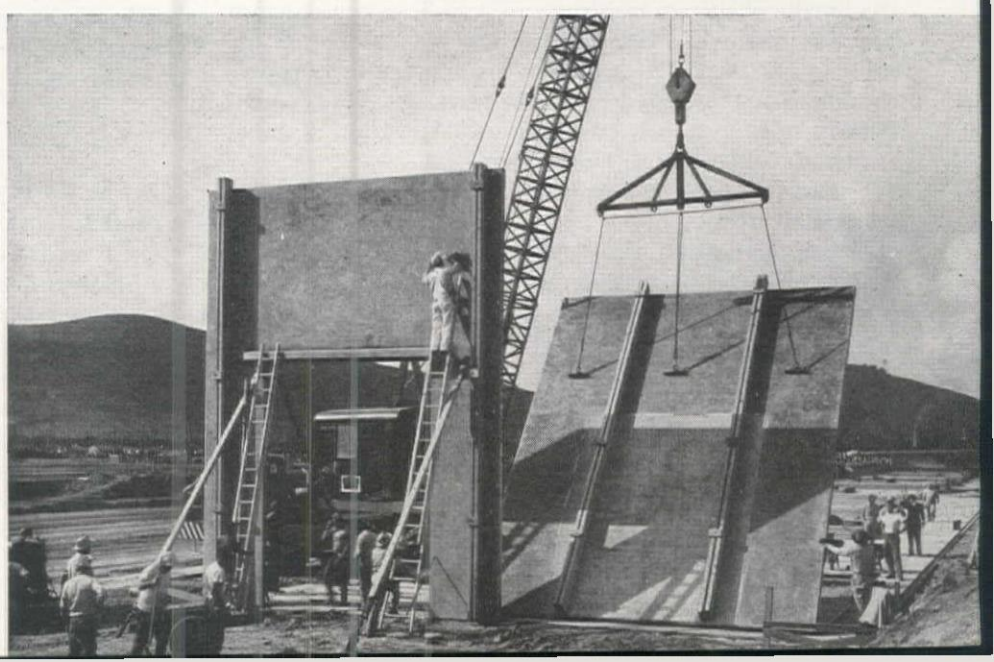

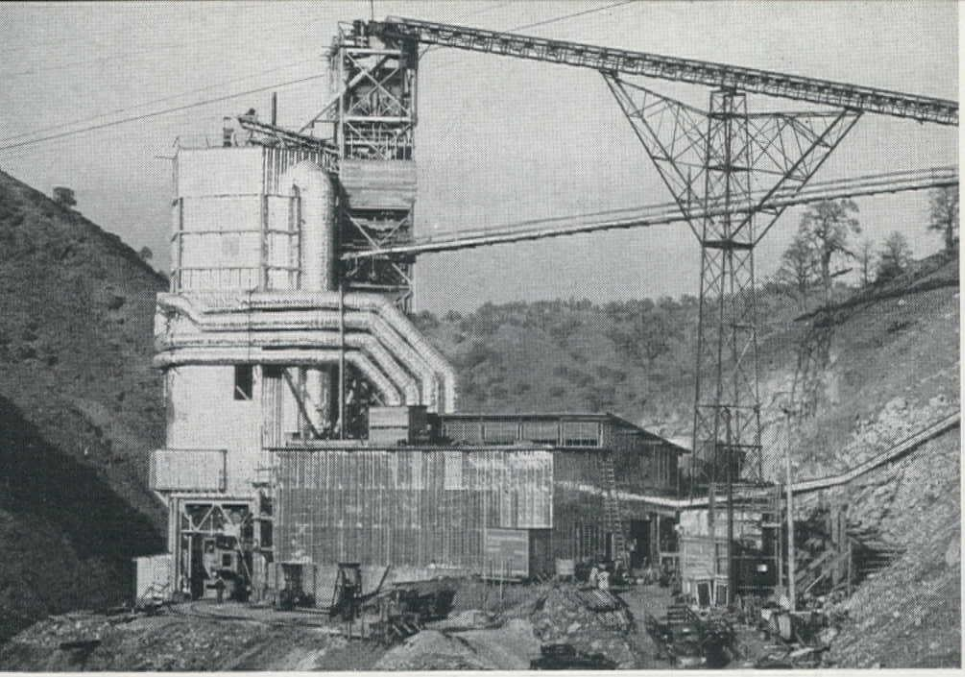

". . . Contractors and concrete equipment experts have developed methods for producing cold concrete . . . cooling the aggregate by circulating cold air through the storage bins at the batching plant . . . The system is employed at Pine Flat Dam."

were inserted into drilled holes around the perimeter of the site and used for temporary supports during excavation, followed by incorporation in the permanent structure (*Western Construction,* July 1951, pp. 61-65).

Handling problems represent an important phase of this general method of construction, involving both the transfer of the units from the casting bed to vertical position, as well as corresponding problems in transportation if casting is done in a central commercial yard. The advantage of flat-casting in the quality of the resulting concrete is well understood by engineers and contractors alike, as compared to a similar whole section cast vertically on the job. With modern proportioning of the concrete, placing methods and vibration, the precast product represents the ultimate in quality concrete.

PRESTRESSED CONCRETE

From precasting to prestressing of concrete represents but one step, although it is a big one. Design principles are relatively simple (*Western Construction,* April 1951, pp. 76-77) although they must include such debatable allowances as: (1) creep in the steel and (2) plastic flow in the concrete over long periods of time if the designers' assumptions are to be translated properly in ultimate stresses. Design has advanced faster than field work in this newest phase of concrete construction. Field developments face the hurdle of certain traditions in American construction practice that favor a lavish use of materials if labor on the job can be saved. This differs from practice in Europe—the home of prestressed concrete—where the cost of field labor is not too important and the conservation of materials is the objective of the designer.

Up to the present time the 110-ft. bridge built as a pedestrian crossing over a flood channel near Los Angeles is the only important use of this process in the West. Other structures to be built of prestressed concrete have been carried through the design stage, but shelved for various reasons. Matters of cost and other factors connected with the steel shortage have tended to delay Western contributions in this field.

The prestressing of cylindrical reservoirs and silos continues, with at least one important development during the past year. Dating back at least 25 years, one of the first practical adaptations of prestressing was the placing of horizontal steel bands around concrete reservoirs and the stressing of these bands by means of threaded ends to place compression in the cylindrical wall. The next development was the wrapping of such concrete structures with a high-strength steel wire wound continuously under a stretching action which placed the same type of prestressing in the concrete. Within the last year this idea has had a further development with the use of individual steel wires stretched to a predetermined tension and fastened. This last development was used in the West for the first time on a series of concrete silos.

PREPLACED-AGGREGATE CONCRETE

From the original idea of introducing cement slurry into graded loose aggregate, the principle has been improved and advanced to a standard procedure which is now termed "Prepakt" concrete. Some of the original developments in this technique started in the West twelve years ago and an important installation was completed during 1951 to form the supporting slab for spillway gates at Whittier Narrows Dam.

Advantages of the procedure, which so far has been used to solve particular concreting problems, include reduction in the amount of cement required and the point-to-point contact provided in the carefully placed aggregate prior to the introduction of the grout, with resulting decrease in volume change for the concrete. The key to the procedure is the use of special materials in the grout to control its set during its intrusion through the aggregate.

COLD CONCRETE

The Corps of Engineers continues its well established procedure of specifying that mass concrete be placed at low temperatures calculated to produce the proper mean annual temperature in the mass, after the effect of the heat generated during the setting process. This procedure differs from that used by the Bureau of Reclamation which provides for extracting the heat of hydration from the mass of concrete by a system of cooling pipes. The net result of the two procedures is presumed to be the same in keeping the concrete temperature from rising higher than its final average, to avoid the problems resulting from subsequent shrinkage.

Contractors and concrete equipment experts have developed two different methods for producing cold concrete: (1) inundation of the coarse aggregate with cold water, and (2) cooling the aggregate by means of circulating cold air through the storage bins at the batching plant. The first system is being used at Detroit Dam (*Western Construction*, October 1950, pp. 65-68, 106) and the second method is employed at Pine Flat Dam.

The general acceptance of controlling the placing temperatures in concrete may gradually be extended into projects involving smaller yardages so that contractors should be familiar with the principles and methods involved. The extensive concern over cracks—superficial or otherwise—in all types of concrete construction indicates that some form of temperature control may be applied to a wide variety of types of work in the future.

MISCELLANEOUS

An established method for the reconditioning of old water mains, by placing a mortar lining on the inside of pipes with centrifugal force, followed by troweling, has been extended in the West to include the rehabilitation of old hydroelectric penstocks, large steel siphons and even new steel pipe used as tunnel liner. The adding of a cement-mortar lining has the double effect of smoothing the interior to improve the carrying capacity of the line and acting to prevent corrosion.

Use of air entraining agents has become practically standard on larger concrete projects where precise control of materials and inspection during placing insures the proper results. Some concrete technologists advocate the use of air entraining agents on all types of concrete construction. A problem would develop in the field where small contractors and their supervisors are not familiar with the peculiarities of air-entrained concrete and inspection does not provide against abuse which would nullify inherent advantages. As a result, the majority of commercial ready-mix plants do not advocate the use of such admixtures in their mixes going to small jobs, but prefer to accomplish some of the same results by enriching the mix with added cement to improve workability.

Special aggregates

More and more large projects are located in areas where concrete aggregates are unsatisfactory, particularly as to available sand and its grading. As a result, the grinding of sand for concrete is a development that will tend to expand in the future. The manufacture of sand requires special equipment and expert control to produce results adequate for modern concrete specifications. The possibility of having to produce sand faces every contractor taking a job where suitable aggregates are not available within economical haul.

Use of lightweight aggregates increases, particularly in the building field because of obvious economies in weight with resulting reduction in steel. An outstanding Western example has been the use of lightweight aggregate for 37,000 cu. yd. of concrete used in the Statler Center in Los Angeles. Concrete made with any of these accepted aggregates which are designed to keep the weight down to about 100 lb. per cu. ft., handles differently when being placed and presents some new problems for superintendents in charge of building construction.

Batching continues to advance rapidly with the exact control and precise weighing previously confined to larger projects now being made available on smaller jobs. This development in batching equipment has kept pace with the added refinements in the demands of the concrete technician. Operations at the plant are approaching the completely automatic transition from separate elements in the bins to a final mix in the hopper.

Winter concreting, with its elements of higher costs and attendant field problems, may be simplified by Bureau of Reclamation findings. Laboratory and field tests indicate that the heat of setting, when properly conserved, is adequate to develop strength during a relatively short curing period of three days. Basis for this revised requirement for concrete placed in sub-freezing temperatures were studies which indicated the period of protection could be reduced.

Soil-cement for rip-rap

Soil-cement has been used experimentally as a protection against wave-action and weathering on the upstream surface of earthfill dams. This product, mixed-in-place on the slope of the dam, would be considered as a substitute for rip-rap where long hauls make rock uneconomical.

Motor carts are being used more extensively to transport concrete on jobs where buggying from bucket to form is required. Higher speed, greater capacity and general over-all efficiency on the job more than compensate for higher cost of the units and the need for stronger runways.

As a result of the complaints of contractors over interpretation of standard specifications for concrete construction, the Bureau of Reclamation simplified some of these requirements. For example, tolerances from fixed lines for finished concrete are now expressed in simpler and more understandable definitions so that contractors know in advance the requirements for form construction and supports. These changes were the result of an AGC committee working with engineers of the Bureau.

". . . Motor carts are being used . . . Higher speed, capacity, and efficiency compensate for higher cost."

ASPHALT

Value of water in the West is resulting in several adaptations of asphalt to hydraulic structures

Today's news in the field of asphalt is its increasing adaptation to use in hydraulic structures. Examples are numerous and have been reviewed in articles during 1951.

One of these developments is the expanding use of asphaltic concrete for the lining of municipal reservoirs. In some cases the asphaltic lining is not used exclusively for water tightness, but is a definite element in the complete design for the lining.

A more widespread use of asphaltic materials has developed in connection with lining of flood channels, irrigation canals and small ditches. On some flood control projects it has become standard to place and roll a lining of asphaltic concrete on the bottom and slopes of the channel. This asphaltic lining may be confined to the upper sections of the banks to prevent erosion.

In irrigation canals and larger ditches the use of a buried membrane produced by spraying catalytically-blown asphalt directly on the excavated surface and covering with an earth back-fill has become standard. One disadvantage to this design is the need for additional excavation so that the back-fill does not encroach on the final design dimensions for the canal. A still further development is the prefabricating of the asphalt membrane in rolls with a paper backing so that strips can be laid transversely in the ditch with overlapping joints. This design also includes the use of the back-fill to protect the membrane against puncture.

Asphalt as rip-rap

During the past year use of asphaltic concrete for the facing of earthfill dams has been given several field tests. In one case, an old earthfill dam which had developed serious seepage was provided with an asphaltic face in an effort to reduce this leakage. One of the small earth dams being constructed at the present time by the Bureau of Reclamation has an asphaltic face, which is the first time such a design has been used. Again, tests are being conducted to determine the possibility of using an asphalt protective coat on the upstream face of earthfill dams to resist wave action and weathering. Such a design could be used in locations where ordinary rock rip-rap was not economical.

To seal the old concrete lining in irrigation canals hot asphalt has been pumped through holes drilled in the concrete. This idea of sub-sealing and adding a support to the concrete slabs has also been used in channels conveying water to hydroelectric plants.

The evolution from road-mix to plant-mix continues on highways in the West, particularly those in the Intermountain States. Whereas years ago the use of the road-mix procedure to secure a relative cheap surfacing was standard, today major highways are being re-built in these same states with plant-mix. The greater permanency and load carrying capacity have dictated this higher type of surfacing. Development of portable hot plants has been a major economic factor.

One of the most interesting developments has been experiments in rejuvenating old asphaltic concrete with a special softener and equipment designed to break up the brittle and oxidized material under the action of the liquid agent. Results have indicated that the method produces a material that can be re-laid to meet standard specifications.

HIGHWAYS

The WASHO test road will answer many questions of design and financing for Western highways

Highway engineers of the West are looking forward to information which will solve important technical questions when the test road project sponsored by the Western Association of State Highway Officials is carried out next season. The test road will be designed and constructed with varying depths of base material topped by bituminous surfacing with a corresponding range of thicknesses. The road will then be tested to destruction by various combinations of truck loads up to the legal limits established by WASHO. This test program is another indication of the

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". . . highways are being re-built with plant-mix . . . Development of portable hot plants has been a factor."

regional character of highway developments in the Western states. The results of the tests on the concrete highway in Maryland could not be interpreted adequately for Western conditions and for the general type of bituminous construction characteristic of most Western states.

The final decisions on financing and specifications are being worked out so that construction can be started early in the spring at the selected site in southern Idaho.

TRUCKS AND TOLLS

Physical dimensions and legal axle loads are under general agreement between trucking interests and highway engineers in the West. At least, there has been a definite lack of controversy on these points as compared to the differences of opinion in Eastern states. The WASHO test road may develop technical information which will institute new discussions based on the results and their interpretation. One of the controversial points which will take on increasing importance in the future is the allocation of user tax, with the possibility that rates heavier trucking are in for readjustment. On this point the proposed long range highway improvement program for Colorado struck a positive roadblock. There the proposed allocation of tax, with particularly heavy increases on trucks, aroused strong opposition from certain trucking interests and those relying directly on truck transportation. Apparently, questions of tax allocation present a more serious problem in the future of Western highways than the matter of engineering design.

In spite of much loose talk and wishful thinking, modern toll roads in the West have only one example up to the present time—the Denver-Boulder Turnpike. Favorable situations relating to traffic and existing routes which make toll roads economical do not exist in the Western states, with rare exceptions.

SUFFICIENCY

To provide a more rational basis for allocating highway and street funds, engineers are turning to surveys which provide factual information on sufficiency. Armed with statistics as to the physical adequacy of highways or streets engineers are better able to cope with the demands of pressure groups. Practically every state highway department has now adopted its own adaptation of a system for conducting a "sufficiency survey" following the original pattern set by Arizona. Although matters of opinion must be included in the various factors, the final result represents a combination of physical adequacy and engineering judgment. With this data a long range program can be instituted which will carry forward an orderly improvement for either a state highway system or the streets of a municipality.

MISCELLANEOUS

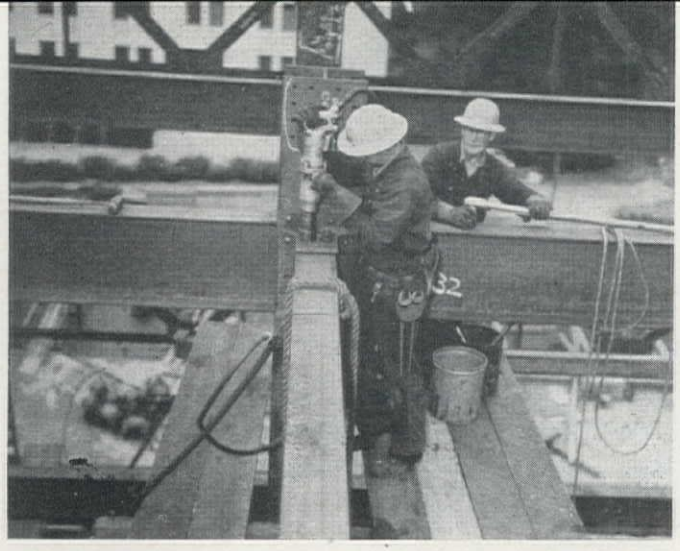
Population and traffic concentration are the factors which determine freeway development. Obviously the Los Angeles area leads the West in this form of super highway. High cost of right-of-way and the number of structures required per mile for grade separations represent the features of significance. Otherwise engineering and construction is not fundamentally different from that on a divided highway.

On two-lane mountain grades more and more highways are being improved by the addition of a third lane which is designed to handle slow trucks, leaving the regular roadway unimpaired for faster traffic. Studies of truck speeds in Arizona have demonstrated the economics of such third lanes.

Cement treated base material continues to be used extensively in California. In Washington, the same material has been used to a limited extent in the solution of particular problems. Otherwise very little use of soil cement has been made by the Western states during the past few years. In one instance a municipality consolidated a fine sand foundation with cement, finding it much cheaper than to waste this material and replace it with rock.

For more efficient use of the heavy volume of excavation required in side-hill locations some highways are being surfaced completely from inside gutter to outside slope. This design has the advantage of reducing maintenance costs in ditch clearing, providing better drainage and making a safer highway for traffic. It is an indication of economies which can be practiced on mountain road locations to keep the volume of excavation at a minimum.

Fifteen years ago there was considerable agitation in the Northwest for the use of liquor waste from paper production as a binder for secondary roads. Extensive field experiments were made with this type of material and the binding effect was demonstrated. The principal problem related to the fact that this material was water soluble and would not develop any permanent consolidation of rock or gravel. Recently this same idea has been used extensively by the Masonite Corporation on its private logging



". . . Of significance is the growing interest in high strength bolts for permanent steel structures."

road at Ukiah, Calif. It has demonstrated again the satisfactory qualities of this material, if it is available in adequate quantities as a by-product, with resulting low cost.

Further development in portable asphalt plants is an important factor in the increasing use of plant-mix for state highway routes. Manufacturers have now increased the portability of such plants so that they are feasible for job-to-job locations with resulting economy.

The problem of cutting and repairing pavements on city streets has found a partial solution in the use of saws for opening such cuts. The change from broken edges for utility trenches to neat lines provides smoother patches and ones less likely to ravel.

STEEL

Innovations and improvements in technique are extending the use of this engineering material

Although most of the current discussions relating to steel revolve about scarcity, there have been several developments during recent months which deserve comment. Probably the most unusual has been the method of "stretching" large size steel pipe used on natural gas lines to increase its working strength and effect a corresponding reduction in the thickness of pipe required for the design. Although the method requires extensive shop installations and may not be suitable for jobs of smaller size, it represents a distinct development in pipeline fabrication.

During the past year the American Concrete Institute has adopted new requirements for reinforced concrete design which take advantage of the higher bond available from new-style deformed bars. Among other advantages, the new deformed type of bars does not require hooked ends with corresponding simplified fabrication and saving in steel.

New type bolts

Of particular significance is the growing interest in high strength bolts for the erection of permanent steel structures. The theory of high-strength bolt fastening involves the clamping action with sufficient contact developed through the bolts to transmit the design stress through the friction between the members as compared to bearing against the rivets.

Welding continues to be the accepted method for most fabrication of pipes and pipelines, including heavy steel penstock sections. Checking by X-ray is considered by the design engineer as adequate protection against possible welding defects. Lack of a corresponding check in field connections between structural members has tended to defer the broad use of the process in building and bridge construction. Structural engineers find considerable variation among the experts and are inclined to feel that the differences must be reconciled before they are willing to use the method extensively on heavy structural jobs. In general, the welding experts take the position that welding can be used on practically any type and thickness of metal, whereas the metallurgical experts point to difficulties when the composition of the steel exceeds certain limits. Such acceptable types of steel change the economic aspect of the design, adding to the differences in opinion.

EQUIPMENT

Western inventiveness on the job often provides ideas for the commercial equipment of tomorrow

On construction projects equipment divides itself between the bulk of the work carried out by standard units performing routine operations and the occasional machine or accessory developed by the contracting organization to meet a job problem. In the West the element of inventiveness on the job is particularly strong. In fact, many standard pieces of equipment in use today have originated from the ideas of Western contractors who are constantly trying to carry out construction operations better and faster. Information on these job innovations usually reaches manufacturers through the channels of salesmen or distributors, to be studied and adopted if feasible for commercial application.

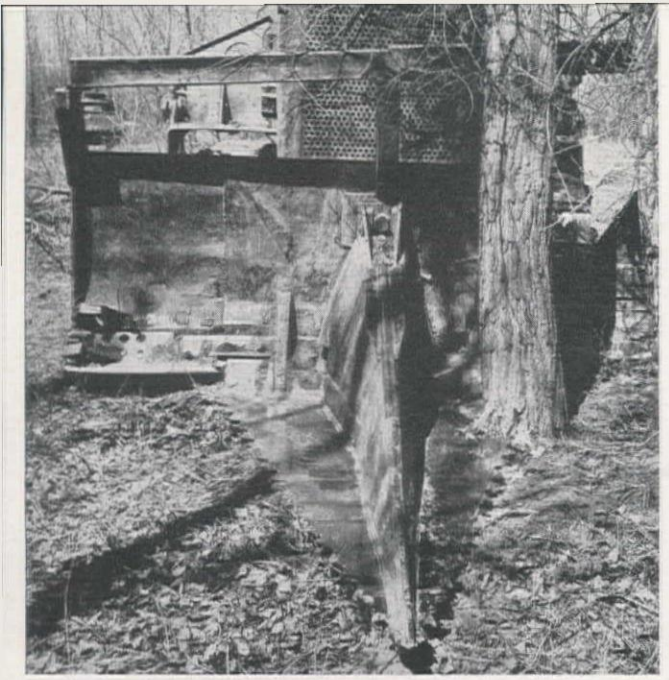
In this procedure there is no conflict in interest because the successful contractor is not concerned with building equipment, and the manufacturer is not interested in bidding and carrying out construction jobs. The two forms of business enterprise are distinctly different.

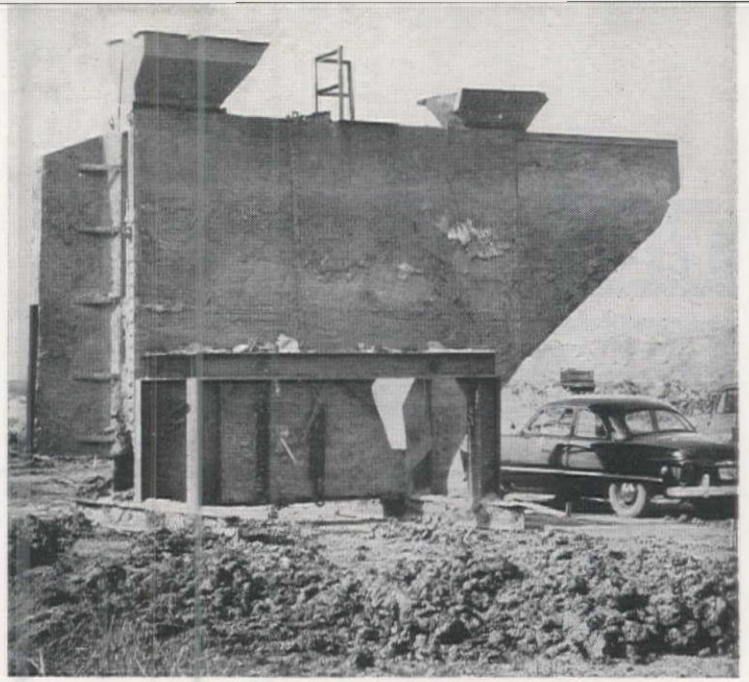
The point of common contact is the equipment itself and what it will do on the job. Contractors are successful in proportion to their reliance on manufacturers for all information and help available on how to get the most out of equipment and to operate it most effectively. Manufacturers on the other hand have much to learn in maintaining close contact with alert contractors and their supervisory staffs.

Equipment use in contract bidding

Engineering design is never static and provides frequent demands for developing new ideas in equipment. Even on the same job, a half dozen alert contractors, each bidding on the specifications, will develop as many different ideas on the use of standardized or improvised equipment. These ideas are all in the interest of securing a profitable contract through the smarter use of equipment.

During the past several months many ideas have originated on construction jobs in the West which provide





Powered by tractor thrust, this saw (left) at Boysen Dam mowed down 24-in. trees. Right: "In caving ground formerly supported by sheathing, this shield pulled behind the trencher eliminated the extra work."

common points of interest between construction men and equipment manufacturers. Not all of these ideas have commercial possibility because the job situations and problems are not common enough to justify the production of a commercial machine. On the other hand, they do represent some of the thinking which results from the contractor's study of job problems.

Canal lining represents a typical Western problem which has become highly mechanized through the combined efforts of contractors and manufacturers of equipment units. Assembled for a specific job these large jumbos are fabricated and equipped to include power sufficient for self movement, with conveyors for handling materials and lights for night work. They are an example of equipment designed to reduce costs in carrying out this type of important reclamation projects in the West.

Size of Western projects is well illustrated by the need for larger and larger equipment. The most striking illustration has been the successful joining of two large size tractors into a dual unit with the resulting advantage of carrying out operations which demand extra power with added efficiency. Closely allied to the original use of these units on the Hungry Horse project was the ingenuity of the clearing contractors in using large diameter steel balls to support heavy chains that were dragged down reservoir slopes to uproot and collect timber.

A development coming strictly from the manufacturer's side is the experimental adaptation of a small jet engine for use in trucks and other mobile units. Although this is a commercial development for some years in the future it represents the type of change which should be watched. In connection with trucks, there is continuing experiment in lightweight bodies in an effort to reduce deadweight. With legal truck limits fixed, any pound removed from the weight of the truck adds a pound to the payload.

Tighter specifications

Engineering specifications for concrete continue to become more elaborate and rigid. The demand for temperature control in the concrete as it goes into the structure, as mentioned elsewhere in this review, is resulting in joint efforts by contractors and equipment manufacturers to meet these requirements. In this type of situation the engineering staff of the contractor and that of the manufacturer become a team in finding the answers to the demands posed by the concrete technician, with constant regard for economy. These modern trends in concrete are equally apparent in the preparation and batching of aggregate, working toward a combination of accuracy and reduction in man-hours per ton of finished product in the mixer. For a mass concrete job involving 1,000,000 yd. of concrete a reduction of 5 cents per yd., which can be accomplished by the contractor-manufacturer team, means a $50,000 reduction in the contractor's bid.

Vibration continues to be an engineering requirement in concrete, with the manufacturer developing new applications for material placed either in mass or in thin sections. The advantages of vibration are also applied to earth compaction, at least in an experimental way. Possibly the advantages in concrete will ultimately be applied to the consolidation of earth as an engineering material.

Miscellaneous

An isolated but interesting illustration of ingenuity was the design and use of a shield to support trench sides in the laying of drain pipe. In caving ground which would formerly be supported by elaborate sheathing, the shield pulled behind the trencher eliminated this extra work, with substantial reduction in the cost per foot of drain. There is no reason why this construction idea cannot be adapted to the work of laying sewer and water lines.

In the field of engineering, one of the commercial developments coming into more common use is the seismic determination of foundation depths to suitable material. Exploration by this method, which has been familiar in the petroleum industry, is now being used effectively for small engineering structures such as buildings and bridges.

The one material that has appeared most frequently in manufacturers' announcements is one of the waterproofing of concrete and masonry—either new or old. This common problem in building design and maintenance now has as many as a dozen products all announced as providing a satisfactory answer in the complete waterproofing of a masonry structures.

WESTERN CONSTRUCTION

No general discussion or claim for the eminence of the West in the country's construction picture can replace the picture itself. In it is the Western scene, which must be documented, job by job; for it is a moving and changing picture, in every state a parade of . . .

PROJECT PROGRESS in the Construction West

HIGHWAYS

Though termed neglected links in a national defense chain, they still represent ambitious programs in the West

MONTANA

Financial problems are an important factor in the state highway program for 1952 in Montana. The state will conclude the current fiscal year (according to press reports) lacking almost $4,000,000 of necessary funds to match federal aid. If this situation continued until 1960 the loss in federal aid could aggregate almost $10,000,000. Since the state contributes only about 43% of the construction costs on the federal aid system in Montana, this situation represents a major problem in the construction program.

At the present time there appears to be no organized effort in the state to change the highway revenue picture in the interest of increasing state funds. The suggestion that a 1-cent increase in the state gas tax would relieve the emergency finds opposition based on the fear it would become a permanent increase. One suggestion relates to a 1-cent increase for a fixed period of time with these funds allocated for definite improvement projects. The possibility of issuing bonds to accelerate this program has been considered.

Among the reasons given for the present situation is the increasing cost of maintenance, together with the addition of secondary routes which are now eligible for federal aid. About 1930 the maintenance budget in Montana was $1,000,000 and for the current year it will exceed $6,000,000.

WASHINGTON

Major highway projects to be undertaken in 1952 by the Washington Department of Highways total about 231 miles. Important sections of this program will be expended on State Highway Route No. 1 which is the main north and south interstate route from Vancouver to the Canadian border. Present plans of the department are to advance this route to a four-lane highway as promptly as funds are available.

At the present time no specific measures have been taken to modify the highway program in relation to shortages of materials, labor and rising costs. In other words, the 1952 program will be pushed as aggressively as possible in all its projects and types of work in as much as these uncertainties will permit.

One of the more important sections of the program will be work on the freeway in Vancouver which will be the first urban freeway project to be carried out in the state of Washington. The 1952 program for this project includes several concrete bridges and grade separation structures. The improvement program will continue north to

Kelso, Centralia and Olympia with important projects of grading, surfacing and structures. In the city of Seattle a concrete vehicular subway will be added on this route and continuing to the north the program includes grading and structures to achieve the final four-lane design.

W. A. Bugge is Director of Highways for the State of Washington, and Norman Hill is work control engineer.

OREGON

Oregon begins 1952 with $18,000,000 of highway construction under contract and a program which will provide an additional $28,000,000 for construction during the year. The State Highway Department has budgeted expenditures of $32,000,000 for 1952, with $18,000,000 to apply on work under contract and $14,000,000 for new jobs. These funds will come from the following sources: $7,500,000 from federal aid; $9,500,000 from regular highway revenue, and $15,000,000 from the sale of bonds. This bond money is the first allotment from a $40,000,000 issue approved by the state legislature last year. The purpose of the bond issue was to accelerate construction on some of the more urgently needed projects in the state's sufficiency program which is estimated to require a $350,000,000 expenditure for modernization.

Among the more important projects included in the 1952 program (allotments of more than $1,000,000 each) will be: The Salem by-pass in Marion Co.; the Chenoweth Park-Deady section in Douglas Co.; Medford-Ashland in Jackson Co.; Shogren-Rowena in Wasco Co.; Newport-Toledo in Lincoln Co.; the Boones Ferry road in Washington Co., to Marion Co. line; and 82nd Ave. to Fairview, east of Portland. All of these projects will include grading, paving and miscellaneous structures.

In general, the details of the state highway program in Oregon for 1952 must be contingent upon such influences as federal controls, inflation, material shortages and any increase in the construction of military facilities. At the present time recognition of such problems has resulted in deferment, whenever possible, of projects requiring large amounts of steel with a substitution of projects involving principally grading and paving.

Recent bid figures do not indicate any inadequacy on the part of contractors to bid on work. Competition in bidding is good, although the figures reflect the continuing increase in cost of materials and labor.

R. H. Baldock is State Highway Engineer and W. C. Williams is Assistant State Highway Engineer.

CALIFORNIA

With an announced construction budget of about $72,000,000 for the coming fiscal year, the California Highway Commission has allotted more than $50,000,000 to the twelve southern counties of the state. An additional $31,000,000 will be spent for rights-of-way. The concentration of population and resulting traffic problems in the Los Angeles metropolitan area provided a further concentration of funds, with possibly $45,000,000 going into the extensive freeway program in that area. Since freeways require extensive grade separations and approaches, and because these structures require steel this part of the state program is seriously threatened as a result of the materials situation.

Latest figures for California steel allocation included 4,500 tons in the first quarter and about 5,600 tons in the second quarter. These figures correspond to a request for 18,000 tons for the second quarter of last year submitted by the state through the Bureau of Public Roads.

Construction of the second unit of Seattle's Alaskan Way viaduct pushes along the Puget Sound waterfront

As a specific illustration of construction curtailment resulting directly from a lack of steel, last month construction work stopped on five grade separation projects on the Santa Ana Freeway. Contractors stated they had already used up the entire 1951 allotment and also all of the allocation for the first quarter of 1952.

As an example of the status of some of these superhighway units, the Hollywood Freeway to date has been completed for 6 mi., with about 3 mi. under contract. This project has involved $22,500,000 for right-of-way, with $16,000,000 of construction work completed and another $8,000,000 under contract. In the coming year, work is programmed for another $4,000,000 on this particular freeway with completion originally scheduled for the fall of 1953. This is the type of program which will be curtailed most severely as a result of continuing steel shortages.

Aside from Los Angeles County, San Diego receives the next largest allocation for the coming fiscal year of about $4,500,000.

By comparison the remainder of the funds for the fiscal year are fairly uniformly allocated through the state, with an important project costing $6,500,000 planned as part of the Santa Cruz-San Jose highway. The 6.5 mi. of this route authorized for the current program has been declared a freeway. Funds totaling about $3,000,000 were appropriated for extension of the Eastshore Highway, including an important structure at San Leandro Creek. Further funds were allocated for the construction of a bridge, now under contract at Bay Farm Island, with the work scheduled for completion late this year.

No announcements have been made as to modification

Status of Federal-Aid Highway Funds for the West

State	ACTIVE CONSTRUCTION PROGRAM Total Cost	Federal Funds	Miles	Previous Balances	Next Fiscal Year	Total Funds for New Work
Arizona	$ 11,223,000	$ 7,965,000	189.6	$ 379,000	$ 6,009,000	$ 6,388,000
California	99,886,000	41,744,000	408.3	6,297,000	26,155,000	32,452,000
Colorado	21,863,000	11,964,000	519.1	2,256,000	7,658,000	9,914,000
Idaho	19,032,000	11,391,000	592.2	3,642,000	4,895,000	8,537,000
Montana	31,023,000	18,792,000	687.7	4,657,000	7,838,000	12,495,000
Nevada	8,064,000	6,730,000	287.5	2,969,000	4,869,000	7,838,000
New Mexico	17,021,000	10,895,000	411.9	1,819,000	6,501,000	8,320,000
Oregon	20,830,000	11,601,000	263.9	708,000	7,422,000	8,130,000
Utah	10,936,000	8,107,000	226.3	1,534,000	4,734,000	6,268,000
Washington	32,754,000	15,253,000	281.4	2,201,000	7,942,000	10,143,000
Wyoming	11,356,000	7,457,000	314.1	295,000	4,757,000	5,052,000
TOTAL	$283,988,000	$151,899,000	4,182.0	$ 26,757,000	$ 88,780,000	$115,537,000

in the state highway program based on the shortage of materials up to the design stage. Award of contracts will be governed by availability of steel and emphasis may develop on grading and surfacing projects.

Geo. T. McCoy is State Highway Engineer of California.

ARIZONA

In spite of materials and manpower shortages, combined with continually rising costs, Arizona has already scheduled major projects for 1952 totaling more than $2,600,000 on 27 mi. of major routes. This program includes about $500,000 for the lining of the Superior Tunnel on U. S. 60. A bridge at Hell Canyon (U. S. 89) is included in the program at $375,000 and a heavy grading job on U. S. 70 extends 11 mi. between Cutter and Peridot. These major projects are in addition to carry-over work from the last season.

