WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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MAY • 1943

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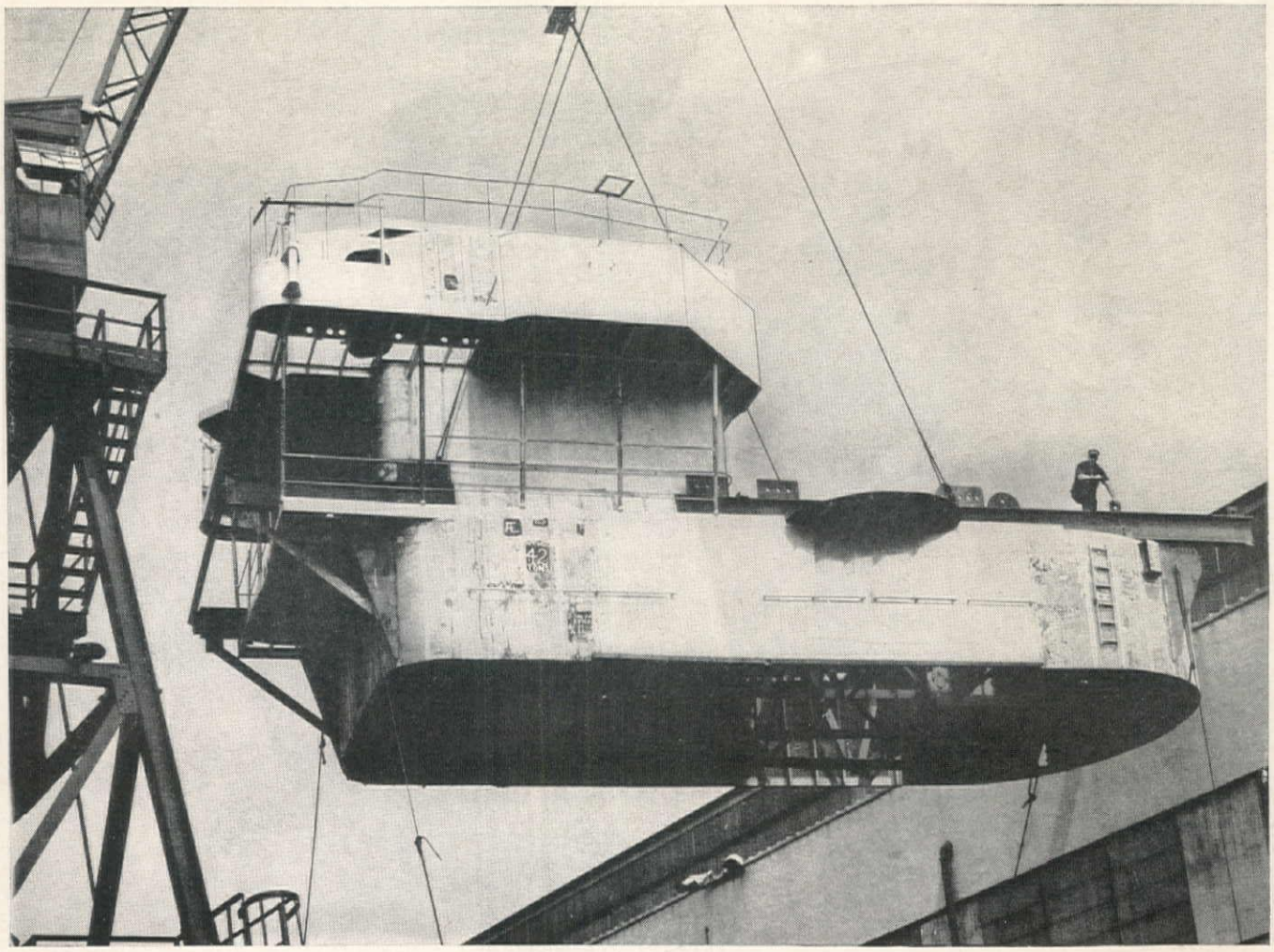
IN THIS ISSUE

PLACING the welded framework of reinforcing steel for the bulkhead wall of one of the holds in a concrete ship being built in Belair Yards, San Francisco, California



PROTECT YOUR CABLES for Vital War Work

SETTING in place this 40-ton destroyer deckhouse and other huge prefabricated ship sections represents one of the important wartime uses of wire rope.

To keep cranes, shovels, hoists, draglines, derricks in service . . . doing vital war work . . . operators everywhere are protecting their wire rope by lubricating it with *Texaco Crater.*

Texaco Crater penetrates to the very core of wire rope, sealing each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, prevents corrosion, makes ropes last longer.

So effective have Texaco Lubricants proved in increasing output that they are definitely preferred in many important fields, a few of which are listed in the panel.

A Texaco Lubrication Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

☆ ☆ ☆

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

THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

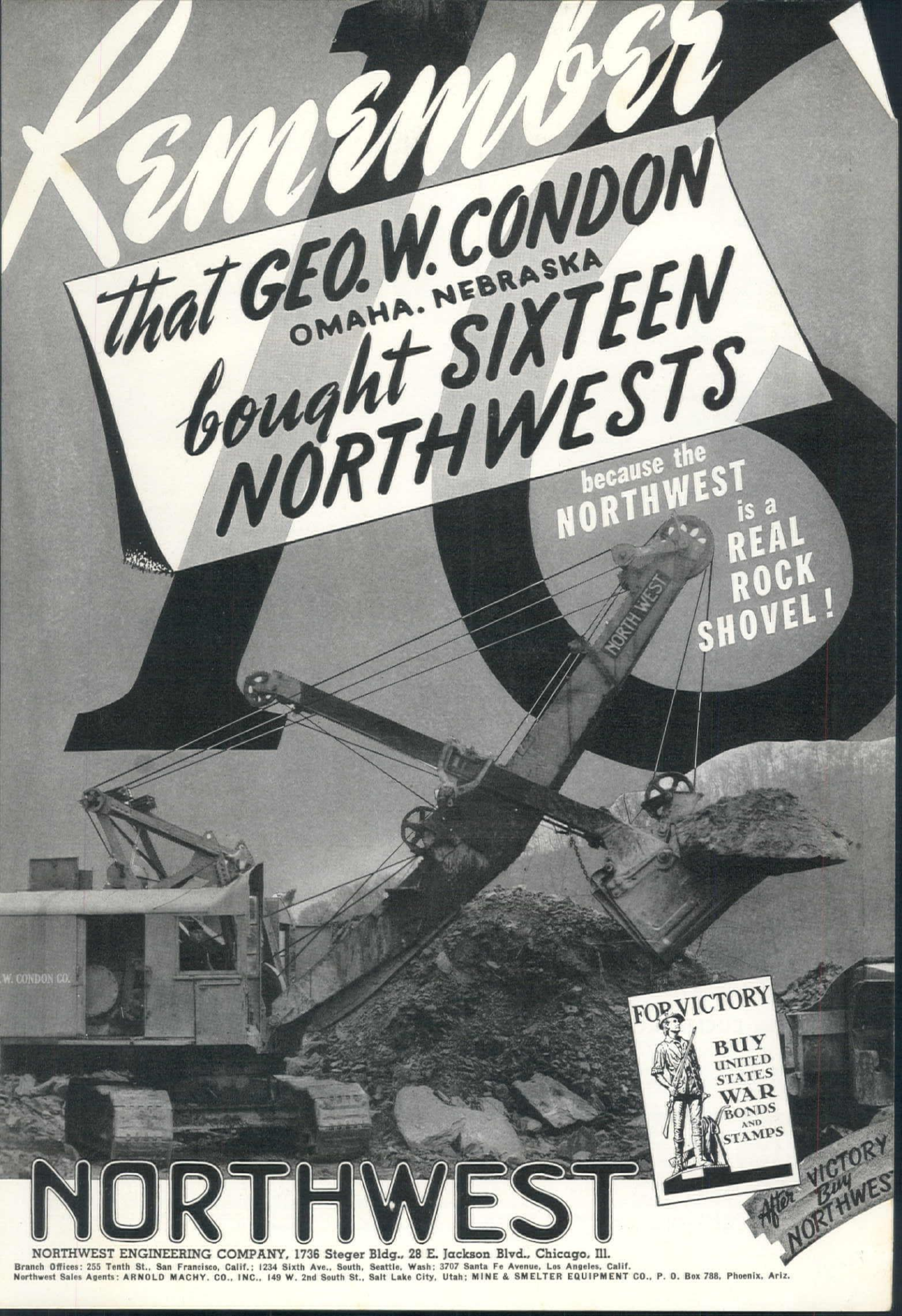
TEXACO

REG. T.M.

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY



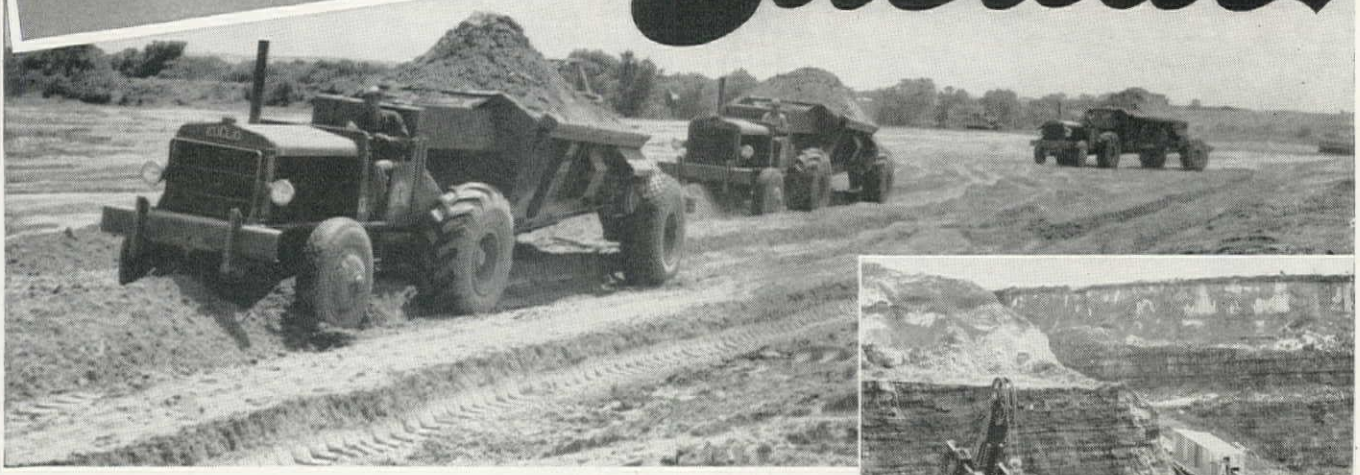
NORTHWEST

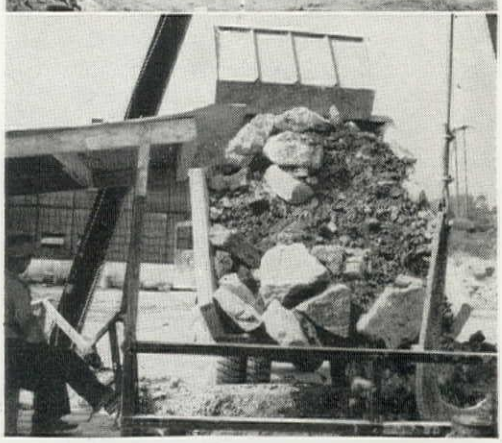
NORTHWEST ENGINEERING COMPANY, 1736 Steger Bldg., 28 E. Jackson Blvd., Chicago, Ill.

Branch Offices: 255 Tenth St., San Francisco, Calif.; 1234 Sixth Ave., South, Seattle, Wash; 3707 Santa Fe Avenue, Los Angeles, Calif.

Northwest Sales Agents: ARNOLD MACHY. CO., INC., 149 W. 2nd South St., Salt Lake City, Utah; MINE & SMELTER EQUIPMENT CO., P. O. Box 788, Phoenix, Ariz.

STEPPING UP PRODUCTION WITH *Euclids*





● Increasing production, or even maintaining present levels, is a tough problem these days when men and equipment are not readily available. Bottom-Dump and Rear-Dump Euclids are helping to solve production problems for many industrial and contractor owners because of their dependable performance on around the clock schedules.

The demands for Euclid equipment by the Army, Navy and other essential users may prevent you from obtaining the advantages of Euclid speed and capacity now, but we would like to plan with you for the time when priorities no longer restrict the sale and use of Euclids.

The EUCLID ROAD MACHINERY Co.
CLEVELAND, OHIO

THE EUCLID ROAD MACHINERY CO.

3710 SAN PABLO AVENUE — PIEDMONT 8046 — EMERYVILLE, CALIFORNIA

CONTRACTORS' EQUIPMENT & SUPPLY CO., Albuquerque; INTERMOUNTAIN EQUIPMENT COMPANY, Boise; HALL-PERRY MACHINERY COMPANY, Butte; F. W. McCOY COMPANY, Denver; LOGGERS AND CONTRACTORS' MACHINERY CO., Portland; A. H. COX & CO., Seattle

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

The National Magazine of the Construction West

Contents for May, 1943

J. M. SERVER, JR.
Editor

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RAILROADING CROSSES A NEW FRONTIER

Today on the Great Northern, GM Diesel Locomotives *like this are hauling heavy war loads through "The Great West." On one mountain operation, consisting chiefly of movement of metal vital to victory, the utilization of GM freight locomotives resulted in an increase of 50% in train-hauling capacity.*

Here Currier and Ives, the famous portrayers of American life of the past century, depict one of the great eras of railroading—the achievement of rail transportation from East to West—the opening up of new lands and unexploited resources.

WARS have a way of ending old eras and starting new ones. Following the Peace of 1865, the nation was first united from coast to coast by bands of steel (May 10, 1869). Geographically, America has no new frontiers. Technically we have many. The curtain already has been drawn back on one element of the new era that surely will follow the present conflict —a new tool for the improvement of national transportation—General Motors locomotives.

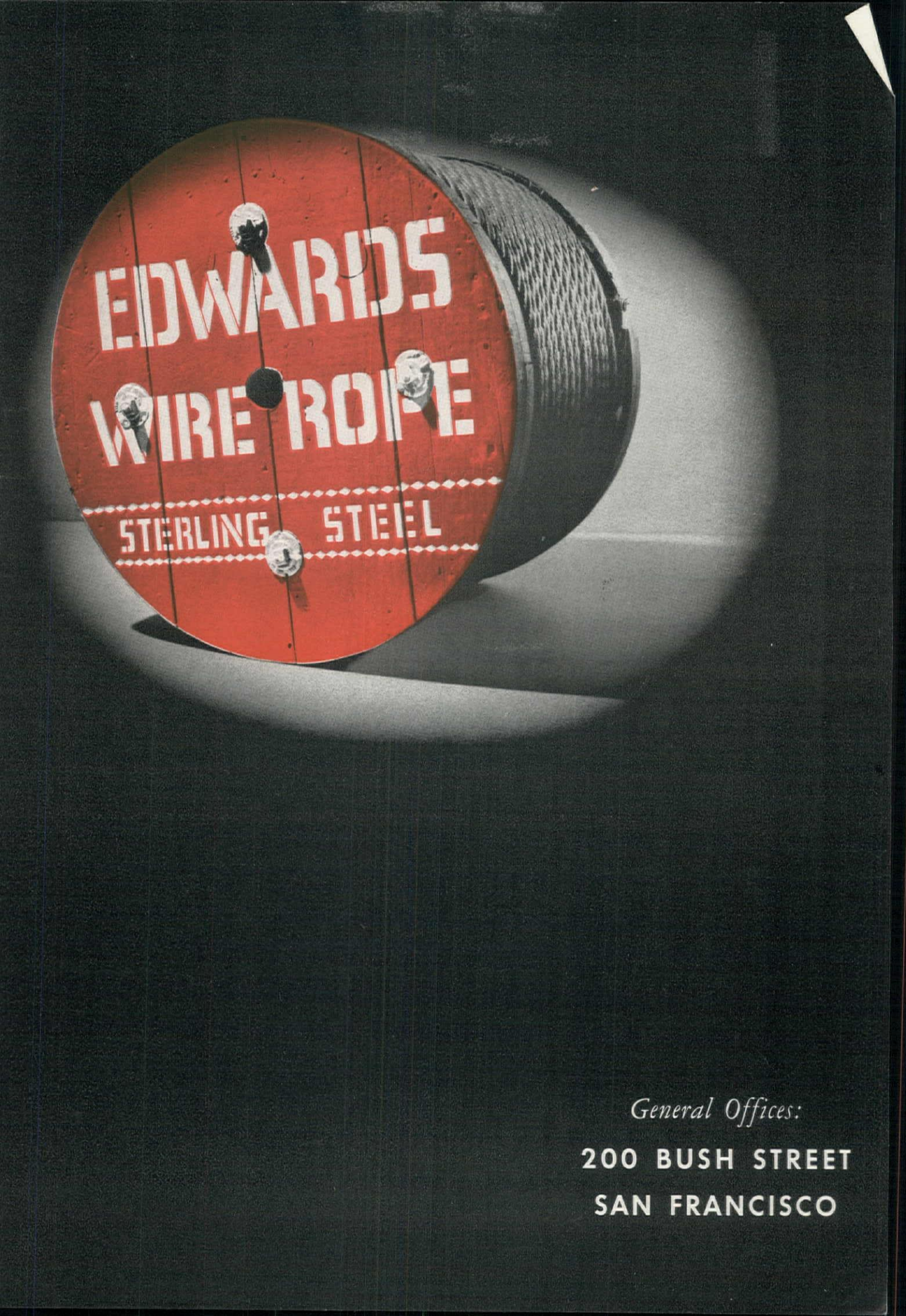
Reconstruction and new construction are going to need plenty of this hard-hitting, easy-on-the-fuel power. With normal refinement and development speeded up by war, with production expanded, GM Diesels will be ready to serve in more fields and in more ways than ever.

GM
GENERAL MOTORS
DIESEL POWER

LOCOMOTIVES.....ELECTRO-MOTIVE DIVISION, La Grange, Ill.

ENGINES..150 to 2000 H.P...CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

ENGINES.....15 to 250 H.P.....DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.

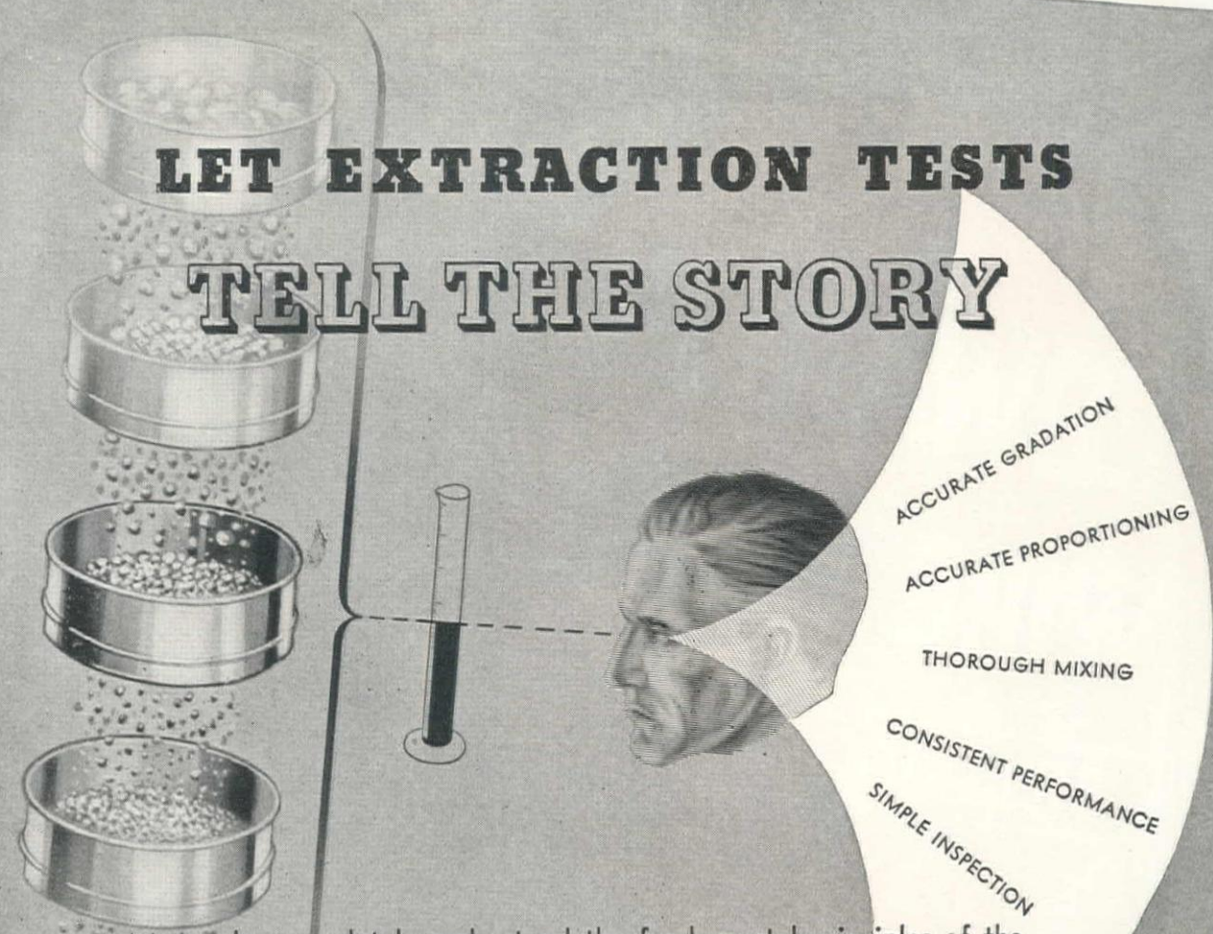


General Offices:

200 BUSH STREET

SAN FRANCISCO

LET EXTRACTION TESTS TELL THE STORY



Many who completely understand the fundamental principles of the Barber-Greene Mixer logically wonder if it is possible for the results to be as good as the theory. They know that the aggregate feeder is calibrated by weight, on the job; that each size of aggregate is continuously, but separately fed into the pugmill. They know that the bitumen metering pump and the aggregate feeder are mechanically interlocked to deliver a constant ratio, and that the materials are fed in a small continuous stream, giving a practically uniform distribution at the start of the mixing. But with such revolutionary advantages they want to see the final proof. Job after job has produced this proof. Laboratory analyses of samples from the discharge of the pugmill, and core samples from the finished course prove the highest accuracy of proportioning, the finest homogeneity.

You owe yourself a complete understanding of the principles and *results* of what is truly TOMORROW'S MIXER TODAY. Write for literature, there is no obligation. Barber-Greene Company, Aurora, Illinois.

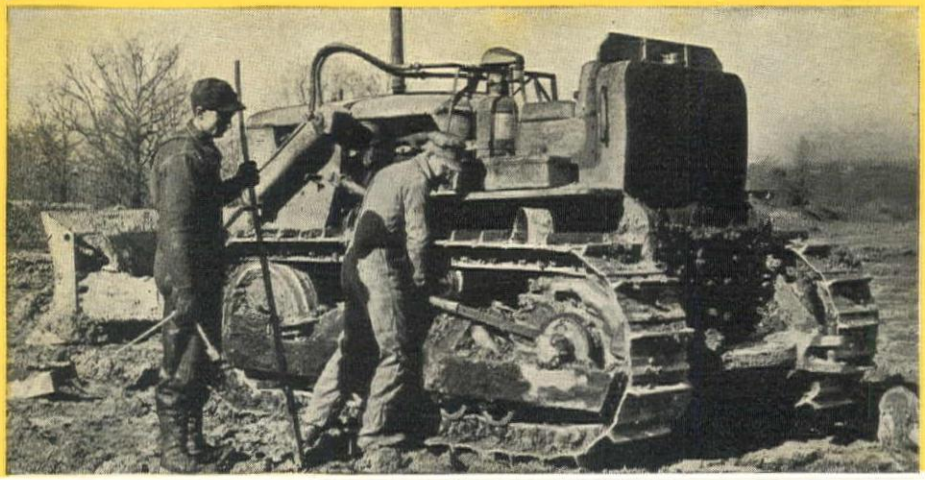
41-15

BARBER GREENE

Brown-Bevis Equip. Co., Los Angeles, Phoenix; Columbia Equip. Co., Portland, Spokane, Seattle, Boise; Contractors Equip. & Supply Co., Albuquerque; Jennison Machinery Co., San Francisco; Lund Machinery Co., Salt Lake City; Western Construction Equip. Co., Billings; Ray Corson Machinery Co., Denver.

LONGER LIFE FOR YOUR "CATERPILLAR" DIESEL TRACTOR

• A "Caterpillar" dealer's service man adjusts a final drive bearing right on the job, without loss of working time.



PREVENTIVE MAINTENANCE

WARTIME work puts a punishing strain on tractors. There are fewer of them to go 'round — more jobs to be done, and done faster.

Your "Caterpillar" dealer's program of *preventive maintenance* is plain common sense that saves you down-time and repair costs, and saves critical metals for war.

How does it work? When you're running your "Caterpillar" Diesel night and day you naturally take extra care to keep it lubricated and make ordinary operating adjustments. But things you can't see may be happening in an overworked tractor . . . wear on hidden parts . . . loosening of tensions. In normal times you may have had your machine checked by your service dealer every six months. Now, with more hours of work a day, those inspections should be made more often.

In a few minutes an experienced service man with proper equipment can make any needed minor adjustments and warn you of any trouble that may be developing — *before* it happens. He'll check on such things as engine performance, the adjustment of the steering clutches and flywheel clutch, as well as on track tension and track alignment.

A good example of your "Caterpillar" dealer's preventive maintenance is keeping your final drive bearings properly adjusted. It should be done at regular intervals because it can *prevent* a lot of possible expensive repairs. If the final drive bearings are kept in correct adjustment, you won't have excessive wear in bearings and gears, or overflexing of the copper bellows seals.

Our fighting forces have first call on new machines and parts. That means all of us must do everything we can to conserve the machines now in use.

Your "Caterpillar" dealer's precision tools and modern shop practices enable him to make service adjustments and repairs with the least expenditure of money and war-needed metals. His excellent welding equipment frequently doubles the life of such parts as sprockets, rollers, track links and track shoes. See him, and ask him about the new meaning of "Caterpillar" service.

What about new "Caterpillar" Diesel Tractors?

To provide for war-essential work at home, the War Production Board has made 15% of "Caterpillar" Diesel Tractor production available for civilian purchase. If you need one of these machines and are qualified to have one, your "Caterpillar" dealer can help you obtain it. Ask him for details and advice.

ARMY E NAVY

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO. • SAN LEANDRO, CALIF. • PEORIA, ILL.

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

A $10 Word *that gets down to Brass Tacks*

No, synergism is not a new word. It is an old word, with the basic meaning—"forces working together to produce a whole greater than the sum of the parts." Lately it has developed an industrial connotation of "minds stimulating each other to create more than the sum total of the ideas expressed."

SYNERGISTIC thinking is the next step beyond co-operation—the creative step that evolves better methods, more effective processes, new materials, faster production, finer products. It has worked miracles in war production.

But synergism is not confined to huge achievement. On the contrary, synergistic thinking is responsible for the little creations that pave the way for bigger accomplishment. Wherever you find minds stimulating each other to action, there you will find progressive steps—big or little.

Sometimes it takes the form of a crude, but functioning apparatus—a rough sketch—an immature product. It is as likely to be the brain-child of skilled workmen as of Ph.D's. Perhaps it developed from a discussion across a desk or around a machine. But always it represents the impact of minds "clicking" together for a practical creative result.

Industry—from top to bottom—is learning that synergism speeds progress, raises standards. The war is a good teacher. Here at Atlas, we have practiced synergism in our spheres of chemical production to gain some notable results in collaboration with our customers. We would like to show you what synergistic thinking may accomplish for any problems of yours that may lie within our scope.