On the problem of costs, the highway department indicates that bids have increased to such an extent that three sets were rejected during the late fall months. They ranged from 17% to 33% above the engineer's estimate. More recently the bids indicate that costs may be leveling off.

In the interest of saving critical materials, the State Highway Department has instituted a plan for constructing culverts consisting of un-reinforced concrete arches up to 10 ft. in span. This will be standard design during the emergency (see p. 67 for sketch). A further substitution in materials relates to the use of timber cattle guards where roads of low-volume traffic enter highways. These guards will be so designed that they can be replaced with steel when it becomes available. On the Cutter-Peridot project, which is the initial stage of the relocation of U. S. 70 on the north side of San Carlos reservoir, "dips" are being specified in place of drainage structures. This provision is considered definitely in line with saving of steel and the plans for permanent structures will be held in abeyance.

R. C. Perkins is State Highway Engineer of Arizona.

NEW MEXICO

New Mexico has adjusted its construction program to existing conditions by planning 1952 construction projects that do not require great amounts of steel for bridges. The decision to forego bridge projects during the emergency was reached when delays were met in building two bridges across the Rio Grande. These two bridges, one at Belen and one at Albuquerque, have already been delayed ten months awaiting the delivery of steel and it is expected that another two months will elapse before work can be continued. In the interest of maintaining quality during this period of material shortages, projects on the federal aid primary and secondary systems will be confined to those that do not require extensive bridge construction.

In keeping with this policy the program will include a relocation of U. S. 85 at La Bajada Hill between Santa Fe and Albuquerque that will cost about $600,000 for a 4-mi. length. A "must" project on U. S. 285, between Artesia and Carlsbad calls for two bridges, but they will be designed with the steel situation in mind. A 17-mi. section of U. S. 54 will be paved between Carrizozo and Corona costing about $375,000. A project calling for 10.6 mi. on this same highway, north of Corona, was let to contract late last year. Access and urban projects are high on the list for construction during 1952. An access project to the Roswell Air Base, an urban project in Roswell to tie in with the access project, and an urban project at Clovis are high on the priority list.

U. S. 66, one of the most heavily traveled of the state arteries, has also been designated for improvement projects during 1952. A section of 16 mi. between Santa Rosa and Tucumcari ($800,000), 12 mi. west of Grants ($425,000) and 27 mi. of widening ($400,000) just west of Albuquerque have been scheduled for this important highway.

In southern New Mexico, U. S. 70-80 will also be in the picture for construction activity during 1952. Two projects estimated to cost $550,000 apiece have been planned. One section is just east of Lordsburg, and the other is between Deming and Las Cruces, both of which are 10 mi. in length.

State Road 3, north of Taos and adjacent to Questa, has only one stretch of roadway that is unpaved, and this will involve a $700,000 project for 6.7 mi. of paving. The drainage problem through this section will be taken care of by box culverts as there are no heavy concentrations of water except at the north end of the project at Questa where the Red River will have to be bridged.

The start of a new highway into metropolitan Albuquerque will be initiated in 1952 with the first of a series of projects on U. S. 85, north of Albuquerque. This project, beginning at Algodones, will be built on the east side of the Santa Fe Railroad tracks and eventually will be extended to Albuquerque. Seven miles, costing about $500,000, will be built.

One of the most beautiful drives in New Mexico on the

Federal Aid Primary System is through Taos Canyon, Moreno Valley and Cimarron Canyon on U. S. 64. Gradually the New Mexico State Highway Department has been improving and paving this most scenic highway, and to continue on with this work, a section through Moreno Valley will be reconstructed. This section will cost $350,000 for its 10-mi. length.

In general, 1952's program of construction will parallel that of last year. A number of other projects, besides those listed, will be built on the primary system, and again farm-to-market highways will be high on the priority lists.

B. G. Dwyre is State Highway Engineer of New Mexico.

COLORADO

New construction programmed for 1952 by the Colorado State Highway Department may total $25,000,000 and the entire state program could be the largest in the history of the department. The budget design includes about $5,000,000 being allocated directly by the federal government for military and defense access roads. These projects, which will be carried out by the highway department, are not in the immediate budget because some features involve direct negotiations. For example, about $3,000,000 of direct federal money may be spent to provide a new freeway to the Pueblo ordnance plant and another $2,000,000 may be available from the same source for roads leading to the vital uranium fields in southwest Colorado.

There will be a carry-over of about $2,000,000 for work budgeted in 1951 but not placed under contract until this year.

Mark U. Watrous is State Highway Engineer of Colorado.

WYOMING

Out of a normal highway department budget of about $13,000,000, approximately $9,000,000 is available for construction and reconstruction, with about $3,000,000 required for maintenance. Such a construction program is hardly adequate for modernizing about 5,000 mi. of highway in the state. In 1949, a survey indicated about $150,000,000 would be needed to bring state highways up to standard requirements, and this estimate is now considered too low.

Regular federal aid funds for the state represent about 1% of the total federal funds, or $5,000,000 per year.

With an estimate of $80,000 per mile for a modern two-lane interstate highway through Wyoming, including a third lane for trucks on upgrades, these funds are entirely inadequate for the program required. Many of the highways surfaced 25 years ago are in a condition to require complete reconditioning to make them adequate and safe.

J. R. Bromley is Superintendent of the Wyoming State Highway Department and G. T. Bath is Planning Engineer.

FEDERAL AID

Funds for Federal Aid highway work in the eleven Western states are indicated in the accompanying table. The table shows the funds now under contract and the mileage under construction at the present time. Funds which have not been placed under program from previous federal allotments are listed by states together with the allocation for the coming year.

Forest highway funds for the entire country are normally allocated to the eleven Western states in the proportion of 90% of the total. The unappropriated balance of these funds available late last fall was approximately $41,000,000. Of the $20,000,000 authorization for forest highways during the coming fiscal year, the allocation by states of the West follows:

Arizona	$1,136,375	New Mexico	$ 805,049
California	2,861,386	Oregon	2,756,602
Colorado	1,433,285	Utah	664,445
Idaho	2,037,716	Washington	1,390,444
Montana	1,588,576	Wyoming	854,031
Nevada	358,885	Alaska	1,753,935

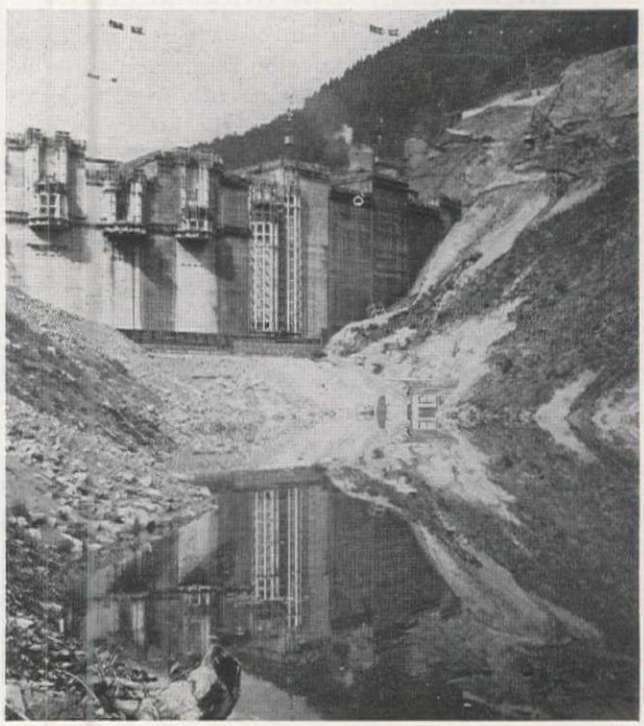
WATER RESOURCES

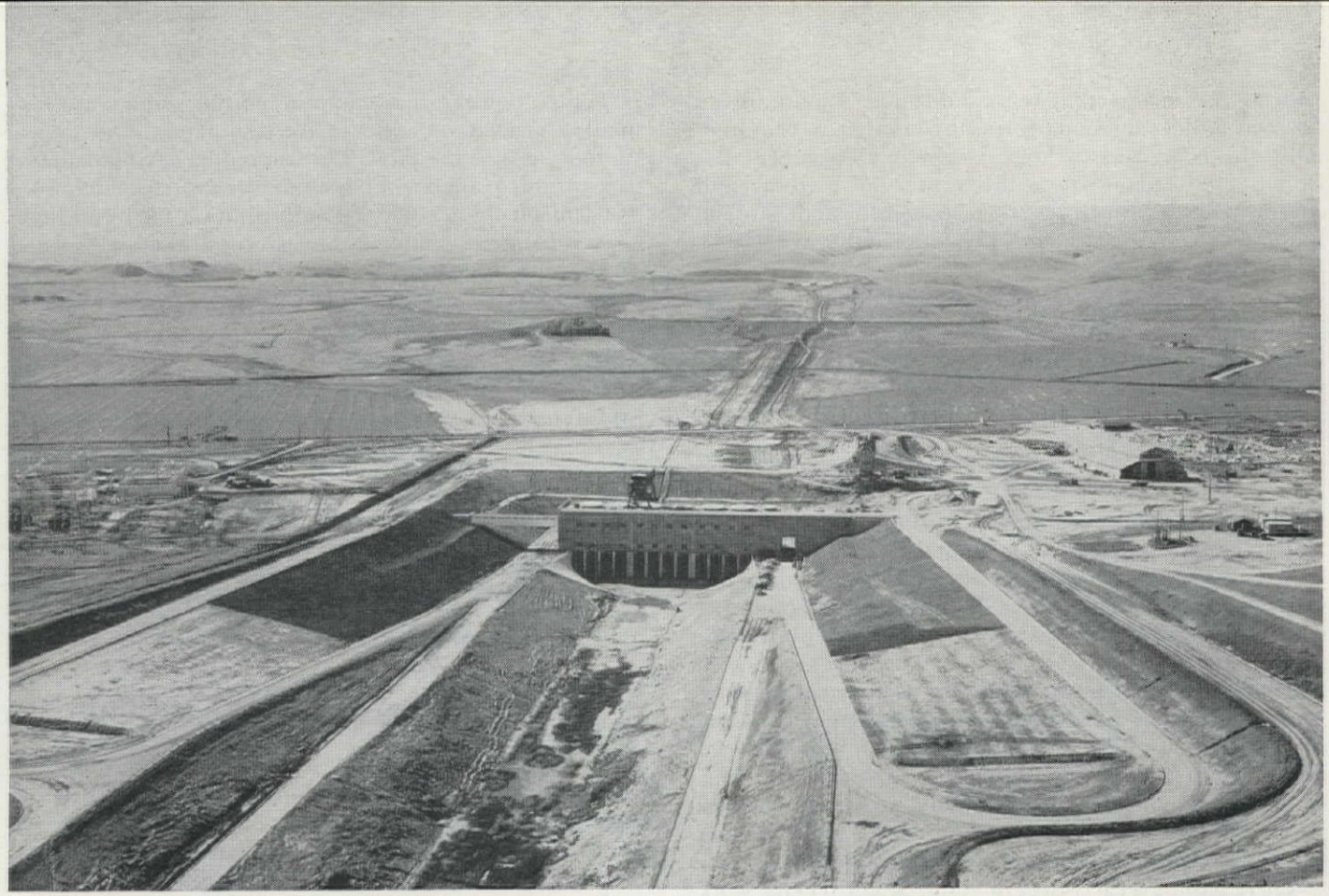
The West's greatest resource, its annual water crop, is being developed for industry as well as agriculture

From small beginnings nearly two centuries ago, Western development of water resources has grown to be a big business, conducted alike by private and public interests. The minor creek diversions of the Mission fathers, effected for irrigation in the 1700's, contrast sharply to today's integrated, multiple-purpose watershed developments, typified by the Columbia Basin Project of the Bureau of Reclamation.

First carried on to meet the needs of an expanding irrigated agriculture, water resources development in the past few decades has grown to include considerations of wholesale land reclamation, flood control, power generation, pollution control, wildlife conservation, navigation, and recreation. Today, in a defense economy, the greatest

". . . Hungry Horse diversion tunnel closure was completed in September and water storage begun."





". . . integrated operation of California's Central Valley Project was commenced last August when the Tracy pumping plant began transferring waters of the San Joaquin into Delta-Mendota Canal for irrigation in the Valley"

awareness is of hydroelectric power potential; dams in 1952 are being built on their power features.

Despite the urgency of power needs, particularly in the Pacific Northwest, water resources projects designed principally to serve other purposes are continuing under construction; and the following "progress reports" are classified according to such prime purposes.

IRRIGATION AND RECLAMATION

Irrigation and reclamation, of earliest significance in the West, is today carried out on the largest scale by the U. S. Bureau of Reclamation, currently in its fiftieth year of Western participation. During the fiscal year 1950-51 the Bureau added about $250,000,000 (in 17 states) to its nearly two-billion dollar investment in Western reclamation projects. It also extended its activities beyond the Western states for the first time with commencement of work in Alaska.

The Eklutna Project, about 30 mi. northeast of Anchorage, Alaska, is essentially a power project, though irrigation features are included. Its main components are an earth dam and reservoir having a capacity of 160,000 ac. ft., a 4½-mi. diversion tunnel, and a 30,000-kw. power plant. Estimated to cost $33,800,000, the project got under way last October with the start of excavation on the 9-ft. diameter diversion tunnel and alterations to an existing dam. Contractor for this initial work, to be completed in 1,050 days, is Palmer Constructors, a joint venture composed of Peter Kiewit Sons' Co., Coker Construction Co., and Morrison-Knudsen Co., Inc., bidding $17,348,865.

During 1952 the power plant will come under contract, as will construction of the Eklutna switchyard, relocation of the Anchorage-Palmer highway, and completion of the 15-mi., 115-kv. Eklutna-Palmer transmission line. Current appropriation for the work totals $5,762,300.

In the Pacific Northwest, Montana's Hungry Horse Dam has stayed ahead of schedule, setting records nearly every month to complete its largest season of activity in November 1951. At that time, about 2,300,000 cu. yd. of the 3,000,000-cu. yd. concrete structure had been placed to an average height of 411 ft. above foundation. Diversion tunnel closure was completed by prime contractor General-Shea-Morrison in September and water storage begun at that time.

About $22,250,800 is available for work on the 564-ft. high dam, and during 1952 it is expected that the first two 71,250-kv. generators will be readied for test well ahead of scheduled autumn dates. Also, by July, another 400,000 cu. yd. of concrete should be placed.

Extra funds speed Palisades Dam

Palisades Dam in Idaho, already a Bureau record breaker in its 14,000,000-cu. yd. earthen volume, is planned for initial construction this May. Later in the year a contract will be awarded for turbines and generators, in order to insure power generation by a 114,000-kw. plant in 1957. Current appropriation for the $76,000,000 project exceeds $10,000,000, to which has been added a supplemental $2,000,000 for commencement of open-cut and tunnel excavation for power and outlet tunnels this winter. Contract for these preliminaries was awarded to J. A. Terteling & Sons, Inc.

Construction on the Columbia Basin Project in Washington was highlighted in 1951 by completion of power

generation facilities at Grand Coulee power plant. With initial operation of the remaining three 108,000-kw. generators, the plant was brought to its full name-plate capacity of 1,974,000 kw. Also completed was the Grand Coulee pumping plant structure, in which two 1,350-cfs. pumps were installed for operation. Work will proceed during the coming year on installation of four more of the eventual 12 units.

Elsewhere in the Columbia Basin, North Coulee Dam, Feeder Canal, and Soap Lake Siphon were completed, as well as extensive reaches of the East Low and West canals. New work, specifications for which are scheduled for issuance early this year, include: Ringold pumping plant, two Lake Lenore pumping plants, 19 mi. of Potholes East Canal channel, and some 70 mi. of laterals. All this is in addition to work presently under contract and expected to wind up this year: Quincy pumping plant, 100 mi. of canals and laterals. The enabling appropriation for fiscal 1952 totals over $27,000,000. In May, the results of this and previous expenditures will be "put to work" for the first time in integrated operation of irrigation facilities for about 87,000 acres.

CVP goes to work

Such integrated operation of California's Central Valley Project was commenced last August when the Tracy pumping plant began its task of transferring surplus waters of the San Joaquin River into the Delta-Mendota Canal for irrigation of lands in the San Joaquin Valley. Still more work is contemplated this year in construction of distribution systems.

New work on the project consists primarily of construction of the 162,000-kw. power plant at Folsom Dam, for which a bid call is scheduled next month. Prior contracts have been awarded covering initial excavation for the plant and a part of the tailrace channel, and also the plant's turbines and three 54,000-kw. generators.

In California also, the Cachuma Project got well under way during 1951 with construction started on Cachuma, Lauro, and Glen Anne dams, Tecolote Tunnel, and Sheffield Tunnel, the latter a 6,000-ft. concrete-lined bore on the 28-mi. South Coast Conduit. Bids are expected to be called next month for 16 mi. of concrete pipe on the Carpinteria section of the conduit.

An accomplishment in the Southwest area of Bureau activities was completion last year of the Davis Dam power plant on the Arizona-Nevada border, 67 mi. downstream on the Colorado River from Hoover Dam. The last of five units of the 225,000-kw. power installation was placed in service last summer, and more than 600 mi. of transmission lines were completed.

Hoover Dam power at capacity

On the Boulder Canyon Project, the emphasis of activity has been on completion of the remaining units of Hoover Dam power plant. It is planned that installation of two 82,500-kw. units and a 50,000-kw. unit will be completed this summer.

Other Southwest progress included completion of Fort Sumner Diversion Dam and 15 mi. of the main canal on the Fort Sumner Project in New Mexico, and 18 mi. of Wellton-Mohawk Canal on Arizona's Gila Project. In addition to continuance of current work, other features are coming up for bid on the two projects in 1952, principally 28 additional miles of laterals on the Gila Project.

In the state of Colorado, the Colorado-Big Thompson Project is nearing completion after 15 years of construction. Current plans call for full use of all facilities in 1953 to effect the trans-Continental Divide water diversion.

Completed in 1951 were the Estes and Marys Lake power plants, principal power sources of the Project; the Granby pumping plant, lifting water from Granby Reservoir on the western slope for delivery to lands on the east; and a power line connecting pumping and power features. Work will continue during the coming year on several power plants, pumping plants, dams and canals. The two remaining major project features, scheduled for a February bid call, embrace about 10½ mi. of canals. For all these works, and nearly 200 mi. of transmission lines, the fiscal appropriation is over $21,500,000.

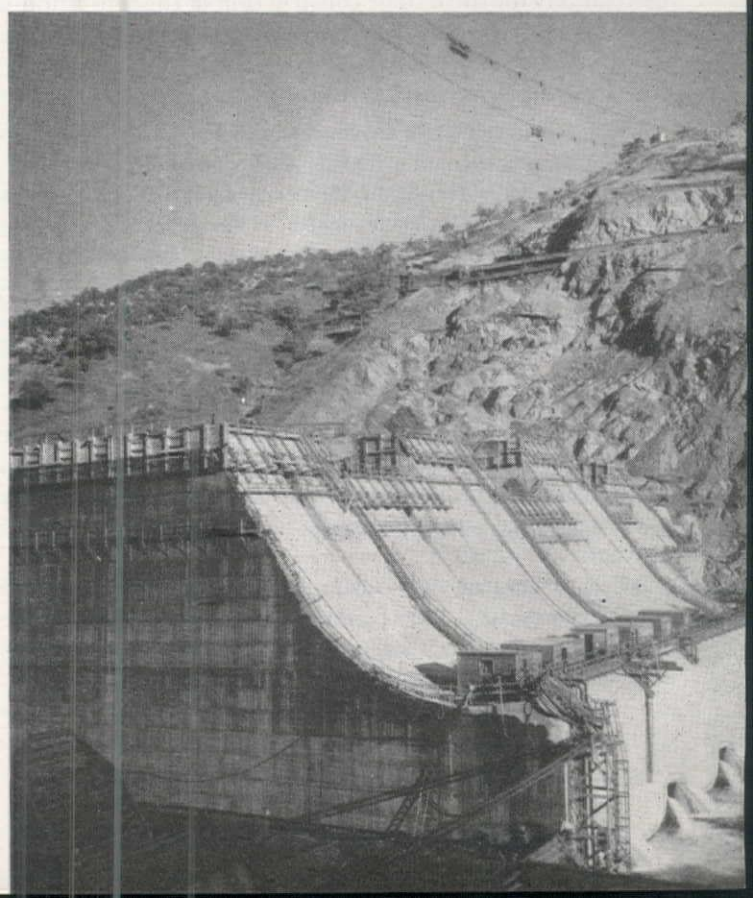
In Utah the terminal reservoir of the Salt Lake Aqueduct is virtually completed, and construction of Duchesne Tunnel and diversion dam, also on the Provo River Project, is about two-thirds finished.

Big Sandy Dam on Wyoming's Eden Project has reached the three-quarter mark and should be finished by next June. Bids will be called early this year for construction and enlargement of canals on this project. Also in Wyoming, work on the Kendrick Project includes construction of the power plant at Alcova Dam and over 140 mi. of transmission lines.

Missouri Basin summary

Farthest east among significant Bureau of Reclamation projects is the biggest of them all, the Missouri River Basin Project, on which 1951 saw completion of, among others, Bonny Dam in Colorado and Kortes Dam in Wyoming. Other dams under construction include Boysen and Keyhole in Wyoming, and Canyon Ferry in Montana. The first two are about 75% complete, the latter, about 50%.

". . . With completion planned for 1954, work at Pine Flat Dam on the Kings River is about 35% finished."



Work at Boysen Dam will include provision of 15,000 kw. of power, while 36,000 kw. have been recently made available by operation of Kortes power plant.

The above round-up is incomplete; there are many other projects and isolated works that represent a definite eventuality both of irrigation benefits to many thousands of acres in the West, and also of needed hydroelectric power throughout the West.

FLOOD CONTROL

With its great variations of climate the Western region presents many different problems of flood control on its streams and rivers. The strictly seasonal rainfall of the Southwestern states is accompanied by a definitely fluctuating regimen of all but the major rivers, such as the Colorado. Flash floods present hazards requiring expensive treatment as Western cities and agriculture encroach on the rich soil of flood plains. In the Northwest, spring thaws on watersheds encompassing several states contribute to the slow development and prolonged duration of flood peaks that waterlog protective levees and threaten their destruction.

Seeking not only the control and safe passage of these crests, but also their conservation for hydroelectric, irrigation and other benefits, the Corps of Engineers has for many years participated in the construction of works that now seem destined to make danger from floods a thing of the past. At the present time, major projects are under construction in five Western states.

In northern Idaho, a current appropriation of $10,000,000 for the $31,000,000 Albeni Falls Dam and reservoir project on the Pend Oreille River will permit a continuance of the work. First stage, consisting of preliminary excavation and cofferdams, was completed last June by Macco Corporation. At present, Donovan-James Construction Corp. is constructing the second stage under a $3,839,000 contract. This second stage is scheduled for completion in April; the recently appropriated money will be used largely for third-stage construction of the powerhouse and other facilities.

Lucky Peak passes half-way mark

Main construction of earthen Lucky Peak Dam in Idaho is progressing ahead of schedule and is now 62% complete. Relocation of Idaho State Highway 21 and construction of Mores Creek Highway bridge is on schedule. An appropriation of $3,800,000 for the current fiscal year is in use to continue the work. A joint venture of Morrison-Knudsen, Co., Inc. (sponsor), J. A. Terteling & Sons, Inc., Macco Corporation, and Puget Sound Bridge & Dredging Co. holds a $3,494,965 contract for construction of the main dam. Placing of earth embankment has been subcontracted to Martin-Green Co. Authorized principally for flood control, Lucky Peak Dam is planned to permit its use as an integral part of a multi-purpose program by joint agreement between the Corps of Engineers and Bureau of Reclamation.

With first power generation at McNary Dam scheduled for December 1953, Guy F. Atkinson Co., in a joint venture with Ostrander Construction Co. and J. A. Jones Construction Co., has completed 90% of final foundation excavation. The completion contract held by the group—$58,416,459—includes construction of the remaining portions of the spillway, powerhouse, abutments and appurtenant structures. It is the largest Western contract let to date by the Corps of Engineers. An allotment of $42,900,000 has been made for the project for this fiscal year.

Bids were called for cofferdam construction, powerhouse excavation and other work at The Dalles Dam on December 14 and are scheduled for opening this month, January 22. The recent appropriation of $4,000,000 for the $350,000,000 project will permit initial contracts to be awarded this spring. Located on the Columbia River at the head of the Bonneville Dam pool, the dam will have a navigation lock, spillway and non-overflow sections totaling 7,800 ft. in length. First power is scheduled to be generated at the project in 1957.

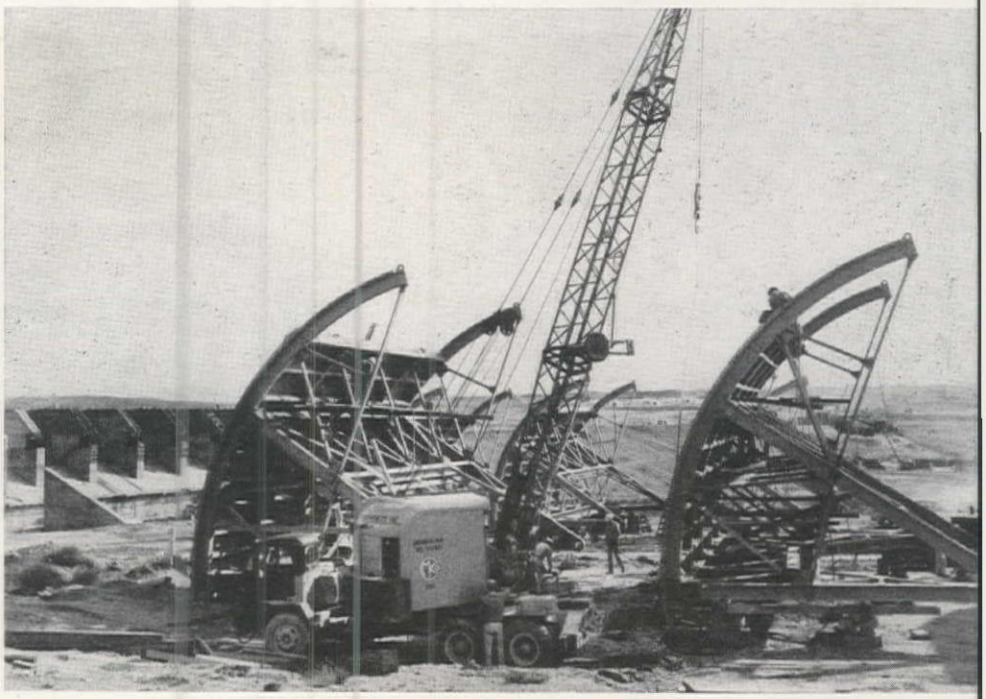
Chief Joseph Dam will have the world's longest powerhouse and be second only to Coulee Dam in power production. Concrete work inside the first cofferdam on the north side of the Columbia River near Bridgeport, Washington, is scheduled for completion this spring. Next, the second, or south, cofferdam will be constructed to permit second-phase concrete work. Working for the Seattle District, Corps of Engineers, under a $25,867,921 contract, the Chief Joseph Builders began concrete work early in September with plans to continue at a rate of about 2,000 cu. yd. per day as long as the weather conditions permit. Foundation excavation in the powerhouse area is ahead of schedule and now about 45% complete. The $16,892,000 appropriated for the fiscal year of 1952 will be used to continue construction. Installation and operation of not less than four of the ultimate 27 generating units is planned for 1956.

Work expands on Detroit project

About 950,000 of the ultimate 1,450,000 cu. yd. of concrete have been placed in Detroit Dam, located on the Santiam River about 50 mi. east of Salem, Oregon. The dam, a feature of the Corps of Engineers $70,000,000 Detroit project, is being built under a $25,230,509 contract held by Consolidated Builders, a joint venture composed of Kaiser Industries, Inc. (sponsor), General Construction Co., Walsh Construction Co., Utah Construction Co., Bates & Rogers Construction Co., Pacific Bridge Co., and The Shea Co. Preliminary work at Big Cliff Dam, a re-regulating structure downstream from Detroit Dam, got under way last summer with The Shea Co. driving the diversion tunnel. The 1952 appropriation of $16,978,000 will be used to further work at both dams, including road relocation and reservoir clearing.

Over 30% of the mass concrete in Lookout Point Dam, on the Middle Fork of the Willamette River near Eugene, Oregon, has been placed by Morrison-Kiewit-Macco. The joint-venture group is constructing the earth-fill dam with concrete spillway under an $18,689,357 contract. The 1952 appropriation, which covers extensive railroad and highway work, is $16,000,000.

In California, Merritt-Chapman & Scott Corp. and The Savin Construction Corp. are currently marshalling equipment and personnel to begin work on their recently awarded contract of $29,444,000 for construction of Folsom Dam on the American River. Current Corps of Engineers appropriation for the multiple-purpose project, $6,870,000, will be used for initial dam work, the Mormon Island auxiliary dam and diversion work. Other contractors on the Folsom Project are H. Earl Parker, Inc., Guy F. Atkinson Co., and D & H Company. The Mormon Island



"... C. J. Strike Dam is notable for its speed of construction, with thirteen months set as the span of time from first excavation to first generation." Here, Morrison-Knudsen assembles control gates for dam spillway.

dam is 65% complete and the diversion work 25% complete.

With completion planned for 1954, work at Pine Flat Dam on the Kings River near Fresno, California, is about 35% finished. At present the Pine Flat Contractors (a joint venture) are placing about 25,000 cu. yd. of concrete per week in what will be the highest concrete dam yet constructed by the Corps of Engineers. The $8,000,000 in new appropriations will be used for continuing work on the dam, relocation of roads and utilities, and reservoir clearing.

Work at Isabella Dam was started in December under a $5,873,782 contract held by Macco Corporation, Morrison-Knudsen Co., Inc., and River Construction Corp. The contract also includes completion of an auxiliary dam of the project, located on the Kern River 54 mi. east of Bakersfield, California. A Corps of Engineers appropriation of $4,500,000 will be used for the dam work. The main dam will have a crest length of 1,725 ft. and will rise 185 ft. above streambed. It will contain 2,900,000 cu. yd. of rolled earth material. The auxiliary will contain 1,800,000 cu. yd. of material and will be 100 ft. high and 3,325 ft. long. A reinforced concrete spillway will be provided in the main dam.

Participation in the Southwest

Other Corps projects include Whittier Narrows Dam, San Antonio Dam, and extensive channel work in cooperation with the Los Angeles County Flood Control District. Whittier Narrows, a $36,000,000 structure on the San Gabriel River near Los Angeles, is planned for completion next year, with various work yet to be advertised, including relocation of roads, bridges, and utilities. The current appropriation is $4,500,000. San Antonio Dam, a flood control feature on a tributary of the Santa Ana River, has $1,700,000 allotted for initiation of outlet works construction and road relocation. The County flood control appropriation, $6,085,000, will be used to complete seven contracts and begin several new ones for bridge and approach construction on the Tujunga and lower and upper Los Angeles rivers and Rio Hondo.

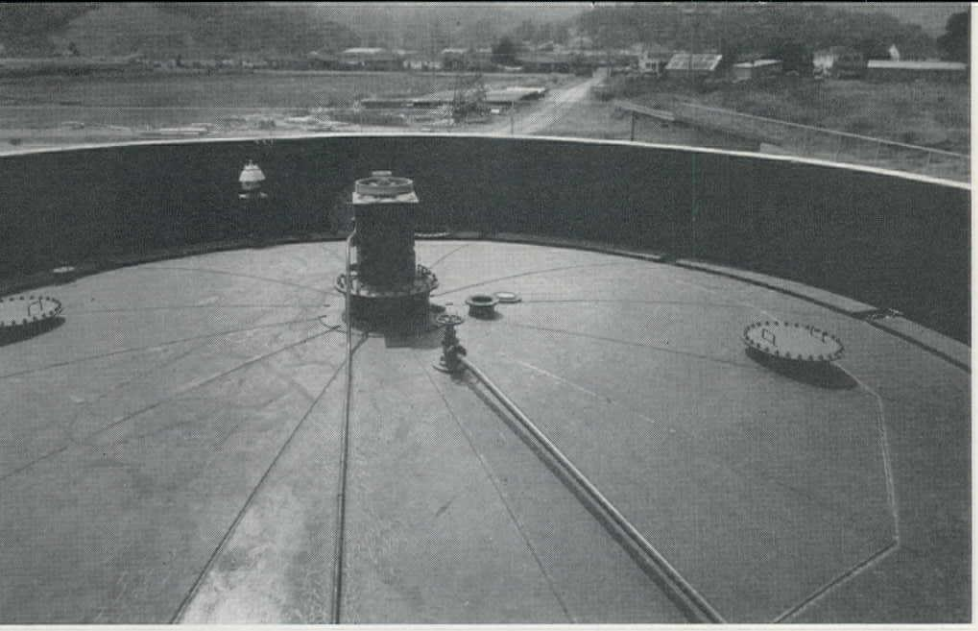
In New Mexico, work continues on Jemez Dam, a feature of the Middle Rio Grande flood control project. Scheduled for completion early this year is more than $1,000,000 in work on the intake tower, stilling basin, and a 600-ft. outlet conduit 13 ft. in diameter. Built primarily for flood and silt control on the Jemez River about 20 mi. north of Albuquerque, the structure has a current appropriation of $900,000.

HYDROELECTRIC POWER

Built under public auspices and providing more immediately tangible benefits—irrigation water and flood relief—to the average citizen, the foregoing projects are perhaps more generally in the public eye. But there are many more projects, some of comparable scope, that are built primarily to provide hydroelectric power. The builders are cities, irrigation and utility districts, and privately owned power companies; and their activities have been heightened by the growing power needs of the West.

Two spectacular Western projects are Cabinet Gorge and C. J. Strike dams, both in Idaho. Cabinet Gorge, scene last August of a one-shot blasting operation that created a cofferdam, is being built for Washington Water Power Co. by Morrison-Knudsen Co., Inc., and is expected to generate power (200,000 kw.) by the end of this year. C. J. Strike is notable for its speed of construction, with thirteen months set as the span of time from first excavation to first generation. Another Morrison-Knudsen job, this $20,000,000 Idaho Power Co. project was described in *Western Construction* last November (pp. 61-65).

The regulatory body of the Federal government that passes on the feasibility and advisability of these projects is the Federal Power Commission, issuing permits for project surveys and investigations, and also licenses for construction and operation. Late last year a digest of recent FPC activity showed that consideration for permit purposes alone had been given ten projects in four Western states, projects proposed to generate nearly 1,630,000 hp. Projects for which licenses to construct and operate were considered total over 860,000 hp. in generation capacity.



". . . since April 1950, bond elections in California alone have provided financing for $50,000,000 of waste disposal facilities, while in the same period actual construction has totaled about $5,000,000."

Photo courtesy Chicago Bridge & Iron Co.

Among the larger ones is the Cowlitz development of the City of Tacoma in Washington. Estimated to cost $142,000,000, including facilities to handle annual salmon runs, the project consists of two dams, near Mossyrock and Mayfield, on the Cowlitz River. Mossyrock Dam is planned to be about 500 ft. high, with a crest length of 1,300 ft. Impounding a reservoir 21 mi. long, its storage will be used initially to power three 75,000-kw. generators in a powerhouse at the dam toe. Provision is included for a fourth unit.

Downstream from Mossyrock, its backwater extending nearly 14 mi. to that dam, will be the 240-ft. Mayfield Dam and powerhouse, having an initial installed capacity of 120,000 kw. in three units. A fourth unit is planned.

In Washington also, the raising of Rock Island Dam on the Columbia River near Wenatchee is included in new work of the Chelan County Public Utility District No. 1. The original project, built 20 years ago, included four generating units totaling 80,000 kw.; but the FPC license provided for additional installations when necessary. In its construction directive last year, the Commission echoed Northwest thought, saying that the new power "is urgently needed to meet existing and future power demands for defense and other purposes."

Yale Dam on the Lewis River in Washington was issued its FPC license for construction and operation last spring. By the end of August, a diversion tunnel 1,500 ft. long and 32 ft. in diameter had been holed through, permitting work to start in the river channel. The 270-ft. earthfill dam is scheduled for completion this year, its power plant providing 100,000 kw. for the owners, Pacific Power and Light Co.