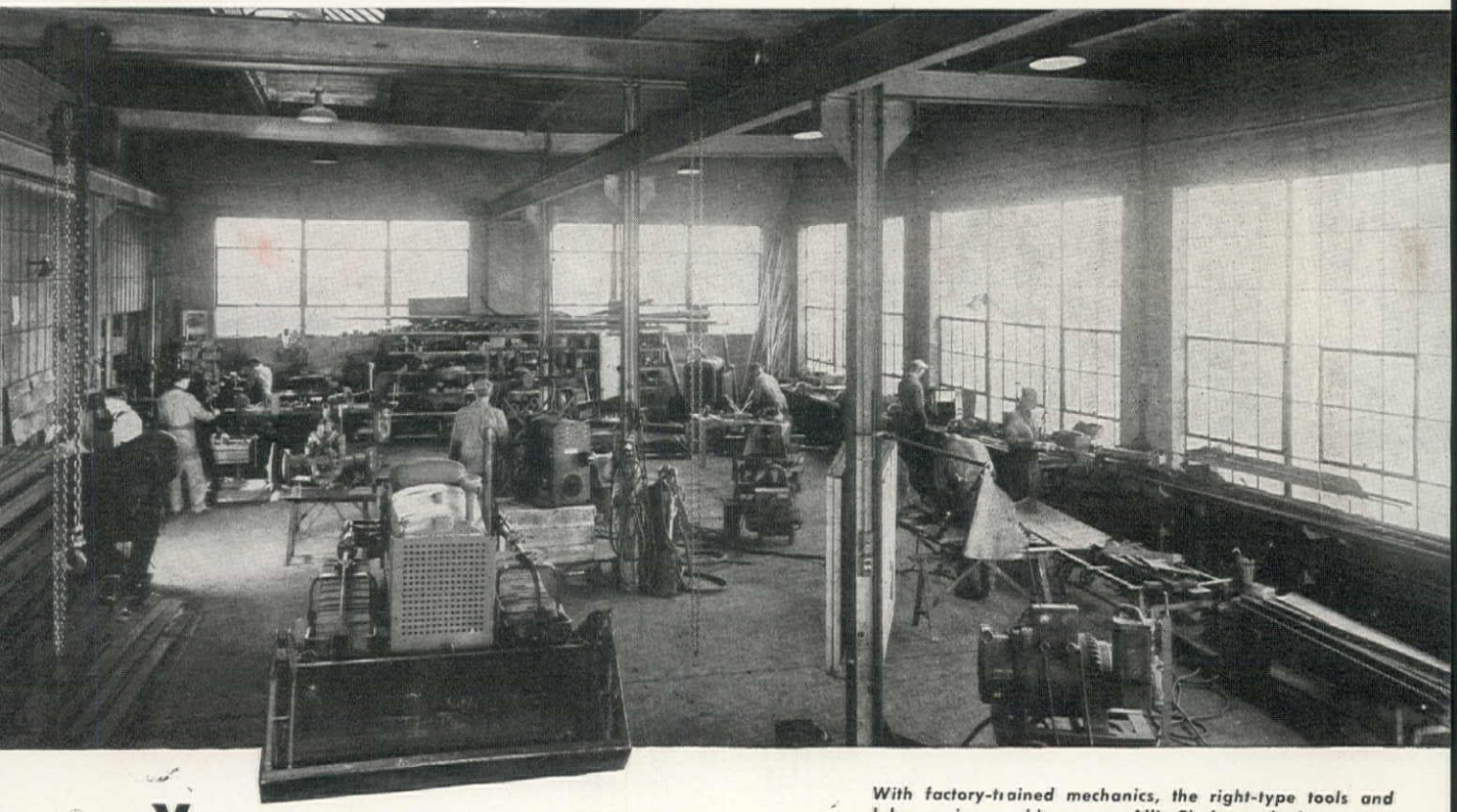
Offices in Principal Cities

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

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

Stop TROUB



With factory-trained mechanics, the right-type tools and labor-saving machines, your Allis-Chalmers dealer services your equipment quickly and economically.

Your tractors are built for the toughest kind of service . . . and they will stand up under the most severe punishment . . . but various parts will naturally wear with time. Take care of this wear promptly and you will ward off trouble. The quickest and most economical way is to have your Allis-Chalmers dealer build-up the worn parts or adjust them to shift the wear. This eliminates replacement cost, does away with waiting for parts and gives you a more efficient-operating tractor in the meantime — also saves you a major repair bill in case the worn part gives way and damages the surrounding mechanism. In addition, you help your country conserve on sorely needed materials.

Follow the Preventive Maintenance suggestions of your Allis-Chalmers dealer. They are proven ways of saving money and extending the life of your tractors. He is fully equipped to give you A-1 service...reliable help and advice. Get in touch with him NOW! Stop trouble before it starts!

ARMY E NAVY

ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE, WIS., U.S.A.

LE before it Starts!

WARTIME SERVICE FROM YOUR ALLIS-CHALMERS DEALER

1 PARTS ASSISTANCE — Information on availability of parts and how to obtain them.

2 PRIORITY ASSISTANCE — Who can get new equipment and how! Up-to-date information on latest regulations.

3 LIMITATION ORDERS — Interpretation of latest government limitation orders affecting construction equipment.

4 SUBCONTRACT INFORMATION — Frequently dealers possess information on subcontract opportunities.

5 REBUILDING FACILITIES — Enlarged, modern shop facilities to handle rebuilding with speed and efficiency.

6 SERVICE EDUCATION — Instructions on how to operate and service equipment correctly. Provides service school instructors.

7 REPAIRS AND MAINTENANCE — Quick, efficient repairing by skilled, factory-trained mechanics, using the right tools and genuine parts.

8 USED EQUIPMENT — In some instances, good rebuilt construction equipment may be available.

9 RENTALS — Good used equipment may be available for temporary emergencies.

10 EQUIPMENT EXCHANGE — Information center on used equipment available in territory.

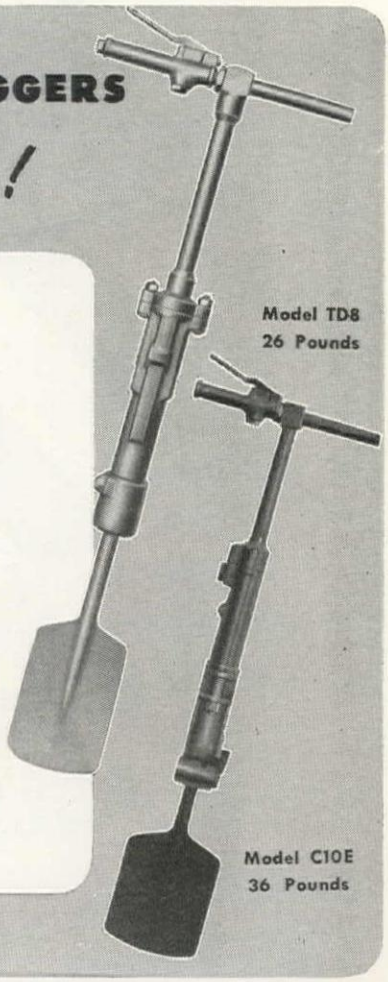
CLEVELAND CLAY AND TRENCH DIGGERS

Take it Out in a Hurry!

Model CD8
Weight, 22
Pounds

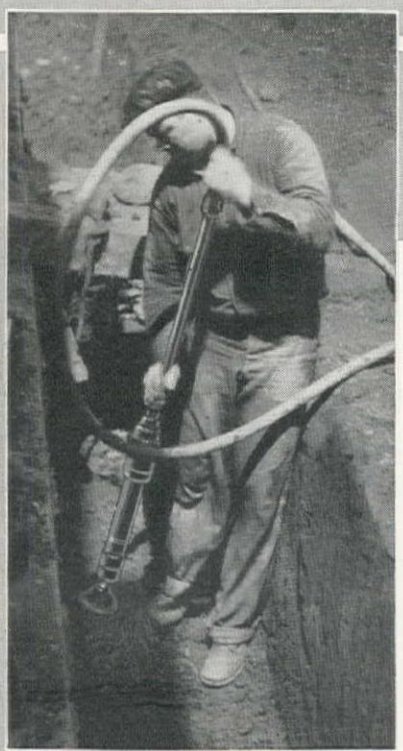
Model C10D
29 Pounds

★ For loosening up hard ground or tough clay, these tools are real time and money savers. There are four types to choose from—a good digger for every condition. Model CD8 is recommended for average work, for caisson jobs, wall trimming, and similar digging. The TD8, with the extension handle, is just right when the operator has a chance to stand erect in his work. C10D, with the spade handle, and the C10E long-handle digger, are for the tougher job.



Model TD8
26 Pounds

Model C10E
36 Pounds



Cleveland No. 5 Back Fill Tamper weighs 30 lbs. with butt.

CLEVELAND BACKFILL TAMPERS

Ram all the Dirt Back Firmly!

★ Whenever construction work or paving must proceed immediately after back-filling, Cleveland Tampers will prove to be the answer to your problem. They ram the earth even firmer than it was originally, making it safe for your job to go ahead. And you won't have any dirt to haul away!

Bulletin 128 provides full information on the Cleveland Line of Diggers and Tampers. Promptly sent on request.

WESTERN BRANCHES

BERKELEY, CALIFORNIA
572 Santa Barbara Road

SALT LAKE CITY, UTAH
65 West Fourth South St.

WALLACE, IDAHO
515 Bank Street

EL PASO, TEXAS
1225 Texas Street

BUTTE, MONTANA
41 East Broadway

CALIFORNIA DISTRIBUTORS

LE ROI-RIX MACHINERY COMPANY
3817 Santa Fe Avenue, Los Angeles

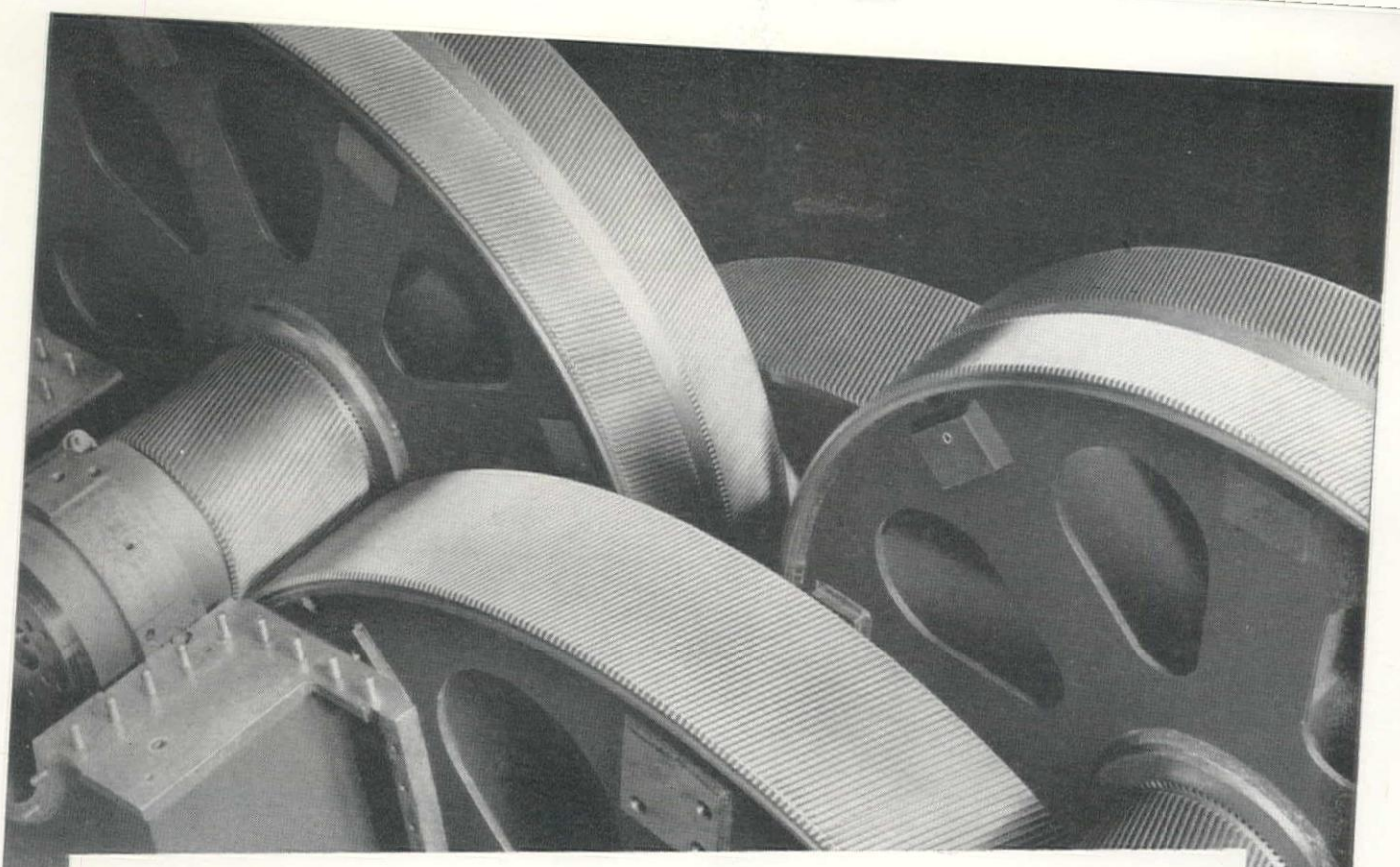
THE RIX COMPANY, INCORPORATED
582 - 6th Street, San Francisco

Cleveland Rock Drill Factory People are buying regularly U. S. War Bonds and Stamps.

THE CLEVELAND ROCK DRILL COMPANY

Subsidiary of The Cleveland Pneumatic Tool Co.

CLEVELAND, OHIO

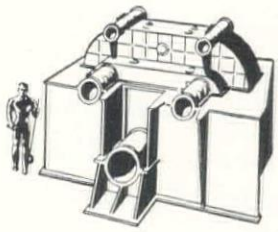


GEARED TO THE BIG JOB

Coupling Hendy marine turbines to the propellers that drive our "Bridge-of-Ships" are these smooth running Hendy reduction gears. Built to the highest precision-standards known in the American gear-cutting industry, they are produced in air conditioned, temperature controlled rooms—by time-saving, production-line methods.

Close meshing of these gears is typical of the coordination that exists among the "Iron Men of Hendy"—who have whole-heartedly geared their combined efforts to the "big job of today." Consistently ahead of schedules, they are delivering 2,500 hp and 2,750 hp steam engines and 4,000 hp reduction gear turbines. Soon they will be building even larger marine power plants—of over 8,000 horsepower.

When "the gears are shifted to peace," this skilled, dynamic organization will focus its efficient production methods on peace-time power—for industries that may need its skill and experience.



ANOTHER ACHIEVEMENT BY THE IRON MEN OF HENDY

. . . is the short time they required to erect plants, design tools, develop production methods, and the speed with which they are now delivering double-reduction gear units for marine turbines. The "bull-gears" for the 4,000 hp reduction gears are 104.6" in diameter, 14" helix; reduction ratio is 65:1.

JOSHUA HENDY IRON WORKS

ESTABLISHED 1856

SUNNYVALE • CALIFORNIA

Divisions: POMONA PUMP COMPANY
CROCKER-WHEELER ELECTRIC MFG. CO.

Manufacturing Plants: SUNNYVALE, LONG BEACH, POMONA and TORRANCE in CALIFORNIA • AMPERE, N. J. • ST. LOUIS, MO.
Branch Offices: NEW YORK • WASHINGTON • PHILADELPHIA PITTSBURGH • CHICAGO • ST LOUIS • SAN FRANCISCO • LOS ANGELES

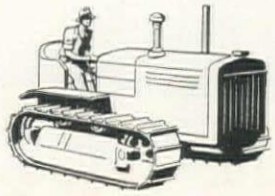
Wherever the going is tough you'll find ASSOCIATED lubricants

In the west we like tough jobs, the kind that "can't be done." Sometimes, while striving to do the impossible, men forget that every machine needs regular care. Graders and tractors, compressors and trucks, ditchers and trenchers, hoists and shovels must be lubricated regularly, expertly. Not just greased and oiled, but thoroughly lubricated with the proper oils, greases and lubricants that won't break down when men and machines are working at top speed 24 hours a day. Long ago Associated accepted the challenge of the builders of the West. That's why you'll find Associated lubricants wherever the going is tough.

FREE TRUCK LUBRICATION CHARTS

Ask the Associated representative in your locality for FREE truck and tractor lubrication charts, for both gasoline and diesel equipment. There's no obligation—it's another Associated service.

How to make your Diesel Equipment run better, longer: Use a clean *distilled* Diesel fuel. We suggest Associated Motor Diesel Fuel. Keep dust and dirt from inside the



engine by servicing the air cleaner every day, the oil filter regularly as specified by the manufacturer. Use an approved lubricant such as Cadel N. C. Diesel Engine Lubricant.

Here Are Two Associated Services for Truck Operations:

1. At key refueling points on major highways Associated maintains 24 hour service for trucks. Look for the big "24-hour Service" poster at the sign of the big Flying A.
2. Truck owners holding Certificates of War Necessity can still secure Associated War Necessity Credit Cards. See your local Associated agent or any Smiling Associated Dealer.

A FEW OF THE HUNDREDS OF ASSOCIATED PRODUCTS

Veedol and Tydol Motor Oils
Veedol Extreme Pressure Lubricant
Veedol Hi-Pressure Lubricant
Veedol U. W. Medium
Veedol Water Pump Grease
Cadel N. C. Diesel Engine Lubricant
Associated Motor Diesel Fuel
Flying A Gasoline
Associated Aviation Ethyl Gasoline

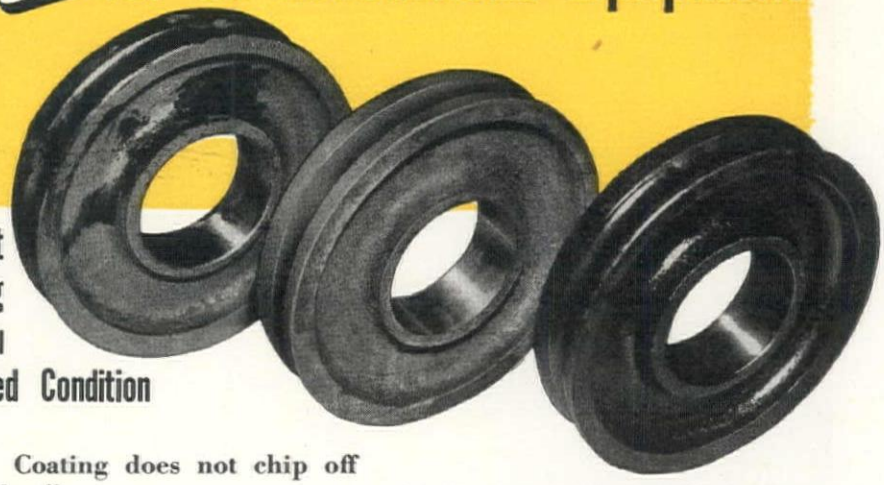
Let's get ASSOCIATED

TIDE WATER ASSOCIATED OIL COMPANY

Oil is Ammunition—Use it wisely!

NOW— Rust-Resistant Parts for all LeTourneau Equipment

Special Processing Protects Replacement Parts Against Rust and Corrosion During Shipment and Storage . . . Gives You Genuine Factory Parts in Factory-Finished Condition



Machined sheave (above, left) is thoroughly washed . . . comes out free of grease and dirt (above, center) . . . is then dipped in special solution and dried giving a uniform, plastic-like coating (above, right) which prevents rusting and corrosion. Coated parts are placed in carton for protection against physical damage. On export shipments machined surfaces are further protected with water-tight, air-tight paper wrapping sealed with coat of wax.

Developed for Wartime Foreign Service — Now Available to All Users

A special process for treating replacement parts for LeTourneau equipment has been installed to prevent rusting and corroding during months of exposure to salt air and arctic and tropical conditions encountered in shipments and storage of war supplies. This same protection is now given parts for all LeTourneau equipment, both domestic and export shipments . . . at no extra cost to you.

All machined parts first are thoroughly cleaned to remove all dirt and grease; then dipped in a special solution which gives a uniform, plastic-like coating to the entire surface of the parts. In tests this protective coating has resisted corrosion for 300 hours of exposure in salt spray. It is not sticky or greasy . . . thus, parts are easy to store and handle, do not collect dust and dirt. Coating does not chip off or rub off.

Saves You Time and Money

You save time and money when you get machined parts in good condition, free from rust, corrosion and grease . . . they are easier fitting, take less time and labor to fit . . . last longer because they're not damaged by corrosion . . . assure better equipment operation. The protective coating readily dissolves in oil and grease and has no harmful effect on the lubricating oil or grease used in LeTourneau equipment. If you prefer, the coating may be easily removed with fuel oil, gasoline, kerosene or lubricating oil before using the part.

Take advantage of this extra service . . . get rust-resistant parts for your LeTourneau equipment. Your LeTourneau-"Caterpillar" dealer's Victory Service Base is nearby . . . see him, now, for expert parts and repair service.

Bearings of this type are adequately treated by the manufacturer to resist corrosion under normal domestic conditions. These photos illustrate how extra protection is given parts for export shipment by LeTourneau. Bearing is greased, wrapped in special greaseproof paper, wrapped again with heavy self-sealing wax paper and dipped in wax, thus making a water-tight, air-tight covering. Sealed bearing is then placed in carton ready for boxing.

Keep Your *Hydraulic* Blade Equipment DIGGING TO WIN!

Bucyrus-Erie
HYDRAULIC BULLGRADERS & BULLDOZERS

With new equipment reserved for our armed forces and existing equipment called on to take the punishment of wartime, highspeed 3-shift service, we've all got to pitch in and do a maintenance job as never before. Here are a few special hints that will prolong the useful life of your hydraulic Bullgraders and Bulldozers and keep 'em producing at top speed:

1. Watch the cutting edge and don't allow it to wear down to where the supporting casting is damaged.

2. Cutting edge can be reversed to give longer service when front edge is worn.

3. Keep the corner bits built up and hard-faced.

4. Don't allow pins to wear down too far before replacing or building up.

5. Inspect the blade and frame regularly for fatigue cracks, and weld them before they become serious.

6. Checking the hydraulic system should be regular routine. Be sure that oil is up to level and system is clear of air. A jerky, noisy machine is air-bound; a smooth one is free of air.

7. Drain the oil when it is dirty. Floating particles wear the pump and valve.

8. Keep all hose and pipe connections tight to prevent loss of oil and infiltration of air.

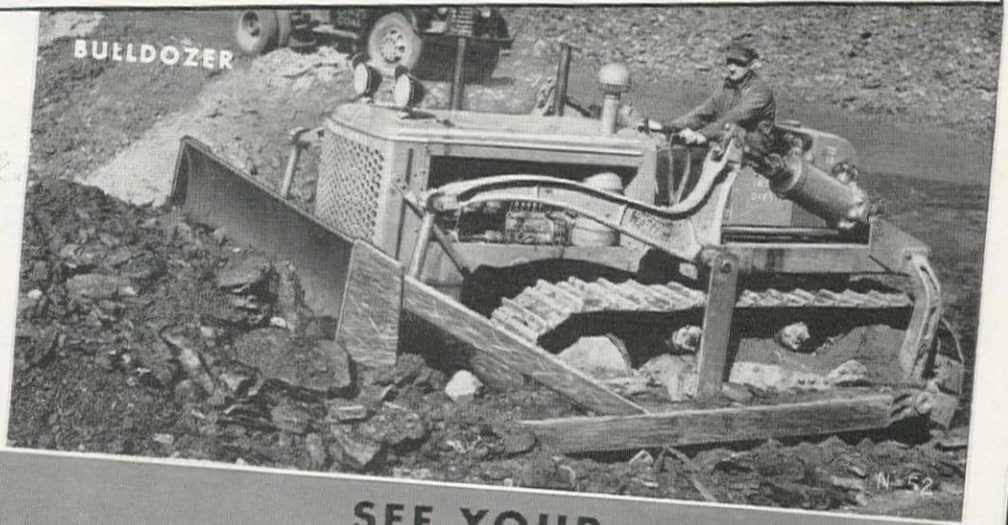
9. Inspect hydraulic hose to be sure it won't chafe and isn't twisted.

10. Keep bolts tight and all parts of the machine adjusted correctly.

11. Clean off dried mud or caked grease and maintain paint surfaces on all parts not subject to abrasion or moving contact.

12. Lubricate regularly. Use good grade lubricants and follow manufacturer's instructions carefully.

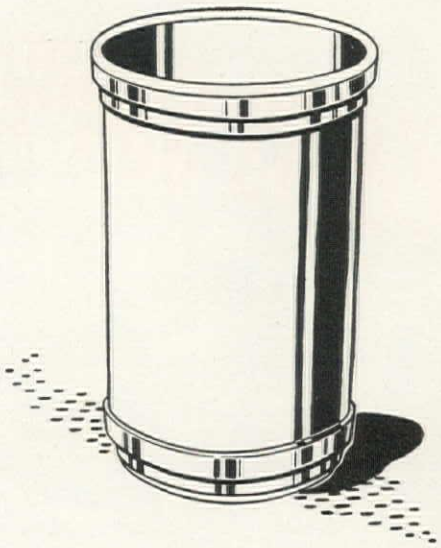
Your International TracTracTor Distributor will gladly advise you regarding proper maintenance and lubrication.



BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

You can buy a new tie in 3 minutes...



but it may take weeks to renew a scored cylinder

The answer is Preventive Maintenance now with Shell Diesel Lubricants

SHELL

When rings stick, allowing hot gases to blow-by the pistons, it's good-by cylinder liners and piston rings . . . parts you can't always get when you need them. Then, too, there's that matter of an idle piece of equipment while new parts are installed. Many of these time-wasting failures can be avoided by careful attention to lubrication.

In peacetime, Diesels were operated under more or less normal conditions. But today, engines are being worked harder and for longer, continuous periods of time. This means oil should be changed at more frequent intervals.

Yes, these more frequent changes do take time. But the few minutes they do take may save you days of delay later. Don't wait for a breakdown. Call in the Shell man now. Let him help you plan your Preventive Maintenance.

First oil refinery to win Army-Navy "E"— Shell's Wood River Refinery

SHELL DIESEL LUBRICANTS

P&H

GET LONGER SERVICE

BY INTERCHANGING CLUTCH SHOES . . .

These P&H advantages are already helping to keep wartime maintenance to a minimum:

WELDED ROLLED STEEL CONSTRUCTION assures extra toughness and rigidity.

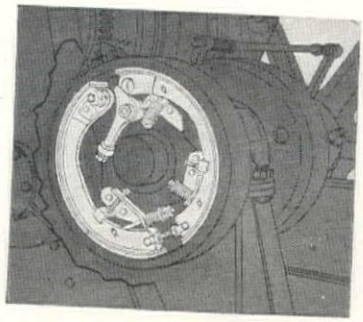
TRUE TRACTOR-TYPE CRAWLERS put an end to old crawler troubles.

P&H HYDRAULIC CONTROL — easier on both machine and operator.

ARMY E NAVY

A new star has been added to P&H's award for excellence in war production.

Get every ounce of service you can for the duration. For the same reason you rotate the tires on your car, interchange clutch shoes on your excavators to make *them* last longer. Avoid replacements — save money — conserve materials — prevent delays.



We've made it easy for you with a new bulletin that shows exactly how to do it. Clear instructions, along with a detailed diagram of the P&H two-shoe, self-energizing clutches, indicate how to interchange shoes in the shortest possible time.

Make War on Wear with Proper Care

P&H owners and operators are urged to send for this new folder, "How to Interchange Clutch Shoes for Longer Wear" (Folder No. D-50).

General Offices:

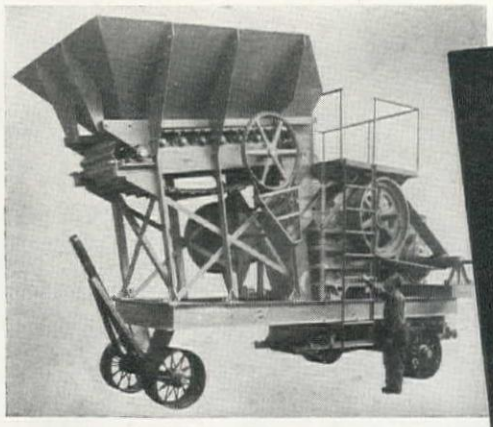
4490 W. National Avenue, Milwaukee, Wisconsin

HARNISCHFEGER CORPORATION
82 Beale Street, San Francisco, Calif.

Portland, Oregon: Loggers & Contractors Machinery Co. Reno, Nevada: R. D. Jenkins & Son. Willows, Calif.: Willow Motor Sales Co. Albuquerque, New Mexico: Mr. Floyd Ames. Great Falls, Montana: Midland Implement Co. Prescott, Arizona: Arizona Mining Supply Co. Napa, California: Berglund Tractor & Equipment Co. Salt Lake City, Utah: National Equipment Co. Seattle, Washington: Glenn Carrington & Co. Spokane, Washington: F. M. Viles & Co. Redding, California: Lowry Tractor & Equipment Co.

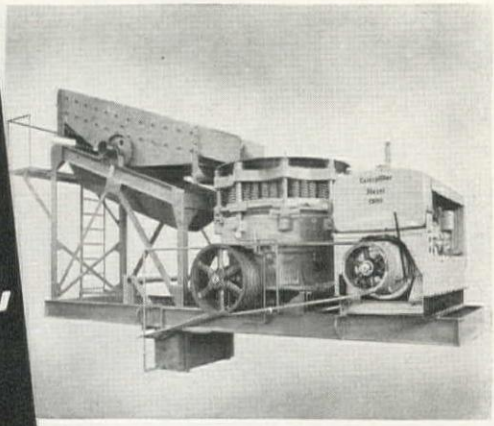
HARNISCHFEGER CORPORATION

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



Primary Unit of large Telsmith Portable Crushing-Screening Plant, including Apron Feeder, Primary Jaw Crusher, power unit and conveyor.

NO "Boots" or "Yardbirds" HERE!



Secondary Crushing Unit of large Telsmith Semi-Portable Crushing-Screening Plant, including Scalping Pulsator Screen, No. 48 Gyrasphere Secondary Crusher, and power unit.

TELSMITH

Portable Crushing-Screening Plants are *Overseas Veterans* in Uncle Sam's Armed Forces

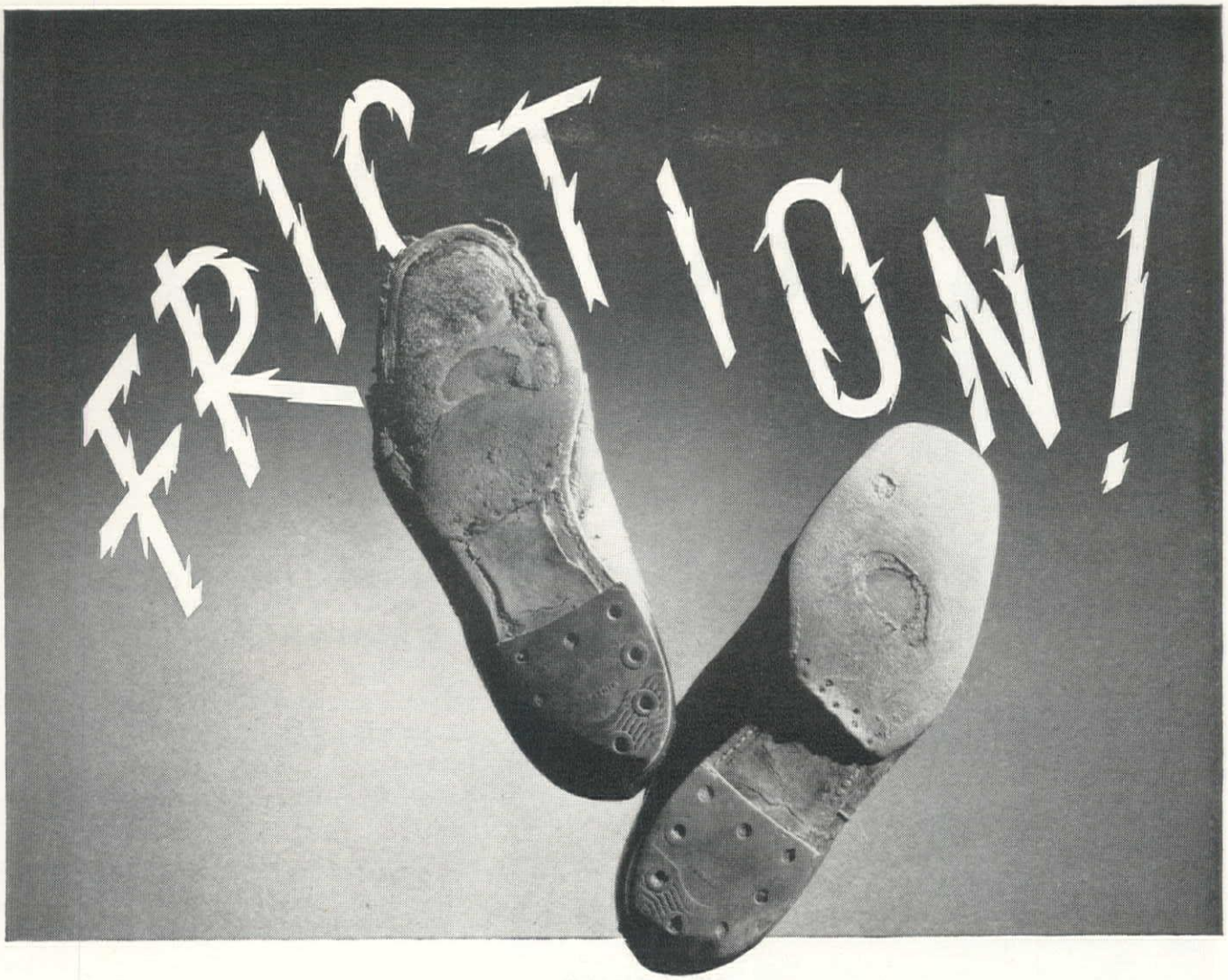
★ They're no rookies, these Telsmith Portable Crushing-Screening Plants. They finished "recruit training" in the armed forces long before Pearl Harbor. Telsmiths helped to build naval bases and docks, air bases, runways and aprons for flying fields, military highways and access roads over here. Then when the sailors, soldiers and marines went overseas, Telsmith Portables shipped out with 'em. They are serving on the first fronts, and on "the second front." And they're still going over. Like you road builders and contractors, Uncle Sam and his nephews, and the United Nations, too, appreciate Telsmith Portables. They turn out the aggregate *fast*—and economically—on large or small jobs. Their output is bigger; their sizing finer. Find out all about 'em, *get Bulletin P-30.*

Complete Telsmith Portable Dual Crushing-Screening Plant P-7

SMITH ENGINEERING WORKS, 4010 NORTH HOLTON STREET, MILWAUKEE, WISCONSIN

MINES ENGINEERING & EQUIPMENT COMPANY, SAN FRANCISCO—LOS ANGELES

Clyde Equipment Co. Seattle, Wash.
Clyde Equipment Co. Portland, Ore.
General Machinery Co. Spokane, Wash.
Gordon Russell, Ltd. Vancouver, B. C.



REDUCE WEAR AND REMOVE CARBON WITH MACMILLAN RING-FREE MOTOR OIL

Undue motor wear, waste of fuel and excessive carbon have no place in a sound preventive maintenance program. At the same time, "production" must be speeded up. That's why operators simply must pay more than usual attention to motor lubrication . . . and motor *cleanliness.*

Macmillan RING-FREE Motor Oil cuts down waste and wear while speeding up performance, and at the same time, RING-FREE removes carbon!

In 1094 Certified Road Tests, with various makes of owner-driven cars, 10 per cent increases in gasoline mileage were not uncommon after crankcases were drained and refilled with RING-FREE. As indicated by these tests, the average immediate saving was 1.3 miles per gallon! These tests emphasize that RING-FREE lubricates better . . . *reduces friction faster.* It delivers direct to the drive shaft more of the horsepower ordinarily wasted in overcoming motor friction. It postpones "down-time" for repairs.

Macmillan RING-FREE Motor Oil combines all these qualities: great film strength, high heat resistance, long cling to metal, fast penetration . . . *plus* the fact that it is non-corrosive, is less affected by dilution and it *removes carbon.*

CARBON REMOVAL A NATURAL RING-FREE FUNCTION

Macmillan RING-FREE Motor Oil actually removes carbon while the motor runs! Hence, by its continued use, pistons, rings, valves—all vital parts—stay cleaner. Carbon removal is a natural function of RING-FREE, inherent in the crude oil and retained by the exclusive Macmillan patented refining process, *without the use of additives.*

TO SUM UP: MACMILLAN RING-FREE gives more horsepower to the drive shaft—tangible saving of fuel—allows less wear on hard-to-replace engine parts—it removes carbon.

Macmillan Petroleum Corporation

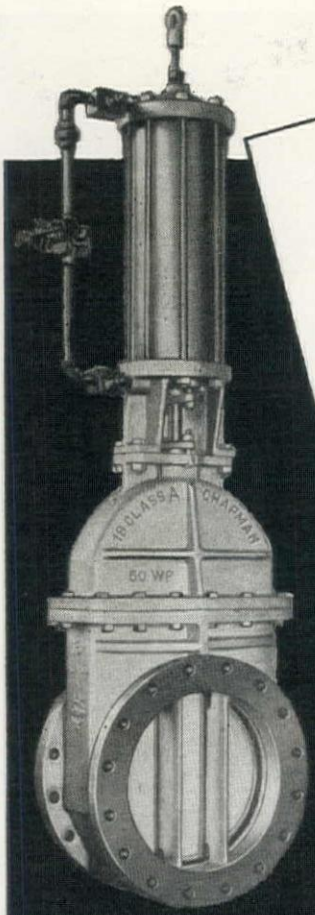
50 W. 50th St., New York • 624 S. Michigan Ave., Chicago • 530 W. Sixth St., Los Angeles

MACMILLAN RING-FREE MOTOR OIL

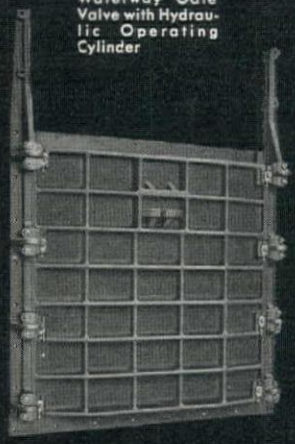
REDUCES WEAR BY REDUCING FRICTION

92 CHAPMAN "Beamed Waterway" GATE VALVES

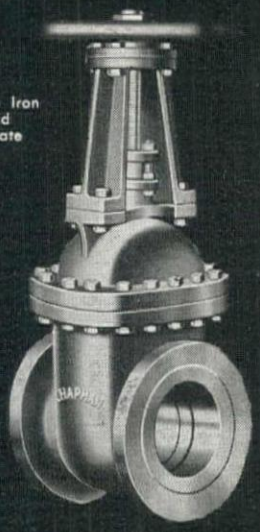
FOR TENNESSEE'S VOLUNTEER ORDNANCE WORKS...



Chapman Beamed Waterway Gate Valve with Hydraulic Operating Cylinder

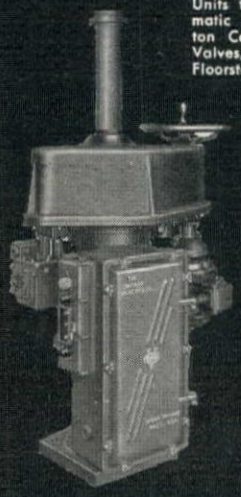


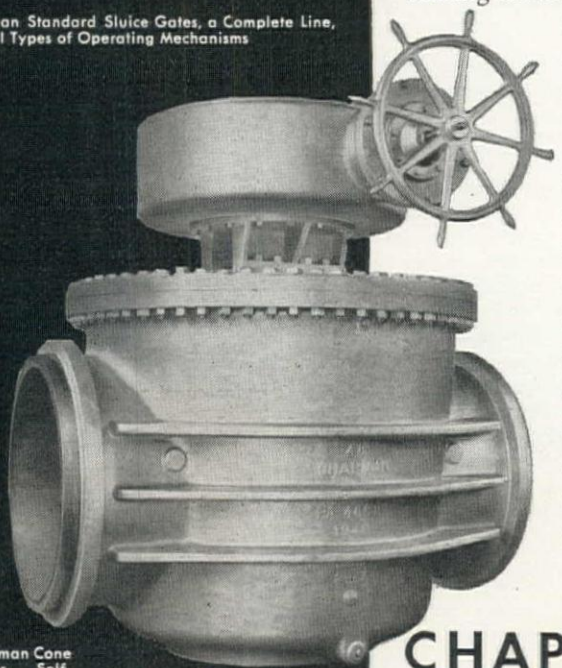
Chapman Iron Body, Solid Wedge Gate Valves.



Chapman Standard Sluice Gates, a Complete Line, with all Types of Operating Mechanisms

Chapman Motor Units for Automatic Push-Button Control of Valves, Gates, Floorstands.



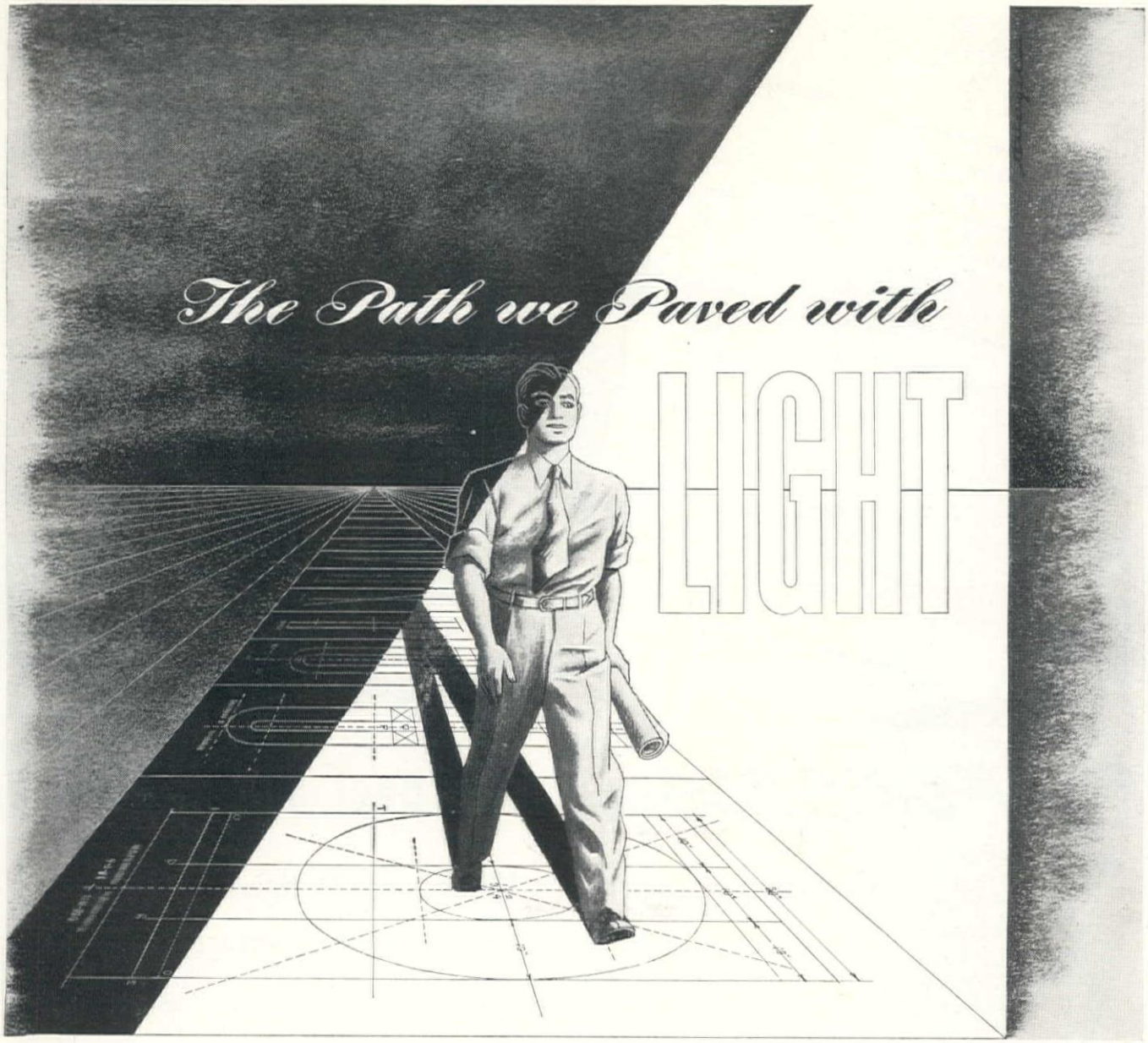


Chapman Cone Valves. Self-Cleaning. Plugs fully seated and fully protected.

For the new plant of the Volunteer Ordnance Works at Tyner, Tennessee . . . engineered by Stone & Webster . . . Chapman built 92 Beamed Waterway Gate Valves with hydraulic cylinders, in sizes from 10" to 30". This type of valve was developed by Chapman to prevent the excessive wear on seats encountered in double-disc parallel-seated gate valves which, when open, tend to tip the downstream disc into the waterway, leaving small contact between disc facing and body seat ring. In Chapman's Beamed Waterway Valve, extra bearing contact is secured by vertical beams in the downstream port, so the disc can't tip into the waterway, wear the seat rings, and cause leaks.

This exclusive design is a noteworthy instance of Chapman's advanced engineering in all types of equipment for waterworks, sewage, and filtration plants. Chapman always designs and builds for tomorrow as well as today . . . to protect investment and keep maintenance down where it belongs. That's why it pays to "check with Chapman."

THE
CHAPMAN VALVE
MANUFACTURING COMPANY
INDIAN ORCHARD, MASSACHUSETTS

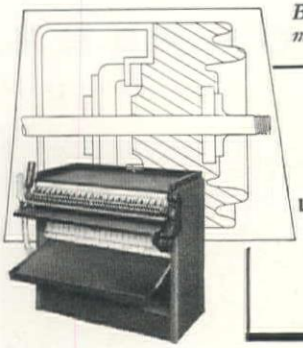


BEFORE Bruning, there was nothing better than blue prints.

Then, 14 years ago, Bruning introduced the first successful black-line direct printing process . . . easier-reading Bruning Black and White Prints.

Constantly improved through research, BW Prints have thrown new light on industrial progress. Today, they fit in with *modern* equipment and methods. Why? Because you save time with these prints that are made in seconds instead of minutes. Because BW Prints banish the time-lag of washing and drying that blue prints require. Because black lines on white backgrounds are easier to see, easier to understand.

And because, too, Bruning BW Prints can be produced in quantity with a *single operator* in sheets cut to the exact size of your tracings. Let us tell you why Bruning BW Prints give you the sureness of speed you need for today and tomorrow. Call a Bruning representative! Charles Bruning Co., Inc.



Bruning Model 154 Developing Machine—one of the many modern machines in the complete Bruning line.

BRUNING

SINCE 1897

Los Angeles: 919 S. Maple Avenue San Francisco: 16 Fremont Street
Seattle: 2025 Third Avenue Chicago: 4700 Montrose Avenue

Sensitized Papers and Cloths . . . Drafting and Engineering Supplies and Equipment

CHARLES BRUNING CO., INC. 2172-288A
Los Angeles: 919 S. Maple Ave.
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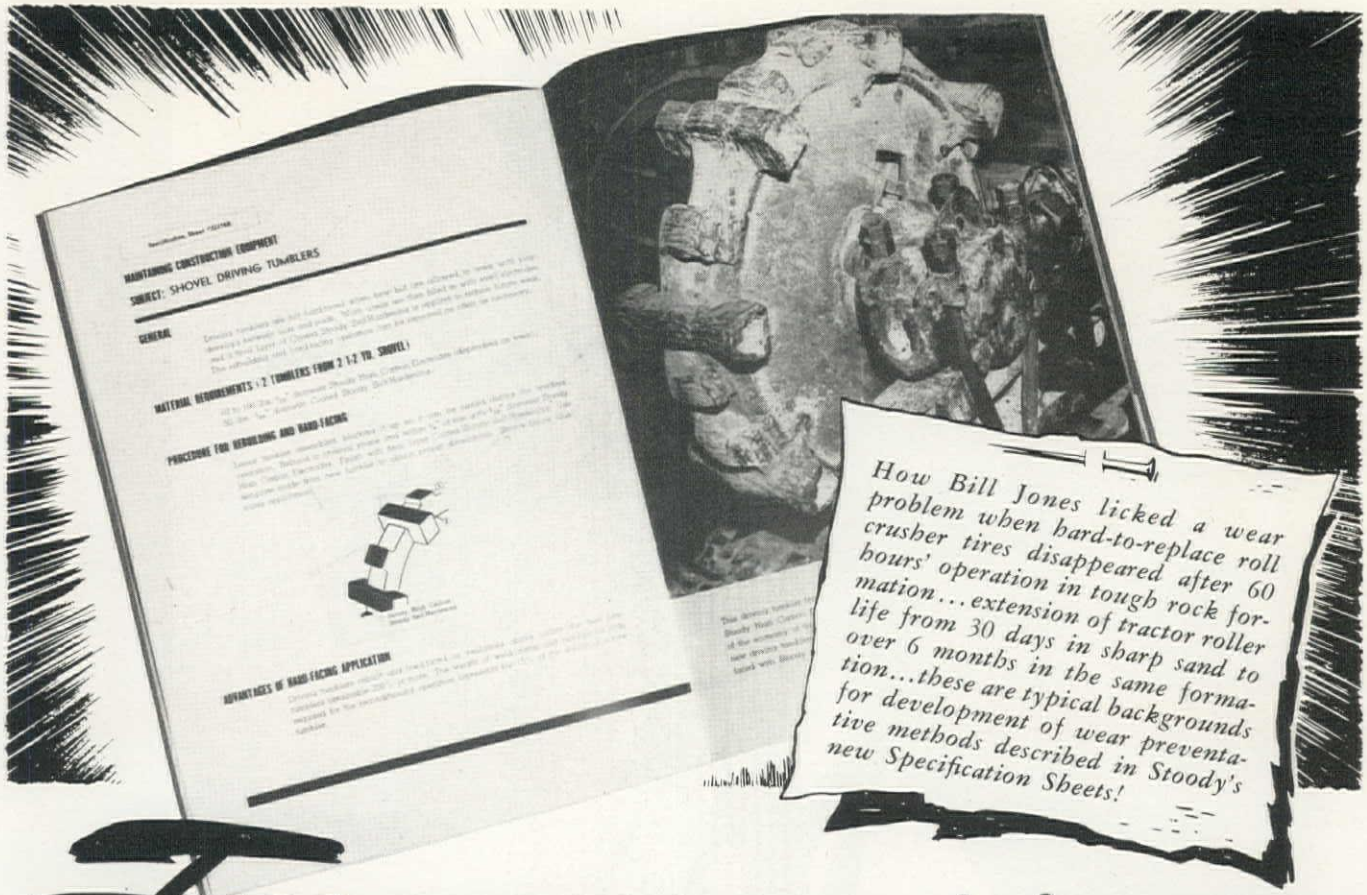
Please send me a copy of your free illustrated booklet on the BW direct printing process.

Name.....

Company.....

Address.....

City.....*State*.....



Free access to a pool of experience

Summary of Contractor's Methods for Maintaining Construction Equipment Despite Wartime Shortages

HERE are twenty proved hard-facing applications that halt abrasion on fast wearing, earth-working and crawler type equipment. Each is the result of practical experience combined with intensive engineering research.

Stoody Specification Sheets tell where and when to apply the hard metal — the quantity of material required to successfully protect the part. They describe hard-facing procedures concisely, the advantages and approximate gain in service life, and they include large photo reproductions of properly hard-faced parts.

Take advantage of this pool of information for keeping your equipment in operation under pressure of contract deadlines and wartime shortages.

To conserve paper we have printed a limited quantity of these Specification Sheets. For this reason, copies are restricted to those concerns engaged on essential projects where wear is a major problem. If you feel that you qualify, write for your copy now!

In active territories engineering service is available for contractors having special wear problems. If you need help, address your request to The Engineering Department, Stoody Company, Whittier, California.

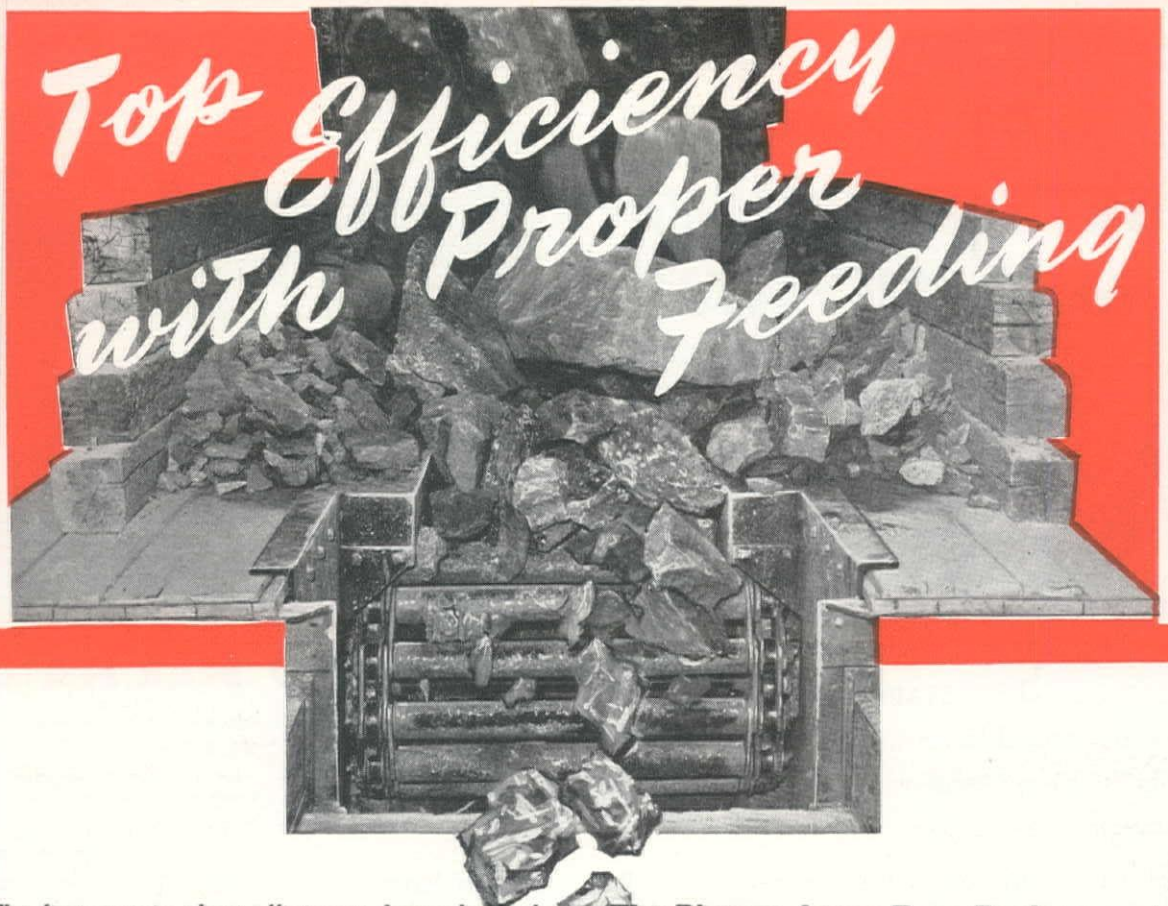
STOODY COMPANY

1136 WEST SLAUSON AVENUE, WHITTIER, CALIFORNIA

STOODY HARD-FACING ALLOYS

Stop wear... Eliminate Repair

Top Efficiency with Proper Feeding



The first step in plant effieiency depends on the feeding of the rock or ore to the primary crusher. Different materials and conditions require different types of feeders. Pioneer builds four types.

The Pioneer Oro Manganese Feeder is an extra heavy duty feeder for handling heavy ores or large abrasive rocks.

The Pioneer Traveling Grizzly Feeder is a heavy duty feeder which by-passes the small materials around the crusher.

The Pioneer Apron Type Feeder is a solid pan feeder, suitable for feeding all types of rock, ore or gravel.

The Mechanical Plate Type Feeder is an eccentric feeder and recommended for feeding gravel onto a belt conveyor.

There is a Pioneer Feeder for every feeding requirement. Ask for recommendations to answer your feeding problem.

TWO PIONEER APRON TYPE FEEDERS HANDLING IRON ORE ON THE MESABI RANGE.

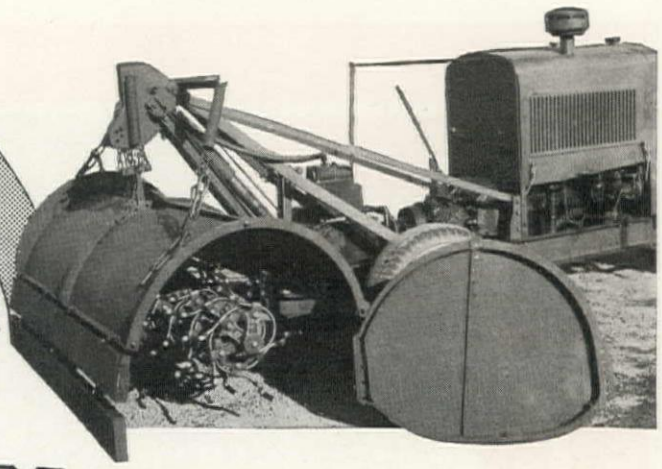
PIONEER TRAVELING GRIZZLY FEEDER HANDLING INDIANA LIMESTONE.

Pioneer

ENGINEERING WORKS

MINNEAPOLIS, MINNESOTA, U. S. A.

For building
BETTER HIGHWAYS
to the **SKYWAYS**



ROTOTILLER

TRADE MARK REG. U.S. PAT. OFF

ROADMAKER

SOIL STABILIZATION is speeding military operations wherever our armed forces are or go. Using local materials or any others available, highways, landing strips and airfields can be built or repaired faster, better, more economically.

ROTOTILLER Roadmaker is the pioneer "3-in-1 Rotary Action Machine" especially designed and built for soil-cement and soil stabilization work. The "3-in-1 Rotary Action" assures more accurate control in both wet and dry mixing operations as well as more thorough pulverization of materials. The fast-revolving, self-sharpening tines thoroughly mill the earth from top to bottom to a depth of 12 to 18 inches *in one operation.*

GET THE FACTS on this 1943 job-tested ROTOTILLER Roadmaker. Write for descriptive literature.

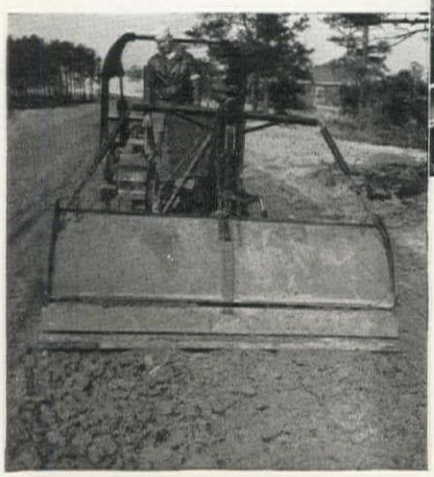
7 STAR FEATURES

1. Improved, self-sharpening, single unit spring-tines.
2. 4-speed transmission permits use for scarifying as well as mixing.
3. Flexible tilling unit gives fast, easy operation; sharp turns with safety.
4. Weight of tilling unit variable to suit conditions; lessens wear.
5. Depth of operation regulated to within one-half inch.
6. Powerful 6-cylinder Chrysler motor operates economically on 1 to 2½ gallons of gasoline per hour, depending on conditions.
7. Strong, dependable ROTOTILLER Roadmaker cuts 6 ft. wide, 12 to 18 inches deep, with complete ROTOTILLAGE across entire width of cut — no untilled areas.