Sierra Nevada streams

The San Joaquin River headwaters in California will be combined by the Mammoth Pool project of Southern California Edison Co. for generation of 169,000 hp. in one powerhouse, to be located 7 mi. downstream from Mammoth Pool Dam. Two other dams will be built to divert the waters of Rock and Ross creeks into a 40,000-ft. tunnel for delivery to the powerhouse penstocks.

Also on the Western slope of the Sierra Nevada, Pacific Gas & Electric Co. is harnessing the waters of a Mokelumne River tributary with its Bear River rock-fill dam, being built by Utah Construction Co. The 230-ft. structure will impound water for diversion through a 13,600-ft. tunnel to the powerhouse at Salt Springs Dam, where a 2,100-ft. head will be utilized to develop 40,000 hp.

Elsewhere in the West, power is the key to construction of several other projects. The State of California is seeking FPC license to construct and operate the power features of its Feather River Project, a multi-purpose project that will eventually cost over one billion dollars and furnish water to areas as much as 500 mi. distant. In Colorado, the City and County of Denver is building a dam and reservoir on South Boulder Creek that will firm the city's water supply and also provide an initial 10,500 hp. The California Oregon Power Co. of Medford, Ore., has been granted license amendments by the FPC for construction of additional facilities on its projects that will provide over 55,000 hp. in hydroelectric energy.

MISCELLANEOUS

A summary of Western work includes projects that are typical and projects that are special in their execution

POLLUTION AND SEWAGE DISPOSAL

Two factors—population growth and increasing stream pollution—are providing an acceleration in the construction of water supply facilities including treatment plants and sewage disposal plants. An indication of the impetus behind this type of construction activity is the fact that since April 1950 bond elections in California alone have provided financing for $50,000,000 of waste disposal facilities, while in the same period actual construction totaled about $5,000,000. In the corresponding field of water supply, population pressure is demanding additional water supply facilities, illustrated by the coming call for bids by San Diego on an $18,000,000 project to double the capacity of its present aqueduct connection to the Metropolitan Water District. In the Northwest the same pressures are producing plans for sewage disposal plants in accord with Federal requirements of reducing stream pollution. Projects estimated to cost $123,000,000 have been recommended by state authorities at 398 municipal and industrial locations. These proposed projects are located in the

Continued on page 88

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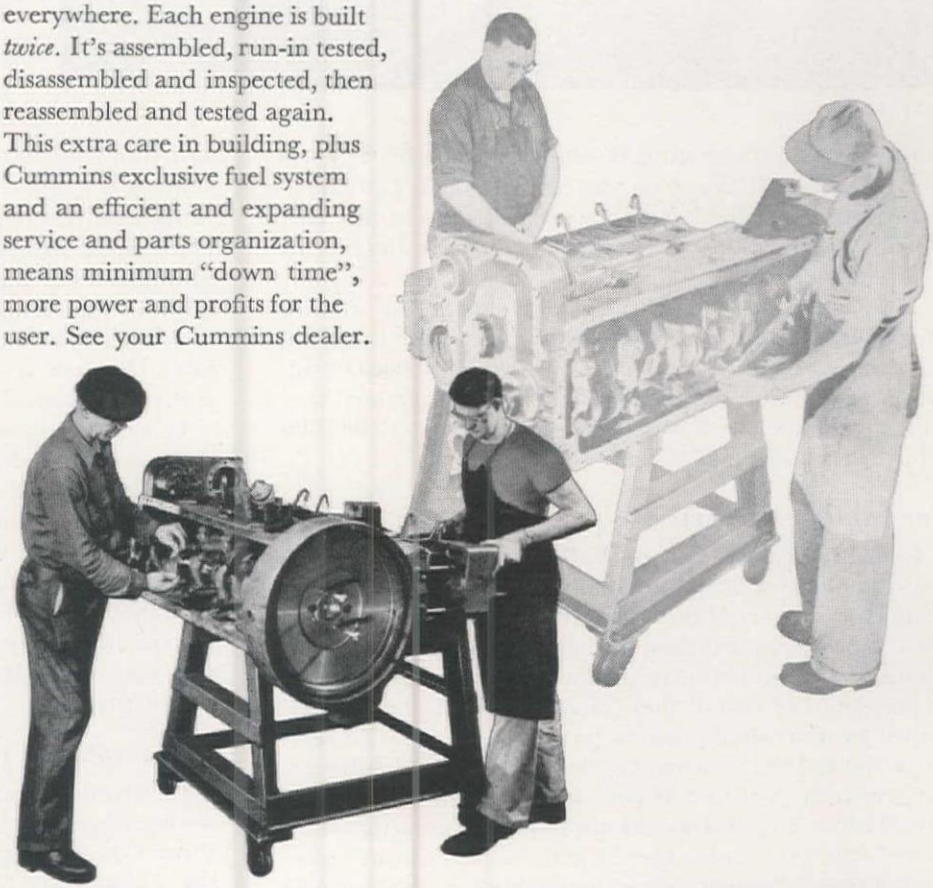

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Municipal parking feature is Los Angeles' 2,000-car subterranean Pershing Square garage covering a full city block and estimated to cost about $5,000,000. With excavation completed, activity now centers in formwork and concrete placement.

drainage area representing Washington, the greater parts of Oregon and Idaho, plus western Montana. Only 55% of the municipalities having sewerage systems in this area and 18% of the industrial establishments have any type of treatment facility.

The City of Spokane will call bids shortly for another $1,000,000 additional section to its interceptor program. Portland is scheduled to start at once on a $10,000,000 addition to its water supply aqueduct and storage facilities. In addition, the city is concluding work on its $17,000,000 interceptor and plant system.

Per capita cost varies

In California, the Central Valley area will require 220 sewage plants for 204 municipalities and an additional 16 plants for industry. The report which presented figures on these requirements indicated that the need for treatment plants at 389 industrial establishments was undetermined at present. The cost of these facilities has not been determined by individual projects, but the Public Health Service of the Federal Security Agency normally applies figures varying from $10 to $60 per capita for such municipal installations and this would apply to a population of almost 3,000,000 people. The estimate is exclusive of industrial waste treatment. Such an estimate of costs would undoubtedly be increased considerably because of population growth and obsolescence as the program was carried out during the next several years.

In the Great Basin drainage area of California 150 treatment projects will be required, including 92 for municipalities and 58 for industry. Although the population in this area is relatively light, stream flow is comparatively low and pollution represents a correspondingly large problem.

In the state of Washington considerable progress was made on municipal sewage treatment plants during 1951 and although shortages in materials may curtail this construction this year the high priority given to this type of work is not anticipated to reduce the volume seriously. Municipalities requiring critical materials for treatment plants are instructed to obtain letters supporting their application from the Washington Pollution Control Commission. Plants under construction during 1951 total 20, with an estimated cost of almost $3,000,000. Corresponding work this year is scheduled for 16 municipalities, with a cost estimate of $3,500,000.

During the same period work has been undertaken on 23 waste disposal plants at industrial establishments. Of special note was a combined disposal program carried out by two timber products companies at Everett, Washington, which included a diffusion line for discharging of cooking liquors into 300 ft. of deep water at an estimated cost of $650,000. The Pollution Commission estimates that a corresponding number of industrial plants will be carried out this year although an estimate is more difficult than for public projects.

Plant effluent for irrigation

In Arizona about $4,000,000 was expended last year in sewage disposal systems, including a $2,500,000 project in Pima County. This system serves a 60,000 population in the Tucson area eliminating a serious ground water pollution threat. Several waste disposal plants are being constructed at industrial establishments and in each case the effluent is being made available for irrigation because of the importance of water supply in that area.

Although Utah has no stream pollution law, general educational work has stimulated several municipal sewage treatment projects during the past year. Four municipalities have projects in the planning stage with bonds voted. Engineering studies are being made on pollution and treatment facilities at Salt Lake City, Ogden, Utah County and Weber County. In fairness to those munici-

Continued on page 91

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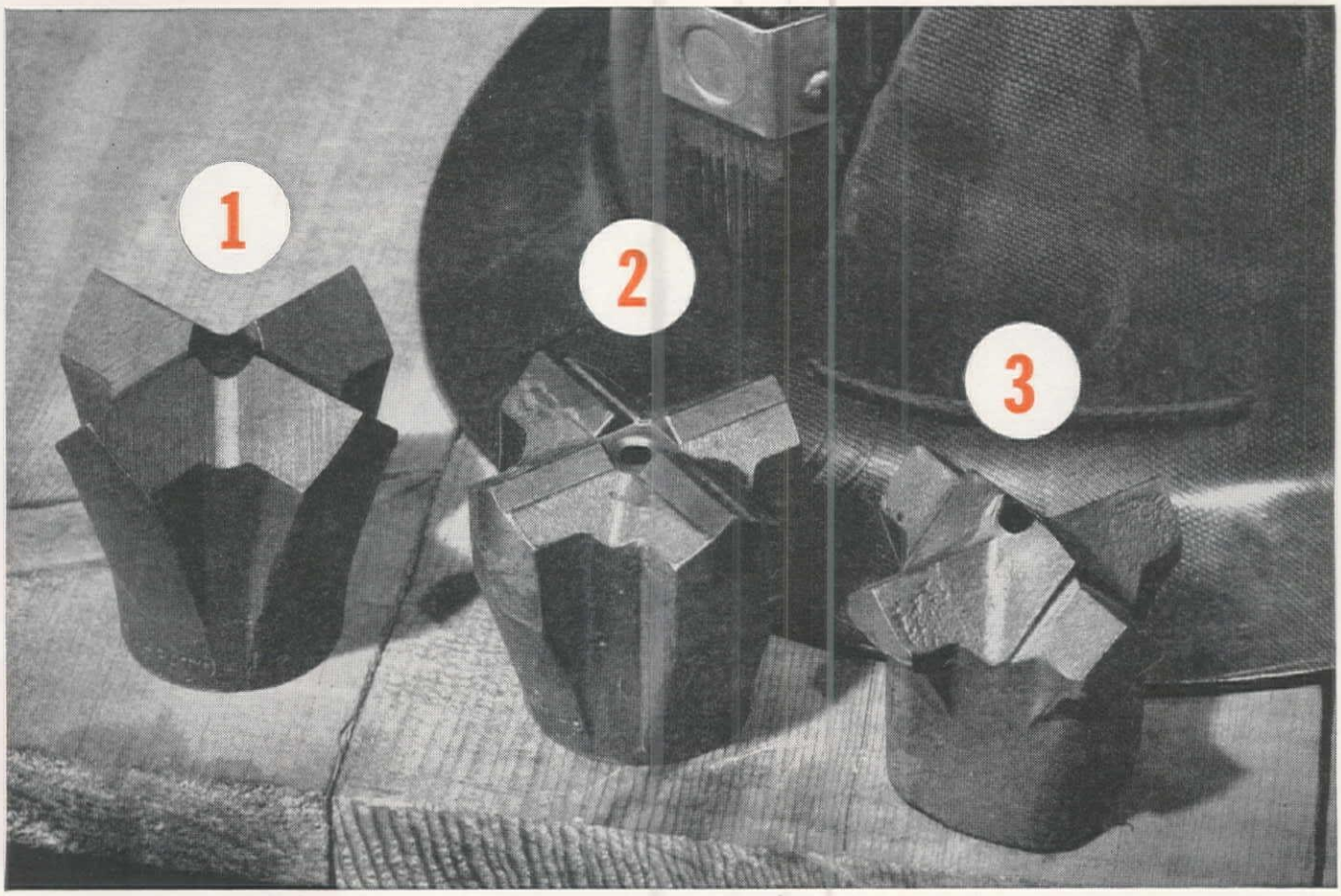

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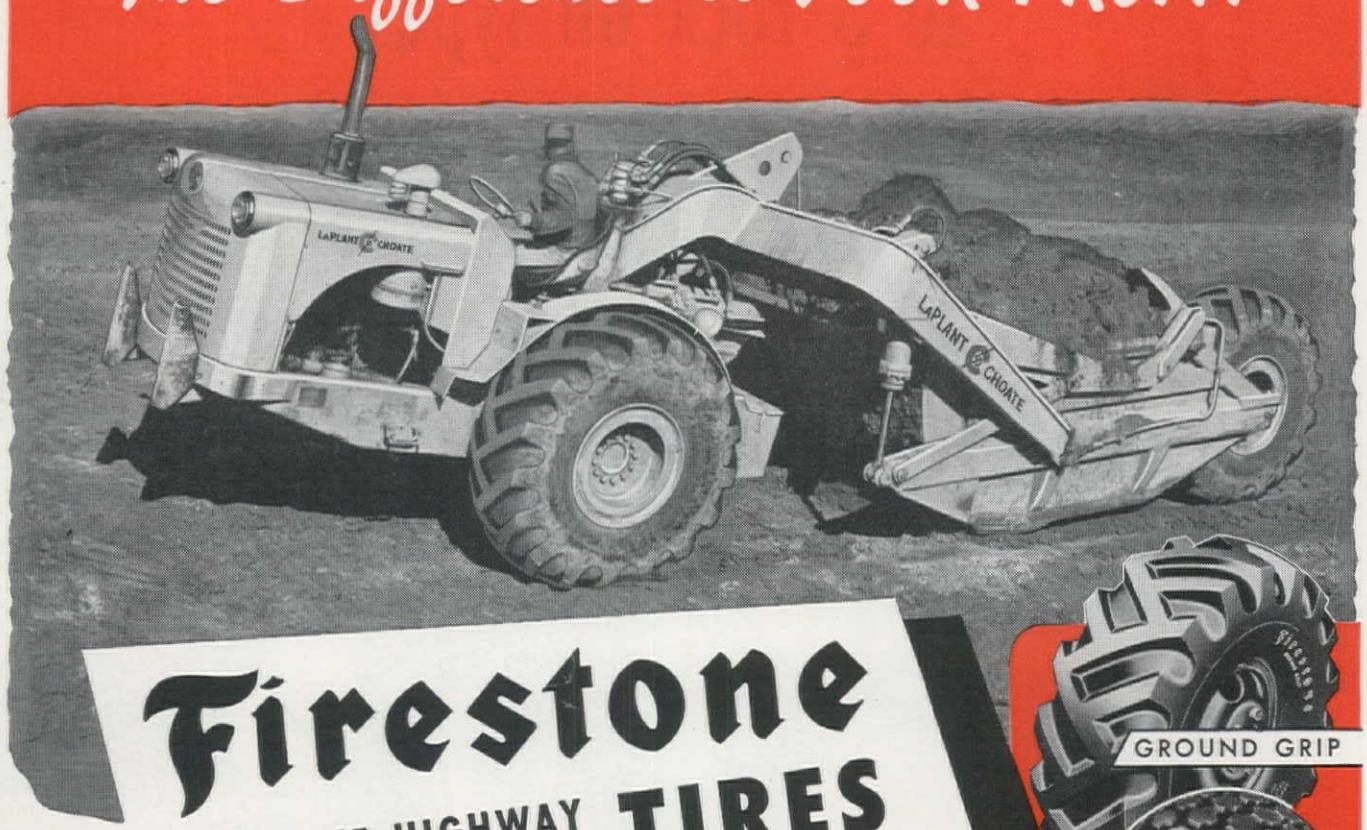

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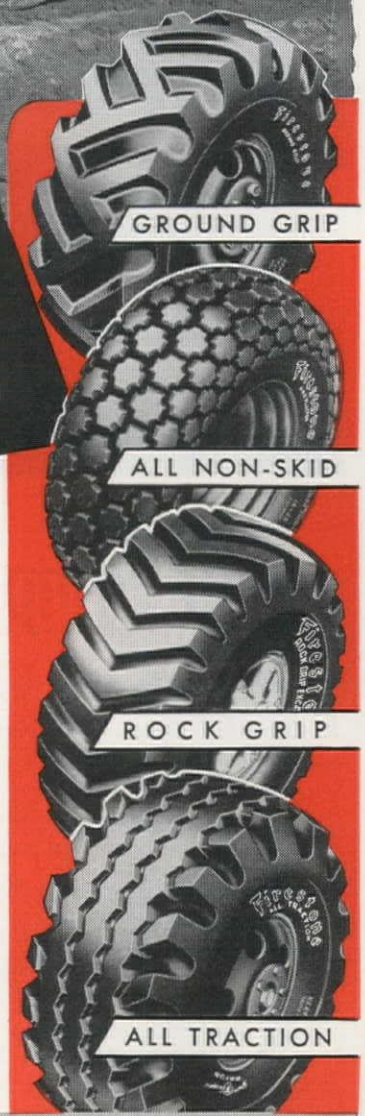

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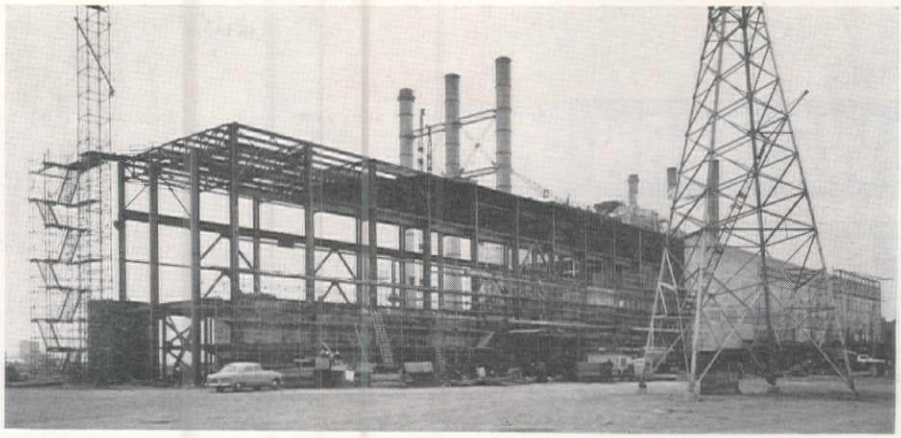

Steel framework to house turbines and boilers shows the size of a $30,000,000 addition to the $50,000,000 Moss Landing steam plant of Pacific Gas & Electric Co. in California. The new installation will add 200,000 kw. to the plant's existing 300,000-kw. generating capacity.

palities which have taken the initiative in eliminating stream pollution, there is agitation for a statewide anti-pollution law.

Intermountain states projects

In Montana three sewage treatment projects were carried out last year located at Laurel, Hot Springs and Galen. In Nevada two treatment plants were under construction last year at Lovelock and for the Nellis Air Force Base near Las Vegas. Engineering plans would indicate that five or six projects for waste treatment may be initiated this year.

In Wyoming an important project has been the extensive construction program on the municipal plant at Cheyenne, which is scheduled for service this spring. The estimated cost of the entire project including outfall and treatment plant is $950,000 for a community of 50,000.

New Mexico reports several projects scheduled for this year including a plant expansion estimated to cost about $750,000 at Albuquerque with bonds already voted. In addition the Atomic Energy Commission proposes to construct an industrial waste materials plant to treat radioactive laundry wastes.

HERE AND THERE

During the past year, the Super-Inch natural gas line from Texas and New Mexico fields to the San Francisco Bay area was completed. The record line extends more than 1,600 mi., with the final section of 500 mi. built at a record rate averaging a mile a day. The line is 34 in. in diameter, being the record gas transmission line to date. At the present time, 3 booster stations are being constructed on the line to double the quantity of gas delivery.

This year, the Southwest Potash Corp. will expend $10,000,000 on a refinery and expansion of its mining operations near Carlsbad, New Mexico. At the present time Columbia Steel Co. is continuing a multi-million dollar expansion program at its works near Pittsburg, California.

Work will start this year on an $80,000,000 steam plant installation to be built by P. G. and E. near Antioch, California. Installed capacity will be ultimately 600,000 kw., developing more power than the combined capacity of the plants at Shasta and Keswick dams.

In Montana, the Victor Chemical Works will build a $5,000,000 phosphate plant near Butte. In Nevada, the National Lead Co. will construct a $22,000,000 titanium plant. The Public Service Co. in Colorado plans to build a 60,000-kw. steam plant costing $11,000,000, while the Colorado Interstate Gas Co. plans a $3,500,000 expansion program to extend over two years.

The Riverside Cement Co. has received necessary permission to spend $2,700,000 for additional facilities at the Oro Grande plant. Calaveras Cement Co. is completing installation of a fourth kiln at its plant.

In Vancouver, B. C., the Imperial Oil, Ltd., plans a $24,000,000 expansion program at its two nearby refineries. In Nevada, Anaconda Copper Co. is planning a $33,000,000 plant for handling zinc ore and concentrates.

Industrial expansion

In Kalispell, Mont., the Anaconda Copper Co. is now securing government approval for the construction of an aluminum processing plant to cost $45,000,000.

Plans are under way for an oil pipeline almost 700 mi. long from Alberta, Canada through British Columbia to Vancouver. Present plans call for the piping of natural gas from the Canadian fields as far south as Seattle and Portland. Plans are continuing toward final designs for the Richmond-San Rafael bridge crossing in upper San Francisco Bay. Necessary permit has been received from the U. S. War Department and preliminary studies indicate that the structure can be financed by revenue bonds. Engineering feasibility has been demonstrated. Agitation continues for some type of dike-crossing for San Francisco Bay south of Hunters Point to connect with the Eastshore Freeway on the Oakland side.

In San Diego, California, a vote will be taken this month on a proposal to form a special authority for constructing a vehicular tunnel under the Bay to Coronado.

To supplement the existing bridges across the Willamette River at Portland a committee composed of representatives of civic bodies has proposed that the Oregon State Highway Commission undertake engineering studies for a subaqueous crossing. Likewise, studies continue by an engineering board for plans to cross Puget Sound from Seattle to Bainbridge Island with an extension to Bremerton. Several types of unusual designs have been suggested for this important engineering proposal.

Awards of contracts continue for important extensions to runway and building facilities at the Fairchild Air Force Base near Spokane. A program which will reach $24,000,000 in size will make this installation one of the most important air bases in the country.

The CAA airport program for 1952 indicates an expenditure (federal and sponsor) totaling about $5,000,000 in the eleven Western states, with an additional expenditure of about $500,000 in Hawaii.

WESTERN CONSTRUCTION

In either their conception or their construction, certain Western developments illustrate engineering vision that renders them noteworthy, respectively, to encourage their construction or to bring about sooner their adaptation elsewhere. These are the . . .

GRANDIOSE PLANS in the Construction West

TO MANY PEOPLE, including some in the industry, construction is a periodic thing, defined by the scope of enabling annual legislation if not by the seasons of the year. But this is not exactly true; for the planning function of the civil engineer is not on a fiscal basis. At any given time, there are in the minds of Westerners the plans for great projects whose ultimate benefits and significance transcend those of any single existing highway, dam, or other structure.

These grandiose plans are incapable of execution within any single year, yet they do develop in time from dreams to engineering eventualities. Some, like Washington's Columbia Basin Project, go on to the project stage, finally achieving completion to stand as monumental accomplishments of the engineering profession.

The staggering dimensions, both physical and fiscal, of Western grandiose plans are indeed proof that the West is different. With population concentrations still far less than those of the East, the West nevertheless must build to singular proportions for reasons of its distances, its terrain, and its aridity. Not single valleys, but entire watersheds, are developed to furnish the water necessary to its irrigated agriculture. Not a small trestle, but the greatest suspension bridge of all, spans its Golden Gate, so that municipal commuters shall not interfere with Pacific shipping. Not 24 ft., but 52 ft., of pavement width are laid for miles on end to move its people and its produce and its commerce from city to city.

The West is a place of engineering frontiers. And it is also a place of geographical frontiers the development of which will find engineering in the van. Examples of the latter are British Columbia and the Territory of Alaska. In both cases development is presently feeling the spur of military necessity, directly in the construction of military facilities and indirectly in the exploitation of hydroelectric and mineral resources by basic material producing industries of the two countries.

ALASKA

Territorial development has seen civilian and military construction expand into every engineering field

Alaska, already mentioned as the coming U. S. strategic stronghold, has a destiny far beyond any transient condition of war or peace. And this destiny is being hastened as international considerations bring about a focus there. The military funds currently being expended in Alaska, though intended to build primarily military facilities, necessarily go in part to works and structures of more universal value—roads, port facilities, power developments, and supporting commercial enterprises.

Ralph Browne of the Alaska Development Board has written of Alaska's many-sided future in a manner that shows the entire Territory to be virtually a single grandiose plan of U. S. engineering:

"The construction industry already has played a dominant role in the Territory in pushing back wilderness frontiers, bridging the gap formerly isolating some communities and laying the foundation for a stable and enlarged economy. Much more remains to be done and the construction industry will play even a greater role in the years ahead . . .

"Private enterprise has no small stake in Alaska. As natural resources become depleted elsewhere in the more densely populated regions of the North American continent, basic industry is looking more and more toward Alaska as a potential source of supply . . .

"Prospects for expanded construction activities, as the forerunner to launching numerous civilian developments, are encouraging. In 1950, the total value of construction amounted to nearly $280,000,000. Estimates for 1951 approximate $500,000,000. No slackening is in sight . . .

"Highways are the Territory's arteries of commerce, and the highway construction program has been expanding at a rapid rate since the war . . . The Alaska Road Commission hopes to be able to spend about $30,000,000 per year for the next six years on its road program. This includes construction of many significant highways such as the proposed Copper River road from Cordova, along the old road bed of the Copper River & Northwestern Railway, to Chitina . . .

"Some of the highways of benefit to Alaska are international in aspect. These include completion of the John Hart Highway next year between Prince George, B. C., and Dawson Creek, B. C., southern terminus of the Alaska Highway, providing a short cut from the Pacific Northwest to the Territory . . .

Short-cut and strategic alternate

"The most important of the so-called 'international' highways is the long-discussed 'A' route from Fort St. James or Hazelton, B. C., to Whitehorse. Construction of this road not only would shorten the present highway distance to Alaska by several hundred miles, but more important would provide a strategic alternate land route to Alaska. Surveys of the route have been carried out by the Canadian government during the past two years. When completed the road—located hundreds of miles nearer the Pacific Coast than the Alaska Highway—would encourage construction of lateral feeder roads to various southeastern Alaska communities . . .

"The rehabilitation program of the Alaska Railroad, under way for several years, neared completion in 1951. Future railroad plans call for improvement of the Seward-Anchorage division, erection of shop and terminal facilities and similar projects. Eventual extension of the railroad to Haines, a deep-water port at the head of Lynn Canal in southeastern Alaska, has also been considered.

Rail connection with the U. S.

"The most significant of all future railroad programs, however, is the proposed construction of the U. S.-Canada-Alaska rail line. Legislation has been enacted by the U. S. Congress to permit economic surveys of the regions through which this railroad would traverse, but Canada has not yet agreed to participate in the investigations. The British Columbia government, which is extending the Pacific Great Eastern Railroad from Quesnel, B. C., to Prince George, now is talking of pushing its rail lines northwest from the latter city to the Peace River Valley, rich in agri-

". . . Alaska is big, the people used to big things."

cultural, forest, and mineral resources. The recent discovery of oil and natural gas in the Peace River Valley district could speed such extension, constituting an important section of the proposed railway to the Territory, probably providing the incentive and encouragement required for its completion.

"Construction of a dock and ocean terminal at Haines is now under way by the U. S. Army Engineers. It should be completed in 1952 or 1953. Plans currently are being considered for erection of new and enlarged docking facilities at Anchorage. Construction of the latter would assist in lowering present high-cost transportation rates to Interior Alaska . . .

"In the planning stage—distantly, it is admitted—is a pipeline from Fairbanks to Umiat, its construction or installation depending upon discovery of petroleum in commercial quantities in the Arctic field. Such discovery probably would result in erection of a refinery at Fairbanks, or at some tidewater point.

"Renewed interest has been expressed by private exploration companies in the Katalla-Yakataga fields in south central Alaska. This field formerly produced oil in limited quantities and a small refinery was operated at Katalla until 1933, when it was destroyed by fire. Owing to lack of capital, it never was rebuilt. Discovery of oil in larger quantities than heretofore known probably would mean construction of a pipeline to Cordova and, in all probabilities, erection of a refinery there.

"Investigations were completed during the past year on a synthetic fuel plant, which would utilize Alaskan coal deposits, to be located in the railbelt area between Anchorage and Fairbanks. Conducting the studies were the U. S. Army Engineers, U. S. Bureau of Mines and others. No public announcement has been made as to whether or not the project was found to be economically feasible.

"A host of hydroelectric power projects is in the offing. Construction began late in 1951 on the Bureau of Reclamation's first Territorial endeavor—the Eklutna Project near Anchorage . . . The Bureau also plans to investigate about 25 additional power sites in Alaska during the next six or seven years. Those slated first for construction include the Swan Lake site, near Ketchikan; Blue Lake, near Sitka; Lake Dorothy, near Juneau, and the Susitna River project near Anchorage.

"If constructed, the latter would be the largest hydroelectric power project in Alaska, its installed capacity being in excess of 300,000 kw. Low-cost electric energy has proved to be industry's lodestone in the Pacific Northwest. So it will be in Alaska . . .

Canada's Northwest highway system, reaching out from British Columbia into the Yukon Territory, encounters bridge construction conditions like this: 48 below, near Whitehorse.

Photo courtesy
The Thew Shovel Co.

"The past year witnessed the long-awaited arrival of the pulp and paper industry in Alaska. The Puget Sound Pulp & Paper Co. of Bellingham, Washington, announced last July its plans to proceed with construction of a pulp mill near Ketchikan . . .

"Entrance of this basic industry to Alaska has provided an incentive to others engaged in the pulp and paper manufacturing fields. Studies are now being conducted for possible establishment of a newsprint mill near Juneau and a pulp mill near Sitka. The total cost of the three mills, if completed, would exceed $100,000,000. Suitable sites are available for at least two more pulp mills in southeast Alaska . . .

"The Taiya project near Skagway, one of the largest remaining undeveloped power sites on the North American continent, has attracted the interest of the electrometallurgical industry. Possibilities for reduction of aluminum in Dyea Valley continue to be studied. According to press announcements, the Taiya project is not a 'dead duck', as many persons now believe. Size and cost of the project would compare favorably with the much-publicized Kitimat project in British Columbia.

"As Alaska grows and expands, municipal construction projects carried on in conjunction with the Alaska Public Works agency will increase. Since this program was initiated in the Territory a total of $16,000,000 has been awarded to various communities, and applications for projects costing almost $25,000,000 are awaiting official action. Originally, authorization from Congress called for a $70,000,000 program during a six-year period.

"The largest private construction activity during 1951 was in the field of housing, mainly projects made possible by FHA insured mortgages. The value of this type of construction has amounted to many millions of dollars. Housing is still a prime need in Alaska and the demand for new facilities is not expected to taper off during the next few years . . .

"The preceding touches only on a few of the highlights in the Territory's future construction program. Alaska will not grow into a defensive and economic bastion of the United States by itself. Man has to build it. Alaskans, both sourdoughs and newcomers, face the future confidently. . . . The Territory is a big place and the people living in it are used to big things."

For the present, these big things are military: the Army Engineers alone are currently announcing that they will oversee some 96 new jobs valued at about $170,000,000 during fiscal 1952-53.

BRITISH COLUMBIA

Hydroelectric power development is opening the door to industrial expansion throughout the Province

Another Western area experiencing a boom is British Columbia, where construction contract awards have jumped during the past two years like this:

1949	$ 79,429,000
1950	81,240,000
1951 (first 9 months only) . .	354,000,000

The grandiose plan for British Columbia is the realization of an industrial potential that will put it on a par with established areas of both the eastern U. S. and Canada. Toward achievement of this goal, heavy construction contractors of both countries are presently engaged in the construction of facilities that include not only manufacturing plants and similar installations, but also the hydroelectric power projects necessary to their operation.

Most spectacular of these power projects is the one currently under way for Aluminum Co. of Canada, Ltd., with Morrison-Knudsen Co. of Canada, Ltd., as principal contractor. The Alcan project, as it is called, indeed exemplifies grandiose planning: Its first phase is estimated to cost $160,000,000, of which about $23,000,000 was spent last year. Eventually it will total an investment of over half a billion dollars. Its power production, planned to supply an aluminum refinery on the Pacific Coast at Kitimat, will amount initially to some 800,000 hp. Ultimately it will be the largest on the continent—1,600,000 hp., generated by collecting the storage of many lakes by dams and conduits for transport ten miles through the coast mountains to a subterranean powerhouse at tidewater.

Other industries in the process either of establishment or substantial expansion in British Columbia include pulp and paper, plywood, resin, steel, shipbuilding, petroleum, timber, and mining. One of the latter, Consolidated Mining and Smelting Co., producers of lead and zinc, has awarded a $30,000,000 contract for construction of a dam and power house on the Pend d'Oreille River.

British Columbia is justly proud of its leaders, the forestry, agriculture, mining, and fishing industries. But during the time required for execution of this grandiose plan, the construction industry is second to none.