•

Post war plans undoubtedly will call for thousands of miles of soil-cement and oil stabilized secondary roads. Returning soldiers will find economic security in this work. Then, as now, ROTOTILLER Roadmaker will serve faithfully and well.

ROTOTILLER, Inc.
Dept. R TROY, N. Y.



ABOVE: Mixing clay and sand to depth of 12 to 14 inches on experimental project for U. S. Naval Construction Battalions (Seabees). Note fine pulverization and uniformity of mix.

LEFT: Scarifying to rebuild old road.

RIGHT: ROTOTILLER Roadmaker takes sharp turns with safety without taking tines from ground or stopping tillage unit.

CHICAGO FACTORY — 4400 Addison Street

UNION'S NEW D5X "SWEEPS OUT" ENGINE IMPURITIES!

1 You know what happens when carbon forms inside a diesel engine. You get heat-loading, stuck rings, blow-by—power and efficiency are lost, the engine service man starts calling you by your first name. It's a grim situation—until you discover D5X, Union's new diesel lubricant.

2 You see, D5X really does "sweep out" diesel engines. In fact, it goes one step farther, it doesn't let carbon get started in the first place. D5X contains an exclusive ingredient called OSSINAL that keeps the impurities that cause carbon *suspended harmlessly in the oil*. When you drain the crankcase, these impurities flush out with the oil and *presto*—your engine is as clean as a "Dutch kitchen."

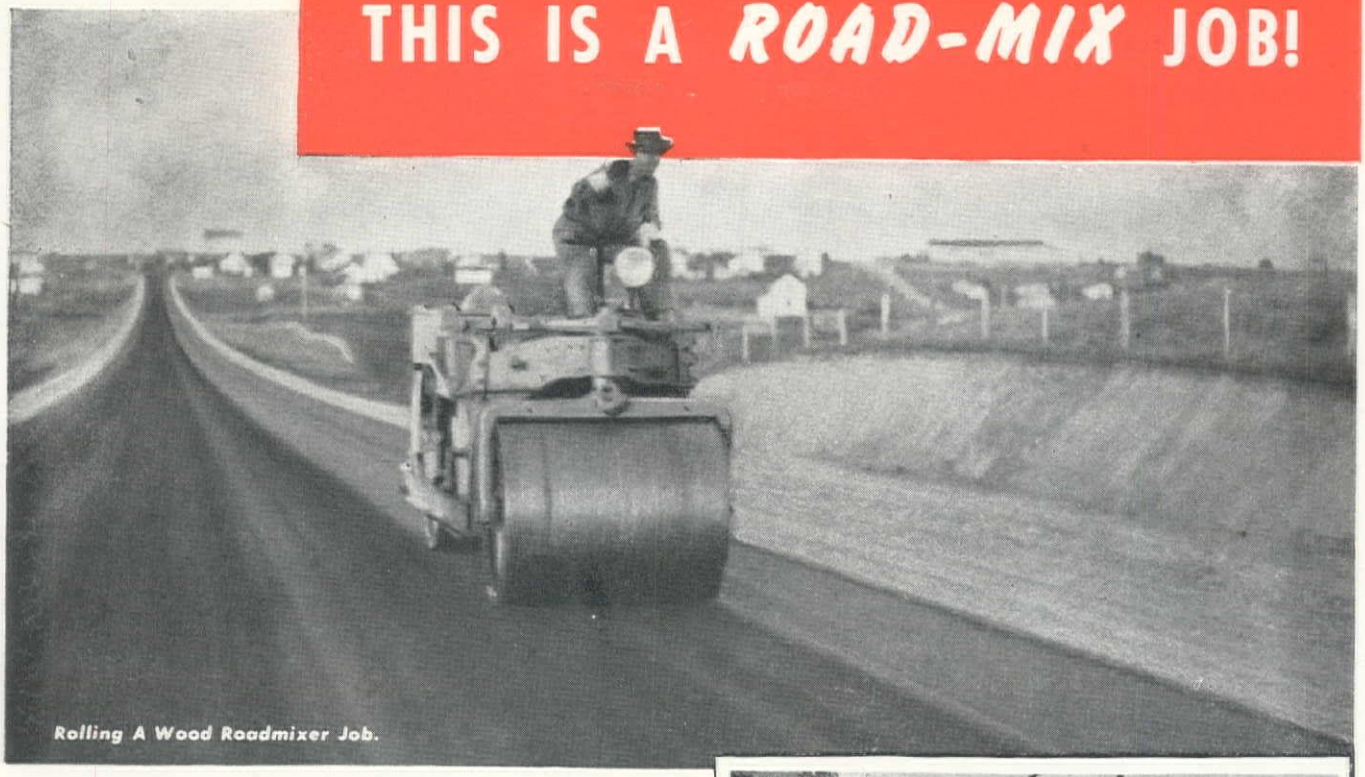
3 And what's more, exhaustive tests have shown that D5X containing OSSINAL *reduces wear as much as 80%* over straight oils containing no compound. D5X is really tough, protects your equipment under all sorts of conditions. Call your Union Oil Resident Manager for a supply of D5X today, then you can worry about something besides how the diesels are working.

UNION OIL COMPANY

TAKE THIS TIP! When you buy petroleum products, buy enough to last. It will protect you against transportation tie-ups and it will insure you of an adequate supply of the products you need.

OIL IS AMMUNITION—USE IT WISELY!

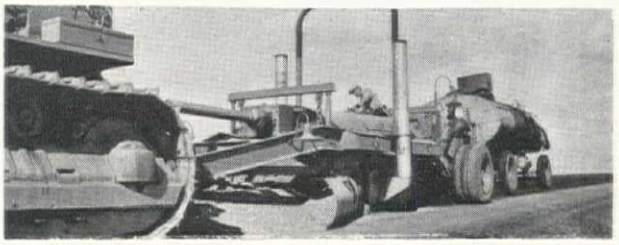
THIS IS A *ROAD-MIX* JOB!



Rolling A Wood Roadmixer Job.

It was built with native and local materials with 50% less manpower and equipment than required by conventional methods!

Here is the basic difference between conventional and Road-mix methods of pavement construction. Conventional methods utilize imported materials mixed at a central plant. Road-mix methods use native and local materials mixed-in-place by a traveling mixing plant. Road-mix methods of pavement construction save hauling costs, conserve equipment, save labor and speed construction. Case histories on scores of Road-mix jobs in this country and abroad show savings of as much as ⅓ in costs. Furthermore, Road-mix paving gives unexcelled performance under all types of usage. Design YOUR paving jobs for Road-mix—the fastest method of low-cost, high-quality paving.



WOOD ROADMIXER

A COMPLETE TRAVELING MIXING PLANT

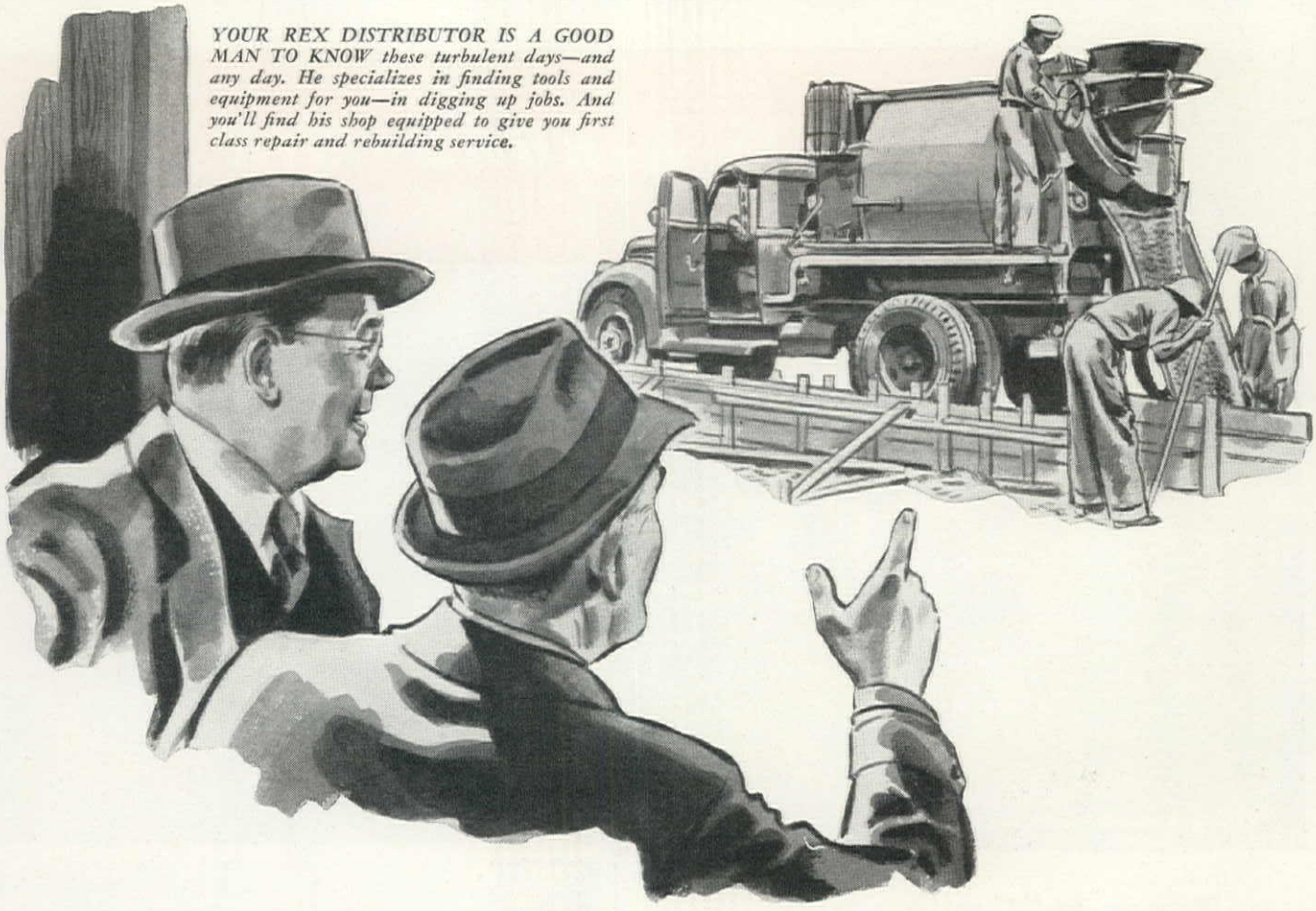
A *single* piece of equipment used with your *regular* equipment, for building landing fields, runways, roads, streets and highways, either emulsion, road oils, or soil-cement. Power for pulling Wood Roadmixer and operating mixing mechanism is supplied by a standard crawler tractor, which can be used for other work when not in use on Roadmixer. Liquid binder supply truck is towed behind the Wood Roadmixer. Wood Roadmixer produces highest output in all types of soil and maintains grade on hard or soft sub-base. Types of mixes include cut-backs, emulsions, soil-cement, tar, water and calcium chloride. Travel speed, volume control and mixing action accurately regulated to meet conditions of job. Wood Roadmixer gives highest production of top-quality paving at less cost. Requires lowest investment, lowest operating cost, lowest maintenance cost. Design *all* your paving jobs for Road-mix—and use a Wood Roadmixer.

➡ ➡ ➡ **DESIGN FOR ROAD-MIX**

Write for detailed and illustrated Wood Roadmixer bulletin, "The Fastest Method of Low-Cost Paving."

WOOD ROADMIXER

Wood Manufacturing Co. • 816 West 5th St., Los Angeles, California



YOUR REX DISTRIBUTOR IS A GOOD MAN TO KNOW these turbulent days—and any day. He specializes in finding tools and equipment for you—in digging up jobs. And you'll find his shop equipped to give you first class repair and rebuilding service.

He Certainly Pulled Me Out of a Hole

I was half-crazy the day our driver skidded into the ditch on that big defense housing job. Bad weather had crowded us to the point where we just couldn't afford to lose a single hour if we were going to finish on time.

I stood there beside the mixer looking like a lost soul when young Bob spoke up—"We'd better get the Rex distributor on the phone," he says, "he'll be able to find a Moto-Mixer we can use while he's putting this one in shape."

I had the Rex distributor on the phone five minutes later, pouring out my tale of woe. "Don't worry," he told me, "I know right where to put my hands on a mixer for you. And I'll send a tow truck right out for your machine."

So we really didn't lose much time after all, thanks to the Rex Distributor. Why, in two days he had our own machine rolling again, even though it looked pretty battered to me lying there in the ditch.

That sudden service certainly pulled us out of a bad spot. My Rex distributor has done a lot of things just like that for me in the past. He's a good man to know.

CHAIN BELT COMPANY OF MILWAUKEE

MIXERS • PUMPS • PAVERS • MOTO-MIXERS • PUMPCRETE

See your REX Distributor *first* for Rentals, Repairs, Rebuilding

Arnold Machinery Co., Salt Lake City, Utah; Brown-Bevis Equipment Co., Los Angeles, California; Brown-Bevis Equipment Co., Phoenix, Arizona; Construction Equipment Co., Spokane, Washington; Contractors Equipment and Supply Co., Albuquerque, New Mexico; Corson Machinery Co., Ray—Denver, Colorado; Hall-Perry Machinery Co., Butte, Montana; Intermountain Equipment Co., Boise, Idaho; Loggers & Contractors Machinery Co., Portland, Oregon; Star Machinery Co., Seattle, Washington.

RODGERS KEEPS 'EM CRAWLING

HYDRAULICS
Rodgers
KEEP THE WORLD MOVING

Manufacturers of:
UNIVERSAL HYDRAULIC PRESSES
TRACK PRESS EQUIPMENT
HYDRAULIC KEEL BENDERS
HYDROSTATIC TEST UNITS
POWER TRACK WRENCHES
PORTABLE STRAIGHTENER
FOR KELLY'S AND PIPE

ON THE FAR FLUNG BATTLE FRONTS, on the new Alaskan Highway, or a road construction job anywhere, Rodgers Hydraulics are doing their bit. ★ Wherever crawler type tractors tussle with heavy road building or construction jobs, Rodgers Hydraulic Track Presses furnish speedy repair of vital track equipment. Wherever heavy machinery operates — automotive, construction, factory or power plant — Rodgers Universal Hydraulic Presses will do a pulling, pushing or lifting job with speed, power, durability and safety. ★ To meet the demands of our times, Rodgers Hydraulic Track Presses are equipped with the Retractable Jaw, the greatest improvement in track servicing equipment — approved and recommended by Engineering and Service Departments of every crawler tractor manufacturer. ★ ***If it's a Rodgers, it's the best in Hydraulics.*** Rodgers Hydraulic Inc., St. Louis Park, Minneapolis, Minn.

Rodgers HYDRAULIC Inc.

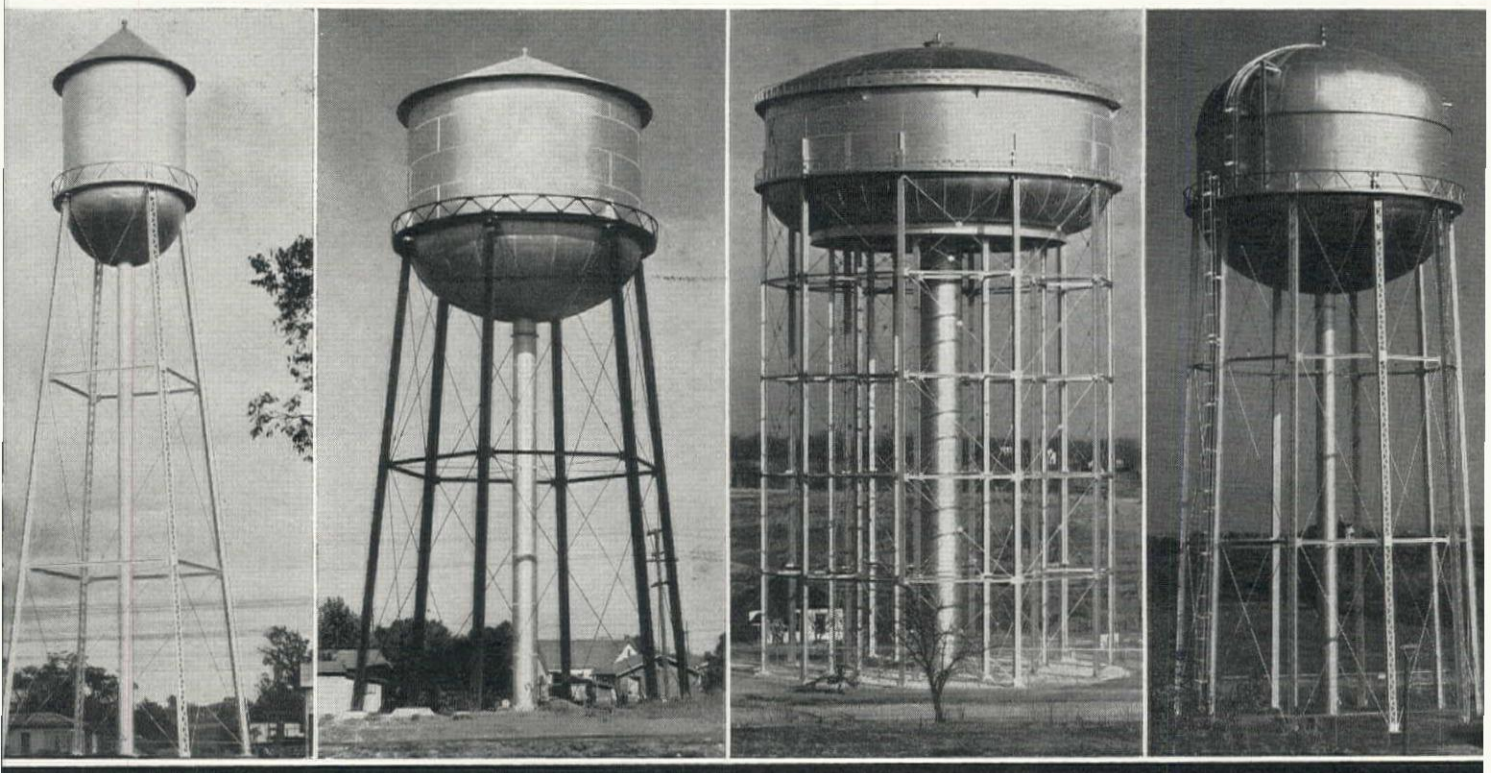
for the Duration—

USE THIS SIMPLE EQUIPMENT TO HELP ASSURE CONTINUED BEST SERVICE FROM YOUR

ELEVATED STEEL TANKS

by PITTSBURGH DES · MOINES

Keep its protective coating intact, and your elevated tank will last for many years! Now, more than ever before, the simple paint maintenance that gives maximum life to steel is a conservation duty for every municipality. To help in this necessity, we will gladly supply paint specifications for your local riggers and painters, and any needed advice as to procedure, without charge. Write!



PITTSBURGH • DES MOINES STEEL CO.

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SEATTLE, WASH., 1128 EIGHTH AVENUE, SOUTH

DALLAS, 1225 PRAETORIAN BUILDING . . . CHICAGO, 1224 FIRST NATIONAL BANK BUILDING
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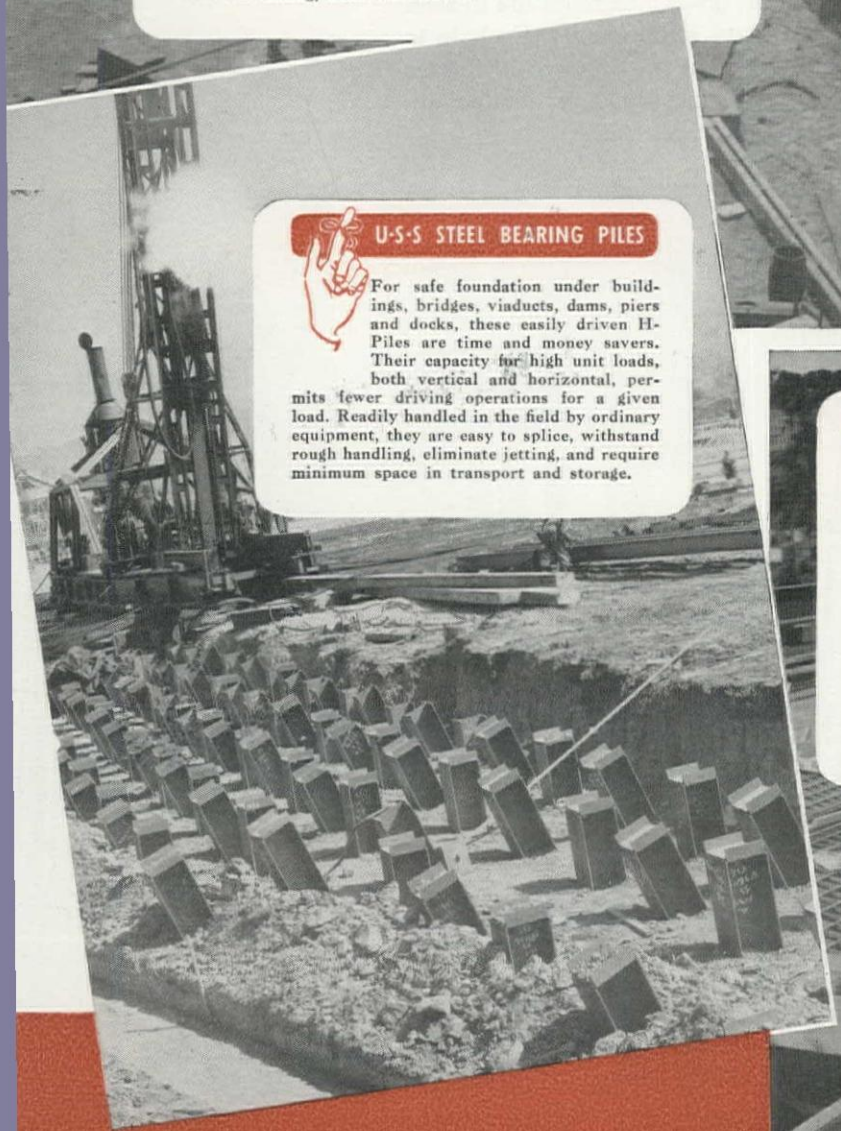

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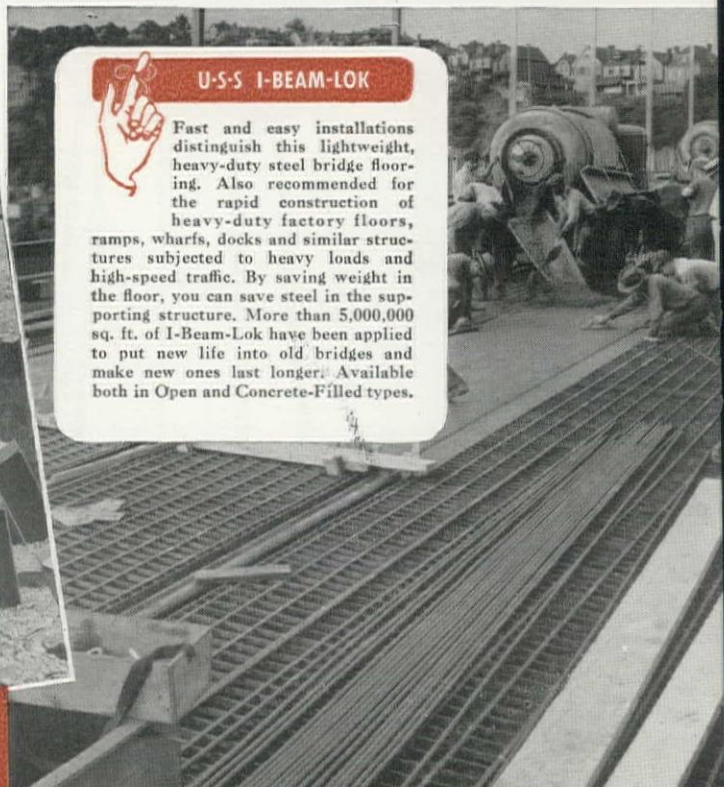

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Fast and easy installations distinguish this lightweight, heavy-duty steel bridge flooring. Also recommended for the rapid construction of heavy-duty factory floors, ramps, wharfs, docks and similar structures subjected to heavy loads and high-speed traffic. By saving weight in the floor, you can save steel in the supporting structure. More than 5,000,000 sq. ft. of I-Beam-Lok have been applied to put new life into old bridges and make new ones last longer. Available both in Open and Concrete-Filled types.

A message to the men who are planning tomorrow's construction

IT is a tribute to the native resourcefulness of our construction engineers and builders that despite the withdrawal of basic engineering products for use in the war—so much important civilian construction and necessary maintenance has been carried on.

But such construction, no matter how ingenious, has merely served to emphasize by contrast the greater efficiency, economy, convenience and all-round versatility of *steel*.

For these reasons we remind you to include in your plans for the future the engineering steels and steel products that you miss so much today. Then, Steel Sheet Piling, Steel Bearing Piles, I-Beam-Lok Steel Flooring, Steel Culverts, Reinforcing Bars and other U·S·S steel engineering specialties will be again available — improved by their war-time service — ready to serve you better than ever before.

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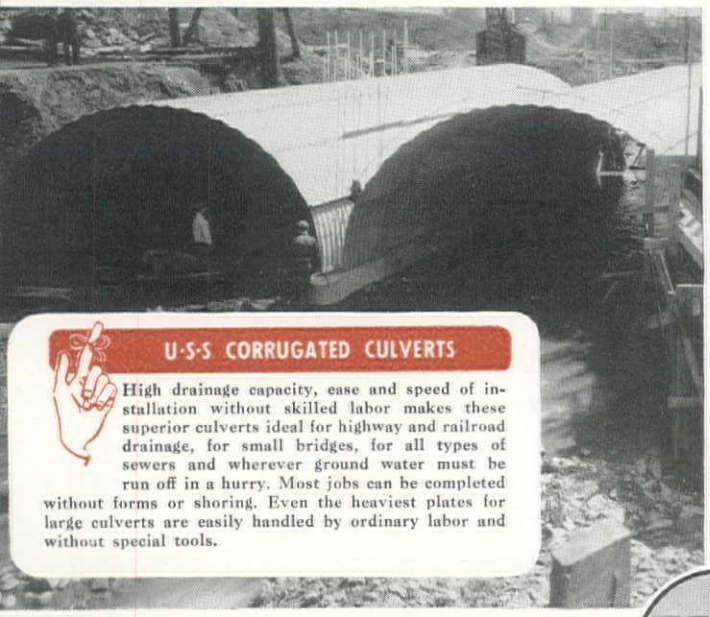

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Made full size, cleanly rolled from new billet steel to standard specifications. These well-known bars are indispensable where strength is necessary in concrete work. Distributors located in all principal cities insure least delay in delivery.

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UNITED STATES STEEL

Construction Crews are Not "Expendable"

These reminders of safe excavator operation may save you serious time-losses and help to keep your men working 100 per cent on the job for victory:

Replace ropes as soon as they show broken strands. A few shifts of extra rope service is not worth a serious accident.

Set dipper or bucket solidly on the ground when leaving the machine—never suspended in the air. By doing this there's no danger that a cooling brake or a creeping drum will pin a man under the load.

Always disengage engine clutch when engine is stopped and whenever operator leaves his seat. Do not engage engine clutch till after engine is started.

Always watch dipper, bucket, or load while it is moving. If you must look away, stop hoist and swing motions. Accurate control adjustments are essential to safety.

Keep eyes peeled for cave-ins; swing machine clear; if necessary, back it out of danger.

Teach pitmen alertness at all times. A rolling stone can maim or kill as well as a bullet.

During blasting operations, turn rear end of excavator toward the blast, moving machine to as safe a position as possible. In an emergency the dipper, set back on the pit floor, makes the safest shelter from blast fragments.

Safety first, last and all the time is a "must" for everyone on the job. Uncle Sam needs every possible man-hour on the production front; each time-loss is a victory for the Axis.

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

WASHINGTON: Bucyrus-Erie Co., 3408 First Ave. So., Seattle; Clyde Equipment Co., 3410 First Ave. So., Seattle; Construction Equipment Co., 1118 Ide Ave., Spokane. OREGON: Clyde Equipment Co., 17th and Thurman Sts., Portland. CALIFORNIA: Bucyrus-Erie Co., 390 Bayshore Blvd., San Francisco; Crook Co., 2900 Santa Fe Ave., Los Angeles. UTAH: The Lang Co., 267 W. First So., Salt Lake City. COLORADO: Ray Corson Machy. Co., 1646 Wazee St., Denver. IDAHO: Intermountain Equipment Co., Broadway at Myrtle, Boise. NEW MEXICO: R. L. Harrison Co., 209 Fourth St., Albuquerque. ARIZONA: O. S. Stapley Co., 723 Grand Ave., Phoenix. MONTANA: Westmount Tractor & Equipment Co., 150 E. Spruce St., Missoula. ALASKA: Northern Commercial Co., Seattle, Wash.

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Continuous Course Correction assures a smooth pavement with the minimum of rough grade preparation.

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Here is a machine that gives true leveling without forms, accuracy of control and a course that rolls out smooth as silk. The future of road building is going to call for a lot of blacktop. Plan to know all about the Adnun. We will be glad to send literature on request to help you.

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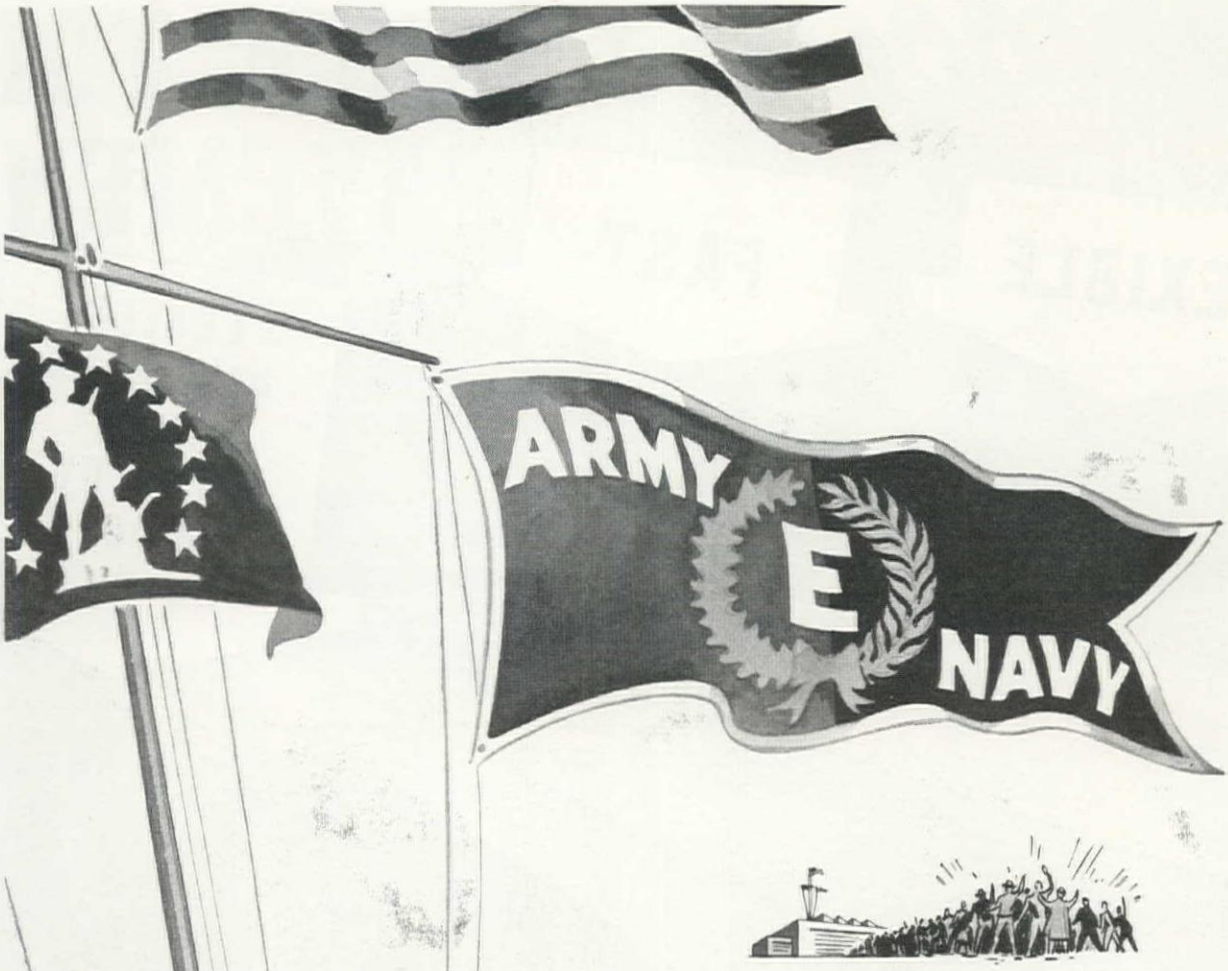

A New Flag Flies Over Union Metal Today

THERE'S a fresh look of determination in the eyes of the men and women of Union Metal today—a look that is accompanied by a greater hum of activity than we have ever heard around here before. For, outside our plant, flying high for all to see, is the coveted Army-Navy E Pennant.

That new flag has done something to all of us—something we can't quite explain, but which certainly augurs no good for America's enemies. And, from here on in, we pledge to do our best to *continue* to merit this great honor which the armed forces have conferred upon us, and to give to them the fullest support, both moral and material, of which we are capable.

Special War Products—Cargo Booms and Masts, Practice Bombs, Recoil Mechanisms, Gun Mounts.

Regular Products—Steel Street Lighting Standards, Monotube Steel Pile Casings, Steel Skids and Boxes, Monotube Steel Poles for distribution and transmission lines.

UNION METAL

THE UNION METAL MANUFACTURING COMPANY
CANTON, OHIO
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Logistics
IS SHIPS AND MEN AND WIRE ROPE...

ROEBLING *"Blue Center"* helps 'em get there first!

Pushing stubby assault boats ashore, through withering enemy fire, storming the beaches and mopping up enemy strong points—advancing inland to take and hold strategic airports, towns, road and railroad junctions—there is more to a successful invasion than these stirring deeds of U. S. fighting men in North Africa. To make that invasion possible, to make it *stick* till all objectives are fully attained, takes the brains and brawn of thousands of men who may never get to see the fighting at all—sailors on escorting warships, seamen on transports, dockworkers and stevedores to load and unload thousands of tons of equipment and supplies. It is these men and their ships *and their rope-equipped machinery* that make up the physical basis of *logistics*—the art and science of getting there first with the most and *staying longest!*

It's a tough job, meeting all the needs of a sizeable army in the field against a powerful enemy. Army Engineers and special stevedore units, Navy crewmen, merchant seamen—all of them swing to with a will. And they keep the ammunition coming for men and guns. In many of these places where the going is tough today, Roebling "Blue Center" Steel Wire Rope is in there swinging. Bringing to this tough job too the extra values built into it by Roebling Engineers out of their experience in the field—in Roebling's mills—in Roebling Development Engineering. Meeting unfailingly all the demands of Victory.

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You can do a lot to save steel by observing simple precautions in the installation and handling of wire rope, and help conserve rope for use by our fighting men. To make the job even easier, Roebling has prepared a handy tag—yours for the asking—to fasten right to your machinery where it'll do the most good. Our nearest office will gladly supply you with as many as you need. Ask for Tag "A".

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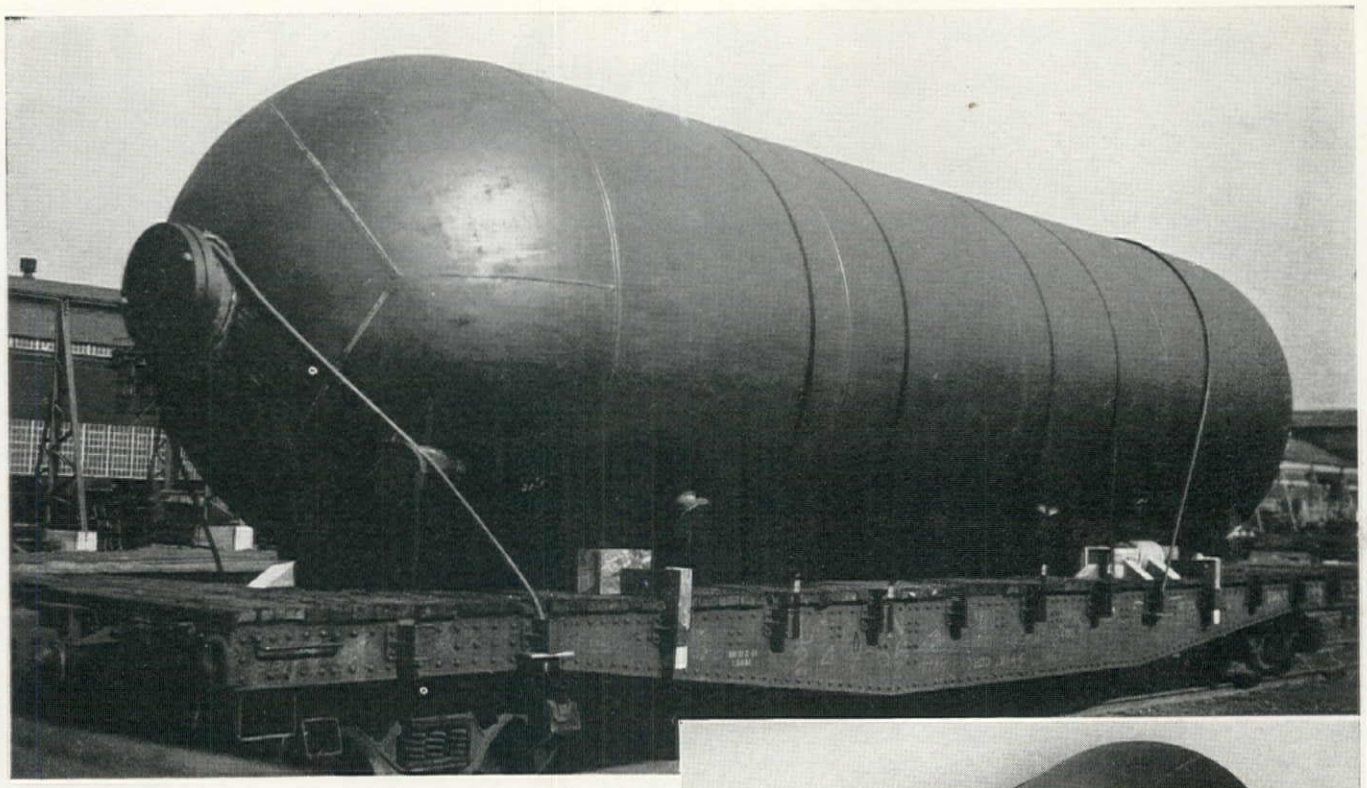

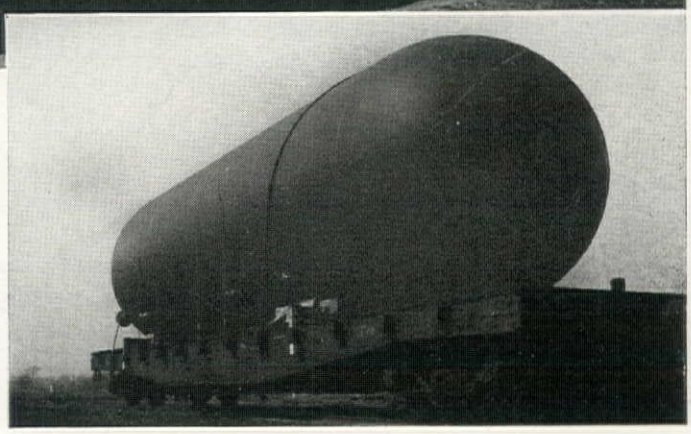

Another PRESSURE VESSEL INSTALLATION FOR VITAL WARTIME SERVICE

THE experience and knowledge gained during peacetime production of welded steel pressure vessels has made possible the fabricating of units specifically designed to help various industries meet wartime production schedules. Pressure vessels are utilized to solve various storage and handling problems in the production of butyl rubber, aluminum and many other essential products.

If governing specifications call for x-raying or stress-relieving . . . our Birmingham plant has complete facilities for meeting these requirements. Vessels up to 13 ft. 2 in. in diameter and as long as can be shipped can be handled in the stress-relieving furnace.

In addition to pressure vessels, we are building a wide variety of storage tanks to serve industry . . . and speed the war effort.

Here are two "bullets" which were fabricated at our Birmingham plant for an Ordnance Works. The vessels are each 10-ft. 5½-in. in diam. and 40-ft 9-in. long, and will be used for the storage of anhydrous ammonia. Both vessels were stress-relieved.

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WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER
May, 1943 Vol. 18, No. 5

Hail To The Dreamer

WESTERN CONSTRUCTION NEWS this month publishes an outline of a proposed trans-Pacific air terminal to be located on the east shore of San Francisco Bay, immediately north of the Bay bridge. It is an ambitious project, to cost in the neighborhood of $60,000,000 and to provide landing accommodations for every type of aircraft, as well as terminal facilities for ocean vessels and land transportation. It may seem a fantastic dream to some readers, and in fact it is a dream at the present time, since neither money, material, manpower, nor right-of-way is available for its construction.

But it's the sort of dream that makes for progress in human activity. For years, probably ever since 1849, settlers of the San Francisco area had dreams of fast, easy transportation across the romantic Golden Gate, and across the great bay. And then a few years ago, engineers added solid knowledge and resourceful construction to those dreams to produce two of the greatest bridges in all the world. Boulder, Grand Coulee, Ft. Peck dams had been dreamed of, wished for, for a long time before they became realities because of exploration and the ingenuity of engineers and construction experts.

The construction of such a complete terminal for trans-Pacific air travel when commercial relations are resumed after the war, is an unquestioned necessity, and San Francisco bay seems to be the geographically correct location for such a terminus.

Whether or not the site and plan suggested by Donald R. Warren, engineer who has made the studies for this particular proposal, are perfect, this editor wouldn't care to say. It certainly looks good and seems entirely feasible. Immediately to the south of the Bay bridge, the U. S. Army has in the past two years filled almost as great an area as is proposed for the airbase, on tidal flats of exactly the same character as found in the location designated. Certainly something approaching this plan in magnitude **must** be built in the Bay area. Certainly the plan as outlined **could** be built.

Perhaps when the base is finally constructed, it will be a few miles one way or another from the site currently proposed. Perhaps further tide, fog and wind studies will cause a rearrangement of runways or docks or facilities. Perhaps the terminal will be even larger than now considered. Whatever the final development, the citizens of the Bay region, in fact of the entire West owe a debt of gratitude to Mr. Warren for his dreaming, and for the solid study with which he has clothed that dream.

When or where or how it will be built, no one now knows. But it shall be, and as people are immeasurably better off because dream bridges and dams become solid, so the nation will be benefited when this dream of a connecting link between the Far East and America's Pacific shore shall become real.

Construimus Batuimus

THE IMPORTANCE of the home front in winning the war has been emphasized almost to the point of boredom from radio, press and platform. In spite of the over-propagandization no one can deny that home morale and production are of first importance and dare not be allowed to deteriorate.

But armies can not be trained, nor the implements of war produced unless the ingenuity of the engineer and builder has first been called on to construct. It is interesting that belatedly credit is beginning to fall on the construction industry. Army-Navy "E" pennants are being won and Selective Service is recognizing most branches of the industry as "essential."

But less well-known and even less appreciated until very recently are the exploits of those experts of the construction industry who are plying their trade at, or immediately behind the battlefront.

It is said that the Marines land with their guns in their hands and start fighting. Right behind them the "Seabees" land, carrying a hammer or some other tool in one hand, and a machine gun in the other. Their motto is *"Construimus Batuimus"* ("We build, we fight.") Ranking equally in importance and bravery are the combat units of the Army Corps of Engineers.

Men returning from the battlefields of the world report that these two groups of men, enlisted almost wholly from the ranks of the civilian construction industry, have a spirit as high or higher than any other branch of the service, as they recognize the vital necessity of properly and swiftly built bases, roads, fields, and fortifications. They labor gladly under all sorts of "impossible" conditions; they begin repairs while bases are still under fire; they join combat troops in repelling counter-attacks and bombing raids.

From the south Pacific, from the Aleutian Islands, from Iceland, from all over Africa come splendid accounts of the valiant endeavors of these construction men. The stories range from bravery under fire to long and sleepless attention to merely routine duties. The men with whom we've worked and bunked and quarreled are fighting men today, fighting men no less because they wield the familiar tools of construction than if they used the more sinister weapons of death.

On the occasion recently of his dedication of Camp Endicott, the new Seabees training center on Narragansett Bay, Navy Secretary Knox delivered a speech of commendation for the work of the battalions, praising their "know-how" and fighting spirit. We construction men can be proud of these our brothers in the service.

Certainly the tremendous home front task which the construction industry has so splendidly performed and which is now nearing completion is worthy of great praise. But it is anticipated that only about one-eighth as much money will be spent on construction activities in continental United States during 1943 as was spent in 1942. *Western Construction News* very highly recommends to the men of the profession enlistment in either the Seabees or the Army Engineer Corps when their present jobs are done, as the most effective use of their talents in delivering the knockout blow to the Axis.

PRECISION POWER and "PUSH"!

Blade leveling with the "99-M" at an immense dam and flood control project.

Finishing up at a Naval Training Station site; soon afterwards "99-M's" had the area evenly graded and ready for use.

OFFICIAL U. S. NAVY PHOTOGRAPH

► The only way to get things done, on a basis that pays, is to team up men and equipment that have plenty of "push". There's no other formula for the job that must be tackled energetically—be accurate when finished and entirely satisfactory. Nowadays there are many such jobs—victory demands it—and so there are many "99-M's" busy on contracts, helping builders to quicken their tasks.

What owners like about a "99-M" is the surge of extra power and "push" which all-wheel drive and steer develops—by stabilizing the front end and by increasing traction. Also the precision they get with hydraulic control, the exceptional blade firmness and the accuracy of the moldboard side shift.

Austin-Western Distributors can give you all the information you want about this machine and they will be glad to cooperate as well on any maintenance or service problem to keep present equipment running and producing. THE AUSTIN-WESTERN ROAD MACHINERY Co., Aurora, Illinois, U.S.A. Distributors in Principal Cities. Cable Address: AWCO, Aurora.

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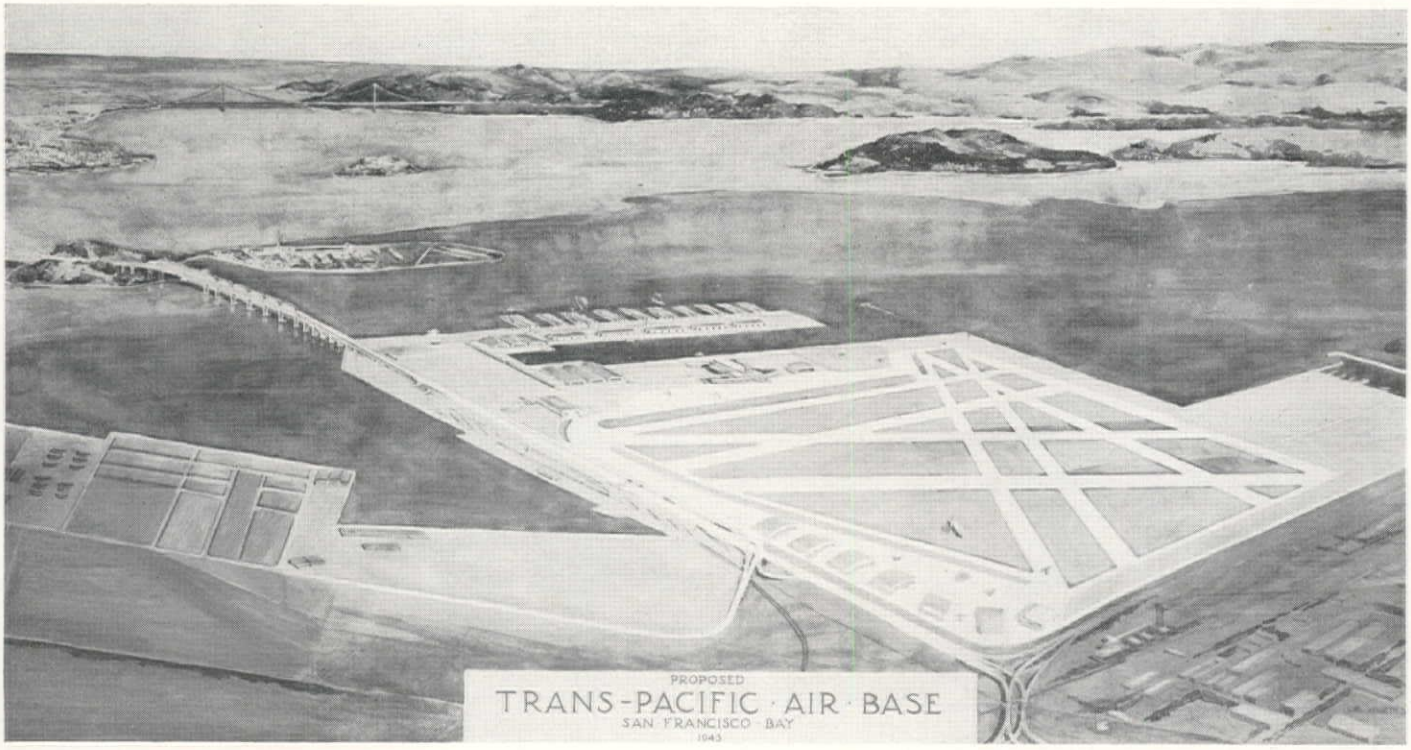
WESTERN CONSTRUCTION NEWS
MAY • 1943



Plan Pacific Air Terminal

A sixty-million dollar air base to accommodate every type of flying ship, ocean liners, and land transportation is proposed for the east shore of San Francisco Bay, to serve as a United States terminus for post-war trans-ocean aviation lines

AN AIR BASE to serve the entire San Francisco Bay metropolitan area and provide a centrally-located west coast terminus for trans-Pacific as well as western hemisphere air lines is now being studied. It would serve as a partial solution to economic readjustment after the war and should have a far-reaching effect upon the growth of the West. The need for an adequate base is already great, as the growth of the airplane industry in recent years has been astounding.

In the year 1942 six times as much money was spent on aircraft production as was expended on automobiles in the maximum year of automobile production. This "infant" industry has already shown its importance in the transportation field, for example the wartime job of rapid hauling of vital material by the ferry commands. Experts are confident that the airplane will never invade the field of heavy freight hauling, because economic factors prevent successful competition with ground transport. It will, however, be valuable in carrying special and perishable cargoes such as flowers, fruits, mail and small parcels, and for servicing isolated communities.

The bay region airports are now handling passengers at the rate of 1,000 per day even with a great curtailment of facilities. In normal times, with more planes available for civilian transport, estimates have been made that over twenty-five times that volume may be expected.

An indication of the trend toward aviation is the recent bill introduced in Congress to have all first class mail transported by air.

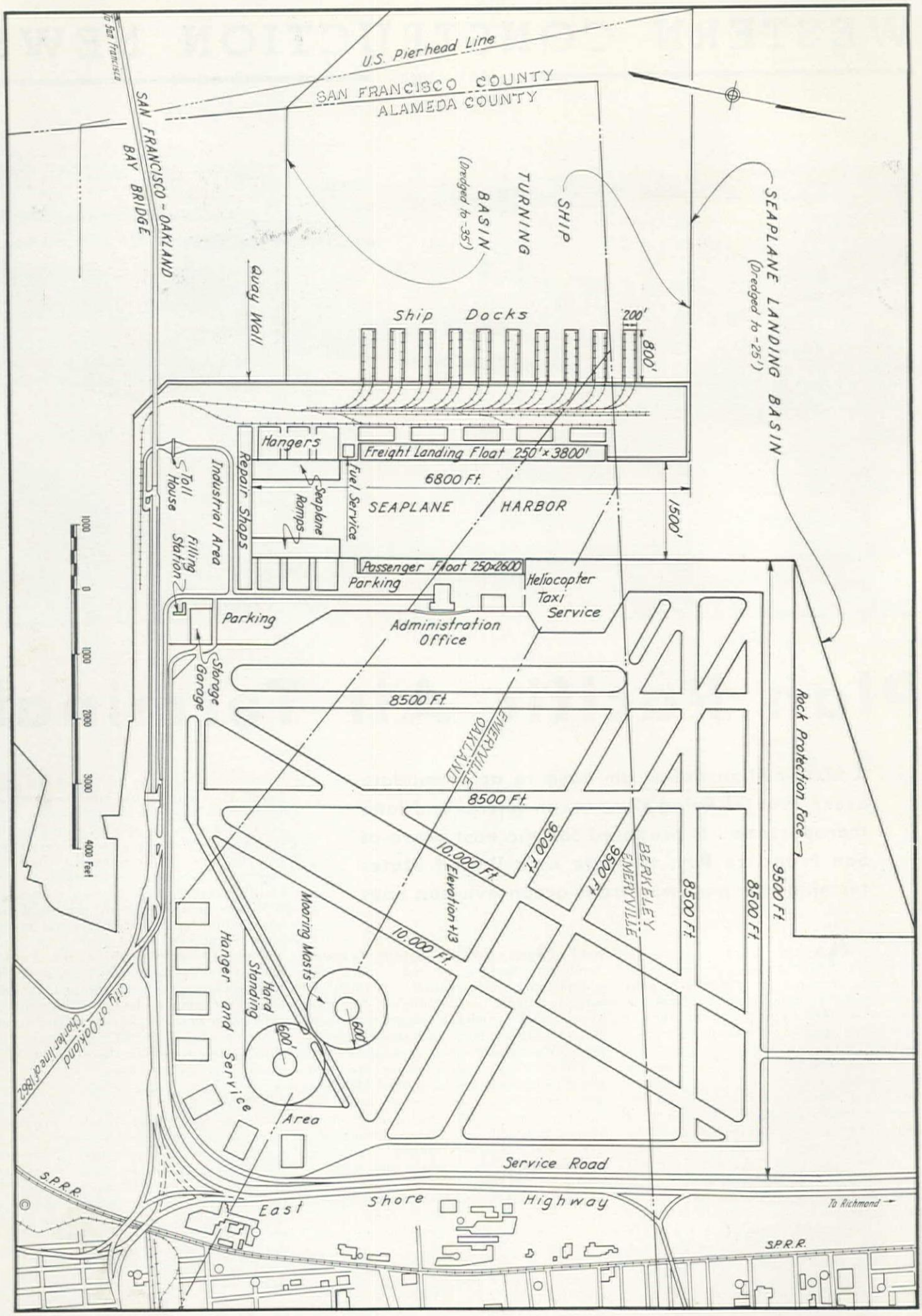
Some cities in the eastern United States maintain that they are closer to the Orient than the San Francisco Bay region by virtue of the shorter "Great Circle" route, and an airbase of the proposed type, combining land, sea and air facilities will be an important factor in offsetting these claims, according to the supporters of the proposal. Flyers from this base will not be obliged to face the vigorous Arctic flying conditions encountered on the great circle route.

When completed the proposed air base would be the largest in the world, comprising 3,200 acres or 5 sq. mi., and will usefully employ the exposed mudflats of the bay onto which most of the Eastbay sewage is now pumped. Included in the project is the extension of existing sewer lines and construction of a sewer outfall further out from the shore, thus aiding in the solution of a major Eastbay problem.

Location

The designers feel that the proposed location for the air base immediately north of the San Francisco-Oakland Bay bridge, on the east shore of the bay, is the most advantageous of any area in the bay region. It would be within 10 minutes of the downtown districts of both San Francisco and Oakland. Present airports require 45 minutes or more traveling time from either of the metropolitan districts.

Its central location and proximity to the Bay bridge give it a preferred situa-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tion. Climatic conditions in this location are as favorable as any in the Bay region, and it is thought that fog will present no great problem.

Two alternate sites for the air base were studied. One a little to the north of the final proposed location, to which the major objections were a more expensive highway grade crossing and the fact that it would be 6 mi. further from downtown San Francisco and 1½ mi. further from downtown Oakland. A prominent hill close by in Albany also presented a definite flight hazard. The other alternate was at the present proposed site but with a different orientation, placing the administration building at the north end of the fill. This would also have added to the distance from metropolitan areas and the location had certain other disadvantages.

Cost

The Trans-Pacific air base is being sponsored by a non-profit, non-political organization known as the Metropolitan Developers, which was formed for the scientific analysis of problems of local metropolitan concern. The group includes Major-General Walter Sweeney, Attorney Ray C. Hackley, Jr., Major Ernie Smith, and Engineer Donald R. Warren.

The total cost of the airbase development will be approximately $60,000,000. In addition to a Class 4A airport, with eight runways, varying in length from 8,500 ft. to 10,000 ft., the proposal includes a base for seaplanes, ten docks for ocean-going vessels, facilities for servicing lighter-than-air craft, and provision for a heliocopter taxi service to nearby population centers. This class of airport design will accommodate the heaviest and largest of planes. An extensive manufacturing area has also been provided for in the filled area.

In order to be of commercial value the complete development need not be made all at the same time. For a sum of $35,000,000 the area could be completely filled in, four of the runways and a dock constructed with rail and building facilities, and hangars and important buildings erected. Further expansion could then be made as the need arose.

The West will occupy a position of increased importance with growth in the aircraft, steel, and mining industries, and with added electric power available for industrial consumption. This air base development with its far-reaching local and national benefits, could be financed either by federal or private investment. Metropolitan Developers report that private capital has already evidenced an interest in the project.