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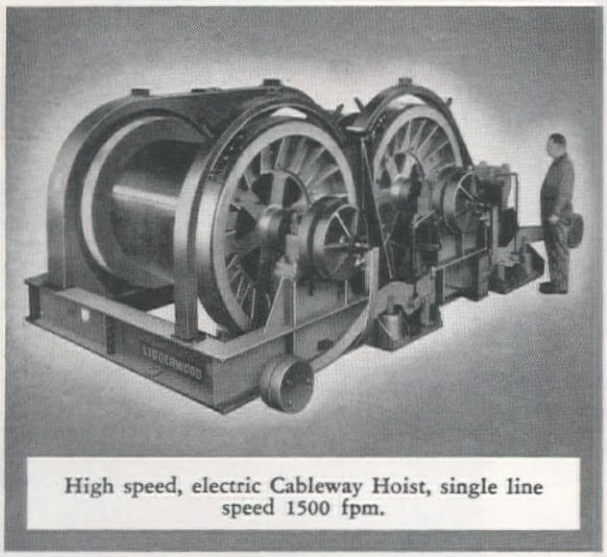

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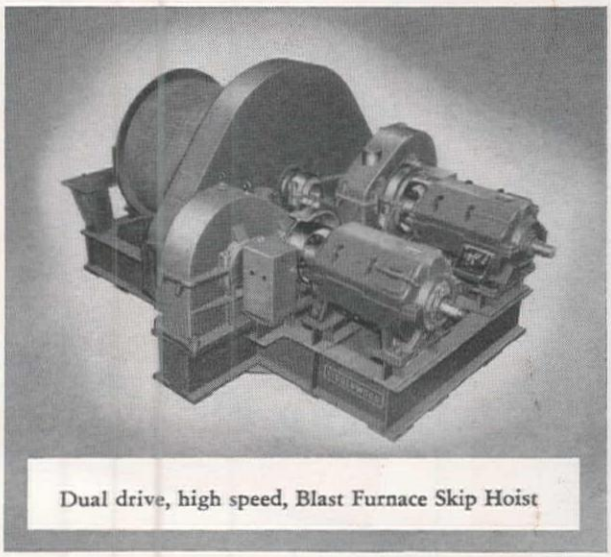

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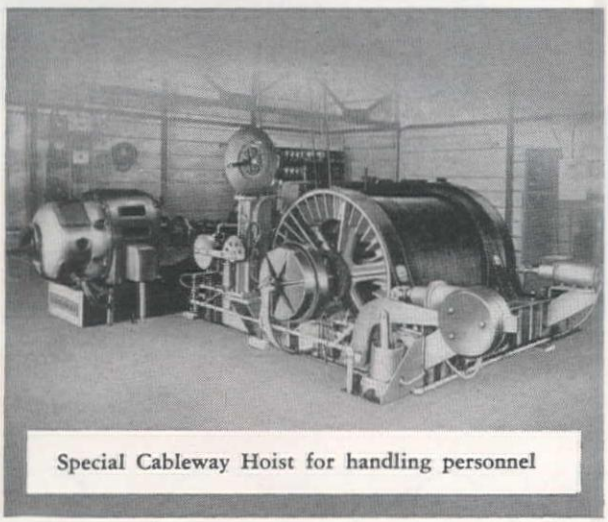

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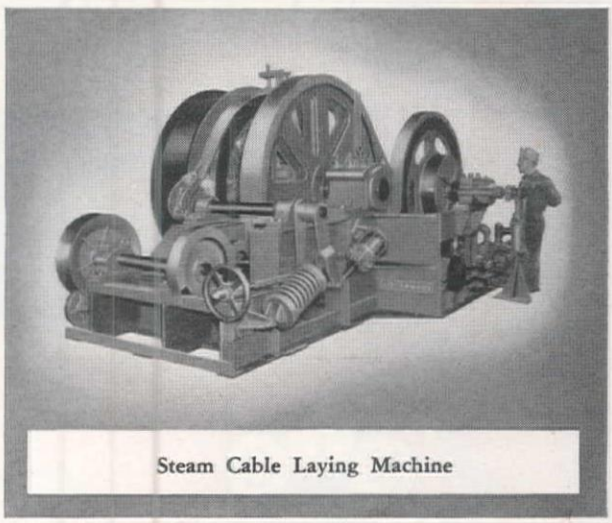

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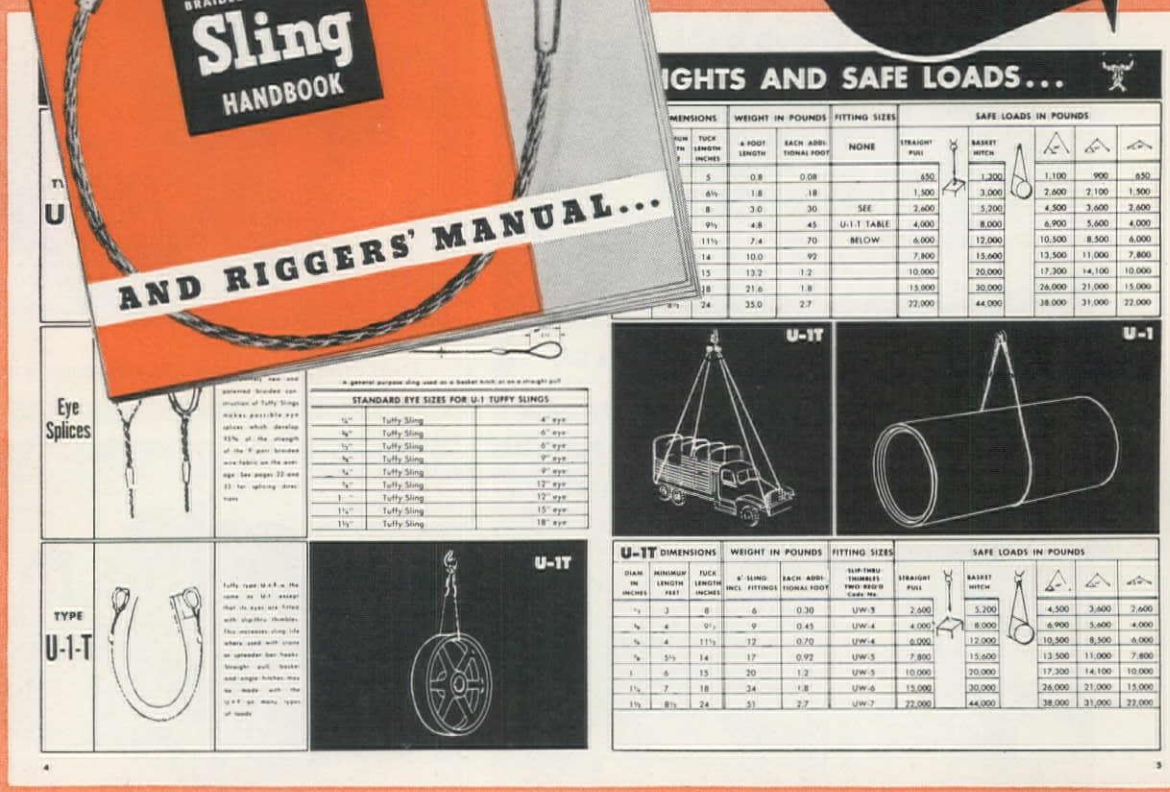

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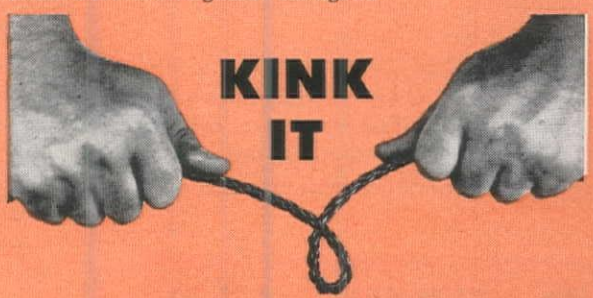

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COLORADO RIVER

Cooperative studies, reported by the Bureau of Reclamation, point to a billion-dollar engineering future

Among the grandiose plans of Westerners is the Colorado River—its complete and effective utilization from headwaters to tidewater. Here is a river providing planning opportunities for many, and, historically, many have contributed to the engineering and political lore of its basin, which includes seven Western states and Mexico.

In particular, the manner of allocation of its waters for use by these states has been the subject of argument. Rights and interests among the upper basin states were reconciled by the Upper Colorado River Compact of 1948; conflict between upper and lower basins still exists, principally in disagreement between Arizona and California.

To date, it is only in the lower basin that significant works have been constructed: Hoover, Parker, Davis, and Imperial dams in the United States and, lately, Morelos Dam at the Mexican border. In the upper basin, cooperation and planning have been promoted by the Upper Colorado River Commission; tentative engineering has been done by the Bureau of Reclamation.

Last year the Bureau published a report on the results of its studies to date, calling for eventual construction of 10 dams on the Colorado River and its tributaries to store 48,500,000 ac. ft. of water and provide 1,622,000 kw. of hydroelectric capacity. The report was sent to concerned states and agencies for comment and is now again in Washington for review by the Bureau. The Upper Colorado River Commission, which has endorsed the plans, hopes for early presentation of the report to Congress.

The report contemplates stage construction of the entire project, and therefore recommends immediate authorization for only five of the dams, and construction appropriation for only three of these. It does, however, also seek authorization of 11 so-called participating projects which would receive financial assistance from power revenues of the principal works.

The three dams recommended for immediate construction total $569,300,000 in estimated cost, represent 33,340,000 ac. ft. of storage capacity, and are planned for 1,048,000 kw. of hydroelectric power. Largest by far is Glen Canyon Dam, located on the Colorado River near the northern Arizona border. The concrete gravity section would rise 700 ft. from bedrock and impound 26,000,000 ac. ft. of water. Upon regulation of this capacity would depend the ability of the upper Colorado basin to comply with provisions of the Colorado River Compact of 1922, whereby 75,000,000 ac. ft. of flow must be delivered in each ten-year period past Lee Ferry, 13 mi. downstream, into the lower basin. With extensive use contemplated for presently wasted waters upstream, this large storage is necessary to conserve remaining outflow through long periods of drought for Compact compliance. The power plant at Glen Canyon Dam, operating under a mean head of 480 ft., would have an installed capacity of 800,000 kw. Cost of this dam and plant would be $363,900,000.

The other two dams presently recommended are on Colorado tributaries: Echo Park Dam on Green River in Colorado, and Whitewater Dam on the Gunnison, also in Colorado. Echo Park Dam, a concrete gravity structure 690 ft. high to impound 6,460,000 ac. ft., is planned for construction in Dinosaur National Monument, a fact which has caused considerable opposition to its inclusion in plans for development of Colorado River basin water resources. Actually, the dam and reservoir will not inundate or otherwise physically endanger fossil deposits within the Monument; much of the opposition centers in philosophical considerations that, for instance, a precedent might be established whereby other wilderness areas and monuments would more easily be opened for resources development. If built, Echo Park Dam will have 200,000 kw. of hydroelectric capacity and will cost $165,400,000.

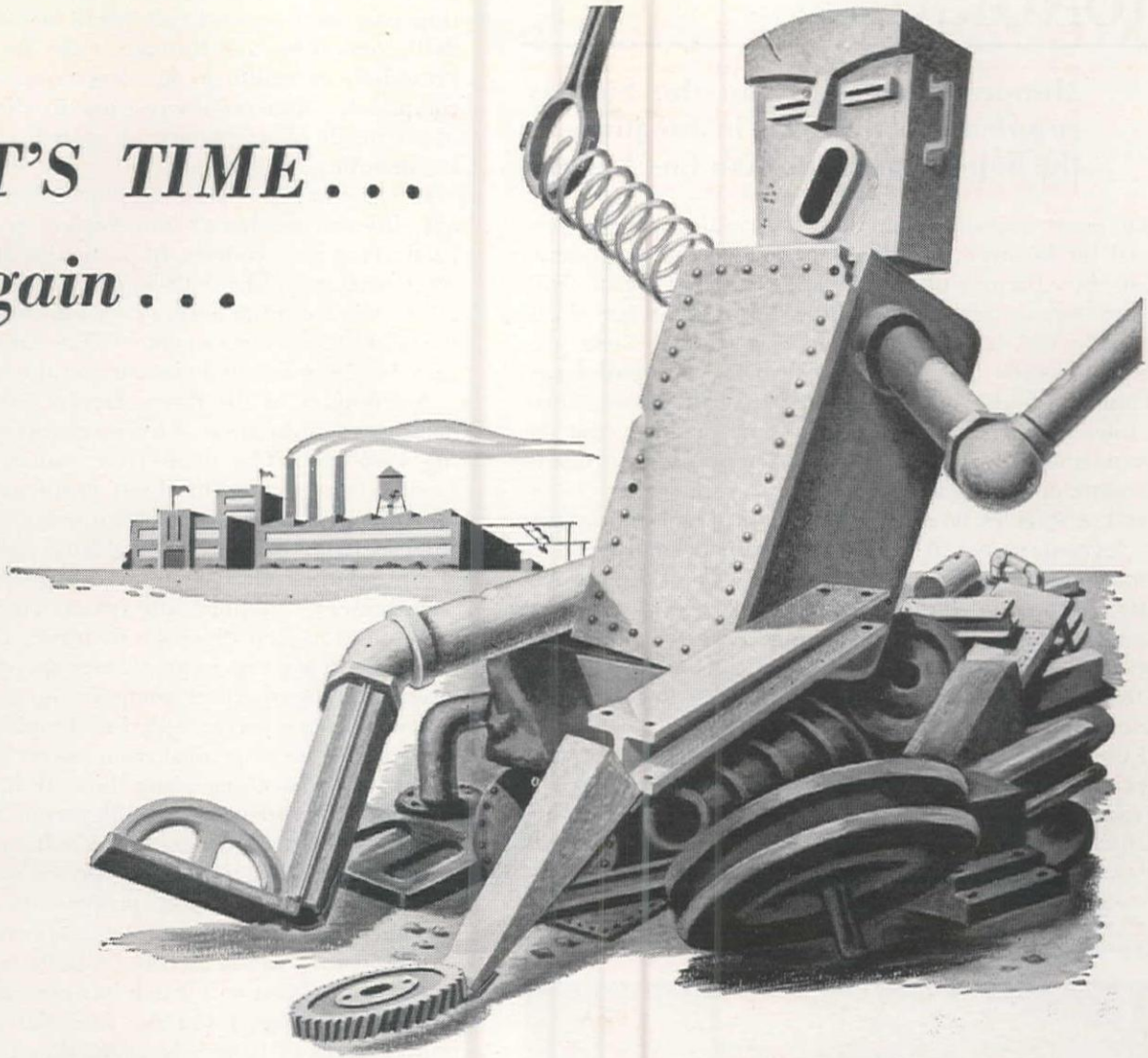
Whitewater Dam on the Gunnison, near Grand Junction, Colorado, is planned as an earthfill dam 335 ft. high, supplemented by three dikes at low points in the reservoir periphery upstream. To cost $40,000,000, the dam would impound 880,000 ac. ft., and have a hydroelectric capacity of 48,000 kw.

Other dams recommended for authorization at this time are Navajo Dam on the San Juan River in New Mexico, and Ashley Dam on the Green River in Utah. While supporting Reclamation recommendations for authorization of these works and construction of some of them, the Upper Colorado River Commission nevertheless notes that "in the light of the present budgetary situation and of existing international tension, it is proposed that no actual construction should be commenced and no contracts therefor should be entered into if it is authoritatively determined that the materials and labor required therefor are more urgently needed for other purposes."

Continued on page 100

IT'S TIME . . .

again . . .



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MONORAIL

Monorail transit, from the Sunday supplements to reality in one jump, is the hope of metropolitan Los Angeles

Off-grade transit systems have periodically been proposed for Western metropolitan centers, the proponents citing installations of eastern U. S. and European cities as successful examples elsewhere. However, when documented with survey results and cost studies, these proposals generally have foundered in waves of apathy, suspicion, and plain Western preference for the private automobile. There has appeared simply no prospect that the commuting public would ride in sufficient volume to assure adequate operating and repayments revenue.

In Los Angeles, however, a current proposal for a system of elevated monorail transit has gained sufficient momentum to bring about legislative creation of the Los Angeles Metropolitan Transit Authority, an agency governed by a seven-man board and having power to build and operate the system. Favorable possibilities for construction of the monorail system seem to be linked with geographic incident and accident.

Los Angeles' metropolitan area sprawls in all directions over an area of several hundred square miles, which it already taps for its urban working population with no adequate transit system. Vehicular freeways are being built by calculated stages to result eventually in an integrated transportation network; they will be of service alike to daily commuting and through traffic. But vehicle parking provisions in building codes have come too late to be of completely effective service even in this city which has based much of its pattern of growth on the use of the automobile.

In the course of its development Los Angeles has not only jumped Southern California's rivers, it has extended itself along their courses. In particular, both business and residential areas line both banks of the Los Angeles River all the way from San Fernando Valley to Long Beach. And the established business center of Los Angeles, since pueblo days, has been situated virtually on the river's right bank.

A tributary of the river, Arroyo Seco, was utilized a decade ago for location of freeway connection to neighboring Pasadena. The main river course is not similarly feasible because of right-of-way problems. Hence, the current plan, for a 44-mi. monorail route following the Los Angeles River bank, requiring but a narrow right-of-way and presenting relatively few crossing situations.

As presently planned, the system would consist of two rails, one for each direction of travel, carrying trains of from one to five cars at an average speed of over 35 mph. This latter figure alone compares quite favorably to an existing average surface speed of 9 mph. for automobiles. Rails would be suspended from towers 35 ft. high spaced about 70 ft. apart, providing about 16 ft. of vertical clearance. Such construction would permit the system to be carried in the center strip of vehicle freeways where otherwise feasible. With necessary approval gained, both for financing and construction, proponents of the monorail system estimate that it could be in operation in two years.

Should this transit facility be built, city planners elsewhere in the West will watch its operation with considerable interest. For, given the financial resources, metropolitan areas of lesser size could do equally well with a measure of relief from traffic congestion. The biggest problem seems to be to induce people to ride any transit system.

Granted that success may be gained in Los Angeles, practical application of monorail transit to highly developed, constricted centers such as peninsular San Francisco or Seattle remains in question.

". . . Stream regulation afforded by Oroville Dam will augment firm flows in the Sacramento River delta."

FEATHER RIVER

California has a plan all its own: moving the Feather River south 600 miles to serve Southern California

Flood flows on California's Feather River have ranged as high as 230,000 cfs. This is a damaging volume in itself, but doubly so when compounded by the often coincidentally high level of its tributaries, the Yuba and the Bear. In past years, the Sacramento River channel has not been able always to pass these and other tributary flows. Despite the provision and operation of by-pass channels across adjacent vacant lands, cities such as Marysville and Sacramento have been partially flooded.

Shasta Dam on the Sacramento has already contributed to control of Sacramento Valley floods, and Folsom Dam

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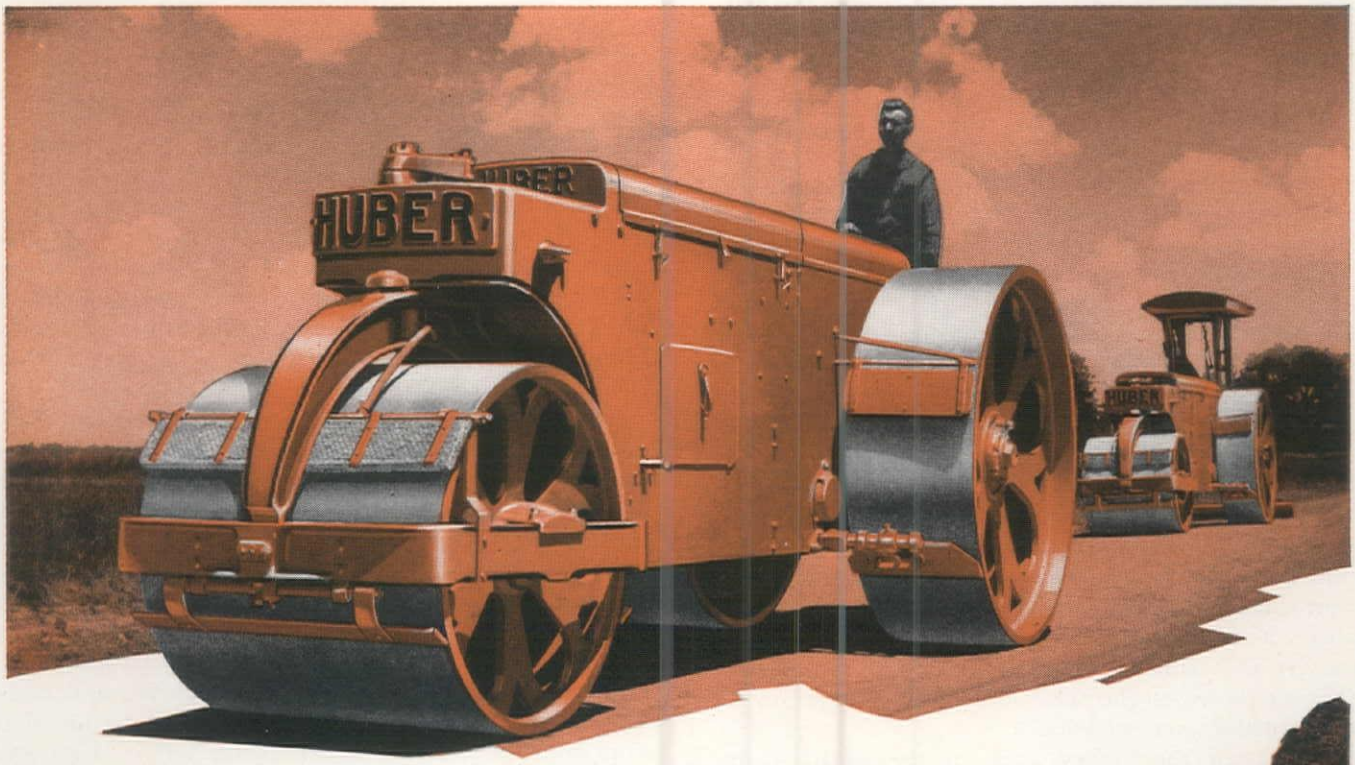

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The O. S. Stapley Co. — Phoenix, Arizona	

on the American will restrain rampages such as the 200,000-cfs. crest of November 1950. Another major unit in the Central Valley system of water resources control and use will be Oroville Dam on the Feather River near Oroville.

This dam is the first and principal structure of the Feather River Project, the sum of which constitutes California's first major proposal for state construction toward solution of water worries north and south. The project has been planned by the State Division of Water Resources, which describes it as "a multiple purpose project which will provide greatly needed flood protection in the Feather River area; conserve supplemental water for domestic, irrigation and industrial uses in areas of deficiency extending as far south as San Diego County; and produce 1,750,000,000 kw-hr of hydroelectric energy annually."

For construction of Oroville Dam, the State Water Project Authority has been authorized to issue revenue bonds. Last August, the Authority directed preparation of an application to the Federal Power Commission for a license to construct and operate the dam, together with other facilities necessary to the development of its power features. At that time also, preliminary negotiation was authorized between the state and local interests to be affected in the reservoir area.

Though not the highest dam in the world, being planned 17 ft. lower than Hoover Dam, Oroville Dam boasts some noteworthy significance elsewhere in its design estimates:

Type		Concrete gravity
Height (above streambed)	(ft.)	710
Crest length	(ft.)	5,700
Mass concrete (about)	(cu. yd.)	13,800,000
Reservoir capacity	(acre feet)	3,500,000
Reservoir area	(acres)	15,450
Spillway capacity	(cfs.)	292,000
Powerhouse design head	(ft.)	558
Installed capacity	(kw.)	440,000

Most imaginative feature of the entire project is its accompanying canal system. Stream regulation afforded by the dam will result in augmented firm flows in the Sacramento-San Joaquin river delta area, where two canals will originate. The smaller one will be 65 mi. long, including tunnels, and will transport 185 cfs. of supplemental water into Alameda and Santa Clara counties of the San Francisco Bay area. Pumping lifts involved total over 700 ft.

The larger canal, 567 mi. long, will have an initial capacity of 6,000 cfs., 1,800 more than the Delta-Mendota Canal. During its course, ending near San Diego, the contents of this canal, depleted by various diversions, will undergo 16 pumping lifts totalling 3,460 ft.

The total cost of the project is about $1,300,000,000. For this cost it provides a firm water supply to 322,000 acres of land in its service area, reduces flood flows downstream on the Feather River to about 100,000 cfs., provides a minimum of 232,000 kw. of power capacity, and makes available 2,845,000 acre feet of water annually for diversion from the Sacramento-San Joaquin river delta area. Of this latter amount, 127,000 acre feet annually is contemplated for delivery to Alameda and Santa Clara counties, 945,000 acre feet annually for areas in the western San Joaquin Valley, and 1,773,000 acre feet annually for areas in Southern California.

Involving for its conception and construction almost unbridled engineering, the Feather River Project takes its place with other Western projects, past and present, as a grandiose plan in the Construction West.

GM Diesel
Case History No. 5011-27

USER: Thomasville Stone and Lime Company, Thomasville, Pennsylvania

INSTALLATION: 3-71 and 6-71 GM Diesels power Joy Heavyweight Champion blast hole drill; 3-71 for rotary and propulsion, 6-71 on compressor and "pulldown."

PERFORMANCE: Replaced 5 small drills. Maximum footage with previous equipment 15 feet per drill in 6¼ hours; with new equipment 180 feet in 6¼ hours. Reduces drilling manpower. Fuel consumption: less than 7 gallons per hour (both engines).

This Diesel replaces five drills

—and more than doubles the footage

Case after case proves that *any* machine with General Motors Diesel power is a *better* machine—gets *more* work done at *lower* cost. Using General Motors 2-cycle design—this Diesel packs more power per pound, runs smoother and accelerates faster. Result—greater production per hour! With most parts interchangeable and easy to replace—GM Diesels take less time out for servicing, cost less to maintain. Check it with other operators—*prove it for yourself* by specifying GM Diesel power in any equipment you buy.

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GENERAL MOTORS, DETROIT 28, MICHIGAN
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GM
GENERAL MOTORS
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NEWS OF WESTERN CONSTRUCTION

JANUARY 1952

OPS ruling covers sale of used machinery

THE SALE of used construction machinery is covered in a new tailored ceiling price regulation, according to Homer F. Potter, San Francisco district director of the Office of Price Stabilization.

Effective on December 17, the new regulation, CPR 105, applies to several hundred items including boilers, conveyors, cranes, cutting tools, dies, derricks, dredges, engines, motors, hoists, railroad equipment, excavating equipment, snow plows, turbines, X-ray apparatus, and stokers. Used farm machinery and used machine tools are not included, being covered by other regulations.

In general, the ceiling price for rebuilt and guaranteed equipment is established at 85% of the manufacturer's current published list price for the same new equipment. For equipment which is not rebuilt and guaranteed, the ceiling price is established at 55% of its applicable base price.

For certain types of equipment, a depreciation method of pricing may be used, with annual rates of depreciation ranging from 3% to 30%. When this method is used, the seller must furnish the purchaser with a statement containing a description of the equipment, the name and address of the original purchaser, and the date acquired by the original purchaser.

Construction begins on Palisades power plant

WORK IS BEGINNING at the Palisades Dam and power plant site on the Snake River, 50 mi. from Idaho Falls, Idaho, to provide hydroelectric power for atomic energy installations and other defense work in the area, under a Bureau of Reclamation contract awarded to J. A. Terteling & Sons, Inc., of Boise.

The company bid $1,242,700 for open-cut and tunnel excavations for the power and outlet tunnels and a construction substation for the dam and power plant, under the first major construction contract for the project. Under the terms of the contract, the successful bidder must complete the construction substation in 45 days and finish the entire job in 230 days.

A total of 17 firms submitted bids for the contract which involved primarily an earth-moving job in connection with construction of the dam which will be the largest earth-fill dam yet built by the Bureau of Reclamation.

Urgent need for the additional hydroelectric power supply in the eastern Idaho region was recognized in the last session of the Congress, when a $2,000,000 item for the Palisades Project was included in the final supplemental appropriation bill approved by the President on November 1.

Earlier in the year need for the $76,000,000 project was emphasized by the Defense Electric Power Administration, which pointed out that the development of phosphate for elemental phosphorus for defense needs, as well as power for the atomic energy installations at Arco, Idaho, was dependent upon the availability of hydroelectric energy from the Palisades Project. A growing domestic demand as a result of these developments was noted.

With plans calling for making the additional power available early in 1955, the construction program calls for the erection of the Palisades Dam, 260 ft. high, with a storage capaciay of 1,400,000 acre-feet, and a power plant with an installed capacity of 114,000 kw., capable of producing 700,000,00 kw-hr of energy annually.

Contractors threaten court action over rainmaking

IN SANTA CLARA County, Calif., where droughts can cause damage to agricultural crops, Bay Area contractors took a stand against rain-making which would cause millions of dollars in damage to construction projects.

A four-page letter representing the views of 121 contractors was read at a meeting of the County Board of Supervisors. The letter stated that contractors might take the County into court if rainmaking hindered their projects. As a result of the contractors' stand, the board may require contractors operating in Santa Clara County to sign waivers absolving the County of any damages caused by rain.

Supervisors refused the request of Harry E. Smith, executive vice president of the Peninsula Association of Contractors, that the matter be discussed in a meeting. The board referred the entire matter to the San Jose Chamber of Commerce water resources committee, which has been urging the cloud seeding operations.

Accompanying the letter from the contractors was a telegram from Guy F. Atkinson Co. threatening litigation if rain-making damaged the firm's extensive construction project at Moffett Field. Atkinson's telegram pointed out the military urgency of the construction under way at the field.

Flood prevented at Boysen by diversion tunnel plug

THE COMPLETION and insertion of a 30-ft. long cement diversion tunnel plug saved the city of Thermopolis, Wyo., and perhaps several sections of the Big Horn Basin from inundation by Boysen Dam reservoir water.

The temporary closure gate, made of timbers reinforced with steel and fitted into concrete, gave way to water pressure and collapsed. Workmen had just moved equipment away after inserting the first of the permanent plugs, which contains 1,040 cu. yd. of concrete. A stream of water trickling along the tunnel floor revealed that the temporary gate had given way. All available manpower was called to avert what could have been a serious flood danger, but the first of the plugs held. The small amount of water which passed the plug never became a serious threat. When the next two plugs are finished, the tunnel will be corked by 3,120 cu. yd. of concrete.

Award offered for welded bridges which save steel

WELDED BRIDGES have been built in the United States which have made possible savings in steel ranging from 5% to 20% of the total tonnage that would have been required had the bridge been riveted. To encourage such steel savings and insure a maximum total national saving in the present emergency, the Lincoln Arc Welding Foundation is sponsoring a 1952 Award Program, "Welded Bridges for Steel Conservation."

The Program is open to all persons in the United States who feel themselves qualified to enter and offers 15 awards totaling $16,100. First award is $7,000, second award $3,500, third award $2,000, with 12 honorable mention awards of $300 each. Awards will be given for the best bridge designs which show weight and cost savings over a comparable riveted bridge. The program allows entrants complete freedom as to size and type of bridge to be designed since the percentage of saving is the most important factor to be judged.

Rules for this program, which is dedicated to the national interest through the conservation of steel, have been formulated by 14 of the nation's leading bridge engineers, 5 of whom will serve as Jury of Award. Chairman of the program is Professor James G. Clark of the University of Illinois. Rules are available from The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

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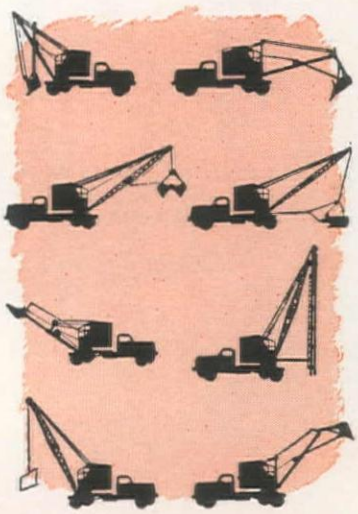

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Please send me complete details on "QUICK-WAY" truck shovels—four different models for large jobs and small.

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Law adds clauses to Corps of Engineers contracts

COLONEL Donald S. Burns, Division Engineer of the South Pacific Division, Corps of Engineers has invited the attention of all contractors to recent Congressional legislation which requires that additional clauses be placed in negotiated contracts, military contracts, and purchase orders issued by the Corps of Engineers.

In a letter to the Associated General Contractor chapters, Col. Burns pointed out that effective immediately and pursuant to section 631, of the Department of Defense Appropriation Act of 1952 (Public Law 179, 82nd Congress) all contracts and purchase orders issued on or after October 18, 1951, which obligate money appropriated in the aforementioned appropriation act, and in all supplemental agreements executed as of or after October 18, 1951 which result in the obligation of money appropriated in such act, the following contract article will be inserted:

"**Gratuities:** (A) The Government may, by written notice to the contractor, terminate the right of the contractor to proceed under this contract if it is found, after notice and hearing, by the Secretary or his duly authorized representative, that gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by the contractor, or any agent or representative of the contractor, to any officer or employee of the Government with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing, of such contract; provided, that the existence of the facts upon which the Secretary or his duly authorized representative makes such finding shall be in issue and may be reviewed in any competent court.

"(B) In the event this contract is terminated as provided in paragraph (A) hereof, the Government shall be entitled:

"(1) To pursue the same remedies against the contractor as it could pursue in the event of a breach of the contract by the contractor, and

"(2) As a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages in an amount (as determined by the Secretary or his duly authorized representative) which shall be not less than three (3) nor more than ten (10) times the costs incurred by the contractor in providing any such gratuities to any such officer or employee.

"(C) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract."

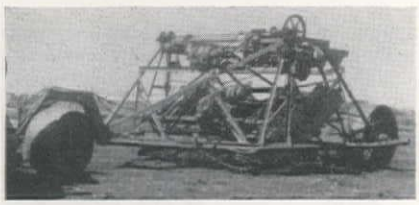
Colonel Burns pointed out that the above quoted article will not be inserted in any true and realistic change order to a contract executed prior to October 18, 1951, where the said change order does not have the effect of obligating any money appropriated under the aforementioned Appropriation Act.

In addition, Colonel Burns stated that all negotiated contracts, or purchase orders in excess of $1,000.00 executed

after October 31, 1951 are required by Public Law 245, 82nd Congress, to have included therein a contract clause in which the contractor agrees to the access and examination of all "directly pertinent books, documents, papers, and records of the contractor involving transactions related to this contract" by the Comptroller General of the United States until the expiration of three (3) years after final payment. Under this law, the prime contractor in a negotiated contract must also agree to include substantially the same contract clauses as to providing access to records in all his subcontracts that support the prime contract.

LeTourneau finds its oldest piece of equipment

R. G. LE TOURNEAU, INC. recently sponsored a contest to determine the oldest piece of LeTourneau equipment still in operation. A grandfather of the long line of LeTourneau products was



found in the possession of E. H. Hahn in Central California. Hahn's family had purchased the second scraper the firm built from the founder of the company.

Built in Stockton, Calif., the scraper is 12 ft. wide and has two 4-ft. buckets, the rear one telescoping inside the front bucket. The machine could pick up 12 to 15 loose yards.

So. Calif. water district area doubles in 5 years

GREATEST EXPANSION in the history of the Southern California area served by the Metropolitan Water District occurred in the past five years. The area has doubled. Forty-four incorporated cities, spanning a distance of 1,512 sq. mi. are now served by Colorado River water.

Increasing population and industrial expansion has necessitated the increased reliance upon the Colorado River water supply in Southern California. New areas which are springing up are continuing to tie to the system. A drought of seven years has made the Colorado River the only reliable source of water for the area.

Joseph Jensen, chairman of the district board of directors of the Metropolitan Water District, points out that new cities and incorporated areas continue to annex to the system in spite of possible legislation concerning the Central Arizona Project. Such legislation would considerably reduce California's supply from the Colorado River at a time when no other source of water is apparently attainable.

ENGINEERS ON THE MOVE

H. H. Roberts, formerly chief engineer at Bull Shoals and Detroit dams, joins The Arundel Corp. of Baltimore, Md. He is currently project manager on Liberty Dam, being constructed for the City of Baltimore.

* * *

Louis Fiscel has resigned as Pinal County engineer to enter the trucking business in Tucson, Arizona.

* * *

Jones

J. P. Jones is the newly appointed regional engineer in technical charge of the Bureau of Reclamation's design and construction activities on water and power projects in the Pacific Southwest. Jones succeeds **C. A. Bissell** who recently retired. He will exercise technical direction over all of the Bureau's design and construction work in Region 3 (So. Calif., So. Nevada, and most of Arizona).

* * *

I. G. (Pete) Homes, Phoenix, Ariz., is the newly elected president of the Arizona Building Contractors. Homes was elected at the group's fourth annual convention.

* * *

When construction gets under way next spring on The Dalles Dam, Columbia Basin Project, **Hubert B. Elder** will be resident engineer. Elder served as a lieutenant colonel with the Corps of Engineers during World War II. He is presently in Nashville, Tenn.

* * *

Las Vegas, Nev. City Engineer, **Wilbur C. Anderson,** resigns his post September 1 to become contractor on the Herlong, Calif., home project, Sierra Ordnance Depot, a $1,000,000 project.

* * *

Fred Clayton, Reno, Nev., engineer, is now in Rangoon, Burma, for a six months' stay. He is engaged in the International Airport project as chief engineer of design and construction for Knappen, Tippetts, Abbett, McCarthy, New York engineering firm. Clayton leaves a position with Guy F. Atkinson Co. to enter this new work.

* * *

Robert E. Vivian, dean of the School of Engineering, University of Southern California, takes a leave of absence from his post to go to Italy as a production specialist for the Economic Cooperation Administration. Vivian will headquarter in Rome and advise the ECA on allocation of funds to chemical industries in Italy.

* * *

T. R. Asbahr is the new president of Portland, Ore., Home Builders Association.

* * *

Awards of Superior Accomplishment were awarded by the Department of the Interior to two Bureau of Reclamation employees at Grand Coulee Dam. **Theodore R. Anderson** and **Percy M. Pharr,** both of whom have been at Coulee Dam since the beginning of construction, receive $200 yearly salary increases. Anderson is chief of the electrical section and is credited with the development of an electrode-type heating plant which saves the government an estimated $4,000 a year. Pharr is a resident engineer, whose services have been of high calibre during all operations.

* * *

James F. San Sebastian is now an engineer for Guy F. Atkinson Co. in South San Francisco, Calif., doing quantity surveying. He was formerly with N. M. Ball Sons as company engineer.

* * *

The position of Assistant State Engineer in California, vacant since the retirement last June of **P. H. Van Etten,** has recently been filled by three principal hydraulic engineers of the Division of Water Resources. **Gordon Zander** will supervise activities of the division in regard to water rights, water quality and pollution investigations. **T. P. Waddell** will have charge of statewide water investigations, the Feather River Project and California's interests in the Central Valley Plan. **G. H. Jones** will be responsible for activities in flood control, state dam supervision and Sacramento-San Joaquin River supervision.

* * *

Ackerman

Louis B. Ackerman will be construction engineer on the Palisades Project in eastern Idaho. He will supervise diversion tunnel work at Palisades this fall and have charge of construction of the main dam, tenth largest earth-fill structure in the world, when the main contract begins next spring.

* * *

The Bureau of Reclamation announces that **I. Donald Jerman** becomes assistant to the construction engineer for the Palisades project in eastern Idaho. **H. P. O'Donnell** becomes field engineer for the multiple purpose structure on the Snake River. Jerman headed pre-construction surveys for the Bureau for six years and O'Donnell supervised construction of two equalizing reservoir dams on the Columbia Basin Project in Washington. Construction of the 13,000,000-cu. yd. earth-fill dam is expected to start next spring. **Louis B. Ackerman** will be construction engineer.