Project details

The 3,200-ac. fill will require 88,000,000 cu. yd. of material, which will be obtained by dredging in the seaplane harbor, ship turning basin and channel. The fill will extend northerly as far as the present Berkeley Yacht Harbor, and the abandoned Berkeley pier will be removed to give a larger seaplane harbor. Treasure Island, built of dredged material as a site for the Golden Gate International Exposition, and now used as a Navy seaplane base, embraced an area of a little over 400 ac.

The fill would be placed to an elevation of plus 13 ft. above mean low water, while the seaplane harbor will be dredged to a depth of —25 ft. and the ship harbor to a —35 ft. depth.

Ten docks, each 200 x 800 ft. with a slip space of 250 ft. between, are provided for in the ultimate plan. The turning basin is to be 6,250 ft. wide at the docks tapering to a 1,000 ft. channel north of Treasure Island.

A rock face around the fill will be required for protection against tidal action. This rock will be quarried from nearby sources. Quay walls on the dock front will be a part of the harbor development.

A large area on the north has been reserved for a future manufacturing expansion. This area is designed for those industries requiring close proximity to such an airport for testing purposes, rapid transportation, etc.

The seaplane harbor is to be 1,500 x 6,800 ft. to allow adequate space for taxiing and takeoff for the huge seaplane transports. It is located on the seaward side of the development, but is protected from rough water by the dock structures.

Commercial facilities only will be provided, since private planes would hinder the efficient use of such a great shipping center. Smaller airports in the vicinity will be entirely adequate to accommodate private planes.

The plans have been prepared so that there will be no interference with existing traffic in the region. One overpass structure will be required over the Bay bridge east approach for the east bound traffic from the base, to eliminate a traffic crossing. Traffic from San Francisco will leave the bridge west of the present toll plaza, and double back under the bridge. All other lanes of traffic to and from the base can be handled by direct feeder lanes together with extra acceleration lanes.

An extra toll plaza is made necessary for traffic from the San Francisco side.

A service road entirely bordering the fill is planned. Next to this will be hard-standing areas for taxiways and parking aprons. The eight runways, each 250 ft. wide, are arranged to accommodate a large traffic volume regardless of the direction of existing air currents. There will be two runways north and south and two east and west, each 8,500 ft. long. One of the two pairs of diagonal runways will be 9,500 ft. and the other 10,000 ft. long.

On the south side of the air base will be located the hangars for the planes. Toward the west will be repair shops and fuel service areas.

Looking toward the not-too-distant future, a provision is made in the plans for a heliocopter taxi service to serve the air base. This additional space will be made available north of the administration building and adjacent to the seaplane harbor. On the opposite, or southeast side, mooring masts will be available for lighter-than-air craft.

Railroad facilities can easily be provided into the base, since both the Santa Fe and Southern Pacific railroads have lines paralleling the east shore of the bay.

An administration building of the most modern design is contemplated, to cost approximately $2,000,000. It will embody features enabling express and mail to be handled with the greatest efficiency. Passenger traffic will be expedited by a curved system of ramps whereby passengers can walk directly to their plane without setting foot on the airfield. This design is in use in a few Eastern airports at the present time.

Drainage of the large area will be accomplished by one of two methods. One would employ pumping stations properly placed in the area, the other method is to have gravity flow into basins from which outlets equipped with tide gates, will discharge into the bay.

The material in this article was obtained from Donald R. Warren, in whose engineering offices the preliminary plans have been drawn, and estimates calculated.

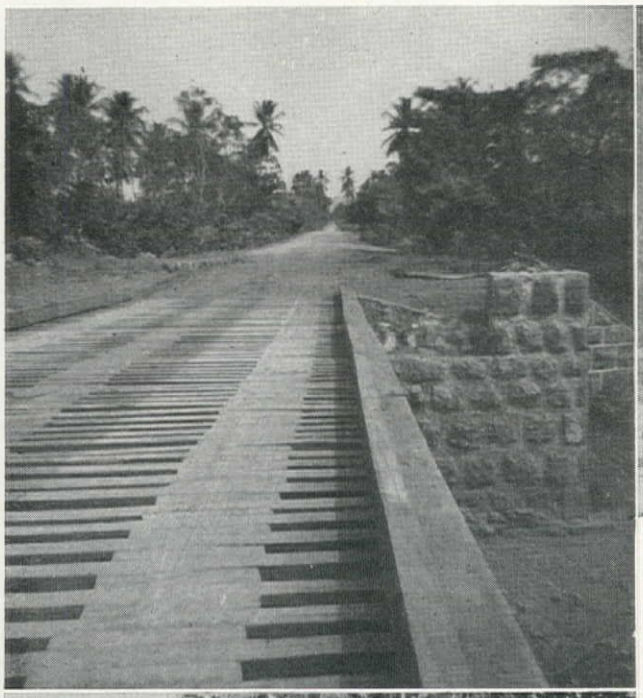
WPB Revokes Order Stopping Work on Portions of Grand Coulee Project

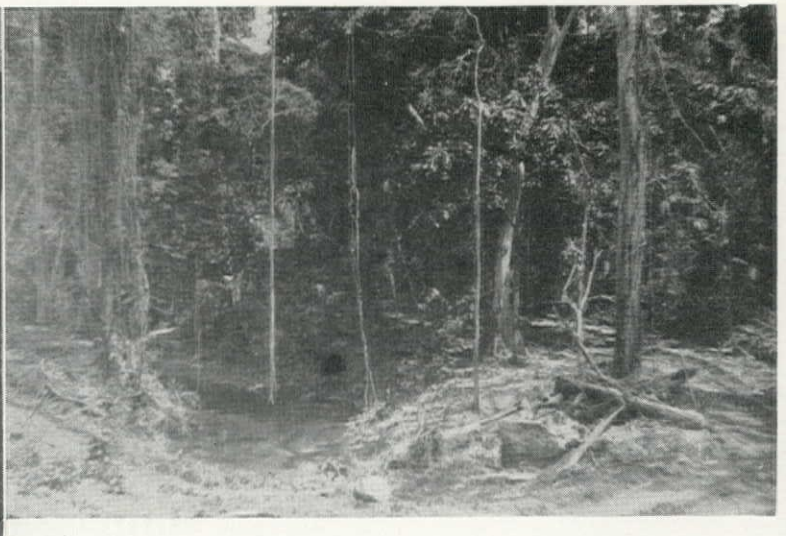
A STOP-CONSTRUCTION order halting work on the Grand Coulee dam project has been partially lifted by the War Production Board, which authorized construction of a road to replace one which was inundated by high water in the Grand Coulee reservoir.

Relocation of the road was stopped by the revocation order for the dam. It was held to be essential in that it provides access to town for farmers who would otherwise be isolated. The road, known as the Lincoln County Road, extends south from Miles, Washington, for a distance of approximately 14 mi. A cost limitation of $366,000 was placed on the project.

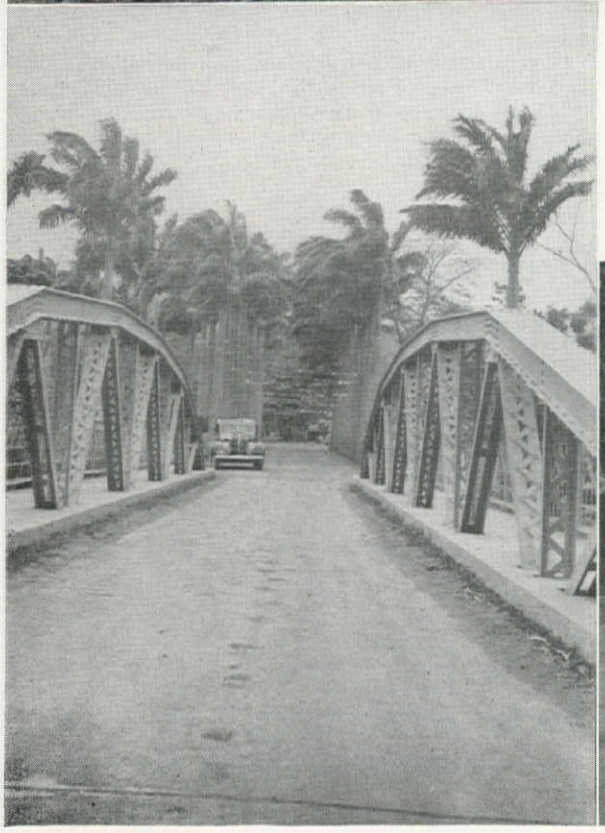
Today's action was the second amendment to the Grand Coulee dam project revocation order. Permission was given previously for replacing the temporary wooden gates at the outlet ends of the turbine draft tubes in the right power house of the power plant with twenty-seven steel bulkhead gates.

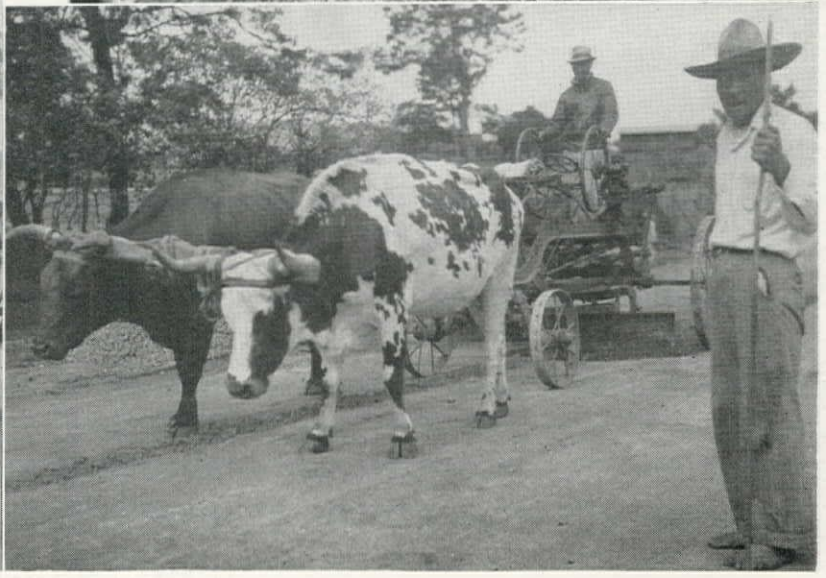
At the same time, WPB partially relaxed restrictions on the Blackfeet, Montana, irrigation project to permit construction of a canal and headgate to replace the former canal system near Cut Bank, Montana, and rehabilitation of seven miles of canal. This part of the program of the Bureau of Indian Affairs was halted December 16, 1942.





Scenes on Pan-





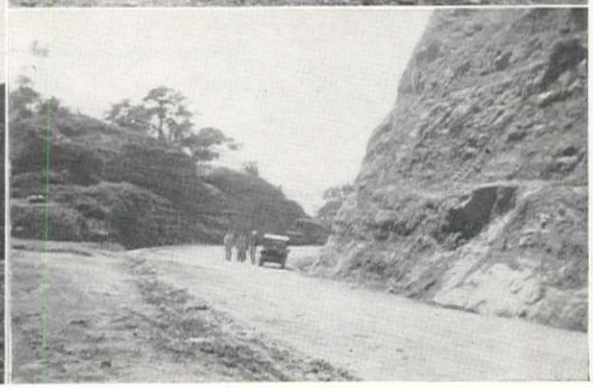
American Route

TYPICAL construction activity on the Pan-American Highway is shown in these scenes taken at various points along the route. On the left hand column of the opposite page are several of the typical structures that have been required, a timber trestle with masonry abutments, a culvert of native timber obtained from clearing operations, and a through-truss steel span. On the right-hand column is a jungle view taken in Panama which is representative of a great deal of country traversed by the highway. Primitive transportation methods are still prevalent in many of the Latin-American countries, illustrated by an ox-cart train hauling explosives and a pair of oxen powering a pull grader.

A great variety of vegetation is encountered along the great length of the highway, from dense jungle growth to semi-desert, and mountain to seashore. Clearing the roadway was an important item on much of the route.

Nearly all native labor was employed by the Latin American contractors and over 90 per cent of labor employed by American contractors was native. Two of the pictures on this page show sections of the road done by hand labor.

Of the connecting links being built at the present time between existing highway units, only one 80-mi. section will be in a complete form. The PRA is in charge of this unit, while on the rest the Army has contracts with three American contractors for an all-weather pioneer route. It is hoped to get this part in an approved form before long. All permanent bridges are under the authority of the Public Roads Administration, while the temporary bridges and culverts are designed and constructed by the Army Corps of Engineers.



Swing Bridge Is Semi-Welded

Design studies for a bridge over the Mokelumne River in California indicated that the swing type was more satisfactory than the bascule and that welding some parts of the truss would be more satisfactory than riveting—weight of metal, appearance and cost all entered into the estimates

By B. M. SHIMKIN
Associate Bridge Designer Engineer
Bridge Department of State of California
Sacramento, California

ARC WELDING was used to a limited extent on a swing bridge built by the California Division of Highways in 1942 across the Mokelumne River about 5 mi. northwest of Terminous on State Highway 12. In the course of design investigations for the structure, numerous matters of interest developed as riveted, welded, and semi-welded types of through-truss highway bridges were studied. Some of these matters are presented in this article.

The semi-welded design was finally adopted for this structure. It was designed in the office of the California Division of Highways in Sacramento, by the author, and erected in 1941-42. It was opened to traffic on June 1, 1942.

A duplicate swing bridge is expected to be built during this year at another site. A similar span, all-riveted swing bridge was built in 1936 on Highway 15.

In the construction of the present swing bridge arc-welding was permissible for use within limits prescribed by the American Association of State Highway Officials, Specifications of 1938.

The total amount of arc-welding used in the structure amounted to 2,032 ft. (mostly 5/16-in.) or 438 lb. of electrodes.

The soil conditions at the site are such that the height of the road fill is limited and total length of structure was fixed, as well as the grade of the bridge deck. This bridge crosses a navigable river and must be open for passing ships.

Different types studied

With such limitation an important consideration, comparative estimates of swing and bascule bridges were prepared and showed a saving in favor of swing bridges amounting to 4.8 per cent.

The cost of maintenance for swing bridges is less than for bascule bridges. The Annual Report of the Department of Bridges, City of New York (for period 1913-1916), based on data for six swing bridges and ten bascule bridges of the same spans, shows the following costs of maintenance and operation:

Bascule bridge for year	$9,467
Swing bridge for year	7,916

California Division of Highways (period 1939-1941) based on data for three bascule and three swing bridges, found the following costs:

Bascule bridge for year	$9,740
Swing bridge for year	4,298

These comparative figures can be accepted in a broad statement only, for there are too many factors involved to make an accurate comparison possible.

However, the study of maintenance expenses revealed that the greatest part of the money goes to repair and replacement of deck on bascule bridges. By the nature of the bascule bridge it requires a lighter deck slab—to reduce counter balance, footing and weight of truss. At the same time a constantly increasing speed and weight of traffic vehicles demands a good solid deck slab, which can be furnished by a swing bridge only.

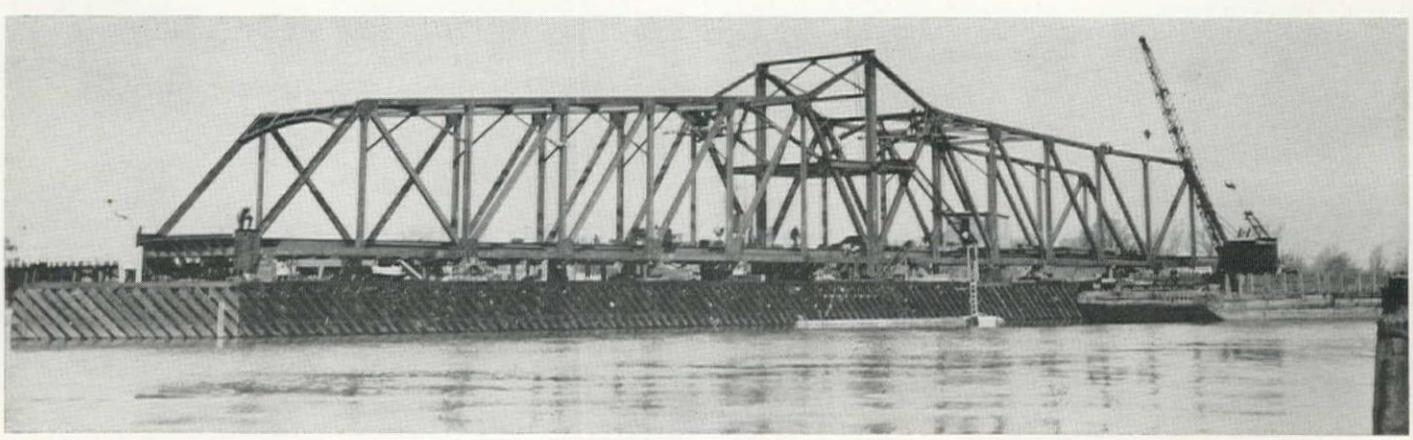
The swing bridge described here was built in a lowland country, where the soil has very poor bearing capacity and an unlimited space for this kind of bridge was provided. The roadway width on the structure is 26 ft. between curbs and sidewalks 2 ft. wide were built on either side. Modified Pratt trusses were used, 31 ft. 9 in. between centers of trusses, and 287 ft. 3½ in. between abutment bearings. The center bearing was based on a center round reinforced concrete hollow pier 40 ft. 6⅞ in. in diameter set on 143 Douglas fir piles.

The center pier and abutments are protected by timber fenders. For navigation, two 110-ft. clearances are provided.

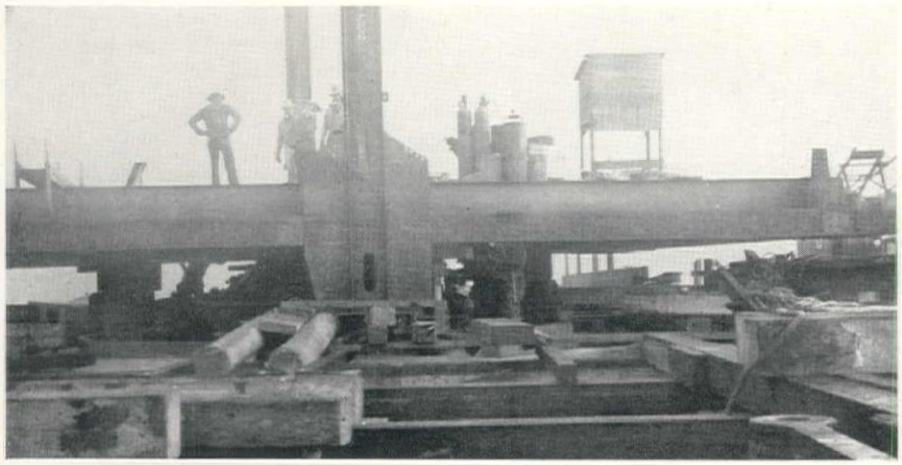
Design studies

All machinery, abutments, piers and other details which are common for both welded and semi-welded designs are omitted from consideration here. However, it should be mentioned that the machinery weights expressed in percentages of structural steel weights for highway bridges equal to from 12 to 13 per cent for span of 200 to 300 ft. This was checked in the design of the present bridge to give 11.7 per cent, and is also given in Table 3L of "Movable Bridges" by O. E. Hovey. The figure of 12 per cent was used in the final estimate for a welded structure.

For better comparison of the two designs, the controlling dimensions and general features of the welded design were made the same as for the semi-welded one. A single exception was made for the deck slab of welded design by using "I-beamlok armored bridge roadway slab," filled with Haydite concrete,



SWING BRIDGE on Highway 12, north of Terminous, across the Mokelumne River near to completion. The structure is protected from crashes by a timber fender, with 110-ft. navigation channels on each side of the bridge.



BEGINNING the erection of trusses from the center pivot girder. Erection of a swing span is a very simple matter, because of the presence of the rest draw and fender, which serve very satisfactorily as a working platform during the erection period.

instead of reinforced concrete slab such as was used in the present bridge.

It should be mentioned also that the design of a swing bridge is quite different from that of a common truss bridge. It is not only a bridge, but a bridge and a great deal of machinery and special equipment (locks, buffers, gates, signals, operator's house, etc.).

In order to obtain the design stresses for truss members in a swing span it is required to calculate stresses in five loading cases and later five combinations of such cases. After that many members should be checked for additional wind, bending and eccentric loading stresses. These additional stresses considerably increase section areas of members compared with areas required by the "design stresses" only.

Construction methods

The presence of the rest draw and fenders in a swing bridge create the most ideal conditions for an erection of trusses. The contractor has a platform to work on without any extra expense for false work, in fact, he is paid for its erection.

The welded members and fillets to gusset plates in this bridge were shop fabricated and no field welds were used in its construction. However, electricity was available on the site from the beginning of work.

The absence of rivet heads on welded members gives a smooth appearance, creates a beautiful impression when compared with riveted members, and decreases painting expenses; it also increases the life of the bridge by elimination of many "starting points" for rust around rivet heads.

In the case of full welded trusses the benefit of the rest draw will be extended by omitting the seat angles for the floor girders, stringers and other members, and supporting of all these members directly from the unyielded platform for the field welds, thus saving a great deal of construction expense. Again, the rest draw gives to the welders and their equipments the best working conditions compared with any other construction on false work and will increase their efficiency.

No filler plates are used in new welded trusses. They are replaced by the spacer bars, which give simpler details and eliminate the ambiguous design necessary for filler plates.

The American Welding Society formulas for calculation of the required area of welds for end connections of the truss members, give quite large areas for welds and such excess creates a total amount of field welds greater than shop welds.

In the present case this disadvantage of field welds would not have increased considerably the cost of construction, because (1) electricity was available on the site; (2) presence of the rest draw gives the best conditions for work; (3) simplicity of erection; and (4) local perfect climatic conditions—and all these factors tending to insure about the same surroundings as in the shop.

General procedure of construction for welded trusses is practically the same as for riveted ones—start from the center pivot girder and proceed to the ends—the work to be executed according to the best present welding practice and the specifications of the American Welding Society and the American Association of State Highway Officials.

Observation of construction of the semi-welded trusses on this swing bridge over the Mokelumne River and also many other jobs where welding is amply involved gives full confidence in the ability of the qualified welders, civil engineers and contractors to handle and accomplish such work with the best results and economy.

Savings from welding

The direct saving in metal for a welded bridge, as shown in the chart, amounts to 189,218 lbs. or 25.5 per cent over the semi-welded present trusses equals 33.3 per cent.

The total saving in cost of the whole structure, using welded trusses, amounts to 13.3 per cent.

Table I has the comparative weight of each group of members separately and clearly shows in which group arc-welding is mostly effective. The gusset plates and filler plates drop to 53 per cent, the welds save 70 per cent as against the riveting. The saving of weight of pivot girder and ring girder needs a special explanation:

By inspection of details of the riveted pivot girder it is seen that a great amount of steel used as construction material in riveted method is purely weight. To that waste weight belong numerous filler plates, web stiffener legs, and web flange legs, totalling in weight to 16,280 lbs.

Reduced dead load on the pivot girder (780.8 kips for riveted, and 532.2 kips for welded), requires a smaller moment inertia for the welded girder and the weight of girder reduces tremendously. Also, welded girders are effectively proportioned for shear and bending stresses without loss of section due to rivet holes. The same analysis applies to the ring girder.

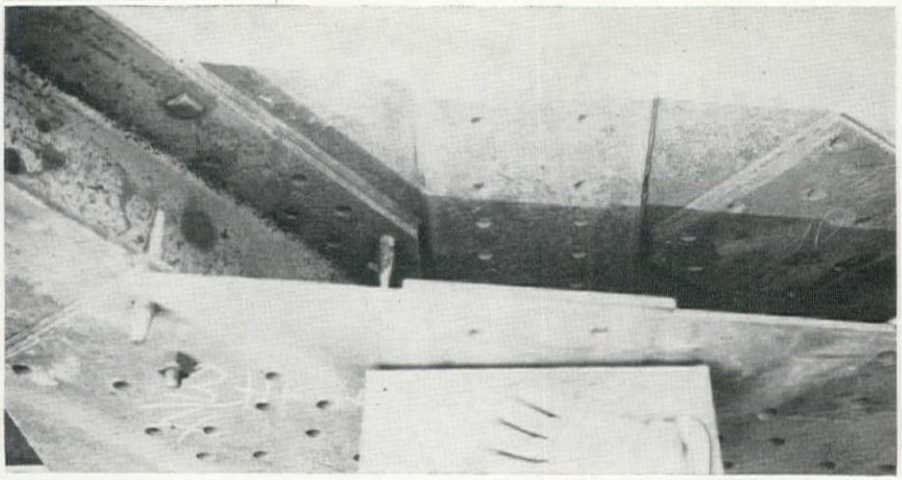
For average size and loading the saving in favor of welded girders runs about 30 per cent but in this case it goes up to

Comparison of Weight of Riveted and Welded Design
(weight in pounds)

TYPE OF TRUSS	Top chord	Bottom chord	Verticals	Diagonals	Gusset Rs, fillers and splices	Rivet-heads† or welds	Top bracings	Bottom bracings	Portal and sway bracings	Floor system*	Pivot and ring girders	Control house and misc.	TOTAL
Riveted	75,632	75,496	61,417	63,724	46,573	4,765	42,508	20,839	28,779	222,003	85,423	31,851	759,000
Welded	48,632	47,520	50,550	55,000	21,940	1,398	25,320	14,928	20,955	203,904	32,154	31,851	569,782
Difference in favor of weld	27,000	27,976	10,865	8,724	24,633	3,367	17,188	5,911	7,824	18,099	53,269	.....	189,218
Per Cent	35.7	37	17.7	13.7	53	70	40.5	28.3	27.2	8.2	62.4	.....	25.5

* Floor system included the girders, stringers, details.

† In riveted truss welding was used in "built-up" members and in connecting the filler plates to gusset plates or members.



FILLER PLATES are shown welded to the gusset plates of the trusses. In an all-welded span no filler plates would be required, only spacer bars being used, the design being much simpler. All welds on this bridge were made in the shop, rather than the field.

62.4 per cent, clearly showing the advantage of the arc-welding in structural connections.

The direct saving in metal of welded trusses (25.5 per cent) and the saving in cost (33.3 per cent) cannot be discussed in this case in terms of mass production because this type of bridge is used very seldom. According to the author's knowledge an average of only four highway swing bridges are yearly built in the United States.

But the same saving (minimum 20 per cent) in metal due to use of the welding process in bridge construction can be expected in any truss bridge and this fact was proved many times in the last ten years in the actual bridge design and construction.

From that point of view, the effort is made to approach the problem on a national scale.

The annual volume of bridge construction in the United States obtained from reported contracts from 1936 to 1941 averaged $145,270,000 per year, including all types of bridges.

During those years structural steel used in bridge construction, according to the American Institute of Steel Construction averaged 462,000 T. per year. Unfortunately, no general statistics are available as to the tonnage by bridge types as girder, truss, etc.

A study of the bridges built by the highway department of one large state from 1931 to 1942 gives the following comparison:

Girder bridges—
26,262,700 lb. or 56 per cent.

Truss bridges—
20,528,000 lbs. or 44 per cent.

Using the above statistics, the following example is derived to show the possible annual savings in the national bridge construction program as a result from the use of arc-welding:

Structural steel in bridge construction per year.....	462,000 tons
Structural steel in truss bridges per year, 462,000 × .44	203,280 tons
Estimated saving due to the use of arc-welding, 203,280 × .20.....	40,656 tons
Using pre-war price for structural steel in-place, 40,656 × $150.....	$6,098,400

This amounts to a saving of 4.2 per cent of the total amount of money spent per year on bridges in the United States.

Regardless of approximations and lack of the statistics available on the subject, it is evident that the use of arc-welding in truss bridge construction can save a considerable amount of money.

Conclusion

The method of construction of swing bridges (assembly starts from center of bridge and symmetrically proceeds to ends) allows a free expansion of welded members and by that minimizes locked-up stresses; it is therefore possible to expect the performance of all welded trusses to be not only as satisfactory as the riveted, but better, owing to the fact that there cannot be expected any loosened rivets under traffic, which is important, especially in railway swing bridges. As mentioned before, the absence of rivet heads creates smooth surfaces on the members and increases the life of the bridge by the elimination of many "starting points" of rust around rivet heads and also saves maintenance expenses on painting. Operating and maintenance costs are also reduced because of the lowered weight of trusses and machinery.

NOTE: Data and illustrations are from a study submitted by the author to The James F. Lincoln Arc Welding Foundation in its recent Industrial Progress Award Program for reports of advancements and improvements made by the application of arc welding in design, fabrication, construction, and maintenance.

First Shasta Dam Block at Roadway Elevation, Pouring Nearing Completion

CONCRETE in Block 58 in the right abutment of Shasta dam is to roadway level, it is announced by the Bureau of Reclamation. A sidewalk and parapet walls remain to be added.

According to Construction Engineer Ralph Lowry the "topping-out" of Block 58 signalizes the entry into the home stretch of mass concrete placement. Lowry said that several blocks adjacent to No. 58 are expected to be poured to road level soon.

Nearly five and one-quarter million cubic yards of concrete have been placed in the structure, leaving about one million cubic yards to be added. As the majority of blocks in both abutment sections are nearing their ultimate height, the spillway section is to receive the bulk of the concrete remaining to be placed. On completion, Shasta dam will contain 6,230,000 cu. yds., making it the second largest concrete dam ever built. Extending 602 ft. from the lowest point in the foundation to the crest, the dam is second in height to Boulder dam, the world's highest.

In the spillway section five of the rows of blocks have been brought to a height permitting installation of the lower tier of spillway outlets. These outlets are four steel-lined conduits each 8.5 ft. in diameter. Fourteen additional outlets of the same size will be installed at various levels as the spillway gap is filled. The outlets controlled by tube valves permit careful regulation of the reservoir level.

Two rows of blocks in the spillway section have been kept low and are used for river diversion. Concrete placement in the low rows will begin as soon as the valve installations in the diversion tunnel under the right abutment are complete.

Work on two of the 75,000-kw. generators in the Shasta power plant is rushing toward completion. The ultimate installation includes five generating sets.

The hydraulic turbine runner and the cover plate for one of the units have been assembled and the scroll case is nearly ready for testing. Generator assembly is expected to begin at an early date. The installation of the second unit is in progress also, with the expectation that the plant will be ready to put 150,000 kw. of power on the line in January, 1944.

* * *

THE national office of the American Water Works Association has been removed from its former location at 22 E. 40th St., New York, to 500 Fifth Ave. in that city. This change became effective March 6.

Desert Snowplow Cuts Brush

A cutting plow was built of salvaged material for the purpose of clearing the overgrown bottom of the Salt River Valley in Arizona, when a bulldozer proved ineffective and hand work was too costly

By L. L. LEE
Office Engineer
Salt River Valley Water Users' Association
Phoenix, Arizona

FOLLOWING SERIOUS floods along the Salt River of Arizona in 1941, interested agencies in the area subscribed $12,000 for protection against recurrence of the situation. In order to clear brush from the channel, and thus remove flow-retarding elements, a unique machine shaped like a snowplow was developed from salvaged material, and with it the job was done efficiently, cheaply and fast.

Tentative appropriations by the U. S. Government to the extent of $152,000 were made to supplement the $12,000 subscribed by the city of Tempe, the Salt River Valley Water Users' Association, and Maricopa County, but the Nation's entrance into the war prevented the actual receipt of this financial aid.

It was determined that in order to prevent damage to farm lands adjacent to the channel in the event of future storms of similar or greater magnitude, it would be necessary to clear away the heavy growth of salt trees, cottonwood trees, willows and other growth forming a strip 1,000 ft. wide for a total length of 70 miles from the Granite Reef Diversion dam to the Gillespie Diversion dam. The work is now being carried on by the Association as rapidly as finances permit. Some bank revetment work will be necessary at various points to protect against further erosion.

Hand work, bulldozers fail

In the first attack on the problem, approximately one-half mile of river channel was cleared by hand, but this method proved too expensive and decreasing available manpower made it necessary to turn to mechanical means to accomplish the purpose.

Two bulldozers owned and operated by the Salt River Valley Water Users' Association were placed in the river channel in an effort to clear the growth. These proved much faster than the hand labor, but failed to give complete removal. The bulldozers in the heavy growth and loose sand had a tendency to bend over and cover the growth rather than to uproot it as was desired. After many trials as to method of attack with the bulldozer, it was decided that the development of an implement with the characteristics of a snowplow could be used with much better effect.

Plow, rake fabricated

The well-equipped Association machine shop proceeded along these lines and developed a triangular shaped bulldozer with a grader blade cutting edge for the purpose. This equipment has proved very satisfactory in operations through a very dense river growth, cutting the roots approximately 10-in. below the surface and leaving behind it an almost perfectly clear path.

The same machine is used in treating the side slopes and bottom of the proposed channel. The blade has not been constructed in a manner to allow tilting, but due to the low gradient of the side slopes, they can be cleared in identically the same manner as level ground.

In order that the heavy brush uprooted may not again take root, a rake has been devised to gather the brush into piles for burning. Instead of the usual bulldozer frame, a 12-in. channel iron with 24-in. teeth was welded together and mounted on an Allis-Chalmers tractor. The rake can be raised or lowered as required to make a clean sweep, in the same manner as a bulldozer.

After the brush has been collected in piles by the rake, a weedburner, mounted on a sled and pulled by a tractor, moves from pile to pile igniting and thoroughly burning the brush. The resultant channel gives a fairly smooth cross-section and contour. Approximately 10 acres can be cleared on each 8-hr. shift with the two tractors.

A comparison of the costs of clearing the channel by the old hand method and the mechanized units is interesting. The approximate cost of clearing a strip 1,000 ft. wide by hand is $3,500 per mile and requires 30 days. With the tractor method the cost of clearing the same width is $1,800 per mile and requires only 12 days. This figure includes the cost of operating the two tractors and the burning equipment.

Salvaged material used

An item of particular interest is the fact that due to priorities, no new materials were available for the construction of the bulldozer-plow and rake. Pieces of 1 in. x 8 in. angle-iron were salvaged from the scrap pile and welded to make the V-nosed bulldozer and its supporting arms. Old grader blades were reground and bolted to the underside of

TYPICAL river bottom growth of two kinds is illustrated. This type of material retards the flow of water during floods and results in inundation of much farm land. At the right is illustrated the ineffectual clearing done by an ordinary straight bladed bulldozer; some plants were merely bent over, others were broken off above the ground, permitting immediate regrowth.

the angle for the cutting edge which protrudes approximately 3 in. beyond the angle. The mold board or wing of the plow was rolled and shaped from boiler plate, salvaged from an old materials bin which had been used during the construction of Bartlett Dam. Reinforcing ribs were cut and welded to the back of these wings for stiffeners, and all points were reinforced with welded web plates. The cutting blades are bolted to the angle iron frame to facilitate removal and sharpening. All other parts of the plow are arc welded throughout.

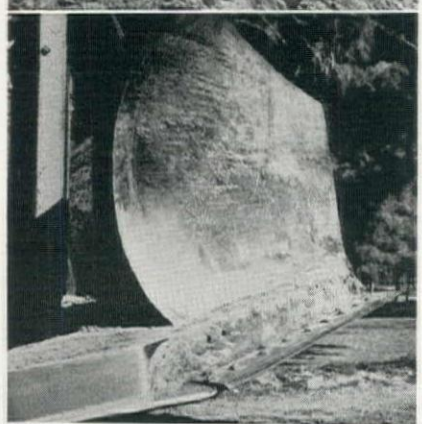
Some difficulty was encountered by the plow being thrown up against the radiator grill when rocks deflected the cutter head out of the ground. This was remedied by inserting a 2-ft. length of 1-in. round rod between the lower sheave of the hoist and the plow.

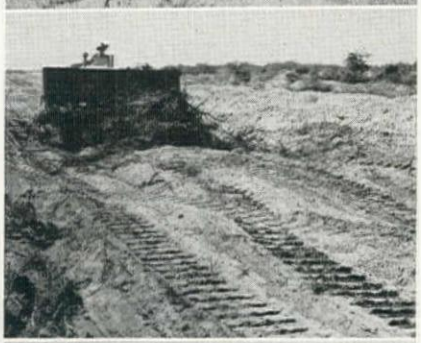
The rake was constructed by the welding of eleven 1¼ in. x 4 in. tool steel bars to a 10-ft. length of 12-in. channel iron. The teeth extended 16 in. below and 4 in. above the channel. Twelve-in. spacer blocks of 1-in. mild iron were cut to fit between the teeth to strengthen them. A ⅜-in. plate 24 in. high was welded on above the channel iron to protect the radiator from injury by the trees and brush.

All the material used in the plow and rake were salvaged materials. The only cost involved was a small expenditure for labor and welding rod. The only priority needed was for the welding rod used.

The planning and fabricating were done under the supervision of Howard N. Ruppers, superintendent of maintenance and Jim Lane, Sr., master mechanic for the Association.

THE CUTTING plow was made of salvaged material and mounted on a tractor in the same manner as a bulldozer. In the top picture, the plow is shown in a raised position. The center picture is a close-up of the cutter, which was usually operated about 10 in. below the surface of the ground. The lower picture shows the rake used for gathering cut brush. It was also made from salvaged material.





CUTTING LIGHT brush was performed swiftly and completely. In the upper picture, the plow cutting over sparsely-brushed area. In the center, the rake is gathering and piling the cut material, preparatory to burning, so that it will not take root again. The lower picture shows the completely cleared bottom. The bridge in the background is the highway crossing of Salt River near Tempe.

The Salt River Valley Water Users' Association was incorporated by the farmers of the area to operate the Salt River Project, consisting of 1,400 mi. of canals and laterals and 242,000 acres of irrigated land, raising crops valued in excess of $18,000,000 per year. Lin B. Orme is President of the Association and H. J. Lawson, General Supt. and Chief Engineer. The clearing work is done under the supervision of Carl L. Williams, Supt. of Irrigation.

THE TRACTOR-POWERED cutter plow tackles an 18-in. cottonwood tree. In the upper photo, it is just starting to topple, in the lower, it has hit the ground. The depth of the cutter in the ground is well-shown in the lower picture.

"E" to H. K. Ferguson Co. For Denver Arsenal Job

THE H. K. FERGUSON COMPANY, industrial engineers and builders, of Cleveland, Ohio, has been awarded the Army-Navy "E" for its participation in the engineering and construction program at the Rocky Mountain Arsenal, Denver, Colo. The company was in charge of design and erection of chemical manufacturing facilities at the large Chemical Warfare Service arsenal. The announcement of the award was made by Under Secretary of War Robert P. Patterson and Under Secretary of the Navy James V. Forrestal.

The banner was presented at a ceremony at Denver April 17 and was accepted by H. K. Ferguson, president of the company, and C. A. Harwick, vice-president in charge of engineering.

Other projects upon which the company has established speed building records are a synthetic rubber plant, several ordnance depots, detinning plants and a magnesium plant near Spokane, Wash.

The companies participating with the Ferguson organization in the Army-Navy "E" include the C. G. Kershaw Contracting Co., Swinerton & Walberg Co., Whitman, Requardt & Smith, H. A. Kuljian & Co., and E. I. du Pont de Nemours & Co., Inc.

Post-War Planning for Small City

THE PRIMARY PURPOSE of this report is to outline, as briefly and concisely as possible, a program of public works, based upon needs for civic improvement and upon the probable financial resources of the city of Inglewood. A large part of the projects listed will of necessity be deferred until the post-war period. Furthermore, this report will list needed municipal improvements for which a method of financing cannot be predicted at this time, but are projects very desirable and essential to continued civic development.

The advantage to be gained from such a programming effort are three-fold, viz.:

(1) It will organize the capital improvement needs of the city into a schedule based upon relative need and engineering feasibility.

(2) It will establish an efficient and business-like method of budgeting capital improvements coordinated with other governmental functions.

(3) It will place into the files of the Federal government information needed for post-war planning, on a nationwide scale, to assure adequate and continuous employment of the nation's manpower on worthwhile and essential construction projects.

Not knowing to what extent, if any, Federal aid might be available for the construction of public works, it is a sound policy at this time for all public agencies to plan on what work might be constructed based on their own resources. Then if Federal aid is available, several years of the proposed program could be compressed into one year.

During the war period, when municipal construction is being seriously restricted by the lack of certain materials, it is possible to utilize technical employees on the preparation of post-war plans so that in case any outside funds become available for capital improvements, the City will be prepared to take advantage of the opportunity without delay.

In an article on Post-war Construction Planning by V. B. Stanbery and Mel Scott in the April issue of Western Construction News, the advisability of long-range detailed post-war planning was emphasized. As an example of a well worked out plan of post-war development, the long-range program of the city of Inglewood, Calif. is presented here. Inglewood is a small city and its total program envisions the expenditure of only $1,744,320, but the carefully worked out report and detailed study make it a model to be copied by other and larger cities and governmental agencies.

Succeeding issues will carry other reports and discussions on this subject.

Background material

Inglewood, a city of approximately 7.75 square miles in area, has grown in population from 19,480 people in 1930 to 30,114 people in 1940, (estimated population in 1942, 35,000), or an increase of about 55% during the decade as compared to a growth of 28.5% by the County of Los Angeles for the same period.

The per capita assessed valuation of the city has always been relatively low, averaging less than $600 for its entire history. Its charter restricts the tax rate of $1.00 per $100 valuation of real property for general governmental expense and $0.15 per $100 valuation for parks, advertising and music. No restrictions are placed upon the tax rate necessary to provide for debt service on general city obligations. However, any bond issues or loans obtained by the city must be submitted to the vote of the citizens and receive the support of two-thirds of the voters. This has resulted in the defeat of all bond issue attempts since 1933, when bonds were voted for the rehabilitation of public buildings following the earthquake of that year. The prospects for a change in the public's attitude toward further bond issues for public improvements, is not in evidence at this time even though the status of the present city's bonded indebtedness is such that it might prove advantageous to the present citizens to authorize a bond issue following the war period to cover much needed capital improvements and thus spread their cost more equitably to future inhabitants who will benefit therefrom.

Inglewood is strategically located near the center of a large aircraft manufacturing district. Although none of the large plants are located within the city boundaries nevertheless a large portion of the employees of the Northrup, North American and Douglas plants live in the city and depend upon its businesses, utilities and recreational facilities to fulfill their needs. Therefore, it is certain that Inglewood will be called upon to house and otherwise provide for the needs of a large manufacturing population for a long time to come. Hence, it would seem advisable for the city officials to give serious consideration toward long-range planning for a continued steady and substantial population growth by taking steps in planning improvements that will at least provide for needs already in sight.

Trends in revenues

To determine what may happen in the future it is important to consider past experience and occurrences and endeavor to establish relationships between basic data. The end product, sought in this study, is what amount of funds may reasonably be expected, with which capital improvements can be made in the future. This amount depends upon the revenue collected and the expense of performing the normal City governmental functions, exclusive of any capital improvements.

Revenues of the city of Inglewood are obtained from four general sources, viz.:

(1) Advalorem taxes, personal property tax, penalties and interest.

(2) Subventions—State and County.

(3) Miscellaneous—licenses, permits, fees, franchises, securities, rentals and concessions, etc.

(4) Water revenue.

Year	Revenue From Penalties and Taxes	Revenue From Subventions	Revenue From Other Sources	Total Revenue	Capita
1929-30	$194,089	.....	$ 83,295	$277,384	$14.22
30-31	153,770	$ 15,000	73,758	243,528	12.18
31-32	169,560	.....	59,782	229,342	11.39
32-33	121,289	.....	51,631	172,920	8.48
33-34	143,341	20,426	49,655	213,420	10.41
34-35	140,729	24,367	58,793	223,889	10.42
35-36	153,858	43,307	67,921	265,086	11.68
36-37	171,510	73,531	75,060	320,101	13.32
37-38	181,656	94,793	85,338	361,787	14.13
38-39	198,998	73,978	101,589	374,565	13.47
39-40	222,008	72,701	113,568	408,277	13.56
40-41	220,406	107,134	114,567	442,107	13.73
41-42	229,417	109,956	94,941	434,314	12.47
		ASSIGNED			
42-43	234,000	90,872	71,840	396,712	11.34
43-44	243,360	85,045	68,040	396,445	10.86
44-45	252,720	79,560	76,740	409,020	10.70
45-46	259,740	93,600	88,200	441,540	11.30
46-47	261,000	106,080	102,000	469,080	11.50
47-48	263,320	141,440	113,500	518,260	12.43

(At this point in the report are included 6 tables and several charts tabulating in detail and summarized by fiscal periods from 1929-30 to 1949-50, the revenues, actual and anticipated of the city. Under each of the four general sources listed above, a breakdown is shown, listing receipts from each type of tax, fee, and revenue. The only one of the tables shown here is the revenue summary.)

Assumptions in estimating

Since this study is primarily concerned with the immediate post-war period it was necessary to, first of all, surmise as to when the conflict would end. The year 1944 has been chosen because it is felt that if the war continues longer than that, the living conditions of the people and the economic condition of the country as a whole will have developed trends beyond any influence of the past. On the other hand if the conflict ends before that time it is felt that the predictions, based upon that date of cessation, will be on the safe side as far as this study is concerned.

It has been assumed that a continued increase in population will be experienced by Inglewood beyond the year 1943 at a rate of growth slightly less than for the period from 1935 to 1940, allowing for an adverse effect of the evacuation of Japanese, Germans and Italians during 1942, up to the year 1946. Beyond the year 1946 a slightly reduced rate of growth is assumed, arriving at an estimated population, in 1950, of 43,000. Population growth between census counts has been estimated from utility services and new dwelling units constructed. This continued growth will, of course, directly depend upon continued residential construction at a rate of about one dwelling for every three additional people.

Estimated projections of future revenue and expense have been made on a per capita basis, based on historical data of the past five years.

Tax delinquencies have been assumed at a minimum of 2 per cent during the war period because of high wages and an abundance of employment in the war industries. It is further assumed that delinquencies will reach percentages comparable to those experienced just prior to the war. Also it is assumed that the collection of back taxes each year will equal the amount of delinquency thus making the collected taxes equal to each year's levy.

The possibility of any annexations to the city seems remote and has been disregarded in this study.

Inventory of projects

An important effort, in the course of this study, was the listing of all proposed public works projects, also referred to as capital improvements. Each department of the city government was asked to list all such projects under its control, giving pertinent data regarding description, location, status of plans and estimates of construction cost by contract. The list of projects thus submitted is as follows:

Department	Name of Project	Estimated Cost
Water—		
	Water Main Replacement—Southwest District	$ 92,700
	Water Main Replacement—East District	98,300
	Water Main Replacement—North District	47,000
	Fire Hydrant Installation	17,860
	Subtotal	$ 255,860
Street—		
	Resurface Residential Streets—City Wide	$ 308,500
	Resurface Streets of Major Importance	107,400
	Freeman Blvd.—95th St. to LaTijera Blvd.	162,700
	Century Blvd. — Inglewood Ave. to La Brea Ave.—Yukon Ave. to Van Ness Ave.	94,600
	Crenshaw Blvd.—120th St. to Manchester Blvd.	110,000
	Subtotal	$ 783,200
Engineering—		
	City Yard	$ 41,070
	North Morningside Sewer District	8,900
	South Morningside Sewer District	16,750
	West Inglewood Sewer District	18,900
	Southeast Drainage System	7,130
	Southwest Drainage System	12,300
	Centinela Creek Drainage—	
	Trunk No. 1	88,500
	Trunk No. 2	160,700
	No. Inglewood No. 1	44,100
	No. Inglewood No. 2	80,000
	Hyde Park Blvd. Line	10,500
	Kew Street Line	18,500
	Potrero Drainage—East	25,000
	Potrero Drainage—West	22,000
	Subtotal	$ 554,350
Building—		
	Police Court Building	$ 94,500
	Subtotal	$ 94,500
Park—		
	Recreational—Centinela Park Improvement	$ 56,410
	Subtotal	$ 56,410
	Grand Total All Departments	$1,744,320

Although no State highway work has been listed above, the highway engineers have suggested that three projects are being considered for the near future, to be financed from the city's ¼c gasoline tax allotment for the improvement of State highways through Inglewood. These projects are as follows:

Project	Estimated Cost
Centinela Ave.—La Brea Ave. to West City Boundary	$ 32,000
La Brea Ave.—Spruce Ave. to Hillcrest Blvd.	15,000
La Brea Ave.—Arbor Vitae St. to South City Boundary	75,000
Total	$122,000

Program by departments

Building department

The Building department has completed plans for a Police Court building which will provide for much needed additional space for the Police Department, City Jail and Municipal Court. This is the only municipal building proposed at this time.

Project	1942-46	1946-47	1947-48
Police Court Bldg.		$94,500	

Street department

Funds for general city capital improvement must come from subventions. Of the subventions the only ones not already earmarked for operating expenses are State and County gas tax funds. Since these funds must be expended for street improvement work it follows that only street department projects can be programmed at this time.

The program suggested above will not absorb all the funds that will probably be available for capital improvements. The reason for this is the fact that the Water Department is becoming more and more aware that eventually it will become necessary for them to develop other sources of water supply. To what extent it will be necessary to go in solving this problem awaits a thorough study, involving all the economics and engineering features that should be considered, by some qualified authority. However, until the solution of this problem has been decided upon the Water Department officials have adopted a policy of building up a surplus fund to be available to apply toward an abnormal outlay that is certain to be required.

The street projects are classified into three groups, viz.:

(1) Residential streets which may be improved by the expenditure of County gas tax funds.

(2) Streets of major importance which may be improved by the expenditure of gas tax funds, obtained directly from the State, on streets that have been so designated.

(3) State highways, within the city, which are improved from gas tax funds as designated by the State Division of Highways.

The residential street projects, and the streets of major importance are estimated to cost more than the amount of funds that will probably be available for that purpose during the six year period. The amounts in excess of the available funds have been programmed as desirable work for which the method of financing is undetermined at this time.

The proposed Street Department program is as follows:

(Table on next page)

Projects	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48
Residential Streets for which funds will probably be available	$14,321	$ 5,567	.....	$20,000	$18,060	$33,280
Residential Street Improvements desirable but financing indeterminate	36,210	36,210	36,210	36,210	36,210	36,222
Major Streets for which funds will probably be available	19,498	18,250	16,250	16,372	22,440	36,750
Major Street Projects desirable but financing indeterminate	57,520	57,520	57,520	57,520	57,520	57,540
State Highways:						
Centinela Avenue—West of La Brea	19,500	12,500	.....	.....	.....	.....
La Brea Avenue—Hillcrest to Spruce	.....	5,750	9,250	.....	.....	.....
La Brea Avenue — South of Arbor Vitae	.....	.....	7,010	15,740	22,440	29,810
Total Estimated Cost of Desirable Projects	$147,049	$135,797	$126,240	$145,842	$156,670	$193,602
Estimated Total Funds Available — See Table No. 6	$53,319	$42,067	$32,510	$52,112	$62,940	$104,376

Water department

Since a majority of the materials required by the proposed projects of the Water Department will be restricted for the "duration" it was decided to program most of the work for the post-war period allowing relatively small amounts to cover emergency replacements, that cannot be deferred, for the two war periods assumed.

Project	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48
Main Replacement—						
S. W. District	$10,000	$10,000	$72,700	.....	.....	.....
East District	10,000	10,000	.....	$78,300	.....	.....
North District	.....	.....	.....	.....	$47,000	.....
Fire Hydrants	.....	.....	.....	.....	8,930	$8,930

Park department

The Park department proposes to enlarge the recreational facilities of the one city park, known as Centinela Park, by constructing a volley ball court, grand stands and lighting for two baseball fields, a rifle range, an archery range, and five double tennis courts. These have been programmed entirely for the post-war period.

Projects	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48
Volley Ball Court	.....	.....	$1,700	.....	.....	.....
Grand Stands and Lighting	.....	.....	.....	$14,400	.....	.....
Rifle Range	.....	.....	.....	.....	$7,750	.....
Archery Range	.....	.....	.....	.....	.....	$22,500
Totals	.....	.....	$1,700	$14,400	$7,750	$22,500

Engineering department

The Engineering department has a list of very urgently needed projects. However, as has already been intimated, the method by which these projects can be financed is extremely uncertain as far as the city officials can determine at this time. In fact no funds from city revenue can be anticipated, beyond the preparation of plans and the supervision of construction, for this work.

Projects	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48
City Yard	$41,070	.....	.....	.....	.....	.....
No. Morningside Sewer Dist.	.....	$ 8,900	.....	.....	.....	.....
So. Morningside Sewer Dist.	.....	16,750	.....	.....	.....	.....
W. Inglewood Sewer Dist.	.....	18,900	.....	.....	.....	.....
S. E. Drainage System	.....	.....	7,130	.....	.....	.....
S. W. Drainage System	.....	.....	12,300	.....	.....	.....
Centinela Creek Tunnel No. 1	.....	.....	88,500	.....	.....	.....
Centinela Creek Trunk No. 2	.....	.....	.....	$160,700	.....	.....
Centinela Creek, No. Inglewood No. 1	.....	.....	.....	.....	44,100	.....
Centinela Creek, No. Inglewood No. 2	.....	.....	.....	.....	80,000	.....
Centinela Creek, Hyde Park Blvd. Line	.....	.....	.....	.....	10,500	.....
Centinela Creek, Kew St. Line	.....	.....	.....	.....	.....	$18,500
Potrero Drainage—East	.....	.....	.....	.....	.....	25,000
Potrero Drainage—West	.....	.....	.....	.....	.....	22,000
Totals	$41,070	$44,550	$107,930	$160,700	$134,600	$65,500

The sanitary sewer projects, that are listed above, are all that remain to complete the main sewer lines needed by the city. There is a possibility that a part, if not all, of these projects may be financed by subscriptions from the property owners. However this depends upon the attitudes taken by the various owners involved, which cannot be predicted now.

Nevertheless, these projects have been programmed below, in the order of the city's relative needs, regardless of how they may be financed.

The debt policy

The debt policy of the city of Inglewood regarding general city obligations, has always been very conservative and the amount of such bonds outstanding at the present time is insignificant ($30,000).

The bonded indebtedness of the city's water department, although more formidable than the general city obligations, is in satisfactory condition and is being amortized on schedule. At the present time the total of these bonds is $229,500.

Water department finances

The margin of profit between the Water department's revenue and expense is substantial and even anticipated replacements and extensions, during the next six years, will not absorb the amount that is estimated will be available. However, as was spoken of earlier in this report, it is expected that it will become necessary, in the not far distant future, to expend a large amount of funds to augment the present city water supply. Two methods of doing this have already been given some thought.

One of these methods is to buy more water bearing lands and bring more wells into production. However, this method will not eliminate the hazard that has been anticipated of salt water intrusion as pumping in larger and larger volumes becomes necessary. The ultimate cost of solving the water supply problem by this method is not yet known.

The other considered method is to join the Metropolitan Water District. And here the stumbling block is the matter of cost. If the city should join the District during the current year (1942-43) it would be necessary to assume an initial expense of about $545,000, which could be amortized over a 20-year period without further interest charges, and agree to an additional tax rate of about $0.48 per $100 assessed valuation throughout the city, that is to say, increase the present tax rate by about 40%. The solution is at a "stalemate" so far.

A comparison of the cost of pumping water shows that there was a gradual yearly reduction in cost per million gallons up to the year 1939-40. Since that time the trend seems to have been reversed. However, for this study, it has been assumed stabilized at $99 per million gallons pumped.

Heavy equipment hauling supplies across trackless terrain at an advanced position in the Aleutian area. Both at the right and the left can be seen Quonset living huts, partly buried as protection against strafing from the air.

"Seabees" Build Vital Bases

The Navy Civil Engineer Corps establishment of Construction Battalions gives engineers and construction men a chance to enlist their skill and training in the war by building important facilities for the fighting forces at advance bases

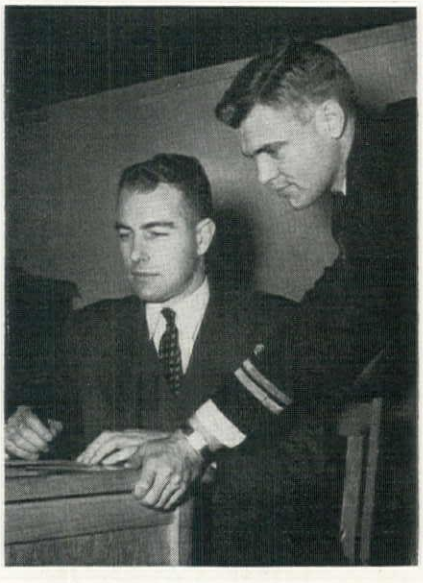
AN OPPORTUNITY to make full use of their training and experience for defense of the Nation is offered to engineers and construction men by the Navy Civil Engineer Corps establishment of Construction Battalions, commonly called the Seabees.

Previous to the start of the present war, practically all construction of navy bases was carried out under contract or by station forces with civilian personnel. However, after the declaration of war and the capture of many Pacific bases it became evident that work beyond the continental limits, particularly in the combat zones, could not be satisfactorily accomplished by civilian workers, but rather needed to be done by military personnel under military command. It was with this fact in view that the Construction Battalions were organized.

Congress in decreeing the establishment of this organization authorized a full strength of 207,000 officers and men. This strength is far from being completely filled at the present time, but it is hoped that all necessary personnel will be enlisted by the fall of 1943. At the present time units already organized have been sent to all parts of the world and have been commended by Secretary Knox for their diligence, spirit and accomplishments at Guadalcanal and many other outlying bases.

Two training centers are maintained for Seabees, one at Norfolk, Va., the other at Davisville, R. I., where the recruits are given eight weeks of intensive training consisting primarily of military indoctrination, since they are already skilled in the various trades which they will use in their construction and maintenance field work. The men are trained and equipped to participate in combat duty if necessary in connection with their primary mission of advance base construction. In some cases they have been assigned to locations where actual combat is unlikely, and in other cases such as Tulagi and Guadalcanal, they have landed in the second wave, immediately behind the Marines.

FRED J. EARLY, JR., president of the construction firm operating in his own name, has been commissioned a lieutenant commander in the Seabees. He is shown here with LT. D. E. CARBERRY, procurement officer in San Francisco.



Battalion organization

A construction battalion is made up of 1100 officers and men, divided into one headquarters company of 175 men and four construction companies of 226 men each. The headquarters company consists of clerks, draftsmen, surveyors, pharmacists, etc. The construction companies are directed by seventeen commissioned officers, ranking from lieutenant commander to ensign, and ten warrant officers. In each company are seventy unskilled men (laborers) with ratings of seaman first and second class, and the remainder of the personnel is made up of skilled artisans in various trades. Adequate medical, dental, kitchen and other facilities are assigned to each battalion.