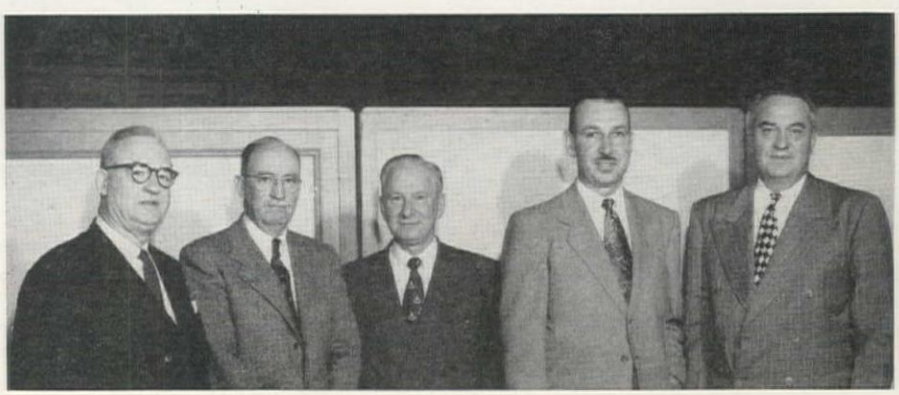
Jerman *O'Donnell*

* * *

Walter H. Price is the new head of the Bureau of Reclamation's Engineering

AGC WESTERN CHAPTERS CONFERENCE

Pictured at the AGC Western Chapters Conference at the Sir Francis Drake Hotel in San Francisco, Calif., Nov. 15 are, left to right: *James D. Marshall*, asst. mgr. director, Wash. Hdqtrs.; *A. S. Horner*, 1952 National President; *J. W. Thompson*, district director; *John H. Sellen*, Seattle, Wash. contractor and *Ellis N. Barker*, Salt Lake City, member of the National Advisory Board.



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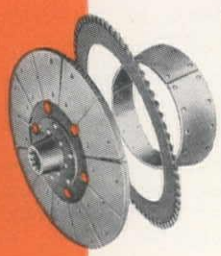

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Velvetouch

Laboratories. Price joined the Bureau in 1930 and has been a staff member of the Denver laboratories since 1934. Prior to his appointment as head of the laboratories, he was head of the material laboratories. Price succeeds **Robert F. Blanks,** who resigned to become vice president of Great Western Aggregates, Inc.

* * *

Max H. Kight will head the Electrical Branch of the Bureau of Reclamation's Division of Design and Construction. Kight replaces **Henry H. Plumb,** who retired. Plumb has served 33½ years with the Bureau.

CALENDAR OF MEETINGS

January 10—San Diego Chapter of AGC, annual meeting, at San Diego (address of chapter 455-6 Spreckels Bldg., San Diego).

January 11-12 — Intermountain Branch of AGC, annual convention, at Salt Lake City (address of branch, 430 South Main St., Salt Lake City).

January 11-12 — Montana Building Chapter of AGC, annual meeting, at Florence Hotel, Missoula, Mont.

January 11-12 — Montana Contractors' Association, annual meeting, at Florence Hotel, Missoula, Mont.

January 21-24 — American Road Builders' Association, 50th anniversary convention, at Houston, Texas.

January 25—Central California Chapter of AGC, annual meeting, at the St. Francis Hotel, San Francisco.

January 27-31 — Associated Equipment Distributors, 33rd Annual meeting, Conrad Hilton Hotel, Chicago, Ill.

February 6-8—California Conference on Street and Highway Problems, fourth annual conference sponsored by the Institute of Transportation and Traffic Engineering, University of California. To be held on the Los Angeles campus of the University of California.

February 13-15 — Fifth Northwest Conference on Roadbuilding, More Hall, University of Washington campus.

February 25-28—Associated General Contractors, Annual Convention, Statler Hotel, Detroit, Mich.

February 27, 28—American Concrete Pressure Pipe Association, annual convention and meeting, at Drake Hotel, Chicago, Ill.

February 28, 29, March 1—American Concrete Pipe Association annual convention, at Drake Hotel, Chicago, Ill.

March 3-5—American Concrete Agricultural Pipe Association annual convention and meeting, at The Brown Palace Hotel, Denver.

DEATHS

Charles Wikoff, 55, senior engineer, died November 9 in Los Angeles, Calif. Wikoff was a senior engineer in the inspection department of the City Bureau of Engineering.

* * *

Pierce W. Van Doren, 56, building contractor, died November 2 in Los Angeles, Calif.

* * *

William Kirkland, 39, engineer, was killed instantly November 2 by a dynamite explosion. Kirkland was driving a pickup truck in Colville, Wash., when a case of dynamite on the seat beside him blew up. He was an engineer and superintendent for Western Knapp Engineering Co., and the blast occurred near the site of the Van Stone mine where Kirkland's company was building a mill.

* * *

Russell M. Olson, 45, road contractor, died October 30 in his Pendleton, Ore., home. Olson was well known in the Inland Empire as the owner of his firm and as an associate in Pendleton Sand & Gravel Co.

* * *

John H. Henrikson, contractor, died November 23 in Seattle, Wash.

* * *

Hugh F. Fague, 65, superintendent of construction for the Portland, Ore., city water bureau, died November 16 at his home. Fague had been with the water bureau since its beginning.

* * *

Dr. Archie Burton Pierce, 84, civil engineer, died November 15 in Carmel, Calif. Pierce was the designer of the Florence and Shaver Lake dams in the Sierra Nevada range and a former professor of mathematics at the University of California.

* * *

Ira E. Dalzell, 66, retired contractor, died November 10 in his Portland, Ore., home.

* * *

H. J. Schmiedeskamp, contractor, died November 22 in San Francisco, Calif.

* * *

Harry A. Dick, president of the General Construction Co., Seattle, Wash., died November 9 in Portland, Ore.

* * *

A. Frederick Anderson, 59, general contractor, died October 11 of asthma in Delano, Calif. He was associated with Truitt, Shields and Fisher, and prior to his death he supervised construction of the administration building at Fresno State College. Anderson was at one time a general contractor in the San Francisco Bay area.

SUPERVISING THE JOBS

Six reinforced concrete buildings are being constructed near Wenatchee, Wash., for the new Aluminum Corporation of America plant. **Roy A. Stanley** is general superintendent for The Austin Co., and **Frank Ketsman** is his assistant. **Harry Coldius, Wesley Groat, Kenneth Newton** and **Vernon L. Webb** are all carpenter foremen on the project. Other foremen are **Kenneth Qualseth, Mike Hardesty** and **Jeremiah Beckwith. Ed French** is steel superintendent and **Clifford L. Long** is field engineer.

* * *

Pat Eller and **Pat Eddy** are foremen for E. C. Young Co. on highway construction south of Johannesburg, Ore. **Jack Manchack** is foreman for V. P. Hun & Co., who has the trucking contract for the job.

* * *

G. H. Bailes is superintendent for **J. R. Reeves** at Haggin Gravel plant. **C. K. Kirk** is plant foreman. Other key men are: **C. W. Mason, Ivor Martin, Cal Cleaser, Herb Sales, Roy Moore, Leo Farmer, R. B. Savage** and **D. R. Kerns.**

* * *

Construction is almost complete on the Convair Engineering building, Pomona, Calif. **Otto A. Ronlund** is project manager and general superintendent. **Frank W. Anderson** is general carpenter foreman for George A. Fuller Co. and F. E. Young Co., joint venturers, on the $2,600,000 project. Carpenter foremen are: **W. A. Mayhorn, George H. Watson, W. W. Heavlin, Jack Sprinkle** and **L. Mulkins.** Labor foremen are: **Chris McBurnie, W. C. Nelson, J. C. Smallwood** and **Lester White. Mike Mena** is cement foreman. The building contains 246,400 sq. ft., is 75 ft. high, 365 ft. long and 220 ft. wide.

* * *

Munter Construction Co. is engaged in the clearing of transmitter sites at Elmendorf and at Ft. Richardson, Alaska. **John Dolgash** is superintendent at Ft. Richardson, and **Al Martin** is superintendent at Elmendorf. **Roy Kinney** is master mechanic at Elmendorf.

* * *

Vernon Hallbery is hot plant foreman and **Ed Nelson** is ready-mix plant foreman for Perkins Gravel Co., Brighton, Calif.

* * *

Joe F. Young is superintendent for Young & Smith Construction Co. on a $447,097 highway construction job on

Continued on page 114

Down-time Dopes. . . . . by Domagalski

What if they did misspell your name, Hauschildt? At least they mentioned it!

It's easy dozing with Baker, Allis-Chalmers matched equipment—either for dozing, gradebuilding or ripping roots and rocks.

The "move-more-dirt" curve of Baker's famous involute blades, added to the design feature which puts the tractor weight on the cutting edge, leaves maximum power for push. These Baker features help make the Baker, A-C team the most maneuverable—the most easily operated, and thus by far the most *productive* of all earth moving equipment.

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Springfield, Illinois

Wherever you see the Baker, A-C team at work, you see action like that pictured above, in photos of a conservation job near Lanark, Illinois. It's an Allis-Chalmers HD-9 with Baker Bulldozer.

Thar she rolls!

P. S. Have you seen the new 9-X no push beam dozer?

They're sold together
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Mountain Tractor Company
Missoula, Montana

Northland Machinery Company
Sidney, Montana

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Harry Cornelius Company
Albuquerque, New Mexico

Smith Machinery Company, Inc.
Roswell, New Mexico

•

Dielschneider Equipment Oregon, Ltd.
The Dalles, Oregon

Farm & Industrial Equipment Co.
Eugene, Oregon

West-Hitchcock Corporation
Klamath Falls, Oregon

Oregon Tractor Company
LeGrande, Oregon

Tractor Sales & Service, Inc.
Medford, Oregon

Wood Tractor Company
Portland, Oregon

•

Cate Equipment Company, Inc.
Salt Lake City, Utah

•

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

Northern Harris
Walla Walla, Washington

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

American Machine Co.
Spokane, Washington

•

Studer Tractor & Equipment Co.
Casper, Wyoming

U. S. 91 near Las Vegas, Nevada. **Elmo C. Longstroth** and **Larry Lassen** are job supervisors.

* * *

In Fremont County, Idaho, where Goodwin Construction Co. is building a 278-ft. bridge and approaches off Ora Rd., **Barney Goodwin** and **Verl Goodwin** are superintendents, and **Howard Clark** is carpenter foreman.

* * *

O. W. Lane is general superintendent for McKinnon-Decker Co. on grading and paving 6.5 mi. of the Ledger-East and West Rd. in Pondera County, Mont. **Arnold Powell** is project superintendent.

* * *

On the $1,500,000 Los Angeles River Freeway job in Southern Calif., Griffith Co. has **Tom W. Oglesby** as general superintendent. **R. R. Belding** and **Jack Nicola** are equipment foremen, **G. Esbjornson** is carpenter foreman and **Jack Fritts** is truck foreman. Completion date is August 1952.

* * *

Clifford Craig is superintendent for Nilson-Smith Construction Co. on 10.2 mi. of highway construction on the Great Falls-South Highway in Cascade County, Montana. **A. L. Willems** is foreman on the $241,454 project.

* * *

Dewey James is general superintendent for Holdener Construction Co. on the $400,000 concrete construction at Sacramento State College, Sacramento, Calif. **B. C. Ryan** is assistant superintendent.

* * *

John Dorris is general superintendent for Anthony & Wark on the $175,000 cement warehouse for Signal Depot, Sacramento, Calif. **Verle Anthony** is project manager.

* * *

Construction of the Motor Vehicle Department office building in Sacramento, California, is being supervised by **Curt Whitney** with **Charles Burke** as his assistant. **John Valenuezla** is concrete foreman, for Williams & Burrows, Inc. and Carl N. Swenson, Inc., joint venturers on the $3,500,000 contract. **Red Davis** is lay-out engineer and **Avon Smith** is State of California superintendent in charge.

* * *

Concrete construction on the Sacramento County Hospital in Sacramento County, Calif., is supervised by **E. L. Gilbert** with **Gene Hutcherson** as his assistant. Lawrence & Mackey Construction Co. has the contract.

* * *

Construction of the $2,500,000 administration building at Rapid City Air Base, S. Dak., is under the supervision of **George Stieger, Jr. Orville Habeck** is assistant superintendent. Job includes construction of 17 airmen's dormitories. **Robert Winkler** is engineering superintendent and **Tom Wright** is engineer. **Don Collett** is general foreman. Southwest Town Construction Co. holds the contract.

E. G. Crawford is general superintendent for Cox Bros. Construction Co. on $1,600,000 freeway construction in Oceanside, Calif. **R. A. Kerfoot** is assistant superintendent along with **J. A. Gilbreath. D. J. Rossiter** is asst. superintendent and **Glen Lawrence** is chief mechanic. **D. D. Peters** is concrete foreman, **Orville Burnett** is curb foreman and **George Campbell** is grade foreman. **R. C. Reif** is job engineer and **G. E. Walcott** and **Glen Richardson** are resident engineers for the State of California.

* * *

In Goodyear, Ariz., where Gunther-Shirley-Trepte, Contractors, is engaged in a $3,000,000 construction project on Litchfield Naval Air Base hangar facilities, **E. E. Ashlock** is project manager and **C. C. Campbell** is carpenter superintendent. **Joseph Mayne** is administrative manager. **Dudley W. Jenkins** is engineer. Allison Steel Co. has the steel contract and S. L. Stewart Construction Co. is subcontractor for the ready-mix concrete. **B. B. Collins** is superintendent for J. H. Welsh & Sons on its utilities, heating and plumbing contract. **Robert Adair** is superintendent for H. B. Adair Co. on its dirt-moving contract.

* * *

Grafe-Callahan Construction Co., Dallas, Tex., and Los Angeles, Calif., has started work on a $2,731,000 contract for the Bureau of Reclamation to complete the spillway stilling basin at Davis Dam and to improve the river channel downstream from the dam. The following personnel are on the job: General superintendent, **Fred Brandt**; assistant superintendent **Cal Rickel**; office manager **Howard Miller**; general excavation foreman **John Reid** and mechanic foreman **Walt Reynolds. D. W. Eichner** is engineer.

* * *

Marshall H. Weaverling, who has spent several months in Korea as technical representative for Vinnell Corp. on 5th Air Force construction, is now supervising installation of 300-kw. generators at strategic locations in Korea. He is a mechanical engineer assigned to the 5th Air Force.

* * *

Russell A. Rorabaugh is superintendent for Pacific Rock & Gravel Co. on runway extensions at Brown Field, San Diego, Calif. J & B Construction Co. has the contract for rehabilitation of buildings and **Cyril Brown** is superintendent.

* * *

Harry King is general superintendent for Dail Construction Co. on the construction of a bridge over the Grand Canal in Phoenix, Ariz. **Duane McNeill** is carpenter foreman on this job. **Mark Hentis** is superintendent for the firm on the steel erection for Phoenix-Tempe Stone Co. at Yucca Bridge.

* * *

Concrete construction at Sacramento State College, Sacramento, Calif., is being supervised by **H. T. Nielson.** Lawrence & Continental is contractor on the $1,000,000 job.

Continued on page 122

NEW BOOKS

Proceedings of The Third California Conference on Street and Highway Problems—By Institute of Transportation and Traffic Engineering, University of California, University Press, Berkeley 4, California. 132 pages, 8½ x 11. Price $1.00.

Thirty-four pages on construction, maintenance, traffic, county, urban and general road developments are contained in this record of proceedings along with two papers dealing with important aspects of National Defense . . . and the part highways must play in the defense system. In addition there is a paper devoted to the "Importance of Drainage Design in Highway Construction," by Carl Izzard of the Bureau of Public Roads. This paper applies hydraulic principles to the design of both small and large structures. A 7-page summary of the research activities of the Institute of Transportation and Traffic Engineering is also included in this paper-bound book of proceedings.

* * *

1575 Review Questions for Surveyors—by Russell C. Brinker. Published by Russell C. Brinker, Department of Civil Engineering, Blacksburg, Virginia. 108 pages, 8½ x 11. Price $2.00.

Questions compiled in this comprehensive book should be of great service to those taking civil service or registration examinations in surveying and/or tests in which surveying questions are likely to appear. The author has collected a very impressive array of questions, which have been gleaned from many tests in the field. The book is said to contain the most comprehensive set of surveying questions ever published. Although no book could possibly collect all possible questions about surveying, this work is a thought-provoking project, which may well lead the reader to contemplate further questions of his own. An index to subject is included in the paper-bound text, and answers which can be readily tabulated are given for about 700 of the questions.

* * *

ASTM Standards on Bituminous Materials for Highway Construction, Waterproofing, and Roofing—Published by American Society for Testing Metals, 1916 Race Street, Philadelphia, Pa. 344 pages. Price $3.25.

The latest edition of this valuable book contains 98 ASTM standard and tentative specifications, test methods, recommended practices and definitions of terms pertaining to bituminous materials for highway construction, waterproofing and roofing. Additions since the 1948 edition cover methods of testing asphalt-base and bituminous emulsions for use as protective coatings, bitumen content of paving mixtures by centrifuge, cohesion and compressive strength and specific gravity of bituminous mixtures, and plastic flow of fine-aggregate bituminous mixtures. New specifications relate to sieve analysis of granular mineral surfacing for asphalt roofing and shingles. Several of the earlier specifications and test methods have been revised. The book is a joint effort of the ASTM committees on road and paving materials and bituminous waterproofing and roofing materials. It includes 36 specifications and 56 methods of testing covering highway construction materials and waterproofing and roofing materials, such as asphalts, coal-tar pitch, etc. Viscosity by means of the Saybolt viscosimeter, volume correction tables and recommended practices covering accelerated weathering tests and bituminous mixing plant inspection are also contained in the book.

* * *

Manual of Surveying Instruments—Published by W. & L. E. Gurley, Troy, New York. 152 pages. Price $1.00.

This 52nd edition of the "Manual of Surveying Instruments" combines specific details of adjustment of Gurley instruments with related factual information and practical instruction data on the care and handling of all transits, levels, alidades, compasses and accessory surveying equipment. Included is a complete explanation of the theory and application of the Beaman Stadia Arc, types of reticles and reticle patterns for particular purposes, level vial construction and use, as well as assorted tables of logarithmetic and natural functions, distance and elevations stadia readings. This latest edition, published by the 106-year-old firm, contains 152 pages packed with surveying information, engineering tips, and maintenance procedure. There are 85 illustrations in the new manual. This book attempts to acquaint the reader thoroughly with the proper methods of surveying and provide him with an understanding of the instruments he is called upon to use. The illustrations supplement the text in a convenient way, designed for easy reference to any particular instrument. The Gurley firm believes in the cultivation of good surveying habits and this book is a package guide to surveying efficiency.

CONTRACTS

A Summary of Bids and Awards For Major Projects in the West

****

Alaska

$219,625—**J. J. Badraun,** Girdwood—Award for construction of 4 I-beam bridges in the Valdez district; by Alaska Road Comm.

$373,907—**Electric Smith, Inc.,** E. 123 Sprague St., Spokane, Wash.—Award for construction of telephone installations at Ft. Richardson; by Corps of Engineers.

$174,999—**A. J. Hopper,** 1200 Westlake North, Seattle, Wash.—Low bid for construction of a railroad bridge over Ship Creek, Anchorage; by Alaska Railroad.

$214,712—**Morrison-Knudsen Co., Inc.,** 603 Hoge Bldg., Seattle, Wash.—Award for improvement of Third Ave. in Ketchikan; by Alaska Public Works.

$720,611—**S. S. Mullen, Inc.,** 621 Ninth N., Seattle, Wash.—Award for construction of a remote receiver facility at Ladd Air Force Base; by Corps of Engineers.

$3,932,000—**Valle-Sommers Co.,** Box 4906, Interbay Station, 407 3rd Ave. W., Seattle, Wash.—Low bid for construction of the 70-bed Alaska Native Service Hospital, Bethel; by Bureau of Indian Affairs.

Arizona

$662,889—**Daley Construction-Acme Materials Co.,** P. O. Box 1590, Phoenix—Low bid for grading, draining, select material, aggregate base and bituminous plant-mix from a point 15 mi. north of Nogales extending 9.5 mi.; by State Highway Department.

$190,326—**Fisher Contracting Co.,** P. O. Box 4035, Phoenix—Low bid for grading, draining and select material on highway beginning at Christmas and extending north on S. H. 77 for 1.5 mi.; by State Highway Department.

$211,172—**D. A. Flickinger, Contractor,** P. O. Box 896, Phoenix—Low bid for grading, draining, select material, aggregate base and bituminous surface treatment from Duncan to a point 3¼ mi. westerly; by State Highway Department.

$547,786—**H. J. Hagen Contractor,** Globe—Low bid for grading and draining a roadway which begins near Cutter and extends easterly over a new alignment for a distance of approx. 11¾ mi.; by State Highway Department.

$333,348—**H. L. Royden, Contractor,** P. O. Box 3707, Phoenix—Low bid for grading, draining, select material, aggregate base and bituminous road-mix which extends west from Hopi Dr. in Holbrook for a distance of 2.8 mi.; by State Highway Department.

$690,784—**R. P. Shea Co.,** P. O. Box 218, Indio, Calif.—Low bid for earthwork and structures, reservation levees, Lower Colorado River District, Colorado River front work and levee system; by U. S. Bureau of Reclamation.

$148,118—**Tiffany Construction Co.,** P. O. Box 6292, Phoenix—Low bid for grading, draining, select material, aggregate base and bituminous plant-mix beginning south of Tempe and extending 4 mi.; by State Highway Department.

California

$1,500,000—**Bechtel Corp.,** 220 Montgomery St., San Francisco—Award for expansion of alkane plant facilities at Richmond refinery; by Standard Oil Co. of California.

$747,750—**R. A. Bell,** 901 S. Primrose St., Monrovia—Award for construction of diversion tunnel and power tunnel stubs, Cherry

River Project, Stanislaus National Forest; by Public Utilities Commission.

$5,300,000—**Ray E. Frasure,** 4423 S. Wilton St., Los Angeles, and **Claude T. Lindsay,** 564 Market St., San Francisco—Award for construction, management and finance of 644 housing units at March Air Force Base, Riverside; by Corps of Engineers.

$1,260,449—**Fredrickson & Watson Construction Co.** and **M & K Corp.,** 873 81st Ave., Oakland—Low bid for 1.8 mi. of grading and paving with portland cement concrete and plant-mix surfacing on Eastshore Freeway between 0.9 mi. north of Route 68 and 0.2 mi. north of Trimble Rd.; by State Division of Highways.

$817,166—**Griffith Company,** 1060 S. Broadway, Los Angeles—Low bid for 5.5 mi. of grading and paving with portland cement concrete on cement treated subgrade; existing pavement to be surfaced with plant-mix surfacing over untreated rock base; between McFarland and Delano underpass, Kern County; by State Division of Highways.

$258,501—**Charles L. Harney, Inc.,** 575 Berry St., San Francisco—Low bid for grading and paving and related work at Guerrero St. and San Jose Ave., San Francisco; by Department of Public Works.

$1,196,114—**E. A. Hathaway & Co., Inc.,** 1098 Fifth Ave., San Jose—Low bid for general construction of Manor School, Palo Alto; by Ravenswood Elementary School District.

$1,380,702—**Kemper Construction Co.,** 3701 Overland Ave., Los Angeles—Award for construction of a reservoir in Eagle Rock; by Los Angeles Department of Water and Power.

$1,803,700—**Maino Construction Co.,** 2238 S. Broad St., San Luis Obispo—Low bid for general construction of buildings at Paso Robles School for Boys; by State Division of Architecture.

$1,347,500—**Milton Kauffman Construction Co.,** 2918 W. Compton Ave., Gardena—Low bid for construction of a stucco and frame housing project, including 26 two-story units, San Pedro; by Housing Authority of the City of Los Angeles.

$5,873,781—**Morrison-Knudsen Co., Inc.,** and **River Construction Corp.,** 74 New Montgomery St., San Francisco—Award for construction of the main dam of the Isabella Project; by Corps of Engineers.

$265,790—**Nappe Construction Co., Inc.,** 1201 N. Keystone St., Burbank—Low bid for 0.9 mi. of grading, placing of untreated rock base and surfacing with plant-mix surfacing on Laguna Canyon Rd. between Forest Ave. in Laguna Beach and 0.2 mi. north of Canyon Acres Dr.; by State Division of Highways.

$1,243,710—**Offco Construction Co.,** 2650 Cherry Ave., Long Beach—Award for furnishing and installing a steam generating unit; by City of Pasadena.

$1,156,216—**Oppenheim & King,** P. O. Box 1902, Fresno—Low bid for construction of Project CAL 6-7, 58 dwelling units, and Project CAL 6-10, 118 dwelling units, Fresno; by Housing Authority of the City of Fresno.

$411,957—**Gene Richards, Inc.,** 165 N. H St., Fresno—Low bid for 1.8 mi. of grading and plant-mix surfacing on untreated rock base and a draining and pumping system to be installed on Blackstone Ave. betw. Olive Ave. and ¼ mi. north of Shields Ave. in Fresno; by State Division of Highways.

$1,064,570—**Rothschild, Raffin & Wierick,** 274 Brannan St., San Francisco, and **Pacific Bridge Co.,** 333 Kearny St., San Francisco—Low bid for construction of Lake Merced Pumping Station, San Francisco; by Public Utilities Commission.

$2,627,005—**United Concrete Pipe Corp.,** Bonita and Stewart Aves., Baldwin Park—Low bid for construction of Unit 2, Hollywood-Eagle Rock conduit, Los Angeles; by Department of Water and Power.

$1,370,545—**Webb & White,** 7220½ Melrose Ave., Los Angeles—Low bid for 0.7 mi. of grading, and surfacing with portland cement concrete on cement-treated subgrade on Hollywood Freeway in Los Angeles betw. Hollywood Blvd. and Western Ave.; by State Division of Highways.

Colorado

$204,805—**C. L. Hubner Co.,** 4000 York St., Denver—Low bid for 4.1 mi. of structures, grading and road-mix oil treatment from

Hillside south to 7 mi. north of Westcliff; by State Highway Department.

$129,675—**Northwestern Engineering Co.,** P. O. Box 567, Denver—Low bid for 6.1 mi. of structure, stabilization and application of oil processing, Bristol-Cheyenne Wells on State Highway 51, Holly Slough on State Highway 89 and Kornman-May Valley on State Highway 196, Prowers County; by State Highway Department.

Idaho

$1,540,754—**Elle Construction Co.,** 390 Monroe Ave., Pocatello—Low bid for construction of a high school in Twin Falls; by Twin Falls School District.

$219,648—**LeGrand Johnson,** 595 E. 1st So., Logan, Utah—Low bid for 10.5 mi. of construction on the Lost River Highway from Taber Pass to Reverse in Bingham County; by State Department of Highways.

$1,242,700—**J. A. Terteling & Sons,** P. O. Box 1428, Boise—Award for construction of power and outlet tunnels for Palisades Dam Project; by U. S. Bureau of Reclamation.

Montana

$258,796—**J. E. Beaulaurier & Sons,** 1908 1st Ave. No., Great Falls—Low bid for construction of a base operations building and control tower, Great Falls Air Force Base; by Corps of Engineers.

$809,120—**Kiely Construction Co.,** P. O. Box 65, Butte—Award for 5.3 mi. of grading and construction of small drainage structures on the Bonita-Nimrod section of the Turah-Bearmouth highway, Missoula and Granite counties; by State Highway Commission.

$170,037—**O'Brien Construction Co.,** 1811 2nd Ave., Great Falls—Award for 10.1 mi. of grading, gravel surfacing on the Chinook-Canadian Line highway, Blaine County; by State Highway Commission.

$325,506—**The O'Neil Construction Co.,** P. O. Box 1511, Havre—Award for 4.8 mi. grading, gravel surfacing, road-mix bituminous surfacing on the Gilford-Havre East and Ft. Benton-Havre West highway in Hill County; by State Highway Commission.

$837,390—**Parker-Schram Co.,** Builders Exchange Bldg., Portland—Low bid for construction of the Hungry Horse-Hot Springs 230-kv. transmission line; by Bonneville Power Administration.

$249,937—**Lou Richardson,** Box 513, Miles City—Award for 9.7 mi. of grading, gravel surfacing and road-mix oil surfacing on the Opheim-Scobey highway, Daniels County; by State Highway Commission.

Nevada

$415,577—**Isbell Construction Co.,** P. O. Box 2351, Reno—Award for construction of a portion of the highway system from White Horse to approx. 19 mi. south of Wendover in Elk County; by State Department of Highways.

$110,526—**Wells Cargo, Inc.,** 1800 E. 4th St., Reno—Award for construction of highway from a point near Comet Mine to a point approx. 5½ mi. south of Comet Mine in Lincoln County; by State Department of Highways.

New Mexico

$157,139—**O. D. Cowart,** Albuquerque—Award for 17.0 mi. of highway work on the Datil-Reserve rd., NM12, Catron County; by State Highway Department.

$307,599—**G. I. Martin,** 520 S. Tulane, Albuquerque—Award for 10.6 mi. of highway work on the Duran-Corona rd., U. S. 54, Torrance County; by State Highway Department.

$115,536—**G. I. Martin,** 520 S. Tulane, Albuquerque—Award for 6.9 mi. of highway work on the Broadview-North rd. in Curry County; by State Highway Department.

$172,616—**D. D. Skousen,** 201 Springer Bldg., Albuquerque—Award for 6.1 mi. of highway work on the Koehler-Hoxie Junction, NM375, Colfax County; by State Highway Department.

Oregon

$179,643—**J. N. & M. J. Conley,** 4332 N.E. Royal Ct., Portland—Low bid for bridge, grading and oil mat surfacing on the Pitts-

burg-Wilson Creek section of the Pittsburg-Scappoose County rd. in Columbia County; by State Highway Commission.

$335,984—**Modern Excavating Co.,** 9614 57th St., Seattle, Wash.—Low bid for clearing and access road construction on 30 mi. of the Big Eddy-Troutdale 230-kv. transmission line; by Bonneville Power Administration.

$728,595—**C. R. O'Neil,** Box 346, North Powder—Low bid for grading and paving the Ochoco section of the Jones Ranch-Mitchell highway in Wheeler County; by State Highway Commission.

Utah

$497,139—**W. W. Clyde & Co.,** Springville—Low bid for 2½-in. road-mixed bituminous surfacing on the Monticello-Peter's Hill road in San Juan County; by State Road Commission.

$181,754—**Gibbons & Reed Co.,** 259 W. 3rd So., Salt Lake City—Low bid for 2 concrete structures over 20-ft. span and graded side approaches to Kaysville on Lagoon-Layton-Lagoon and 2nd No. St., Davis County; by State Road Commission.

$166,542—**R. M. Jensen,** 1057 So. 4th W., Salt Lake City—Low bid for a gravel surfaced road located at Fruitland-Tabiona in Duchesne County; by State Road Commission.

$292,365—**Parson & Fife Construction Co.,** P. O. Box 563, Brigham—Low bid for a 3-in. plant-mix bituminous surfaced road on Plymouth-Idaho State Line in Box Elder County; by State Road Commission.

$493,912—**Parson & Fife Construction Co.,** P. O. Box 563, Brigham City—Low bid for 3-in. plant-mixed bitmuinous surfacing on 11th East-Parley's highway in Salt Lake County; by State Road Commission.

$188,886—**Sorensen Bros. & England Bros.,** 1330 W. 4200 S., Murray—Low bid for 9.5 mi. of 2-in. bituminous surfacing on Utah County Line-Deseret Chemical Depot, Tooele County; by State Road Commission.

$400,000—**Utah Construction Co.,** 57 E. 4th So. St., Salt Lake City—Award for construction of an earth-fill dam at Sunnyside; by Geneva Steel Co. and Kaiser Steel Corp.

Washington

$234,260—**Hunt and Willett, Inc.,** Box 1418, Wenatchee—Low bid for Scooteney pumping plants and laterals, Columbia Basin Project; by U. S. Bureau of Reclamation.

$396,610—**Hunt and Willett, Inc.,** Wenatchee—Low bid for construction of Lucky Peak Dam intake structures and outlet diversion work; by Corps of Engineers.

$1,063,659—**MacRae Bros.,** 2733 4th Ave. So., Seattle—Award for construction of the third unit of the Alaskan Way viaduct; by State Department of Highways.

$398,884—**Neukirch Bros.,** 745 Bellvue Ave. No., Seattle—Award for 0.1 mi. of construction, Johns River Bridge, Grays Harbor County; by State Highway Department.

$1,745,130—**M. A. Pithoud,** Box 248, Vancouver—Award for construction of 19.5 mi. of 230-kv. double-circuit transmission line, Skagit Project; by Seattle Board of Public Works.

$292,215—**Rogers Construction Co.,** 11760 N.E. Glisans, Portland—Award for 3.0 mi. of highway construction, Walla Walla to Hell's Forty, Walla Walla County; by State Highway Department.

$274,232—**Thomas Scalzo Co.,** 3211 Airport Way, Seattle—Award 4.7 mi. of work on Secondary State Highway No. 21-A, Poulsbo vicinity, Kitsap County; by State Department of Highways.

$3,379,501—**Strand & Sons,** 3939 University Way, Seattle—Low bid for 12-month completion of a 5-story office building; by Boeing Airplane Co.

$3,423,654—**Howard S. Wright & Co., Inc.,** 414 Pontius Ave., Box 3106, Seattle—Low bid for 9-month completion of 5-story engineering office building; by Boeing Airplane Co.

Wyoming

$2,324,224—**A. S. Horner Construction Co.,** 118 S. Pecos St., Denver, Colo.—Low bid for Alcova power plant and appurtenant works, Kendrick Project; by U. S. Bureau of Reclamation.

Construction plan for Arizona naval station

CONSTRUCTION ACTIVITY at Arizona's Litchfield Naval Air Facility continues in high-gear with announcement of a contract award to Yost and Gardner, engineers, for design of two water wells, a distribution system, sewer extensions, lighting for streets and runways, an electric distribution system and construction of a huge dining hall.

This contract is part of the $12,000,000 planned program for permanent projects at the base. Some of these projects are already under way, while others will be begun in the near future.

Gunther-Shirley-Trepte, contractors, have been working on one phase of the total program since October 15. This project consists of a 400- by 300-ft. hangar. At the present time 100 men are engaged in this construction, but it is estimated that five times that number will be required for various phases of the project before it is completed. The prime contractor has issued ten subcontracts for related work on the structure.

The next major job at Litchfield is scheduled to begin early this year. Bid openings are expected January 8 for construction of four barracks buildings at the huge base. No figures are available at the present time to indicate how many men will be at the base and whether additional barracks will be needed.

Mix designs for proper use of pumice based on practical experience

THE PROPER USE of pumice aggregate, called by the Pumice Producers Association the only true lightweight structural aggregate, has been defined by a series of mix designs that cover specifications for compressive strengths to 3,000 psi. Data for the designs have been collected from the field, from manufacturers of masonry and precast units, and from tests by the Association and its members.

These observations and tests have also shown that concrete embodying pumice aggregate does not require special equipment or treatment. For example, presaturation, once considered essential, is now required only with very short mix time. Also, standard mixing equipment is satisfactory. In place, pumice concrete can be effectively protected by the usual precautionary curing techniques.

Citing Rome's Parthenon, built of pumice concrete reinforced with bronze chains, as an example of the long history of pumice, producers of the lightweight aggregate today advance its structural quality and low thermal conductivity as valuable properties for construction.

Typical design data are given in the following table, which gives approximate weights of materials. For the pumice, these are air-dry or shipping weights.

Specifications		Mix design, cu. yd.				
Strength, psi.	Weight, lb. per cu. ft.	Cement, sacks	Natural Sand, lb.	Fine Pumice, lb.	Coarse Pumice, lb.	Remarks
500	70	4.5	0	1,350	0	Roof fills, less than 3 in.
500	70	4.5	0	800	550	Roof fills, 3 in. or thicker.
1,500	72	5.5	0	750	500	Minimum weight, maximum insulation, structural.
2,000	75	6.5	0	700	500	Minimum weight, maximum insulation, structural.
2,000	90	6.0	500	450	550	2,000 psi. at 3-4 in. slump.
2,500	95	6.5	600	400	565	2,500 psi. at 3-4 in. slump.
3,000	100	7.0	650	380	560	3,000 psi. at 3-4 in. slump.
3,000	105	7.0	1,450	0	600	3,000 psi. at 3-4 in. slump.
2,500	78	6.0	0	1,200	0	Non-plastic masonry, precast.

SUPERVISING THE JOBS...

...Continued from page 115

Stan Buchanan is general superintendent for A. Teichert & Son, Inc., on general construction of Arden Manor in Sacramento, Calif. **Bob Brock** is assistant superintendent on the project which will cost approximately $1,000,000. **R. C. Wise** is project superintendent and **Bob Reith** is project manager.

* * *

In Sacramento, Calif., where Lowrie Paving Co. is constructing a gas line for Pacific Gas & Electric Co., **Danny Cronin** is superintendent with **Benny Mellor** as his assistant.

* * *

The construction of a $1,000,000 building at 21st and Q Sts. in Sacramento, Calif., is under the supervision of **Martin Bassett. Henry Staley** is assistant superintendent on the building project for the Sacramento Bee, a newspaper. **Nathan Rise** is concrete superintendent for Lawrence Construction Co., and **Lockwood Green** is engineer.

* * *

Construction of the H St. underpass is being supervised by **Charles McPhee** for Lord & Bishop. The job, for the City of Sacramento, Calif., began in July 1951 and will be complete this month.

* * *

John Craig is general superintendent for Continental Construction Co. on foundation construction of the State Printing Plant at 7th and Richards Aves., in Sacramento, Calif. **Frank Giarrotana** is assistant superintendent on the $330,000 project. Bethlehem Pacific Coast Steel Co. has the steel contract on the job which should end February 1952.

* * *

Construction of 36-in. water mains for the filtration plant at 14th and H Sts. in Sacramento, Calif., is under the supervision of **W. L. Hollern** with **Otto Wunchell** as assistant superintendent. Job consists of jacking 180 ft. of 36-in. pipe under the S. P. railway levee. Lentz Construction Co. has the contract.

* * *

In Sacramento, Calif., where Lord & Bishop is constructing a bridge foundation for the State of California, **Frank Cox** is superintendent and **H. S. Lord** is project manager. **Thomas C. Royce** is engineer and **Ray E. Glover** is his assistant on the $608,000 project.

* * *

Construction for the Sacramento Municipal Utility District is under the supervision of **Forrest C. Newbury.** Bayshore Construction Co. holds the $335,000 contract which consists of erecting a pre-cast structural concrete warehouse and service building of 48,000 sq. ft. single-story truck height. **Earl Holm** is project manager for SMUD.

* * *

Ken Gooding is superintendent for MacDonald Young & Nelson on the

Continued on page 126

UNIT BID PRICES

Selected Bid Abstracts for Typical Western Projects

Irrigation . . .

Precast and monolithic concrete pressure conduit

Colorado—Colorado-Big Thompson Project—Bureau of Reclamation. Colorado Constructors, Inc., submitted the low bid of $210,330 to the USBR for Schedule 1 construction of the Carter Lake Pressure Conduit, with precast-concrete pipe, Estes Park-Foothills Power Aqueduct. Peter Kiewit Sons' Co., Denver, submitted the low bid of $429,545 for Schedule 2 construction with monolithic concrete. Unit prices were as follows:

SCHEDULE 1—PRECAST CONCRETE PIPE

(1) Colorado Constructors, Inc.	$210,330	— Northwestern Engineering Co.	$299,900
(2) Paul G. Van Sickle Corp.	239,450	— Bill Curphy Co.	309,691
(3) A. S. Horner Construction Co.	264,010	— Peter Kiewit Sons' Co.	344,220
(4) Winston Bros. Co.	282,620	(6) Engineer's estimate	287,970
(5) K. S. Mittry Construction Co.	297,115		

SCHEDULE 2—MONOLITHIC CONCRETE

(1) Peter Kiewit Sons' Co.	$429,545	(2) Engineer's estimate	$330,890

SCHEDULE No. 1
Carter Lake Pressure with Precast-Concrete Pipe

	(1)	(2)	(3)	(4)	(5)	(6)
38,000 cu. yd. excav., all classes	.75	2.25	2.00	2.20	2.75	2.40
9,000 cu. yd. backfill	.50	.50	.60	1.00	.85	.50
900 cu. yd. bedding matl., excav., hauling, and plac'g	1.00	1.00	1.15	3.00	4.45	1.50
900 cu. yd. compacting backfill and bedding	5.00	5.00	5.75	4.00	7.50	4.00
30 cu. yd. concrete in structures	100.00	60.00	90.00	80.00	100.00	70.00
70 cu. yd. concrete in bedding	60.00	30.00	25.00	30.00	40.00	40.00
1,500 bbl. furn. and handling cement	4.00	3.60	4.70	6.00	5.10	5.60
2,000 lb. furn. and placing reinf. bars in structs.	.25	.15	.16	.20	.20	.20
3,000 lb. furn. and installing miscl. metalwork	1.00	.50	.60	.80	.80	.65
430 lin. ft. furn. and lay. conc. pipe, symbol A96C275	115.00	95.00	120.00	122.00	112.00	121.00
780 lin. ft. furn. and lay. conc. pipe, symbol B96C275	116.00	100.00	123.00	127.00	122.00	132.00
60 lin. ft. furn. and lay. conc. pipe, symbol C96C275	125.00	115.00	125.00	130.00	120.00	134.00
60 lin. ft. furn. and lay. conc. pipe, symbol D96C275	130.00	120.00	129.00	135.00	124.00	144.00

SCHEDULE No. 2
Carter Lake Pressure Conduit with Monolithic Concrete

	(1)	(2)
41,500 cu. yd. excav. all classes	2.05	2.40
6,500 cu. yd. backfill	.75	.50
340 cu. yd. bedding matl., excav., hauling, and placing	2.00	1.50
550 cu. yd. compacting backfill and bedding	9.00	4.00
1,450 cu. yd. concrete in structures	57.00	35.00
2,175 bbl. furn. and handling cement	5.00	5.60
510,000 lb. furn. and placing reinf. bars in structs.	.16	.16
4 jt. furn. and installing contraction joints	300.00	200.00
4,000 lb. furn. and installing miscl. metalwork	2.00	.65
258,000 lb. furn. and installing plate-steel liner	.58	.30

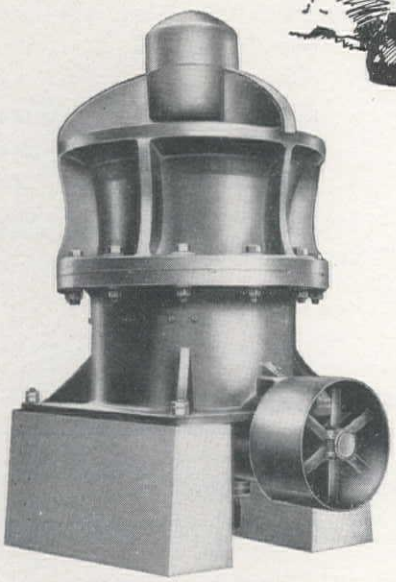
Earthwork, pipe lines and structures, Potholes East Canal in Washington

Washington—Columbia Basin Project—Bureau of Reclamation. Intermountain Plumbing Co. and Henry L. Horn, Moses Lake, with a bid of $237,439, was low before the Bureau of Reclamation for earthwork, pipe lines, and structures, sublaterals and wasteways for Potholes East Canal, Columbia Basin Project. Unit prices were as follows:

(1) Intermountain Plumbing Co. and Henry L. Horn	$237,439	(4) J. A. Terteling & Sons, Inc.	$293,462
(2) Goodfellow Brothers, Inc.	238,011	(5) United Concrete Pipe Corp.	296,533
(3) John Klug & Co.	247,808	(6) Engineer's estimate	169,364

	(1)	(2)	(3)	(4)	(5)	(6)
43,300 cu. yd. excav., common, for laterals	.40	.80	1.00	.60	.60	.30
500 cu. yd. excav., rock, for laterals	3.00	5.00	5.00	18.00	7.00	3.00
2,600 cu. yd. excav. from borrow	.50	.50	.50	.60	.40	.40
9,000 cu. yd. excav., com., and backfill, of pipe trenches	.75	1.00	1.50	1.00	3.00	.75
500 cu. yd. excav., rock, and backfill of pipe trenches	4.50	4.00	7.50	7.00	10.00	5.00
500 cu. yd. compacting backfill in pipe trenches	3.00	1.00	4.00	7.50	5.50	2.00
6,600 mi. cu. yd. overhaul	1.20	.20	.50	.84	1.00	.40
250 cu. yd. gravel or cr. rock bedding for riprap	6.00	5.00	5.00	7.00	8.00	5.00
2,500 cu. yd. furn. and placing gravel blanket	5.00	4.00	2.45	2.70	4.00	2.00
7,500 mi. cu. yd. hauling gravel for gravel blanket	.18	.20	.30	.18	.25	.20
4,200 cu. yd. excav., common, for structs.	1.50	2.00	3.00	3.30	2.50	1.00
25 cu. yd. excav., rock, for structs.	5.00	10.00	10.00	18.30	25.00	5.00
4,100 cu. yd. backfill about structs.	1.00	1.00	.50	.60	1.00	.50
1,700 cu. yd. compacting backfill about structs.	2.50	2.00	3.50	8.60	4.00	2.50
400 sq. yd. dry-rock paving	5.00	10.00	6.50	6.60	11.00	5.00
375 cu. yd. riprap	15.00	8.00	7.00	4.80	11.00	6.00
295 cu. yd. concrete in structs.	120.00	85.00	97.50	125.00	130.00	85.00
10 cu. yd. plain concrete	120.00	100.00	90.00	58.00	50.00	50.00
437 bbl. furn. and handling cement	6.00	6.00	6.50	8.45	8.00	6.00
29,000 lb. placing reinforcement bars in structs.	.12	.10	.12	.15	.12	.08
2.5 M.b.m. furn. and erecting timber in structs.	350.00	200.00	300.00	370.00	400.00	300.00
60 lin. ft. furn. and installing 6-in. diam. std. conc. irrigation pipe for air vents	1.25	2.00	1.50	3.90	1.25	1.50
640 lin. ft. furn. and laying 12-in. diam. std. conc. irrigation pipe	2.50	2.50	1.75	2.60	1.80	1.50
2,890 lin. ft. furn. and laying 15-in. diam. std. conc. irrigation pipe	3.00	3.00	2.40	3.20	2.20	2.10
650 lin. ft. furn. and laying 12-in. diam. std. str. conc. culvert pipe	3.60	3.50	2.90	4.00	6.00	3.10

Continued on page 124



The Traylor TY Reduction Crusher is an example of how experience contributes to building superior machinery. All the details are in Traylor Bulletin 6112.

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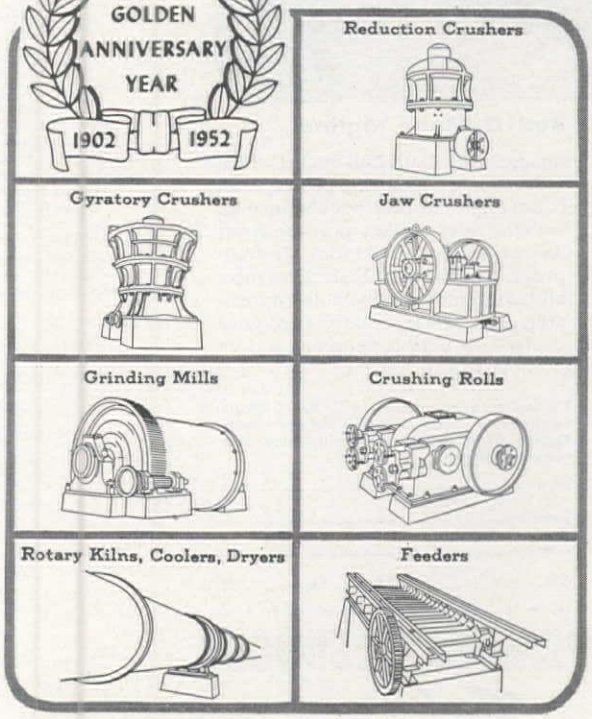

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A TRAYLOR LEADS TO GREATER PROFITS

UNIT BID PRICES . . . CONTINUED

	(1)	(2)	(3)	(4)	(5)	(6)
800 lin. ft. furn. and laying 15-in. diam. std. str. conc. culvert pipe	4.50	4.00	3.75	5.50	7.00	3.85
310 lin. ft. furn. and laying 18-in. diam. std. str. conc. culvert pipe	5.00	5.00	4.35	6.65	8.20	4.00
90 lin. ft. furn. and laying 21-in. diam. std. str. conc. culvert pipe	6.50	6.50	5.60	9.35	9.20	5.50
690 lin. ft. furn. and laying 24-in. diam. std. str. conc. culvert pipe	7.70	8.00	6.75	10.50	11.30	6.50
250 lin. ft. furn. and laying 30-in. diam. std. str. conc. culvert pipe	10.30	12.00	8.75	13.50	14.00	8.40
160 lin. ft. furn. and laying 36-in. diam. std. str. conc. culvert pipe	13.75	16.00	12.00	20.75	16.50	10.75
40 lin. ft. furn. and laying 42-in. diam. std. str. conc. culvert pipe	18.05	21.00	20.00	25.80	21.00	13.40
1,000 lin. ft. furn. and laying 12-in. diam., 25-ft. head conc. pressure pipe	3.60	3.30	4.25	4.00	6.00	3.00
1,000 lin. ft. furn. and laying 15-in. diam., 25-ft. head conc. pressure pipe	4.60	4.50	5.10	5.60	7.00	3.95
2,280 lin. ft. furn. and laying 18-in. diam., 25-ft. head conc. pressure pipe	5.35	5.20	6.25	6.30	8.20	4.85
330 lin. ft. furn. and laying 36-in. diam., 25-ft. head conc. pressure pipe	14.80	16.50	14.70	19.70	16.50	10.90
700 lin. ft. furn. and laying 12-in. diam., 50-ft. head conc. pressure pipe	4.00	3.70	4.25	4.30	6.20	3.30
1,000 lin. ft. furn. and laying 15-in. diam., 50-ft. head conc. pressure pipe	5.00	5.00	5.25	6.00	7.30	4.10
2,000 lin. ft. furn. and laying 36-in. diam., 50-ft. head conc. pressure pipe	19.00	21.00	15.70	26.00	17.00	11.30
36 lin. ft. furn. and laying 18-in. diam., 25-ft. head conc. culvert pressure pipe	5.00	5.25	6.25	7.00	8.80	5.50
60 lin. ft. furn. and laying 36-in. diam., 25-ft. head conc. culvert pressure pipe	15.00	15.10	15.00	20.00	18.00	13.00
3 joints furn. and installing expansion joints in 12-in. diam. conc. pipe	30.00	30.00	40.00	31.00	20.00	30.00
9 joints furn. and installing expansion joints in 15-in. diam. conc. pipe	36.00	35.00	60.00	35.40	24.00	40.00
2 tapers furn. and laying reinf. conc. pipe tapers 12 in. to 18 in. and 12 in. to 15 in.	50.00	50.00	20.00	47.50	60.00	50.00
3 units furn. and installing pipe drain units	200.00	275.00	150.00	435.00	150.00	150.00
6,440 lb. furn. and installing screw lift circular gates	.90	.70	.65	.70	.80	.70
4,710 lb. furn. and installing screw lift orifice gates	.90	.70	.85	.68	.80	.70
3,240 lb. furn. and installing adjustable weirs	.90	.70	.70	.77	.80	.70
2,350 lb. furn. and installing miscl. metal-work	.90	.70	.60	.81	.70	.60

Bridge and Grade Separation . . .

Steel railway undercrossing; shoo fly

Washington—Clark County—State. C. J. Montag & Sons, Portland, Oregon, received a contract from the Department of Highways on a bid of $305,984. Work consists of the construction of the S. P. & S. Railway Undercrossing in Vancouver. Unit prices were as follows:

(1)	C. J. Montag & Sons	$305,984	
(2)	Hawkins & Armstrong	316,928	
(3)	General Construction Co.	318,858	
(4)	Carl M. Halvorson, Inc.	319,430	
(5)	Guy F. Atkinson Co.	332,364	
(6)	Anderson Bridge Construction Co.	$337,810	
—	Peter Kiewit Sons' Co.	338,508	
—	State Construction Co.	346,712	
—	David Nygren	347,772	

BRIDGE	(1)	(2)	(3)	(4)	(5)	(6)
320 cu. yd. crushed rock ballast	5.00	5.60	5.75	7.00	4.40	5.00
830 cu. yd. structure excav.	3.00	4.50	5.00	6.50	3.40	6.00
230 cu. yd. concrete, Class A	45.00	41.00	66.00	35.00	70.00	60.00
690 cu. yd. concrete, Class F	40.00	41.00	38.00	35.00	37.00	40.00
47,000 lb. steel reinforcing bars	.11	.11	.10	.11	.11	.12
372,000 lb. structural carbon steel	.21	.208	.1225	.205	.19	.25
276,000 lb. structural low alloy steel	.21	.208	.2125	.205	.19	.25
26,000 lb. cast steel	.33	.35	.31	.40	.35	.50
18 only bridge drains	60.00	60.00	50.00	80.00	62.00	75.00
282 lin. ft. downspouts	7.00	6.50	4.50	7.50	4.00	5.00
5,500 lin. ft. furn. precast conc. piling	3.50	3.20	3.85	4.40	3.50	4.00
220 only driving precast conc. piles	40.00	40.00	55.00	40.00	57.00	60.00
3 only furn. and driving precast conc. test piles	650.00	$1,500	700.00	$1,500	500.00	400.00
Lump sum, removing portions of exist. struct.	$27,875	$30,000	$30,000	$25,000	$52,650	$20,000
SHOO FLY						
700 cu. yd. common borrow including haul	3.00	1.75	3.50	3.50	1.20	2.00
420 cu. yd. gravel ballast	2.00	3.70	4.50	7.00	3.00	4.00
111 M.B.M. timber and lumber (untreated)	275.00	315.00	250.00	350.00	300.00	200.00
11,000 lin. ft. furn. timber piling (untreated)	.60	.85	.65	.85	.55	.75
318 only driving timber piles (untreated)	40.00	40.00	43.00	30.00	60.00	50.00
2 only furn. and drive. untreated timber test piles	200.00	500.00	275.00	$1,000	200.00	300.00

Steel stringer bridge

California—Imperial County—State. R. P. Shea Co., Indio, with a bid of $343,507, was low before the State Division of Highways for construction of a steel stringer bridge across New River, at Seeley; approaches to be graded and surfaced. Unit prices were as follows:

(1)	R. P. Shea Co.	$343,507	
(2)	R. M. Price Co.	345,855	
(3)	Norman I. Fadel	$379,295	
(4)	K. B. Nicholas	384,312	

	(1)	(2)	(3)	(4)
380 cu. yd. removing concrete	4.25	3.00	10.00	7.80
Lump sum, removing existing bridge	$3,730	$7,500	$13,000	$4,700
Lump sum, clearing and grubbing	775.00	$3,000	$3,500	$5,000
25,000 cu. yd. roadway excav.	.44	.60	.80	.70
190 cu. yd. structure excav.	3.40	2.50	8.00	3.50
10,600 sq. yd. compacting original ground	.046	.05	.05	.08
9,500 ton imported subbase matl.	2.40	1.50	1.50	3.00
Lump sum, devel. water supply and furn. watering equip.	$4,650	$1,000	$3,000	$2,500

		(1)	(2)	(3)	(4)
2,000	M. gal. applying water	.80	2.00	1.50	1.75
37	sta. finishing roadway	10.00	15.00	20.00	20.00
4,800	ton mineral aggregate (rd.-mix. cem. treated base)	1.49	2.30	3.40	3.00
2,100	bbl. portland cement (C.T.B.)	4.05	4.00	4.20	4.05
17,400	sq. yd. mix. and compact (C.T.B.)	.122	.70	.35	.35
42	ton asph. emuls. (cur. sl., bind. and sl. ct.)	38.00	65.00	50.00	45.00
25	ton sand (sl. ct.)	6.40	5.00	6.50	5.50
220	ton screenings (sl. ct.)	6.60	6.00	6.50	9.00
4,100	ton mineral aggregate (R.M.S.)	1.37	2.50	3.40	3.10
210	ton liq. asph. SC-3, 4 or 5 (prime ct. and R.M.S.)	25.40	30.00	24.00	27.00
26,500	sq. yd. mixing and compacting R.M.S.	.084	.15	.17	.17
40	lin. ft. raised traffic bars	1.50	2.00	2.00	1.50
270	lin. ft. placing R.M.S. dikes	.25	1.50	1.00	.50
910	cu. yd. Class "A" P.C.C. (struct.)	50.00	60.00	65.00	78.00
383,000	lb. struct. steel	.156	.17	.178	.17
56	ea. steel roller bearing assemblies	225.00	250.00	290.00	300.00
10,140	lin. ft. furn. conc. piling	6.58	4.50	4.10	4.00
134	ea. driving conc. piles	311.00	240.00	250.00	220.00
Lump sum,	cleaning and painting steel	$6,521	$4,000	$5,500	$9,000
50	cu. yd. Class "A" P.C.C. (curbs)	35.35	40.00	55.00	44.00
26	ea. r/w monuments	10.00	7.00	7.00	8.00
1,284	lin. ft. corrugated metal bridge railing	4.00	7.00	6.00	6.00
282	lin. ft. metal plate guard railing	3.75	7.00	4.00	4.50
14	ea. guard posts	5.00	6.00	8.00	10.00
70	ea. installing guide posts and clearance markers	4.50	5.00	8.00	4.00
6	ea. horiz. reflector units	7.50	7.00	9.00	12.00
1.1	mi. new property fence	$1,637	800.00	$1,200	$1,700
4	ea. 10-ft. drive gates	31.00	60.00	75.00	100.00
40	lin. ft. 8-in. C.M.P. downdrains (16 ga.)	2.05	3.00	2.50	2.00
4	ea. spillway assemb.	30.00	50.00	25.00	40.00
150,000	lb. bar reinf. steel	.12	.12	.125	.10

Small concrete grade separation structure

Oregon—Morrow County—State. Schrader Construction Co., Portland, submitted the low bid of $60,460 to the Highway Commission for the Boardman Grade Separation job on the Boardman-Stanfield Highway. Unit prices were as follows:

(1)	Schrader Construction Co.	$60,460	
(2)	G. T. Gentle	60,838	
(3)	H. & R. Construction Co.	60,841	
(4)	Leonard & Slate Oregon Ltd.	66,275	
(5)	Parker-Johnston	66,850	
(6)	C. J. Montag	68,545	
—	George E. Berry	71,090	
—	Birkemeier & Saremal	$72,380	
—	Howard Halvorson Co.	73,166	
—	Colonial Construction Co.	75,600	
—	Valley Construction Co.	77,700	
—	Lee Hoffman	83,120	
—	Roy L. Bair & Co.	85,580	

		(1)	(2)	(3)	(4)	(5)	(6)
330	cu. yd. structural excavation	6.00	5.00	2.90	5.00	7.00	2.50
10	cu. yd. excavation below elev. shown	3.00	8.00	6.00	5.00	18.00	3.00
770	cu. yd. Class "A" concrete	53.00	55.00	57.82	60.00	56.00	65.00
147,000	lb. metal reinforcement	.12	.114	.1041	.125	.14	.12

Redecking of 48 timber trestle bridges

California—San Bernardino County—State. C. B. Tuttle Co., Long Beach, with a bid of $192,881, was low before the State Division of Highways for the redecking of 48 timber trestle bridges between Barstow and Amboy. Redecking will be done with reinforced concrete slabs, plank floors and plant mix surfacing. Unit prices were as follows:

(1)	C. B. Tuttle Co.	$192,881	
(2)	Norman I. Fadel	211,944	
(3)	E. S. & N. S. Johnson	215,022	
(4)	K. B. Nicholas	$216,194	
(5)	George Herz & Co.	232,995	
(6)	R. M. Price Co.	277,989	

		(1)	(2)	(3)	(4)	(5)	(6)
69,850	sq. ft. removing surface	.23	.45	.25	.12	.37	.40
3,360	sq. ft. removing laminated floor	.21	.45	.25	.20	.40	.30
5,903	lin. ft. removing bridge railing	.70	.50	1.00	.70	.92	2.00
96	cu. yd. struct. excav.	10.00	5.00	5.00	5.00	5.85	4.00
1,030	ton min. aggre. (P.M.S.)	24.00	13.00	18.00	18.00	18.00	17.00
53	ton liq. asph., SC-3 or SC-4 (P.M.S.)	32.00	13.00	30.00	18.00	28.50	30.00
2.1	ton asph. emuls. (pt. bdr.)	250.00	100.00	200.00	300.00	41.00	100.00
24	M.F.B.M. treated Douglas fir timber	276.00	310.00	325.00	270.00	290.00	350.00
14	M.F.B.M. untreated Douglas fir timber	385.00	350.00	325.00	275.00	675.00	300.00
252	lin. ft. relocating existing stringers	.50	1.00	1.00	.70	.70	1.00
1,073	cu. yd. Class "A" P.C.C.	45.00	50.00	44.00	75.50	46.50	70.00
116,400	lb. bar reinf. steel	.12	.125	.14	.14	.17	.20
3,983	lin. ft. corr. metal bridge railing	3.50	4.00	5.50	5.00	4.30	5.00
3,700	sq. ft. sheet metal	.70	.40	.40	1.00	.50	.20
10	M.F.B.M. installing salv. timber	163.00	125.00	100.00	65.00	375.00	150.00
27,500	sq. ft. spiking deck (br. types AS & ASD)	.08	.25	.40	.14	.39	.20
96	ea. clearance markers	10.00	10.00	10.00	8.50	9.25	6.00
11,136	lin. ft. metal plate guard rail	3.00	3.20	3.50	3.60	3.85	4.50
1,570	lin. ft. temp. timber railing (br. type A & AS)	3.50	2.50	2.50	.80	1.50	2.50
615	ea. portable timber barricades (br. type A & AS)	11.50	20.00	20.00	4.00	19.00	35.00
252	lin. ft. temp. timber railing (br. type P)	4.00	2.50	2.00	2.00	2.80	3.00

Highway and Street . . .

Asphaltic concrete paving on crushed stone base

Washington—King and Kittitas Counties—State. C. E. Oneal Co., Inc., Ellensburg, with a bid of $406,768, was low before the State Department of Highways for construction on Primary State Highway No. 2, Snoqualmie Pass to Hyak. Unit prices were as follows:

(1)	C. E. Oneal Co., Inc.	$406,768	
(2)	N. Fiorito Co.	407,893	
(3)	Goodfellow Bros.	$413,218	
(4)	Northwest Construction Co.	479,951	

		(1)	(2)	(3)	(4)
29.4	acre clearing	900.00	975.00	$1,000	950.00
15.1	acre grubbing	600.00	975.00	300.00	900.00
119,050	cu. yd. common excav., including haul of 600 ft.	.89	.38	.85	.45
83,850	cu. yd. solid rock excav., incluing haul of 600 ft.	.89	1.35	.85	1.75
35	cu. yd. common trench excav., including haul of 600 ft.	4.00	8.00	10.00	3.00
82,600	cu. yd. sta. overhaul	.01	.02	.03	.02
3,101.1	M. cu. yd. sta. overhaul	4.50	5.50	4.00	6.00
11,710	cu. yd. excav. of unsuitable material, incl. haul	.70	1.00	.60	2.00

Continued on page 126

SUPERVISING THE JOBS...

...Continued from page 122

construction of a $3,000,000 building for the U. S. Army in Sacramento, Calif. **Bill Meuting** and **Ed Kemp** are building superintendents, **Bob Cox** is concrete superintendent and **Dick Engstrom** is office manager. **O. G. Twigg** is engineer.

* * *

Grading a state highway from Yolo City by-pass to the M St. Bridge in Sacramento, Calif., is under the supervision of **P. D. Patterson. B. L. Wilcox** is project manager. United Concrete Pipe Corp. holds the contract.

* * *

Construction of the $1,500,000 California Western States Life Insurance Co. office building in Sacramento, Calif., by Swinerton & Walberg Co. is under the supervision of **R. I. (Pop) Gunn** with **Orval B. Smith** as his assistant. **Joseph Levine** is resident engineer.

* * *

In Phoenix, Ariz., where Daum-Donaldson Co. is constructing buildings for the Bureau of Reclamation, **Bob Roberts** is general superintendent and **A. H. Thomack, Harold Baldwin** and **Joe Borden** are assistant superintendents. These buildings will house the Phoenix offices of the Bureau of Reclamation.

* * *

Construction of a $4,500,000 Pyrene power plant for the Salt River Power District of the Salt River Valley Water Users Assn. is being supervised by **H. B. Burkhammer** for Bechtel Corp. **M. S. Morris** is assistant superintendent. **William McKinley, Hy J. Reinsch, Jr., James Waldron** and **Charles Stewart** are foremen along with **John Nash** and **Jean Laviolotte. Mike Walker** and **Jim Atkins** are carpenter foremen and **Curly Operson** is sawman. **Ralph Greenthal, Fred Cashman** and **Kenneth Wells** are engineers. **C. H. Moffett,** Moffett Engineering Co., is supervising construction of a gantry crane at the new Pyrene plant and a 100-ton traveling crane at the transmission plant near Phoenix for USBR and Salt River Water Users Assn.

* * *

Phil Pickel is general superintendent for David Kaiser Co. on the construction of $1,000,000 apartment buildings in Sacramento, Calif.

* * *

E. C. Hart is supervising construction of the Willamette River crossing sewer project for State Construction Co. and Walter McCray, joint venturers. **W. McCray** is diving superintendent and **A. K. Curtis** is concrete superintendent on the $682,725 job in Portland, Ore.

* * *

Slim Assmussen is construction superintendent for Kaiser Engineering Co. on building a pot line extension to Kaiser Aluminum plant at Mead, Wash. **Jim Sheeks** is carpenter superintendent and **Jim Hillyard** is labor superintendent. **Gale Wilson** is project manager.

UNIT BID PRICES... CONTINUED

		(1)	(2)	(3)	(4)
680	cu. yd. structure excav.	4.00	2.50	10.00	5.00
32	day tamping roller	60.00	55.00	50.00	60.00
97	day pneumatic-tired roller	45.00	60.00	50 00	60.00
38	day mechanical tamper	25.00	50.00	50.00	50.00
4,080	lin. ft. slope treatment, Class A	.20	.15	.20	.20
138.7	sta. (100-ft.) finishing roadway	15.00	15.00	5.00	20.00
130	M. gal. water in place	2.00	4.50	5.00	3.00
195	cu. yd. gravel backfill for foundation in place	2.00	6.00	5.00	5.00
3,070	ton crushed stone surfacing top course in place	1.60	1.65	1.45	2.40
3,930	ton crushed stone surfacing top course in stkpl.	1.20	1.25	1.15	1.40
30,100	ton ballast in place	1.20	1.45	1.25	1.50
15,140	ton ballast in stockpile	.90	1.10	.95	1.20
	MINERAL AGGREGATE FOR TYPE I-1 ASPHALTIC CONCRETE PAVEMENT				
4,860	ton coarse crushed screenings ⅝-in. - ¼-in. in stkpl.	1.70	1.25	1.55	1.40
9,360	ton fine crushed screenings ¼-in. - 0 in stockpile	1.70	1.25	1.65	1.40
	OTHER ITEMS				
670.0	cu. yd. concrete, Class A, in place	70.00	70.00	85.00	75.00
115,180	lb. steel reinf. bars in place	.13	.13	.14	.15
125	lin. ft. removing cable guard rail	.05	1.00	3.00	1.00
351	lin. ft. std. reinf. conc. culv. pipe 18-in. diam. in place	4.00	4.50	4.00	5.00
141	lin. ft. std. reinf. conc. culv. pipe 24-in. diam. in place	6.00	6.00	6.00	7.50
268	lin. ft. std. reinf. conc. culv. pipe 36-in. diam. in place	9.50	11.00	10.00	15.00
228	lin. ft. std. reinf. conc. culv. pipe 48-in. diam. in place	14.50	17.00	16.00	23.00
74	only reinf. conc. right-of-way markers in place	7.00	6.00	4.00	7.00

Grading, drainage and plant-mix surfacing in New Mexico

New Mexico—Colfax County—State. D. D. Skousen, Albuquerque, with a bid of $308,837, received a contract from the State Highway Department for construction of the Springer-Colmor Rd. on U. S. 85, to be 6.2 mi. in length. Unit prices were as follows:

(1) D. D. Skousen $308,837
(2) Brown Contracting Co. 342,823
(3) Lowdermilk Bros. 356,575
(4) G. I. Martin $358,557
(5) Engineer's estimate 385,552

		(1) (1)	(2) (2)	(3) (3)	(4) (4)	(5) (5)
	Lump sum, removal of old structures	$2,500	$2,000	$1,750	$8,000	$1,500
145,075	cu. yd. excavation, unclassified	.30	.35	.49	.28	.35
285	cu. yd. excavation for structures	3.00	2.00	5.00	3.00	2.00
350	cu. yd. excavation for pipe culverts	2.00	2.00	2.00	2.00	2.00
293,300	sta. yd. overhaul	.015	.02	.01	.02	.02
75,330	¼-mi. yd. haul	.07	.06	.05	.06	.05
352,250	ton mile haul	.07	.065	.05	.065	.07
340	hr. mechanical tamping	5.00	4.00	5.00	3.00	5.00
1,260	hr. rolling—sheepsfoot roller	4.50	4.50	4.50	4.00	5.00
515	hr. rolling—steel tired roller	6.00	6.00	6.50	6.00	5.00
1,430	hr. rolling—pneumatic tired roller	4.00	4.00	4.50	3.00	4.00
68,640	ton ballast	.60	.58	.55	.63	.75
26,050	ton leveling course	.90	.66	.70	.68	.90
8,210	M. gal. watering	.50	.50	1.00	1.00	1.50
802	cu. yd. Class "AE-AR" concrete	45.00	50.00	53.00	60.00	55.00
1,910	sq. yd. waterproofing	1.00	1.00	1.00	2.00	1.00
112,936	lb. reinforcing steel	.13	.13	.13	.11	.13
56	lin. ft. std. reinf. conc. pipe, 18-in. diam.	7.00	5.40	6.50	4.50	5.00
320	lin. ft. reinf. conc. pipe, 24-in. diam.	9.00	7.15	7.00	6.50	7.50
728	lin. ft. std. reinf. conc. pipe, 36-in. diam.	14.00	12.20	12.75	12.10	13.00
2	ea. monuments and markers	100.00	75.00	75.00	50.00	50.00
34,850	lin. ft. galvanized barbed wire fence	.25	.13	.16	.14	.14
2	ea. gates, Texas type	30.00	10.00	15.00	10.00	8.00
66	ea. bracing	7.00	5 00	6.00	7.00	7.00
2	ea. standard gates, 10-ft. width	50.00	25.00	45.00	30.00	30.00
1	ea. standard gates, 14-ft. width	75.00	30.00	50.00	40.00	50.00
65	ea. treated timber warn. posts, refl. 6-in. diam.	6.00	6.00	7.00	6.00	7.50
46	ea. right-of-way markers	6.00	6.00	6.50	6.00	6.00
6.4	mi. obliterating old road	300.00	200.00	250.00	200.00	250.00
4,200	lin. ft. contour ditches	.10	.10	.12	.05	.15
745	bbl. cutback asphalt, Type MC-1	7.00	6.20	6.30	6.00	7.00
235	bbl. cutback asphalt, Type RC-2	7.00	6.20	6 30	6.00	7.00
295	bbl. cutback asphalt, Type RC-4	7.00	6.20	6.75	6.00	7.00
10,150	ton hot plant asphaltic pavement	3.00	4.00	3.00	4.50	4.00
3,700	bbl. 85-100 asphalt (for hot plant asph. pave.)	6.00	5.80	6 25	5.75	7.00
200	lin. ft. 4-in. diam. galv. stand. pipe	5.00	2.50	3.00	4.00	3.00
85	hr. equipment roller operation	8.00	15.00	12.50	15.00	20.00

Earthmoving, gravel base and plant-mix surfacing in Nevada

Nevada—Washoe County—State. Isbell Construction Co., Reno, with a bid of $530,136, was low before the State Department of Highways for 3.1 mi. of highway construction from Sparks to Vista. Unit prices were as follows:

(1) Isbell Construction Co. $530,136
(2) Silver State Construction Co. 543,451
(3) Dodge Construction, Inc. $558,511
(4) Gibbons & Reed Co. 594,861

		(1)	(2)	(3)	(4)
	Force account, flagmen	$3,500	$3,500	$3,500	$3,500
280	hour pilot car	4.50	2.50	4.00	3.50
	Force account, maintain base	500.00	500.00	500.00	500.00
	Lump sum, signs	$2,500	$2,500	$2,500	$1,000
	Lump sum, clearing	$5,500	$5,500	$2,500	$6,000
11,065	lin. ft. remove fence	.10	.05	.10	.12
28	cu. yd. remove concrete	30.00	20.00	25.00	25.00
980	lin. ft. remove culvert pipe	3.00	2.00	1.50	1.25
21	ea. remove headwall	15.00	25.00	20.00	25.00
	Lump sum, remove timber bridge	100.00	$1,000	500.00	.....
180	lin. ft. remove guard rail	.50	.25	1.00	1.25
301,715	cu. yd. roadway excav. "A"	.35	.45	.42	.40
74,605	cu. yd. roadway excav. "B"	.38	.48	.45	.43
1,461	cu. yd. drainage excav.	1.00	1.00	1.00	.75
35	sta. V-type ditches	10.00	5.00	6.00	7.00
1,373,000	yd. sta. overhaul	.015	.02	.015	.01
284,591	yd. mi. overhaul	.20	.10	.15	.15

Continued on page 128

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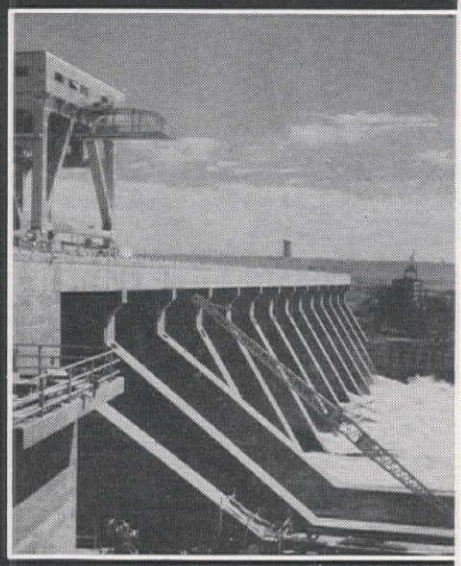

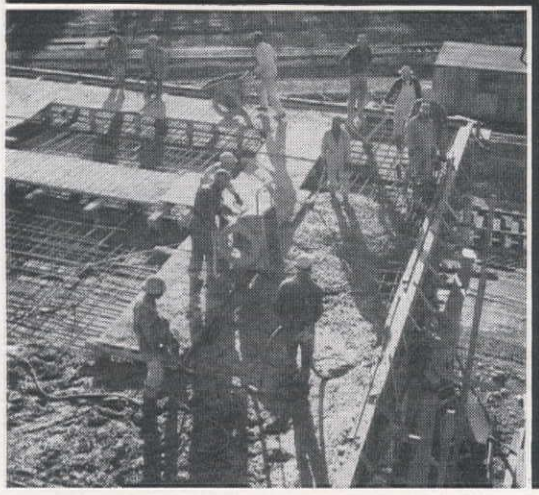

CEMENT continues to intensify its position as one of the most important basic materials in the Nation's defense program. While steel, copper and aluminum furnish the munitions of war - cement has a vital auxiliary role in providing concrete for construction of the factories, warehouses, dams, power plants and airports - without which the defense organization could not operate.

PERMANENTE CEMENT COMPANY, as the West's largest cement plant, has been called upon to supply a continually increasing proportion of the cement required by theWestern Defense Command's huge construction program. However, since the completion of Permanente's expansion program, during which additional capacity of 1,400,000 barrels was installed, the Company has been able to supply not only the increasing defense requirements, but has continued to fulfill the needs of its commercial customers.

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UNIT BID PRICES . . . CONTINUED

		(1)	(2)	(3)	(4)
4,110	cu. yd. structure excav.	3.50	3.00	3.50	3.20
3,240	cu. yd. backfill	1.00	2.00	2.50	1.85
3,500	cu. yd. sand for backfill	3.00	1.50	3.00	4.25
2,390	cu. yd. foundation fill	3.00	2.00	3.00	1.85
Force account, roadside cleanup		100.00	100.00	100.00	100.00
12,823	M. gal. water	1.00	1.00	.75	1.10
Lump sum, furnish water equipment		$5,000	.....	.....	.....
370	hr. power roller	6.00	6.00	6.00	6.00
15,800	ft. hr. tamping roller	.50	.50	.60	.78
49,930	ton Type 1 gravel base	.41	.65	.50	.58
24,550	ton Type 2 gravel base, one inch	.69	.60	.90	1.20
236	ton liquid asphalt, Type MC-1 (prime)	37.00	35.00	33.00	38.00
33	ton emulsified asphalt (seal shldrs. and approaches)	37.00	35.00	37.50	42.00
98	ton emulsified asphalt (seal)	37.00	35.00	37.50	42.00
746	ton screenings	4.00	3.00	5.00	4.25
824	ton liquid asphalt, Type 3C-6 (plantmix)	26.00	25.00	27.50	30.00
18,300	ton Class F-2 plantmix surface	2.10	2.00	2.50	2.00
689	cu. yd. special Class A concrete	70.00	80.00	75.00	87.00
71,190	lb. reinforcing steel	.13	.15	.13	.16
230	lin. ft. 15-in. corrugated metal pipe	2.65	3.00	3.00	3.50
2,044	lin. ft. 24-in. plain concrete pipe	5.10	4.00	5.00	5.15
1,292	lin. ft. 24-in. reinforced concrete pipe	7.00	6.00	6.00	6.25
704	lin. ft. 36-in. reinforced concrete pipe	13.00	13.00	10.00	11.00
408	lin. ft. relay culvert pipe	2.00	1.00	1.50	1.75
1,383	lb. structural steel	.50	.25	.50	.40
5,290	lin. ft. beam type metal guard rail	3.00	3.00	3.00	4.00
161	ea. culvert markers and guide posts	6.00	6.00	6.00	7.00
4,970	lin. ft. special Type C-32-3B fence	.45	.50	.30	.40
1,960	lin. ft. special Type C-4B fence	.40	.40	.25	.45
2,875	lin. ft. standard Type B-4B fence	.40	.40	.20	.30
1,470	lin. ft. reconstruct fence	.40	.25	.20	.25
31	ea. right-of-way markers	8.00	6.00	6.00	7.00
Lump sum, sheeting and bracing		$4,000	$7,600	$6,000	$5,700
100	lin. ft. 36-in. jacked pipe (asbestos bonded 8 gage)	70.00	50.00	50.00	50.00

Grading, crushed stone surfacing with bituminous treatment and asphaltic concrete in Washington

Washington—King County—State. N. Fiorito Co., Seattle, with a bid of $159,287, received an award from the State Department of Highways for .3 mi. of highway construction on Primary State Highway No. 2, Mercer Island Grade separation project. Unit prices were as follows:

(1) N. Fiorito Co. $159,287
(2) Northwest Construction Co. 162,897
(3) R. L. Moss & Co. $162,958
(4) David Nygren 177,428

		(1)	(2)	(3)	(4)
Lump sum, clearing and grubbing		$2,000	$4,500	$2,775	$3,000
25,880	cu. yd. unclasified excav. including haul	.60	.75	1.00	.85
15	cu. yd. common trench excav. including haul	5.00	2.50	5.00	5.00
565	cu. yd. structure excav.	3.50	6.00	4.00	5.00
5	days tamping roller	65.00	60.00	75.00	50.00
2	days pneumatic-tired roller	65.00	60.00	75.00	50.00
22	days mechanical tamper	50.00	50.00	35.00	50.00
500	lin. ft. slope treatment, Class A	.30	.20	.30	.20
32.4	stas. (100 ft.) finishing roadway	25.00	20.00	20.00	20.00
20	M. gal. water in place	5.00	3.00	5.00	5.00
40	cu. yd. sand filler in place, including haul	5.00	3.00	5.00	4.00
400	cu. yd. gravel backfill for drains, in place	5.00	7.50	4.00	4.00
17,000	ton selected roadway borrow in place	1.50	1.25	1.25	1.00
2,300	ton crushed stone surfacing top course in place	3.25	3.50	3.45	3.00
	LIGHT BITUMINOUS SURFACE TREATMENT METHOD A				
6,900	sq. yd. preparation, construction, finishing	.04	.10	.05	.05
18	ton asphalt cement MC-3 in place	45.00	45.00	45.00	50.00
150	cu. yd. furn. and placing crushed cover stone	3.00	4.00	3.10	3.50
	TYPE I-1 ASPHALTIC CONCRETE PAVEMENT				
430	ton Class C wearing course in place	10.00	10.00	11.00	11.00
1,130	ton Class L leveling course in place	10.00	10.00	11.00	11.00
6,630	sq. yd. preparation of untreated roadway	.04	.10	.05	.05
110	cu. yd. furnishing and placing new fine min. aggregate	3.00	4.00	3.00	3.50
7	ton asphalt cement MC-3 prime coat in place	45.00	46.00	45.00	50.00
	ONE COURSE CONCRETE PAVEMENT				
300	sq. yd. cement conc. pavement, std. 14-day mix, 8-in. sec. in place	5.00	5.00	7.00	5.00
25,000	lb. pavement reinf., Type No. 2 in place	.12	.13	.15	.12
20	only dowel bars with rubber caps in place	.60	.40	.50	1.00
260	sq. yd. concrete placed as extra thickness	5.00	5.00	3.00	5.00
315	lin. ft. Type A precast wht. reflect. curb in place	2.50	3.00	2.50	2.00
335	lin. ft. Type C precast wht. reflect. curb in place	2.90	3.50	2.90	2.50
15	lin. ft. conc. or V.C. drain pipe 8-in. diam. in place	2.00	1.00	1.50	2.00
252	lin. ft. conc. drain pipe 12-in. diam. in place	2.25	3.00	2.00	2.10
330	lin. ft. plain conc. culv. pipe 12-in. diam. in place	2.25	2.25	2.25	2.50
363	lin. ft. stand. reinf. conc. culv. pipe 18-in. diam. in place	5.00	4.50	4.50	5.00
130	lin. ft. bit. ctd. corr. met. culv. pipe No. 16 ga. 8-in. di. type No. 2 in place	3.50	2.50	3.50	4.00
4	only manholes in place	250.00	250.00	250.00	400.00
11	only catch basins in place	200.00	125.00	90.00	150.00
301	lin. ft. std. beam guard rail, rail plates provided, in place	3.50	2.50	2.00	4.00
5	cu. yd. hand placed riprap in place	35.00	25.00	25.00	20.00
750	sq. yd. removing cement concrete pavement	1.00	1.00	1.00	1.00
385	lin. ft. removing concrete gutter lip	.25	1.00	.25	.50
1	only removing manhole	50.00	100.00	25.00	50.00
3	only removing catch basins	50.00	75.00	20.00	25.00
216	lin. ft. removing guard rail	1.00	.75	.60	.50
	MOVE SANDBUNKER				
Lump sum, move sandbunker and stairway and reconst. footings		$2,000	$1,150	$1,375	$1,500
320	lin. ft. furn. timber piling creosote treated	1.50	1.50	1.50	1.50
16	only driving timber piles creosote treated in place	100.00	35.00	50.00	50.00
3.4	M.B.M. timber and lumber creosote treated, in place	350.00	275.00	350.00	400.00
	BRIDGE				
1,100	cu. yd. structure excavation	4.00	4.00	2.00	10.00
480	cu. yd. concrete Class A in place	70.00	73.00	70.00	90.00

(Continued on next page)

		(1)	(2)	(3)	(4)
97	cu. yd. concrete Class B in place	60.00	30.00	45.00	70.00
220	lin. ft. reinf. conc. bridge railing in place	10.00	12.00	11.00	12.00
141,000	lb. steel reinforcing bars in place	.11	.12	.12	.12
2	only bridge drains, complete in place	100.00	65.00	75.00	75.00

Power . . .

115-Kv. transmission line, Colorado-Big Thompson Project

Colorado—Colorado-Big Thompson Project—Bureau of Reclamation. Sturgeon Electric Co., Inc., Denver, with a bid of $125,833 was low before the Bureau of Reclamation for construction of the Estes-Pole Hill 115-kv. transmission line. Unit prices were as follows:

(1) Sturgeon Electric Co., Inc. $125,833
(2) Smith Hi Line Co. 167,987
(3) Engineer's estimate $119,208

		(1)	(2)	(3)
Lump sum, clearing land and right-of-way		$22,950	$65,000	$25,000
1	structure const. type-HS struct. with 50-ft. poles	356.00	472.00	460.00
1	structure const. type-HS struct. with 55-ft. poles	395.00	496.50	485.00
5	structures const. type-HS struct. with 60-ft. poles	432.00	531.00	512.00
20	structures const. type-HS struct. with 65-ft. poles	468.00	571.50	541.00
10	structures const. type-HS struct. with 70-ft. poles	506.00	622.50	572.00
4	structures const. type-HS struct. with 75-ft. poles	564.00	697.50	605.00
1	structure const. type-HSB struct. with 55-ft. poles	454.00	568.00	534.00
1	structure const. type-HSB struct. with 60-ft. poles	488.00	604.00	562.00
1	structure const. type-HSB struct. with 65-ft. poles	528.00	647.50	591.00
1	structure const. type-HSB struct. with 70-ft. poles	566.00	691.00	622.00
1	structure const. type-HSB struct. with 75-ft. poles	602.00	770.50	655.00
1	structure const. type-3A struct. with 55-ft. max. pole length	474.50	640.50	582.00
1	structure const. type-3A struct. with 60-ft. max. pole length	516.00	709.50	622.00
1	structure const. type-3A struct. with 65-ft. max. pole length	584.00	756.00	665.00
1	structure const. type-3A struct. with 70-ft. max. pole length	642.00	829.50	711.00
1	structure const. type-3A struct. with 75-ft. max. pole length	699.00	924.00	760.00
1	structure const. type-3AB struct. with 55-ft. max. pole length	498.50	690.50	597.00
1	structure const. type-3AB struct. with 60-ft. max. pole length	548.50	747.50	637.00
1	structure const. type-3AB struct. with 65-ft. max. pole length	609.50	800.00	680.00
1	structure const. type-3AB struct. with 70-ft. max. pole length	666.00	869.00	726.00
1	structure const. type-3AB struct. with 75-ft. max. pole length	722.00	965.00	775.00
1	structure const. type-3AC struct. with 55-ft. max. pole length	614.00	942.00	672.00
1	structure const. type-3AC struct. with 60-ft. max. pole length	664.00	987.00	712.00
1	structure const. type-3AC struct. with 65-ft. max. pole length	725.00	$1,062	755.00
1	structure const. type-3AC struct. with 70-ft. max. pole length	782.00	$1,127	801.00
1	structure const. type-3AC struct. with 75-ft. max. pole length	836.00	$1,242	850.00
1	structure const. type-3T struct. with 55-ft. max. pole length	596.00	964.50	707.00
1	structure const. type-3T struct. with one 60-ft. max. pole length	648.00	$1,009	747.00
1	structure const. type-3T struct. with 65-ft. max. pole length	708.00	$1,078	790.00
1	structure const. type-3T struct. with 70-ft. max. pole length	764.50	$1,138	836.00
1	structure const. type-3T struct. with 75-ft. max. pole length	826.00	$1,285	885.00
1	structure const. type-3TX struct. with 65-ft. max. pole length	732.00	$1,091	800.00
1	structure const. type-3TX struct. with 70-ft. max. pole length	788.00	$1,154	846.00

Firm casts iron pipe at new West Coast plant

FOR THE FIRST time in any of the Pacific Coast States, cast iron pressure pipe is being cast centrifugally in metal molds on a production basis. This process is under way at the Decoto, Calif., headquarters of the United States Pipe and Foundry Co.

The plant was designed by the firm's engineering department and constructed by The Austin Co. on a 70-acre tract. Facilities include storage for pig iron, coke, etc., three centrifugal pipe casting machines, a pipe annealing oven, core

blowing machines and a core oven. In addition, a chemical laboratory and a physical testing laboratory are on the scene to check and control the quality of the pipe.

Design of the plant attempted to and succeeded in providing the latest features to insure a quality product. Straight line production prevails from receipt of raw materials to shipment of finished products.

For the present, pipe in diameters four to twelve inches will be cast; however, provision has been made for future expansion and development of plant facilities.

Shipments from this plant will be made principally to the areas included in the firm's Pacific Coast sales territory, which has its general offices in the Monadnock Building in San Francisco, Calif. Clifford R. Tinsley is manager of the plant.

Hope dims for second S. F. underground garage

IN SAN FRANCISCO, Calif., legal and financial difficulties combined to make the proposed construction of a garage under St. Mary's Square unlikely in the near future.

St. Mary's Square Corp., sole bidder on the project when bids were opened recently, is having difficulty obtaining the loan which is necessary before work can begin on the $2,400,000 project. At the same time, the City Attorney announces that the firm's bid is invalid since it was reliant upon a loan.

If the company can eliminate the loan stipulation from its bid, its offer will still be acceptable by the city. Word should be forthcoming shortly from the head of the firm.

Meanwhile, the Parking Authority met to plan future action and perhaps discuss the calling of new bids in case this offer has to be turned down.

UNIT BID PRICES . . . CONTINUED

		(1)	(2)	(3)
1	structure const. type-3AT struct. with 55-ft. max. pole length	517.00	882.00	622.00
1	structure const. type-3AT struct. with 60-ft. max. pole length	566.00	934.50	662.00
1	structure const. type-3AT struct. with 65-ft. max. pole length	626 00	988.50	704.00
1	structure const. type-3AT struct. with 70-ft. max. pole length	683.00	$1,062	751.00
50	X-braces assembling and attaching X-brace for 12-ft. pole spacing	58.00	55.00	50.00
2	X-braces assembling and attaching X-brace for 14-ft. 6-in. pole spacing	66.00	75 00	55.00
2	X-braces assembling and attaching X-brace for 18-ft. pole spacing	77.00	90.00	60.00
50	guys constructing single guy	21.40	27.00	30.00
125	guys constructing double guy	42.00	46.00	40.00
1	guy constructing stub guy with 60-ft. pole	194.00	250.00	200.00
1	guy constructing stub guy with 65-ft. pole	214.00	275.00	225.00
170	anchors placing plate or cone anchor	15.00	34.00	25.00
75	anchors placing grouted anchor	20.00	26.00	30.00
50	protectors installing guy protector	7.00	8.00	7.00
159	assemblies assembling and attaching suspension-insulator assemb. with 7 insulator units	30.00	35.00	30.00
3	assemblies assembling and attaching suspension-insulator assemb. with 8 insulator units	33.00	40.00	34.00
45	assemblies assembling and attaching suspension-insulator assemb. with 9 insulator units	36.00	45.00	38.00
3	assemblies assembling and attaching double suspension-insulator assemb. with 9 insulator units per string and single yoke plate	77.00	84.00	80.00
12	assemblies assembling and attaching tension-insulator assemb. with 9 insulator units	41.00	45.00	42.00
60	assemblies assembling and attaching double tension-insulator assemb. with 9 insulator units per string and double strain yoke	84.00	84.00	85.00
9½	miles of line stringing three 397,500-circular mil, ACSR conductors	$2,600	637.00	$1,100
120	dampers attaching vibration damper to ACSR conductor	9.00	11 00	8.00
9	weights attaching 50-lb. hold-down weight for suspension insulators	22.00	18.50	15.00
3	weights attaching 100-lb. hold-down weight for suspension insulators	70.00	35.00	30.00
9½	miles of line stringing two ⅜-in., high-strength, galvanized-steel overhead ground wires	$1,010	885.00	800.00
152	dampers attaching vibration damper to overhead ground wire	4.70	7.00	8.00
10	posts placing fence ground post and grounding fences	7.70	6.50	8.00
12	gates constructing barbed-wire gate	40.00	100.00	35.00

Miscellaneous . . .

Timber and steel ferry landing

Washington—Island County—State. Cotton Engineering & Shipbuilding Corp., Port Townsend, received a contract from the Department of Highways on its low bid of $105,719. Work consists of constructing the Columbia Beach Ferry Landing, Whidbey Island. Unit prices were as follows:

(1) Cotton Engineering & Shipbuilding Corp. $105,719
(2) General Construction Co. 114,324
(3) Larsen Construction Co. $118,252
(4) Manson Construction & Engineering Co. 124,768

		(1)	(2)	(3)	(4)
260	M.B.M. treated timber and lumber in place	225.00	240.00	270.00	310.00
14	M.B.M. untreated timber and lumber in place	200.00	190.00	161.00	250.00
4,900	lin. ft. furn. untreated timber piles	.35	.50	.47	.50
82	only driving untreated timber piles	25.00	20.00	14.00	20.00
296	only driving treated timber piles	25.00	20.00	27.00	25.00
211	ton Type I-1 asph. conc. pvt. cl. C wear. crse. in place	17.50	14.00	16.00	18.00
100	cu. yd. embankment in place	2.00	2.00	3.00	5.00
Lump sum,	erecting and painting steel transfer span	$6,000	$6,000	$3,664	$4,000
24,000	lb. structural steel in place	.25	.30	.21	.22
70	cu. yd. concrete, class B, in place	60.00	50.00	25 00	40.00
Lump sum,	machinery in place	.....	.....	.....	.....
Lump sum,	removing existing structure	.....	.....	.....	.....

Removing 19,000-cu. yd. slide from highway

Montana—Granite County—State. L. A. Woodward Construction Co., Missoula, received a contract from the Highway Commission for its bid of $21,660. Construction was awarded on the flip of a coin since Kiely Construction Co., Butte, submitted exactly the same figure. Work consists of slide removal on the Philipsburg-Anaconda Rd. Unit prices were as follows:

(1) L. A. Woodward Construction Co. $21,660
(1A) Kiely Construction Co. 21,660
(2) Naranche & Konda 22,800
(3) Union Construction Co., Inc. 24,700
(4) Charles Shannon Co. $33,250
(5) F. & S. Contracting Co. 40,660
— Bov Gibson & Sons 55,100

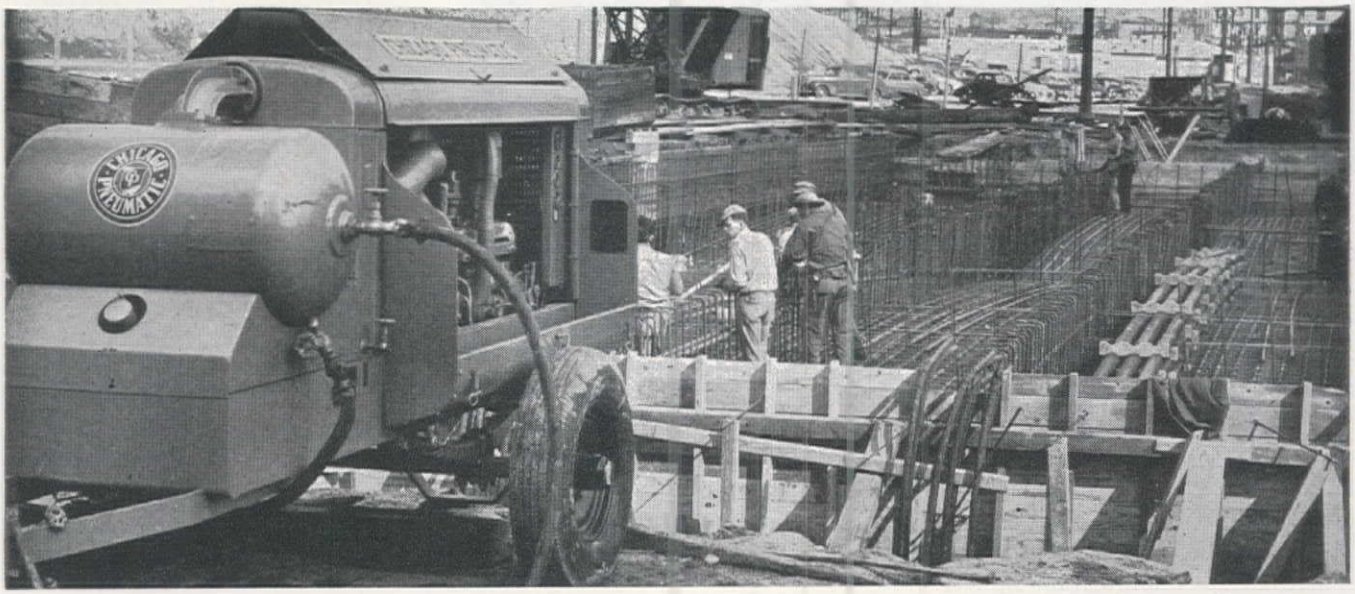
		(1)	(1A)	(2)	(3)	(4)	(5)
19,000	cu. yd. uncl. waste excavation	1.14	1.14	1.20	1.30	1.75	2.14

Drilling for bank stabilization at Grand Coulee

Washington—Columbia Basin Project—Bureau of Reclamation. Forest H. Majors, Salt Lake City, Utah, submitted the low bid of $22,278 to the Bureau of Reclamation for preliminary drilling for stabilization of right bank, Grand Coulee Dam. Unit prices were as follows:

(1) Forest H. Majors $22,278
(2) Lynch Brothers 23,400
(3) R. S. McClintock Co. $27,282
(4) Engineer's estimate 27,282

		(1)	(2)	(3)	(4)
Lump sum,	moving to and from	578.00	$1,100	$1,500	$4,000
1,300	lin. ft. drilling 2⅞-in. holes in stage betw. depths of 0 ft. and 120 ft., no recovery of samples required	8.60	9.00	9.65	3.65
60	lin. ft. drilling 2⅞-in. holes in stage betw. depths of 120 ft. and 180 ft., no recovery of samples required	8.60	10.00	10.00	4.25
20	lin. ft. drilling holes in bedrock, recovery of core required	8.60	10.00	10.00	10.00
80	lin. ft. drilling 3½-in. holes, no recovery of samples required	8.90	9.00	9.65	5.50
120	lin. ft. drilling 3½-in. holes, recovery of samples required	9.10	7.00	10.00	6.85
180	lin. ft. drilling 8-in. holes in stage betw. depths of 0 ft. and 90 ft., no recovery of samples required	12.50	12.00	13.25	11.00
120	lin. ft. drilling 8-in. holes in stage betw. depths of 90 ft. and 180 ft., no recovery of samples required	14.50	13.00	13.25	14.00
1,380	lin. ft. furn. and placing ½-in. slotted pipe and sand packing	2.10	2.00	3.00	1.50
300	lin. ft. furn. and placing 4-in. perf. pipe and gravelly sand packing	3.10	3.70	4.50	6.50
2	units installing hydrostatic pressure indicators	105.00	325.00	500.00	100.00

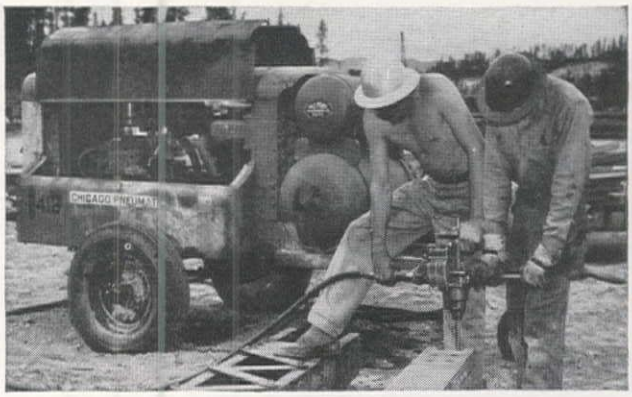


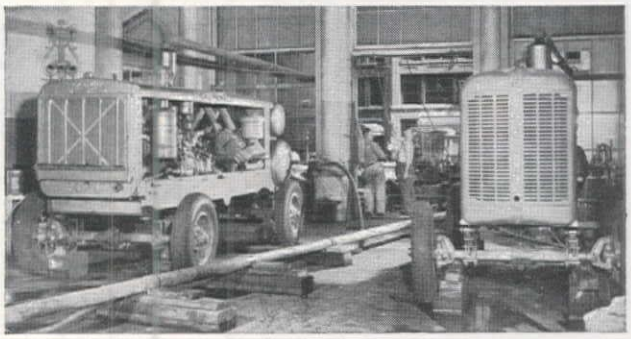
CP PORTABLE COMPRESSORS

stay on the job

Built for dependability, CP PORTABLE AIR COMPRESSORS have a well-earned reputation for staying on the job and cutting costs. They are fuel-thrifty because the gradual speed regulator adapts engine speed to air demands, also minimizing engine wear and reducing maintenance.

Available in gasoline-driven models from 60 cfm to 315 cfm actual capacity, and in Diesel-driven models from 105 cfm to 600 cfm capacity.





All air for the demolition work in the year-long job of razing the famous old Ritz-Carlton Hotel, on Madison Avenue, New York, is being supplied by two CP Diesel-driven compressors —600 cfm and 315 cfm capacity—shown in operation in former dining room of the hotel.

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NEW LITERATURE

101

Welding design and engineering manual

Including 62 new photographs and 132 new drawings in 72 pages, the 4th edition of "Manual of Welding Design and Engineering" is now available free from **Eutectic Welding Alloys Corp.** Here is an up-to-date collection of how-to-do-it articles; scores of application drawings; weld diagrams; tables containing latest information on melting temperatures, tensile strengths, corrosion factors—on and on. This pocket library of welding data gives detailed information on over 100 different Eutectic Low Temperature Welding Alloys for use on cast iron, steel, copper, brass, bronze, aluminum, die cast, etc., and it covers all heating methods.

102

64 pages of welding apparatus in 4-color Victor catalog

This reference book is packed with illustrations, specifications, tables and diagrams portraying the **Victor Equipment Co.'s** line of welding equipment. The table of contents, which covers everything from adapters to torches, makes information on any item easy to locate in this mammoth digest of welding equipment. Every item is keyed by number and size. This complete picture of an equipment line offers good information, many reminders and some valuable short cuts.

103

Ways brick and structural tile can help beat steel shortages

Ways in which brick and structural tile can be used in many buildings to eliminate completely or reduce considerably the need for critical steel products are explained in an 8-page bulletin released by **Structural Clay Products Institute.** The bulletin contains photographs, tables and diagrams which explain that load-bearing brick or tile walls can supplant the use of structural steel in buildings of three stories or less, and reinforced brick masonry walls permit construction of higher buildings with substantial savings in structural steel. Masonry piers replacing steel columns, arches of brick instead of structural or reinforcing steel would considerably lessen the strain on steel supplies. Interesting techniques compose this bulletin and it is well worth looking over.

104

A good gander at the Gradall

So that you can really see the versatility of Gradall, the Gradall Division of **Warner & Swasey** is offering a "Multi-Purpose Job Visualizer." The moving boom running across a chart on the sturdy visualizer card will show you the lifting capacity, depth and reach of operation and height of which the machine is capable. You can really lower the boom and rotate the bucket with this device to any working point on the graph. The other side of the visualizer gives you operation dimensions and specifications.

105

Here's a solution for entraining air in concrete

"Buckeye" Vinsol Resin Solution is a new product which entrains minute air bubbles in concrete. With this entrainment, scaling of concrete roads, caused by de-icing salts, is reduced. The solution contains 12½% vinsol resin and provides greater workability with less

water for a given slump. Shrinkage is therefore reduced. Less spading, rodding and vibration are required since concrete mixed with the solution flows into forms more freely. Bleeding and segregation are reduced. This controlled air makes concrete 400-500% more resistant to weathering, abrasion, frost or sea water action. It becomes water-tight due to greater increase in density. Where interground air entrained cement is used in an average concrete (5 - 5½ sacks per cu. yd.), approximately ½ ounce of the solution per bag of cement will generally produce the entrainment of 3-6% of air. Made by **Davies-Young Soap Co.**

106

Latest forming system bulletin

The **Symons Clamp & Mfg. Co.'s** forming system for concrete wall construction is explained in condensed form in a new 4-page bulletin now available. Material is presented in a short factual manner and erecting and stripping advantages are explained along with the details of just what the system is. In addition to the facts of the system the Symons Form System Service is discussed, including its rental with purchase option, availability of hardware and fittings, as well as other supplies and the complete engineering service that is available.

107

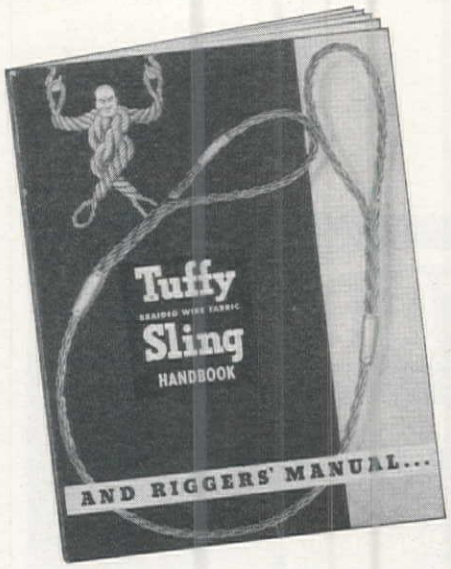
Snow fighting guide

To help in coping with the problem of winter snows on highways and airport runways, **Walter Motor Truck Co.** offers an operating booklet on the firm's Snow Fighter with one-way plow. This bulletin points out that two things are required for proper maintenance against snows: (a) powerful, fast moving displacement snow plows, and (b) a satisfactory plan of attack. Both requirements are discussed in this bulletin and illustrations show the Snow Fighter in action. There is some good advice here.

108

48 pages of know-how in sling handbook and riggers' manual

So much material is contained in this important book just issued by **Union Wire Rope Corp.** that it is impossible to list all the subjects covered. This book



is really a two-in-one offering. Eleven sling types and their dimensions and eleven types of sling fittings are fully described and illustrated. Some 30 illustrations of sling uses accompany the factual data as a help in the selection of proper types. Illustrated step-by-step instruction for splicing the new braided wire sling fabric is included. The comprehensive riggers' manual, which is included in this same book, illustrates and gives instruction on wire rope splicing. The correct methods of making, serving and seizing the regular and the rolled-in-eye splices, making an endless or long splice, splicing preformed, lang lay and the Chicago splicing of eight-stranded rope are contained in the manual. On the back cover of this 48-page book, illustrations show standard hand signals to be used in operating overhead traveling cranes, locomotive cranes and whistle signals for cranes and derricks.

109

Wire tales

A new catalog on Aircomatic equipment and wire has been announced by **Air Reduction Pacific Co.** Described in the catalog are: Aircomatic gun for manual operation, head for automatic operation and wires for use with either manual or automatic equipment. Photographs and sketches of the equipment are supplemented by on-the-job illustrations of a few of the many applications possible.

110

Welding heads and positioners

In two bulletins released by **Mir-O-Col Alloy Co., Inc.,** the firm tells the story of the "55" automatic welding positioner and the "944" automatic welding head. Specifications, diagrams and lists of advantages are contained in the 4-page bulletins.

111

Cylinders save men

"Use a cylinder and save a man" tells about several industrially-proven installations of Ledeen Cylinders in over a dozen fields. **Ledeen Manufacturing Co.**

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offers illustrations and descriptions to show that in some instances manual power is either eliminated or reduced, and in other applications work is done automatically or by remote control, with cylinder applications.

112

Backfill tamper talk

Gunderson Taylor Machinery Co. describes the Triplex Backfill Tamper in a new 4-page bulletin just released. Ways to save at least 75% of your backfilling costs are described in the illustrated bulletin.

113

Illustrated heater bulletin

In a four-page illustrated bulletin, **Cleaver-Brooks Co.** presents the features of Hev-E Gas and Combination Oil and Gas Burners. The forced air draft system and the electronic controls are two of the features described. The back cover of the 4-page, two-color bulletin includes a chart which shows ratings and capacities for all five models.

114

This belting takes a beating

Where there is danger of tearing or puncturing, this heavy duty Ray-Man "F" conveyor belt is recommended. Bulletin No. 6915 tells why this belting is good for jobs where more flexibility, better fastener life and thick narrow belts are required. Bulletin No. 6868, another **Raybestos-Manhattan, Inc.** release, tells important facts about precision balanced and more grip, less slip features which are incorporated into the firm's Condor V-Belts. Interesting installations and a table of standard industrial sizes and list prices are included. Request both under single key number above.

115

Paving the way

Ordering information, complete descriptions and helpful installation hints on paving joints and accessory items appear in a new 8-page catalog from **W. R. Meadows, Inc.**, Sealtight Paving Products.

116

Facts on fireproofing

"Vermiculite Plaster Fireproofing," a publication of **Vermiculite Institute,** is now available in an 18-page revised booklet. All the up-to-the-minute reports on fireproofing tests are given in this booklet along with new drawings of typical fireproofing details. Facts about when and where to fireproof with Vermiculite plaster make worthwhile reading.

117

Penny-saving plywood calculations

The PlyForm calculator offers construction data for plywood forms. Calculations are based on an hourly rate of pour. The price of $1.00 includes a leaflet entitled "Design Assumptions for New Keely Calculator." Available from **Douglas Fir Plywood Association.**

118

Welding cable connections guide

Electric welding cable connection and accessories manufactured by **Tweco Products Co.** are fully described and illustrated in a new 12-page booklet just released by the firm. Ground clamps, electrode holders, cable connectors, terminal connectors, etc., appear in the catalog with full specifications. The last page of the booklet gives complete ordering information.

119

Bridge pile and foundation study

McKiernan-Terry Corp., which supplied twenty single-acting and double-acting pile hammers and extractors for the building of the Chesapeake Bay Bridge, has issued a 6-page illustrated folder describing the methods used for building the foundations and driving the piles. Photographs and diagrams illustrate the "equipment on the job" release.

120

How a welding torch works

"You don't need an egg beater to mix gases" is the interesting title of a 16-page booklet by **Welding Equipment Co.**, which describes how a welding torch works. A step-by-step explanation accompanied by pertinent photographs and tables makes this worthwhile reading for students of welding and those who have been at it a long time.

121

Presenting two pumps

Worthington Pump and Machinery Corp. is offering two new bulletins which describe first the Freeflo Pump for sump, sewage and drainage service and the Vertical Propeller Pump for flood control, drainage, irrigation and similar low head services. Both bulletins contain cross-section drawings, dimensions and other descriptive information.

Literature briefs . . .

122

MEANINGFUL MAINTENANCE—"How to lengthen the life of industrial rubber goods" is the title attached to a well-presented, colorful maintenance guide offered by **Pioneer Rubber Mills.** Here is a very easy way to improve the service you get from rubber products.

123

CONCRETE COMMENT — Concrete testing machines of 100,000-lb. capacity are presented in a 2-page bulletin from **Baldwin-Lima-Hamilton Corp.**

124

SHHHH!-VALVES—Williams-Hager Silent Check Valves, designed to prevent water hammer, are described and illustrated in a 4-page bulletin issued by **The Williams Gauge Co.**

125

WANT WEATHERPROOFING? — Laykold Fibrecoat, a weatherproof mineral-armored asphalt, is the topic of a new 4-page brochure released by **Amer-**

ican Bitumuls & Asphalt Co. Application data and outstanding uses are included.

126

STEAM-CLEANING CLOSE-UP — This 4-page catalog-in-brief describes and pictures the entire Malsbary Steam Cleaner line and tells concisely the difference between the steam vapor and the heavy-duty models. **Malsbary Manufacturing Co.** offers this brochure.

127

CORROSION CONTROL — "Low Cost Corrosion Protection" is a new 6-page folder explaining Permolite pigmented organic corrosion resistant coatings. Illustrations are included in this **Permolite, Inc.**, release.

128

ALL ABOUT ALLOY RODS—In five new bulletins, **Victor Equipment Co.**, Alloy Rod & Metal Division, covers its complete line of hard-facing alloy rods.

129

HOLD THAT PAINT! — Anchorite 100, a paint-anchoring corrosion-resistant phosphate treatment for metals, is described in a new 8-page booklet released by **Octagon Process, Inc.**

130

CRUSHING AND SCREENING — Continuflo crushing and screening plants with exclusive bottom deck feed are discussed in a new **Pioneer Engineering Works** bulletin now available.

131

OTC "CAT' KIT—Hand tools and hydraulically operated pulling tools for servicing Caterpillar Tractors are the subject of a new 16-page booklet just issued by **Owatonna Tool Co.**

132

GATE VALVES—Here is the complete line of Kennedy iron-body gate valves described and illustrated. The bulletin covers AWWA specifications, operating mechanism, method of operation, special features and end connections available—plus full dimensional data for sizes 3-in. to 48-in. **Kennedy Valve Mfg. Co.**

133

A GOOD STEER—**Garrison Manufacturing Co.** is offering information on Garrison Hydraulic Steering for General Motor Trucks, Four Wheel Drive Trucks and Allis-Chalmers AD and BD model Motor Graders.

134

CHECK VALVE COSTS—If you want to know some straight engineering data on this line of Tilting Disc Check Valves which reduce head losses, **Chapman Valve Manufacturing Co.** tells you all about them in Bulletin 30.

135

UNDERGROUND PROBLEMS and how they have been solved by using wrought iron pipe is presented in a free booklet published by **A. M. Byers Co.** Various actual jobs are described and illustrated, and many characteristics of wrought iron are given along with a discussion of corrosion factors.

NEW EQUIPMENT

More information on any of the items in this section may be obtained by using coupon on page 133.

136

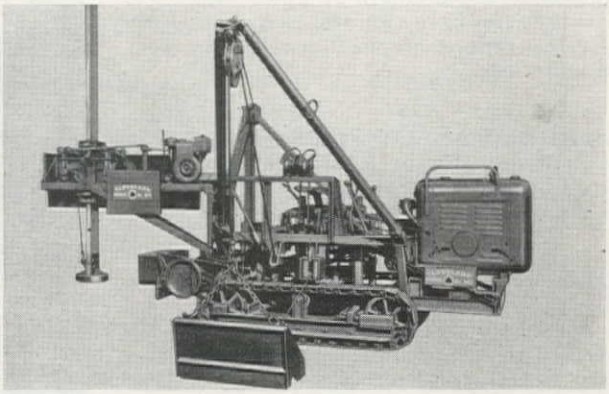
Composition forms developed which are easy to use and re-use

On jobs where a plywood finish concrete surface is required, **Irvington Form & Tank Corp.** suggests its new type composition form. This Atlas Compo Form consists of an all-steel frame faced with plywood. The plywood is fastened with special rivets permitting easy removing and reversal for additional reuses. Only one side form alignment is required through the use of Atlas Flat Bar Ties. Any single panel can be removed at any time during erection without disturbing adjoining forms. This permits the insertion of sleeves, boxes, pipes, etc. Forms are fastened together with quick action wedge clips and waler clamps and do not require any special tools or skill for erecting and stripping.

137

One man and this machine can lay and load pipe, tamp and backfill

In addition to performing operations which would ordinarily require several methods, the Cleveland tamper-backfiller-side-crane is designed to perform these operations better, faster and more cheaply than was previously possible. The crawler on which this machine is mounted has 24 separate speeds, ranging from 1 ft. per min. up to 2⅛ mph. It features three-way simultaneous action—it tamps, as it backfills, as it travels. The tamper delivers a 380 ft.-lb. blow, 45 times each minute. Model 80's backfiller is a conventional drag-line type with a telescopic boom, and it backfills from either side of trench. Without counterweight it will lift a

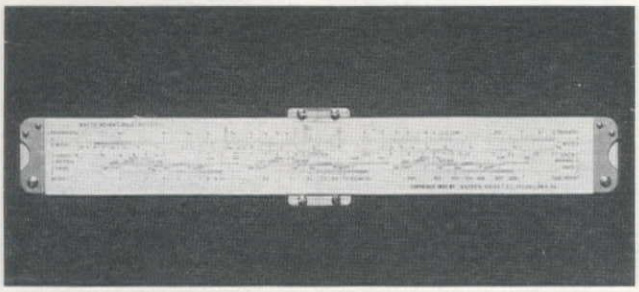


weight of 6,000 lb., located 3 ft. from the edge of the crawler track. Standard boom sections are extendable to 15 ft. Available as a backfiller-side crane only, if desired, with provision made for addition of the tamper unit later. **Cleveland Trencher Co.** is the manufacturer.

138

Build a better slipstick—smaller, lighter, more accurate

This rule includes the basic weight rule scales, but there is a new arrangement of standard slide rule scales on the back. This means the scope of usefulness is increased, since the rule can now be used for weight rule calculations and

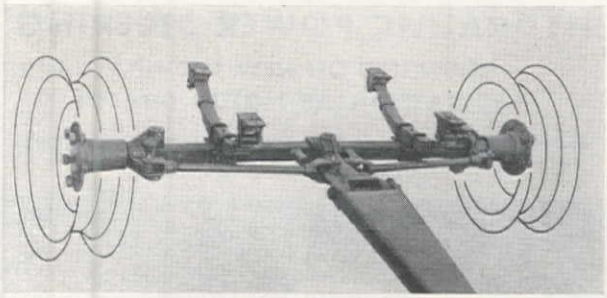


for general slide rule calculations. The new design and construction of the Model 1373-C Wakco Weight Slide Rule makes it different from any other weight rule. It is smaller, lighter and more accurate and can be used to great advantage by estimators who figure sizes and weights of steel, brass, cast-iron, lead, copper, aluminum or magnesium in any field. The rule is available for immediate shipment on a ten-day approval basis. Two instruction manuals are furnished with the rule, priced at $17.50 by **Warren-Knight Co.**

139

Front axle assembly in 4-wheel running gear has up to 45-deg. turning radius

Greater stability is obtained in the re-designed front axle assembly for the Caravan 2-A four-wheel running gear. These automotive type assemblies have capacities ranging from 10,000 to 12,000 lb., and are recommended for application where maximum stability is required such as handling



air compressors, heavy-duty generators, pumps, tar kettles, concrete mixers and other mobile equipment. Inside wheel turning of this new axle is 35 deg. to 45 deg., depending upon model. This wide angle decreases the turning radius for the same wheel base and track, and all turn-stopping stress and strain has been eliminated from knuckles and tie rods by locating durable 1¾-in. round steel stop blocks on center area which has been test proven for proper strength. Manufactured by **United Manufacturing Co.**

140

Marion's new 10-cu. yd. shovel is world's largest on two crawlers

Trucks of the 50-ton class can be loaded by this machine in three or four passes, yet this 10-cu. yd. heavy duty shovel has small-machine cycle time. Powered by electric or diesel electric power with Ward-Leonard controls. The production potential of over 500,000 yd. per month should appeal to the heavy construction industry where large truck haulage units

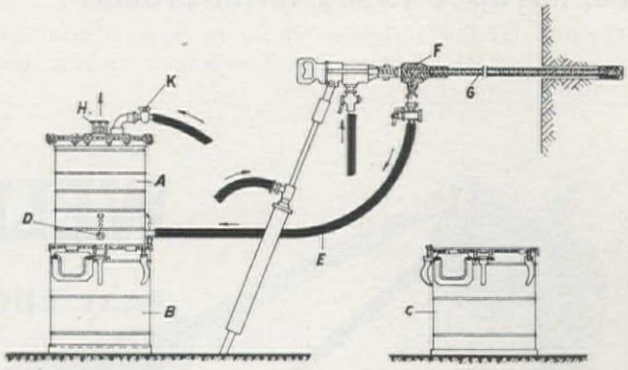
are increasing in number. The **Marion Power Shovel Co.** has equipped the 191-M with Amplidyne or Rototrol high speed electrical controls to permit operating speeds that would otherwise be impractical in large, heavy assemblies.

Two 187½-hp. 600-line motors, with blowers, operate the hoist machinery and, through the use of clutches, drive the propel mechanism. Twin swing motors of 62½ hp. are also equipped with blowers and another 62½-hp. motor mounted on the boom provides power for crowding and crowd retract. Entire working weight of the unit is approximately 710,000 lb.

141

Drilling dust exhauster prevents silicosis; helps percussion rock drilling efficiency

The Konigsborn Exhauster, manufactured by **Hemscheidt Company,** is operated with compressed air from the available air system (see photograph). Compressed air is fed



through valve (K) into the injector (A) which produces a strong vacuum in the apparatus. Air laden with dust and cuttings is thereby drawn from the bore hole, through the bit holes, the hollow drill steel (G), the adapter (F) and the suction hose (E) into filter (A). The incoming air is thoroughly filtered in the latter and evacuated with the spent compressed air through exhaust port (H), while dust and cuttings settle in storage tank (B). The storage tank (B) will hold dust and cuttings from ten 2-in. diameter, 9 ft. deep holes; spare tank (C) is substituted as soon as storage tank (B) is filled. To simplify the disposal of dust, paper bags may be inserted in storage tank (B), in which case spare tank (C) is not required.

142

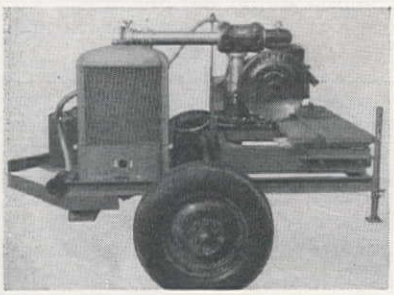
New khaki-clad cargo tractor has civilian construction possibilities

A new member of the army ordnance line of tank vehicles, the M-8E2 cargo tractor, is in production by **Allis-Chalmers Mfg. Co.** Speed and high maneuverability are prime features of this model, which has basically the same chassis as the Walker Bulldog light tank. Versatility of the tractor is increased with the use of interchangeable body kits which convert the cargo tractor into a general purpose hauling unit, wrecker, bulldozer, etc. A Continental air-cooled engine and

the Allison cross drive transmission power the M-8E2. Top speed is 40 mph. The unit crosses swamps and small trenches, can climb or descend 60% slopes and travels speedily on highways and cross country roads. Driver and assistant driver are housed in two front seats.

143

Self-contained saw unit for portable operations



Now available is a new portable power saw unit which is complete with motor, generator, and power outlets for other power tools, electric lighting and battery charging. Builders who have one of these machines can move in on a job without dependence upon an outside power supply. The generator is an Onan 5-kw. 120-208-v., operating a 3-hp. motor, which gives plenty of power for any normal use. More information from **Ets-Hokin & Galvan** by putting key number on the coupon.

144

New lubricant can be applied to wet wire rope

Crater A is a new lubricant now being marketed by **The Texas Company** for application upon wire rope. Because this new lubricant can be applied to wet wire rope it is of significance to construction field applications. The firm has field tested this new Crater A, which has a greater wettability than the previous product which bore the same name.

160

Insulated metallic bushings for electrical conduits

Metallic base insulated conduit bushings provide protection against abrasion of cable insulation and accidental grounds. "Bushends" require no inside locknuts as is the case with bushings which are constructed wholly of insulating material. While extremely light in weight, they are rugged and have metal bases fabricated from tough, corrosion resistant wrought alloy of high mechanical strength. Threads are free, clean-cut and non-seizing. **Buchanan Electrical Products Corp.** is the manufacturer.

145

A 6-way drafting instrument you can carry in your pocket

Paraline is a T-square, straightedge, triangle, protractor, 32nd in. scale and parallel rule in one pocket-sized instrument. It measures 10¼ x 3-3/16 in., and requires no attachments or board clamps. The Paraline is said to be particularly suited for angular line layouts and cross hatching. It sells for $2.95. **Loomis Industries** is the manufacturer.

146

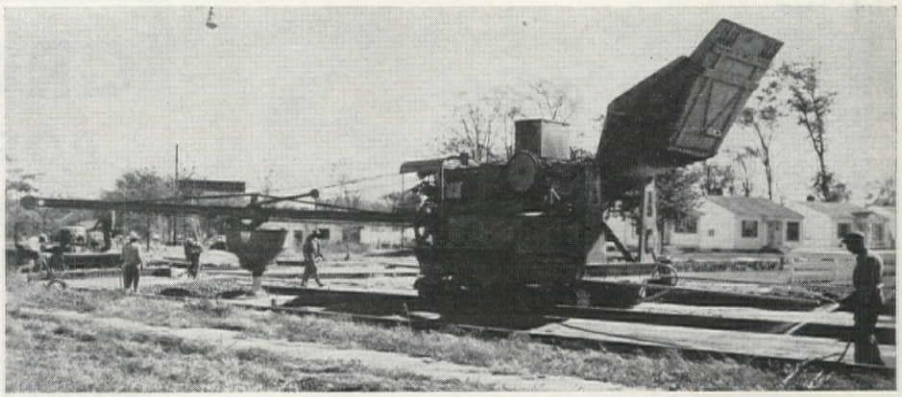
Economical steel bits can be thrown away

Mackintosh-Hemphill Co. is now marketing a line of forged steel disposable bits. The DBT Throwaway bit is a one-pass bit, made so inexpensively that it can be thrown away when worn out. Bits are made in a size range from 1¼ to 2⅜-in.

147

¾-cu. yd. excavator ready after strenuous field testing

The Model 320 ¾-cu. yd. excavator and materials handler fresh from field testing, is now available from **General Excavator Co.** The crawler base, machinery side frames and the deck, are made of castings and rolled structural steel shapes, used separately or in combination to obtain the maximum advantage of each type of material and construction. Machinery mounted on the superstructure is placed well back on the deck, giving an unusual stability and increased lifting capacity, with a minimum amount of dead counterweight necessary. Ground bearing pressures are low. Model 320 is convertible to shovel, clamshell, crane, pile driver, dragline and hoe work in the field with minimum effort. Standard crane boom length is 35 ft. The standard shovel boom length is 18 ft., 8 in., with a dipper handle of 15 ft., 3 in. effective length.



148

High speed paver boom bucket travels 256 ft. per minute

Streamlined to meet modern paving practices and offering boom bucket travel rate of 256 ft. per minute, the new Worthington-Ransome 34E Dual Drum Paver is now available for construction uses. Key figure in connection with this new paver is 6½ seconds. That is all the time it takes for (a) the power loader skip to travel from the ground to discharge position of 56 deg. low slope (b) transfer from the first to the second mixing compartment—depending upon consistency of the concrete, and (c) discharge into the boom bucket. Boom swing is a full 171 deg. Model WP retains the exclusive hydraulic bucket permitting complete control of rate of concrete discharge under all conditions, and increased braking area is provided. **Worthington Pump and Machinery Co.** manufactures this paver, which features the high speed boom bucket.

149

Pin down nailing costs by renting a Nu-Matic nailer

The Nu-Matic nailer was first used on large construction projects in Southern California and is now available on a rental basis throughout the United States. Nailing costs are said to be cut by ⅓ when the Nu-Matic nailer is put into operation. The device runs on compressed air and is guided by the operator with a foot stirrup. The handle is moved up and down to set nails in place for the hammer, which works by hand trigger. Nails are pounded a thousand times per minute and the machine will nail a mini-

mum of 5,000 sq. ft. per day (1 x 6 on 16-in. centers) and 100 nails per minute. Using 6d common to 20d common nails, it is practical up to a 4-12 pitch and weighs 30 lb. The device is adjustable for right or left handed, tall or short operators. The hopper holds 500 nails which are fed automatically. Nails are countersunk to prevent damage to roof coverings. In the case of nailing subfloors, the laying of hardwood flooring is not hindered by the usual protruding nail heads. **National Nu-Matic Nailer, Inc.**, rents the equipment, furnishing the nailer, air compressor, hose, maintenance, repairs, etc. The contractor hires a competent operator recommended by the company.

150

Submersible pump gives small capacities at high heads

From wells of 6-in. inside diameter or larger, the BJ Subette pump is designed for small capacities at high heads. Its capacity ranges from 30 to 130 gpm. at heads from 80 to 770 ft. Motors, available in sizes of 5, 7½, 10 and 15 hp., are 3-phase, 60-cycle, 2-pole, 220/440-volt and have a speed of 3,500 rpm. All motors are oil-filled, mechanically-sealed, and capable of operating completely submerged in water. **Byron Jackson Co.** is the manufacturer.

151

A tire built to take hard rock operations

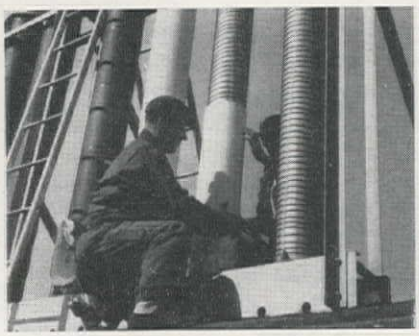
Designed particularly for graders operating where there is considerable

rock or under especially tough conditions, this specialized tire is made for semi-drop center rims. It fits rim size 800 T, has a cross section 13.2 in. wide with an outside diameter of 50.8 in. Maximum rated load of 6,600 lb. when inflated to 50-lb. pressure. It makes 426 revolutions per mile at 25 mi. per hour. This should be of great help in quarrying operations of tractors, graders and motor patrols. **B. F. Goodrich Co.** is the manufacturer.

152

Hot off the wire— a flexible new heating cable

Thermwire, a heavy-gauge nickel-chromium resistor with tough abrasion-resistant insulating sheath, protects



roofs, gutters and downspouts, etc., from dangerous and costly accumulation of snow and ice. It melts ice from office doorways, steps, sidewalks, driveways, or other pavements where severe and costly accidents occur. Available in two packaged sets: one set is 80 ft. long, 400 watts, 115 volts; the other is 160 ft. long, 800 watts, 230 volts. Each set has a 10-ft. cold lead section and plug. Thermostatic control is an optional feature. Manufactured by **Edwin L. Wiegand Co.**

153

Walk-through scaffold end frame for plaster, stucco trades

Light in weight, and especially suited to operations where workmen must walk freely under the scaffold area, this new scaffolding is all-steel and all-welded. The tubular end frames have a standard height of 6½ ft., and are available in two widths, 3 ft., and 5 ft. Built-in floating coupling pins and Waco "Speedlocks" are standard equipment in each frame for safety and erection ease. The scaffolding end frame is manufactured by **Wilson-Albrecht Co., Inc.**

154

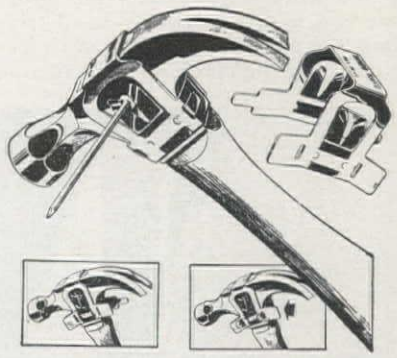
Back-rippers on bulldozer rip when tractor backs up

Preco back-rippers mount on back of bulldozer moldboards and rip only when tractor backs up. Four back-ripper housings are welded to the under side of the "C" frame on angling blade bulldozers, permitting their use irrespective of the angle of the blade itself. Teeth float on top of the ground when the tractor moves forward, and dig and rip when the machine is in reverse. Teeth can be locked up out of the way when desired. **Preco Incorporated** manufactures the product.

155

New nail clip provides a third hand in operation

Extra reach is provided with the use of this Third Hand hammer-nail clip for either right or left handed use. Clip is made of spring steel. Saves time in hours

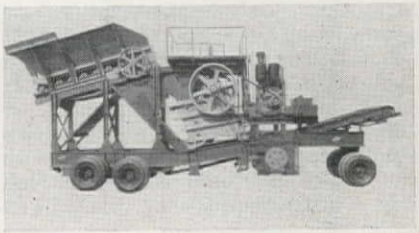


and effort. Extra reach means nailing jobs can sometimes be accomplished without scaffolding, and the Third Hand means you can hold the rafter and start the nail simultaneously on roofing jobs. Retail price 50 cents. A product of **Amsco Co.**

156

Three sizes available in portable primary crushers

Receiving hopper of these new Telsmith Portable Primary crushers consists of heavy steel with special duty apron type feeder. A heavy duty roller



bearing all-steel jaw crusher with cast steel frame and swinging jaw, steel operator's platform with controls, delivery conveyor and power unit with V-belt drive is mounted on a sturdy steel chassis. Front axle with towing pole or king pin for tractor truck hauling can be furnished. This plant can be furnished with or without grizzly between feeder and crusher and is suitable for operation in either quarries or gravel pits. This new type plant by **Smith Engineering Works** is offered in three sizes (the 25 x 36 size is illustrated).

157

New cutting head for helix type earth drill

For use on any continuous helix type earth drill or post hole auger, this new cutting head welds directly to the bottom of any continuous helix auger. It makes it possible to bore holes under adverse conditions with machines using the continuous helix auger, where for-

merly only the heavier type machines were capable of boring. The Pengo cutting head uses standard parts and is available in sizes ranging from ten inches to twenty-four inches in diameter. **Petersen Engineering Co.** is the manufacturer.

158

Single passenger truck gives short wheelbase, large payload

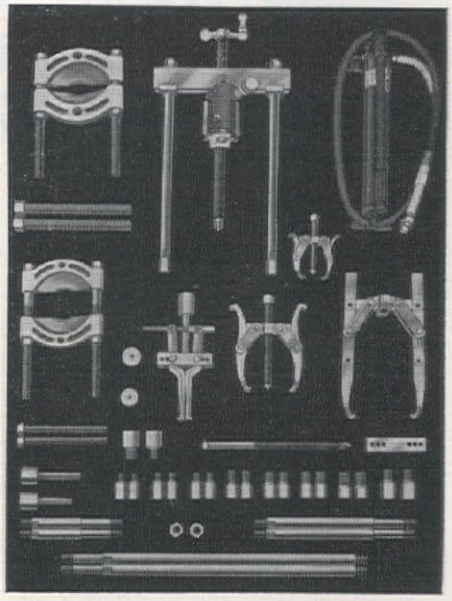
Work limitations were kept in mind by **Cook Bros. Equipment Co.** when it designed this new single passenger M310 truck. Legal payload capacity of this

model is 15 tons and it has a lightweight, high-tensile steel dump body. The wheelbase is 174 in. and comes equipped with Cook Bros. Dual Hydraulic Hoist and Dual Gear Drive. Other models will be available with a single driving axle or single driving axle with third axle attachment.

159

OTC announces new "Cat" kits for Caterpillar tractor service

Designed especially for use with the new **Owatonna Tool Co.** Power-Twin hydraulic puller, a 17½-ton hydraulic



ram, this new set of Caterpillar tractor service tools is now available. Pullers, adaptors and attachments which are deemed essential to proper service on Caterpillar tractors are found in the set. Proper maintenance practices require the use of the proper tools.

NEWS of DISTRIBUTORS AND FACTORY BRANCHES

New Murphy Diesel distributor in L. A.

North Jones, Western district representative for Murphy Diesel Engineering Co., announces the appointment of Industrial Engine Service, 5315 Valley Blvd., Los Angeles, Calif., as an exclusive sales, parts and service dealer on its equipment. Los Angeles, San Bernardino and Riverside counties is the territory covered. Ed Anglemyer, George Rice and Lee Stewart are the principals at Industrial Engine.

Barber-Greene sales staff changes

Organizational changes in the sales staff of Barber-Greene include the announcement that W. B. Holder, formerly general sales manager, will head a new division of the company. Plans are now under way concerning this new division and further details will be announced. E. H. Holt will replace Holder as general sales manager. He will be responsible for over-all sales policy and will direct the Aurora and domestic sales organizations. The third appointment goes to J. D. Turner, who will take over as director of publicity and promotion. In addition to supervising advertising and publicity, Turner will work with Holt on formulation of over-all sales policy and sales promotion.

P. & H. asst. mgr. Pacific Division

E. W. Potratz will become the assistant general manager for the new Pacific Division of Harnischfeger Corp. Potratz will headquarter at 2400 E. Imperial Highway, Los Angeles, Calif. He will be concerned with all operational activities including sales, service, engineering and manufacturing at the new plant.

Columbia Tractor gets "Cat" dealership

Columbia Tractor Co., with headquarters at Wenatchee, Wash., and branches at Waterville and Coulee City, Wash., now has a Caterpillar dealership. Paul Isaacson, Ted Isaacson and Ed Murray, formerly with Young Iron Works, Seattle, are the three principals of the Columbia Tractor Co. The full line of Caterpillar, John Deere and allied manufacturer equipment will be handled by the firm, and Okanogan, Chelan, Douglas and Grant counties in Washington will be served.

Huge attendance seen for annual AED meet

Approximately 1,800 people are expected to attend the 33rd Annual Meeting of Associated Equipment Distributors this month, at the Conrad Hilton Hotel in Chicago, January 27-31. Representatives from 223 manufacturer and 426 distributor members of the association are expected. Speeches by prominent members of industry and government, and sales clinics will highlight the meet. S. F. Laskey, Northwestern Equipment Co., Fargo, N. Dak., is chairman of the 1952 convention committee. W. W. Kershaw, Wheeler-Kershaw Co., Salt Lake City, Utah, is also a member of the committee.

Asst. parts mgrs. for Caterpillar

H. R. Lampe is the newly appointed assistant Western division parts manager of Caterpillar Tractor Co., with

Lampe

Trantina

headquarters in San Leandro, Calif. Lampe joined Caterpillar in 1942. He was assistant parts manager in the Central division at the time of his new appointment. Elwood F. Trantina is now assistant Western division parts manager with headquarters in Spokane, Wash. He will cover the Caterpillar dealers in Washington, Oregon, Idaho, Montana, British Columbia and Alaska.

Vitale represents Wisconsin

Continentaal Sales & Service Co. of Los Angeles, Calif., announces the appointment of Vitale Concrete & Equipment Co. of Monrovia as its new authorized Wisconsin sales and service station. Vitale is located at 926 So. Primrose Ave. in Monrovia. A large supply of genuine factory parts will be kept at the modern headquarters.

"Cat" distributors in Utah, Idaho

Peterson Tractor Service, Inc., Logan, Utah, has a new Caterpillar Tractor Co. distributorship. The firm has branch stores at Tremonton, Utah, and Preston, Idaho. H. Merrill Peterson and Dale O. Hutt are the key men at Peterson Tractor Service, Inc. The firm will serve Box Elder, Cache, and Rich counties in

Utah; Oneida, Franklin and Bear Lake counties in Idaho, and a part of Lincoln County, Wyo. Parkinson Tractor Co., Idaho Falls, Idaho, will be the Caterpillar distributor in that area. Joseph Parkinson is head of the firm which has branches in American Falls and Rexburg. The full line of Caterpillar, John Deere and allied manufacturer products will be handled for distribution in Clark, Fremont, Butte, Jefferson, Madison, Teton, Bingham, Bonneville, Power, Bannock and Caribou counties, Idaho, and Teton County and part of Lincoln County, Wyo.

New B-L-H Corp. office in West

Baldwin-Lima-Hamilton Corp., Eddystone, Pa., announces the opening of a new West Coast office at the Pacific Electric Bldg., 610 S. Main St., Los Angeles, Calif. H. A. Nielsen will direct activities at the new branch, which was opened to better serve the Western Area.

Philpott opens Sacramento, Calif. branch

The George M. Philpott Co. opens offices at 1725 Thirty-third St., Sacramento, Calif. This branch will carry the same lines as those carried by the main offices in San Francisco.

Neihaus joins Gardner-Denver Seattle branch

Don Neihaus transfers from the Quincy offices of the Gardner-Denver Co. to the Seattle, Wash., branch. He will serve as office manager.

Spaulding heads Black & Decker sales

J. F. Spaulding, former manager of the Buffalo, N. Y., branch of Black & Decker Mfg. Co., is now sales manager for the firm.

Bucyrus moves to larger S. F. office

New Western headquarters for Bucyrus-Erie is located at 120 Freeway St., So. San Francisco, Calif. A larger stock of replacement parts for the company's excavators, drills and tractor equipment is provided at the larger location. Sales and service personnel covering the excavator division are: J. H. Sackett, western sales manager; H. L. Livingston, sales representative; H. E. Lowe, sales representative and A. O. Belding, service engineer. Sales and service personnel covering the tractor equipment division are: H. R. Langford, district representative; John Plehn, John Carlile and W. O. Blattner, sales representatives and Ralph Bickers, L. L. Brown and R. E. Jephson, service engineers.

Colson sales eng. for Ariz. Equip.

Ed Colson, formerly with State Tractor Co., is now sales engineer for the Arizona Equipment Sales, Inc., Phoenix. Joe Angle is president of the firm.

Waugh heads Columbia Steel sales staff

D. R. Waugh is the new general sales staff manager of Columbia Steel Co. He succeeds Charles L. Hamman, who joins the Stanford Research Institute at Palo Alto, Calif. Waugh joined the firm's

Howard **(left) and** ***Kenneth Strother,*** **who received simultaneous promotions in the Wholesale Division of The White Motor Co., Pacific Coast Region. Howard becomes sales manager, Pacific Coast Wholesale Division and Kenneth replaces Howard as wholesale manager in So. Calif., Ariz., Utah.**

sales department in 1949 and worked on special assignments until March 1951 when he became product manager.

Hargrove leaves Ariz. Mach. Co.

P. R. HARGROVE resigns his post as northern Arizona manager for *Arizona Machinery Co.*, to become part owner of *Bonner Trucking Co.*, Flagstaff, which will now be called *Hargrove and Jensen.* ED MAYS, former district engineer for the state highway department in northern Arizona and later salesman for Arizona Machinery Co. in Flagstaff, is the new manager, replacing Hargrove.

Termite occupies new offices

Termite Drills, Inc., Pasadena, Calif., has moved to new and larger quarters at 99 N. Lotus Ave., Pasadena. The move will expand production, provide increased office space and shipping facilities. This is part of the expansion program originated by the firm, which includes the appointment of *Clark & Sawyer, Inc.*, Los Angeles, Calif., as sales representatives for all states west of the Mississippi River.

Doyle promoted by Pabco

JAMES J. DOYLE is promoted to assistant district manager, Central District, *Pabco Products Inc.* He was formerly Denver area sales representative of Pabco's Building Materials Division.

LeTourneau district representative

John H. Way is a new Western District sales representative for R. G. LeTourneau, Inc., in Colorado, Wyoming, Montana and Idaho. Way was a member of the sales staff of Contractors Equipment and Supply Co., LeTourneau distributor at Albuquerque.

NEWS of MANUFACTURERS

Sales consultant for Worthington

CHARLES E. WILSON, sales vice president of *Worthington Pump and Machinery Corp.*, Harrison, N. J., is appointed West Coast consultant on sales problems. Wilson retires from his present duties, but will continue in a consulting capacity on sales problems at Worthington's offices in Los Angeles, San Francisco, Calif.; Seattle, Wash., and Salt Lake City, Utah.

Economy Pump, Wheeler Mfg. Co. merge

The Economy Pump Division of Hamilton-Thomas Corp., Hamilton, Ohio, is being consolidated with the C. H. Wheeler Manufacturing Co., Philadelphia, Pa.—another division of the corporation. Production, engineering and sales departments of Economy are being moved to the Philadelphia plant. Economy pumps will now be known as Wheeler-Economy Pumps. Expansion and modernization of the Philadelphia plant are in the offing.

Deshon asst. to V. P. at Republic Supply

Robert E. Deshon, formerly sales order manager for Republic Supply Co. of California, is now assistant to Vice President W. Dale Russell, general sales manager. This is an entirely new position created as a part of a continuing program for development of the firm's sales organization. Deshon will coordi-

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.

nate the sales activities of the various departmental and regional sales managements.

Thermoid Co. and Essex merge

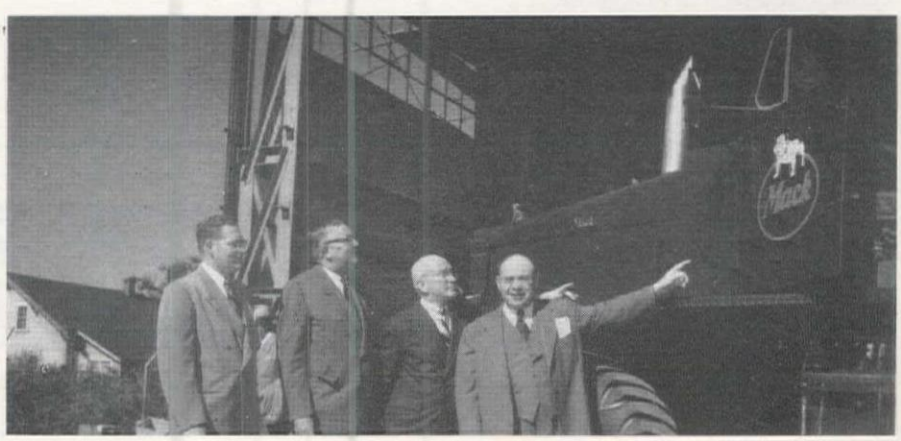
Thermoid Co., Trenton, N. J., announces it has acquired stock control of the *Essex Rubber Co.*, also of Trenton. Thermoid manufactures automotive and industrial rubber, asbestos and textile products. Essex has manufactured rubber soles and heels for shoes and other molded products. No change is anticipated in Essex operating personnel, and Thermoid products will be manufactured at the Essex plant as facilities warrant.

New Electrical Motors, Inc. plant

At a cost of $3,500,000, U. S. Electrical Motors, Inc., will erect a manufacturing plant in Orange County, Calif. The new plant will be on an 85-ac. site between Anaheim and Buena Park. Construction will include a 50,000-sq. ft. administration building and 250,000 sq. ft. of covered manufacturing area. Approximately 1,500 workers will be employed by the company when the new plant is completed.

WOOLDRIDGE SENDS FIRST MACK INTO OPERATION

In ceremonies recently at the Sunnyvale, Calif., plant of the Wooldridge Manufacturing Co. the first Mack off-highway unit moved from the assembly line. The large off-highway trucks will be assembled on a joint venture between Wooldridge and Mack Trucks, Inc. Shown receiving the first unit are, left to right: *J. D. Gusman*, division manager, Wooldridge; *Howard I. Young*, president, American Zinc, Lead and Smelting Co.; *E. D. Bransome*, president and chairman of the board, Mack Trucks, Inc.; and *H. Gusman*, president of Wooldridge Manufacturing Co.



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