Work performed

Since the organization of the first battalion in December, 1941, these units have constructed every type of navy facility, including docks, dry docks, supply

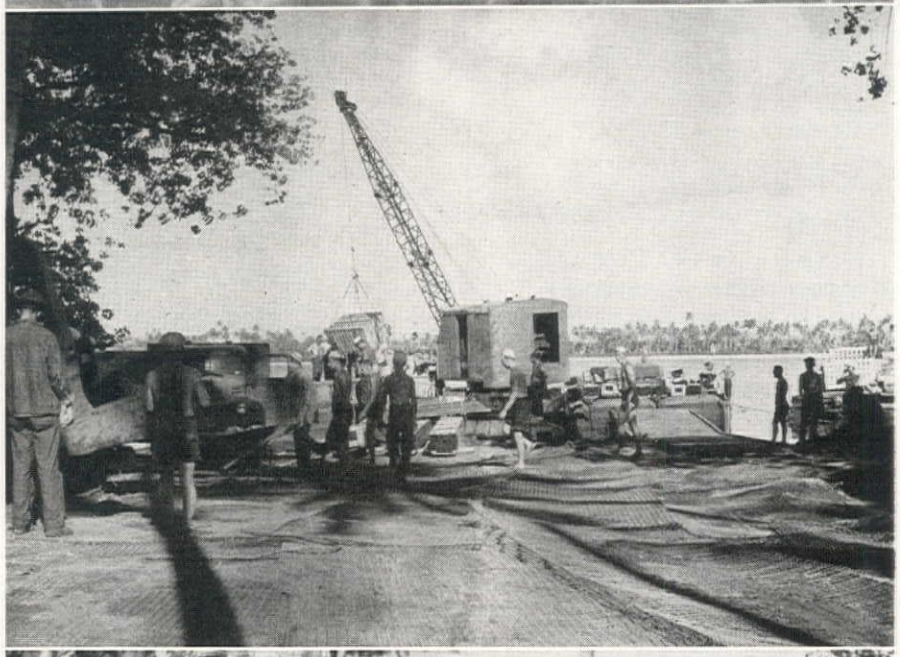
and fuel depots, hospitals, bridges, and barracks. One group which landed on a tropical south Pacific island immediately behind invading Marines hacked out of the dense jungle growth an airport from which bombers were taking to the sky within nine days. Another battalion bridged a rushing stream with a 200-ft. span built on piling made from palm trees. In the construction of wharves at many south Pacific islands quantities of coral must be excavated. This material is crushed and used as concrete aggregate for gun emplacements and other construction projects on the islands. These and hundreds of similar examples illustrate the spirit, aggressiveness and resourcefulness of the Construction Battalions.

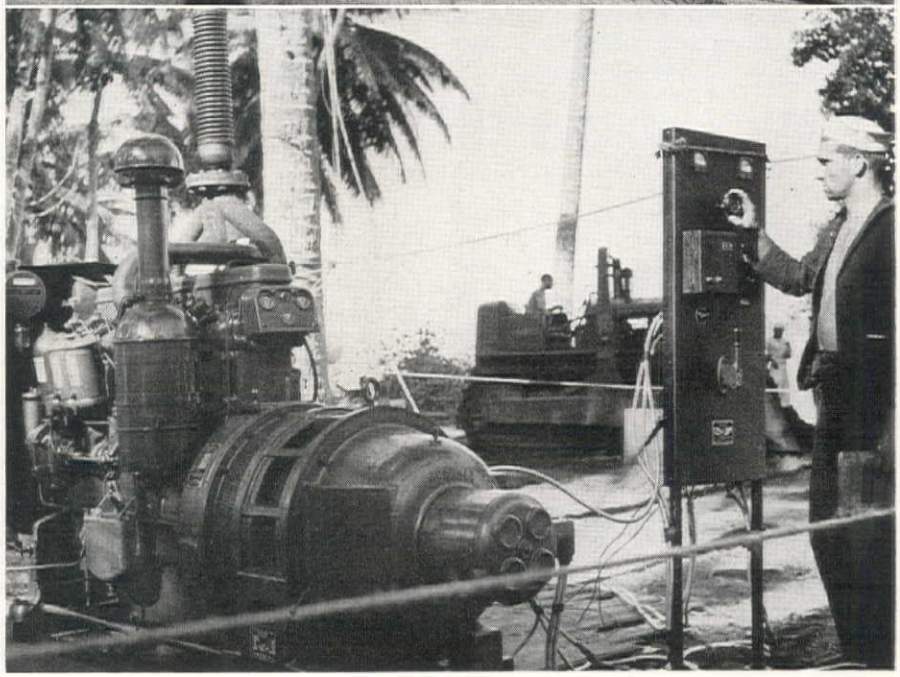
The specific record of one construction battalion for a two-month period immediately after arriving at the site of a new advance base include the following activities: the engineer division surveyed for and designed a 182-ft. bridge; laid out a perimeter road around the occupied area; sounded and made hydrographic maps of 3,500 ft. of waterfront; planned and laid out the main camp site and built a detached camp site, a hospital and appurtenant buildings; surveyed two proposed air fields; made a topographic survey of the occupied area; surveyed the river mouth for bulkheads and docks; planned a signal tower, two water towers, the camp utility system and all necessary gun positions.

The activities of the construction division covered four fields. One group employed on air field construction built three emergency landing strips, one 7,300 ft. x 150 ft. and two each 6,000 ft. x 400 ft. These strips were located in overgrown areas involving much clearing and grading. They improved these strips by installing drainage facilities, fine grading, and gravel surfacing. They were constantly on duty to repair damage to air fields by bombs and shells if such occurred.

Another group working on road construction built 14½ mi. of perimeter, access and camp roads with necessary drainage facilities and constructed the earth work involved in bridge approaches.

Another group working on bridge and waterfront construction placed a 50-ft. pontoon barge dock; prepared 1,500 ft. of waterfront approaches using steel mesh; built two sand-bag jetties and placed cranes thereon for ship unloading; constructed a 40-ft. temporary bridge across a lagoon, using coconut piles and coconut logs, the decking being





TOP, taking soundings of a coral reef preparatory to building a wharf. Each rank of enlistee is shown. From left to right they are a warrant officer, a petty officer, an enlisted man, and a commissioned officer. CENTER, Seabees prepare a beach for landing operations. By laying steel mesh on the sand, trucks are enabled to drive right to the water's edge. BOTTOM, a portable electric generator and other equipment at work on a South Pacific Island.

All illustrations in this article are official Navy photos

adzed to produce a flat top; constructed a 182-ft. trestle across a river in thirteen days, using native piles and lumber; constructed a 72-ft. timber trestle dock and a 42-ft. timber trestle; started construction of a marine railway.

The fourth group was engaged in camp construction and constructed the following items: 700 tents, 18 prefabricated buildings, 34 latrines, 5 messhalls, 3 galleys, 9 bomb shelters and one hospital, one water tower, several hundred pieces of furniture and equipment and numerous miscellaneous structures. They erected a saw mill which produced 204,000 board ft. of lumber from native stock and continuously repaired damage to structures caused by shells and bombs.

During the same period, the maintenance division set up and operated blacksmith, paint, electric, diesel repair, auto repair, welding, sheet metal, plumbing, and heavy equipment repair shops, organized and put into operation mosquito control and camp sanitation facilities; installed a water purification plant; installed a 50-kw. generator and erected electric service lines and electric and refrigeration equipment; installed camouflage facilities.

AMID LYRICAL tropic surroundings, U. S. Navy Seabees erect a pre-fabricated fuel storage tank, recently delivered from the United States. Seabees work in every part of the world, and perform all types of construction work, even fight occasionally.

Western personnel

Many western construction superintendents and workers have already enlisted and are in active service with the Seabees. Fred J. Early, Jr., contractor of San Francisco, was commissioned a lieutenant commander in April.

Richard B. Bailey, formerly assistant superintendent for the Wm. P. Neil Company on construction of naval ammunition depot at Hawthorne, Nev., was commissioned a lieutenant (j.g.).

Alan G. Bowers, a leading inspector for Macco Construction Co. on their contract to build a naval fueling depot at Point Molate near Richmond, Calif., has been commissioned an ensign.

Elwyn H. King, employed by the Chicago Bridge & Iron Co. at Eureka, Calif., has been commissioned an ensign.

George A. Pierce, who was the chief electrical inspector for the navy as a civilian at Hawthorne, Nev., has also received an ensign's commission.

Leslie E. Thompson, an engineer for the Bureau of Reclamation on the building of Seminoe Dam, and more recently in the Denver office of the Bureau, is now a lieutenant (j.g.).

Donnel B. Doyle, associated with his father in housing contracting business at Ogden, Utah, is an ensign in the Seabees.

Robert W. Griffin, owner and general manager of the Crown Electric Co. of San Francisco, has been commissioned a lieutenant, as was Alexander H. Lowe, superintendent in charge of the San Francisco plant of Soule Steel Co.

Alton F. Kay, who was an engineer with the U. S. Forest Service at Eureka, has been made a lieutenant (j.g.). Nicholas R. Petry of the firm of Petry & Son, Denver, Colo., has been commissioned an ensign.

Louis G. Puls, who was formerly in charge of the design section of the Bureau of Reclamation at Denver, Colo., and prior to that had worked on the Dnieperpetrovsk dam in Russia, and Chester M. Schrepferman, a partner in the firm of Brown-Schrepferman, heavy construction contractors of Denver, have both been commissioned lieutenant commanders.

Harry L. Sandow, navy inspector at the Oakland, Calif., supply depot, and formerly of the Clinton Construction Co. of Oakland, received a commission as lieutenant, as did Fred A. Wise, formerly superintending engineer for Gitchel Mines at Red House, Nev.

Western construction men recently granted warrant officer ratings include: William T. Robbins, formerly contract engineer for the Robbins Electric Co. at Salt Lake City, Utah; Grant S. Risdon, superintendent for the Carl N. Swenson Co., San Jose, Calif.; Monan B. Stevenson, formerly employed with Pollock Shipbuilding Co. at Stockton, Calif., and Merwyn G. Younger, formerly with the Dinwiddie Construction Co. of San Francisco.

Enlistment

Opportunities are still available in each of the ranks found in the Construction Battalions, and warrant officers are particularly desired at the present time. The rank of warrant officer corresponds to that of a foreman in civilian life who has had the direction of the work of 100 or 150 men. They are needed in all of the skilled fields, such as plumbing, carpentry, electricity, earth moving, masonry, steel erection and utility construction. Each of them will have complete responsibility for a particular project. Ordinarily there are two warrant officers to each construction company of 230 men. Under them are petty officers who serve as foremen on various sections of the project. The warrant officers wear the insignia of the Civil Engineer Corps on their sleeves. Petty officers and enlisted men do not. It is impossible to specify pay rates because they vary with each man's domestic status, degree of responsibility, and project location. However, the salaries compare favorably with those paid in civilian work, and promotions are given in a high percentage of cases.

At the present time voluntary induction has been reopened to skilled men for the Navy Construction Battalions and they will receive ratings from seamen second class to chief petty officers, depending on their experience. For information concerning enlistment in the ranks of the Seabees, interested persons should enquire at local recruiting offices.

For enrollment as commissioned and warrant officers, prospective candidates should enquire at local offices of Naval Officer Procurement. For the West Coast, these are located at: Title Guarantee & Trust Building, 411 W. Fifth St., Los Angeles, Calif.; 703 Market St., San Francisco; 7117 Marion St., Seattle, Wash.; Bank of America Bldg., 615 Broadway, San Diego, Calif., and 112 N. Central Ave., Phoenix, Ariz. Candidates are thoroughly investigated as to technical knowledge and moral background before being accepted as officers.

Surveys are Completed for Colorado Timber Access Road

SURVEYS have been completed for an access road in southern Colorado which will make available 50,000,000 board feet of Ponderosa Pine timber. Engineers of the Forest Service have completed the surveys for the road, and construction financed from the access road appropriation is expected to begin as soon as rights of way have been secured.

Reflector Beads Aid Safety

Blackout and dimout driving regulations make it impossible to see ordinary traffic markings, but reflectorization with tiny glass spheres increases visibility tremendously—landing field use of the beads adds to safety for pilots in landing, but is invisible to flyers at altitudes beyond 500 feet

HIGHWAY AND landing field strip ainting is being revolutionized by the se of small glass reflector beads embedded in paint. Applications have been eveloped for use under blackout condiions that make automobile driving and irplane landing many times safer.

The use of glass or plastic buttons on eflectorized highway warning signs is f long standing, and under ordinary ight driving conditions, the buttons ave proved very effective. This type of eflecting agent, however, is not suitable or roadway or runway application beause of the size of the individual markrs, which would be deleterious to the fe of tires and would be subject to rushing by heavy trucks, with accomanying spread of sharp glass particles n the road.

The tiny glass spheres, commonly alled "glass beads," on the other hand, re only about 1/100 in. in diameter and ive no impression of roughness or irregularity when driven over. Being so mall, they become embedded in the affic paint to approximately one-half f their diameter and are practically nmune to crushing.

Several states have been using the eaded glass markings on highway cenr stripes for some time. Notable examles in California are the Ridge Route south of Bakersfield, the Bayshore Highway south of San Francisco, the Coast Highway from Monterey to San Luis Obispo, and other primary highways. So far, this type of marking has not been extended to use on the secondary system.

In tests conducted by the California Division of Highways using a standard Weston photographer's light meter the reflection from automobile lights on unstriped blacktop pavement, registered 6 units. Under similar conditions, the reflection from standard white paint registered 18 units and on white paint with glass beads, the reading was 42 units.

Marking machine

A machine has been developed in the shops of the California department for painting the stripes and dispensing the glass spheres into the wet paint in one operation. It was designed by W. F. Holbrook, Superintendent of the Burlingame maintenance yard and Frank H. Blair, foreman, and built under the direction of J. W. Grace, superintendent of equipment at Sacramento, and V. C. Smith, shop foreman at Fruitvale.

The machine is pushed in front of a truck. Paint tanks carried in the truck furnish paint through hose connections to spray guns almost directly beneath the driver. A tank is mounted on the vehicle from which a steady flow of the beads drops into the wet paint. The bead orifice is about 18 in. to the rear of the paint spray guns. If required, three strips may be painted simultaneously, as in the case of grades and sharp curves, where white, black and orange lines are used in parallel. Also attached to the machine is a skip-striping attachment made from a bicycle wheel driven off the main wheel shaft by friction. The make - and - break is accomplished by points on opposite sides of a drum mounted just ahead of the bicycle wheel, and which operates the flow mechanism. The use of this device is made necessary by shortages of paint, stripes on level straight pavement being 15 ft. long, with intervals of 25 ft.

The nature of the paint used is of extreme importance. The originators of the use of beads in traffic paint have devoted much study to the perfection of a paint which will hold the spheres firmly and at the same time serve as a good reflective background. The State Highway Department of California has developed a bead-retention paint that has proven satisfactory. They have experienced some difficulty, however, during recent months due to war time shortages of certain ingredients, but this is only a temporary difficulty.

Some agencies state that the cost of placing beaded highway stripes has been found to be approximately double that of placing plain paint, but the life of the beaded stripe is more than double that of the plain marking, and when the added safety factor is considered the additional investment is more than justified.

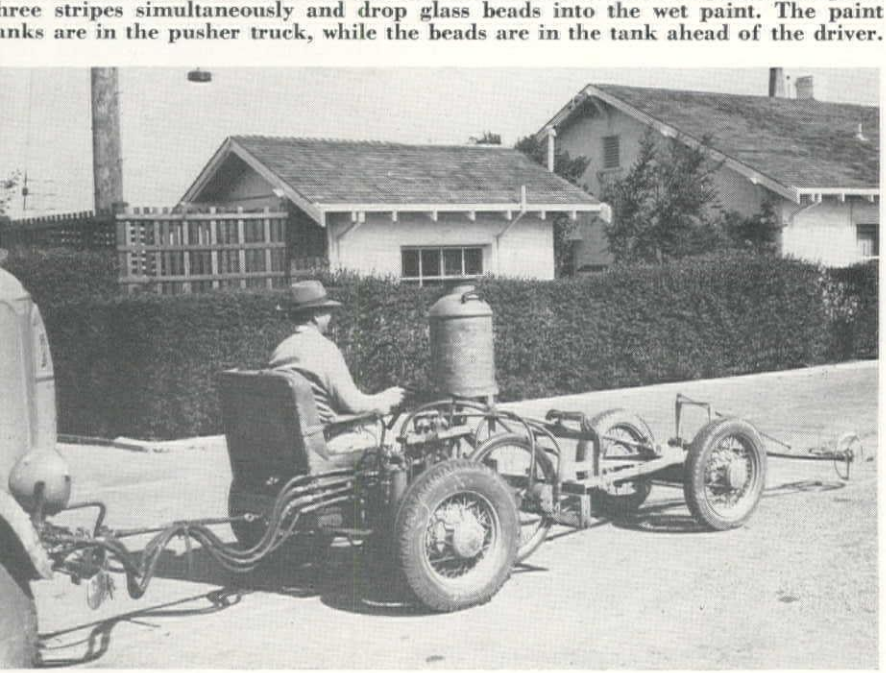
During daylight hours, the beaded stripes look like any other painted markings. After dark, however, the reflected light from the headlights of an automobile makes the stripe so prominent that it may even appear to the driver as a raised curb. Cross-walks, letters and figures on the pavement, and other auxiliary markings are equally retro-directive.

Oil dropped from the crankcases of passing automobiles and rubber scuffed from tires have the same tendency to obliterate the markings for daylight use as is the case for ordinary paint, but for night driving the reflection from the beads is undiminished. There is very little tendency for the beads to be ground away when run over by traffic. Where, through accident, road repairs, or other causes, a group of the glass spheres is obliterated or removed, the night-time reflection pattern will simply appear ragged or spaced.

Dim-out markings

Tests in various places have shown the beaded paint stripes to be the best type of highway markings for seacoast and combat zone areas where emergency dim-out driving rules are in effect, and under blackout conditions.

STRIPING MACHINE constructed by the California Division of Highways will paint hree stripes simultaneously and drop glass beads into the wet paint. The paint anks are in the pusher truck, while the beads are in the tank ahead of the driver.



The blackout driving system approved by the Blackout and Traffic Control Branch of the U. S. Engineers Department consists of one head lamp, two front clearance lamps, and a combination stop and tail lamp. The head lamp must be between 36 and 55 in. off the ground, and the small beam permitted must be cut off so that its top slopes down at the rate of 2 to 3 in. for every 10 ft. and illuminates evenly a level road surface for 20 to 100 ft. in advance of the car. This illumination decreases until no light rays strike the pavement beyond 200 ft. in front of the vehicle.

In tests conducted by the Division of Highway Transport of the Public Roads Administration, it was found that under blackout conditions a painted white center line on concrete surface was of practically no value at all, and a black line on concrete was observed about 30 per cent of the time. A white line on bituminous surface was about 40 per cent effective, whereas a beaded line on concrete yielded 83 per cent efficiency and on bituminous surfacing over 90 per cent. These figures were for solid lines, dashed markings yielding approximately the same averages. In the case of yellow lines, the value for beaded installations dropped to 63 per cent on concrete and 75 per cent on blacktop. It was found that a 3 or 4 in. line reflectorized with glass beads was sufficiently effective, and wider stripes were not needed.

Cross-walk and special limit lines of one kind or another are naturally harder to see than longitudinal lines upon which the driver's eye can be steadily focused. Tests conducted on these markings by the same agency under blackout conditions indicate an increase of visibility from 34 per cent for plain white 8-in. markings to 95 per cent for beaded.

Another feature to be considered in protection of traffic operating under dim-out or blackout rules is the matter of curbs, poles, trees, and marking posts of various kinds, that is, vertical surfaces of which the driver must be made aware. Experiments have shown that whereas plain painted signs are visible to about 30 per cent efficiency, those covered with reflectorized coatings vary from 50 per cent for yellow background to 97 per cent for a silvered background.

It has been found difficult to apply the beaded paint to vertical surfaces, however. Signs may be laid flat while the application is made, but curbs, trees, etc., must be coated while in their vertical position. In these cases, it has been found that a glass-beaded cloth is much easier to apply and gives much more satisfactory results. It is generally glued in alternating strips on curbs and placed on higher objects to a maximum height of only 2½ ft. on the side facing the approaching traffic. The material is waterproof and will remain in place for a considerable length of time.

Airport uses

Another development of the glass-beaded paint, which is becoming increasingly important at the present time, is its use as markings for airport runways and aprons, both as outline markings and in numbering of the landing strips.

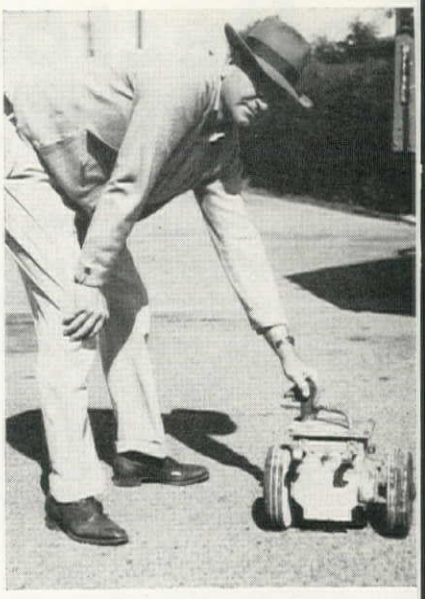
The generally accepted practice in outlining is to have three 6-in. white bands, separated by 6-in. unpainted strips along the entire length of the runway about 1 ft. from its outside edge. The center line is marked by three lines of similar dimension, but painted chrome yellow. Taxiways and aprons are generally outlined with two 6-in. white stripes. The runway numbers, which are 50 ft. tall and about 20 ft. wide, are selected with reference to their compass direction so that the incoming pilot may know his course, are painted from 100 to 170 ft. from the end of the strip.

When these landing fields are used at night under blackout or dim-out conditions, pilots find it extremely difficult to follow the markings with the eye, and frequently they run off the edge of the paved strip even when boundary lights are burning.

As an auxiliary to the boundary lights, the application of the glass beads to the painted runway stripes is being used by many airports and has been found extremely valuable in both military and civilian operations. Although entirely invisible at any great height, the lines become clearly visible and give a sharp outline of the runway by reflecting the planes' landing lights at heights below 500 ft. They are thus invisible to possible enemy bombers, while definite and clear to the plane desiring to land. It should be emphasized that the beaded stripes are only an auxiliary to landing lights and other safety devices for night flying, but are considered a very important aid.

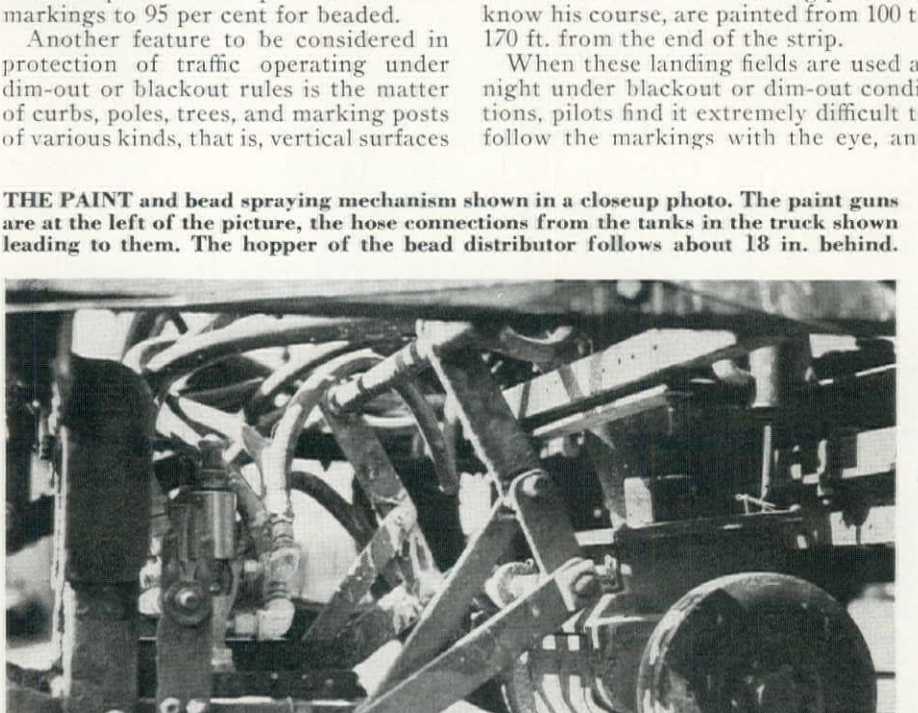
At one California military airport, a local adaptation is the painting of runway markers on board. These can be removed or turned down in the event it is desired to obscure them. This, however, is not general practice.

Beaded striping seems to have an assured field in post war airport perfection.



FRANK H. BLAIR, foreman and co-designer of the marking machine, is holding the hopper from which beads feed onto the painted strip. The proper proportion of beads to paint used has been determined from experience in the field.

THE PAINT and bead spraying mechanism shown in a closeup photo. The paint guns are at the left of the picture, the hose connections from the tanks in the truck shown leading to them. The hopper of the bead distributor follows about 18 in. behind.



Work Scheduled to Resume on Stopped Seattle Bridge

THE SPOKANE STREET viaduct in Seattle, construction of which has been halted for several months, was guaranteed a priority rating of AA-3 for the purchase of needed materials. This will permit immediate resumption of work on the $1,000,000, 4,284-ft. grade separation in the industrial section of the city. MacRae Bros. of Seattle are holders of the original contract and will have an option of continuing construction on the original contract basis or of submitting a new proposal for the remaining work.

Water Prospects Bright for 1943

Bureau of Reclamation, California Water Resources Board report high snowfalls, heavy water content over most Western areas—predict heavy stream flows, full reservoirs, and ample power reserves

A GOOD water year unquestionably is indicated for Bureau of Reclamation power and irrigation projects in the West, according to a forecast based on summaries by Reclamation Commissioner John C. Page of snow surveys in the drainage basins of western streams which feed the Bureau's reservoirs, major suppliers for food and hydroelectric energy in the area. In some basins, the run-off will be the greatest in a quarter of a century.

The Bureau's storage capacity of 61,600,000 ac. ft. of water is more than 70 per cent of the total capacity available for power and irrigation in the West. Bureau projects are making major contributions to the prosecution of the war. They generate huge blocks of power and provide dependable supplies of water for industrial plants and military establishments costing more than half a billion dollars, and, in 1942, produced irrigated crops valued at $250,000,000. Adequate supplies for Boulder Dam in the Pacific Southwest and Grand Coulee Dam in the Pacific Northwest will insure in 1943 the largest power output by 70 per cent in the Bureau's history.

The run-off of the Columbia River in the Pacific Northwest is expected to equal or exceed that of the highest years on record. The Bureau's power plants at Grand Coulee Dam and Bonneville Dam, depend on this stream to serve aluminum plants producing more than one-fourth of the nation's output of this important light metal. The run-off of the Yakima River may reach a peak surpassed only once in 24 years. A tributary of the Columbia, the Yakima River supplies the Yakima project in Washington, a heavy producer of food crops. The mountain snows of another tributary, the Umatilla River in northern Oregon, feeding the project of that name, are nearly 50 per cent heavier than normal.

The accumulated precipitation of the Clark Fork in Western Montana, which also discharges into the Columbia, is 57 per cent above average. Irrigated lands of the Bureau's Bitter Root and Frenchtown developments receive their water from this stream.

Never in 25 years has the water content of the snow along the Upper Snake River and tributaries, the Owyhee, Boise and Payette, been as high as this year. These streams serve the Upper Snake, Minidoka and Boise projects in Idaho, and the Owyhee, Vale and Burnt River projects in Oregon. The Minidoka and Boise projects are also important power producers in the inter-mountain region.

Present conditions indicate that the run-off of the Missouri and its tributaries will be much above normal. Snow cover on the Yellowstone is more than double that of a year ago, and on the Milk River, one-third above last year's figure. These streams in the Upper Missouri supply the Riverton and Shoshone projects in Wyoming, the Buford-Trenton (North Dakota), Belle Fourche (South Dakota), and the Montana projects of Sun River, Milk River, Huntley, Buffalo Rapids and Lower Yellowstone (the latter also partly in North Dakota).

The outlook is very favorable for this season's runoff of the North Platte River and tributaries, from which the North Platte (Nebraska-Wyoming) project is supplied with water for power and irrigation, and the Kendrick (Wyoming) project for power. Principal reservoirs of the Bureau on the North Platte contain the largest carry-over since 1929.

The Elephant Butte reservoir on the Rio Grande River will be full at the start of the irrigation season. It serves the Rio Grande project (New Mexico-Texas), a producer of food crops, cotton and power. On the Pecos River, serving the Carlsbad development in New Mexico, the snow cover is less than a year ago, one of the few cases in which this is true.

The water content of the snow on the headwaters of the Colorado above Grand Junction is 20 per cent greater than last year at this time. In the headwaters of the Green River, a tributary of the Colorado, it is the greatest in many years and about 2½ times that of 1942. The Gunnison River run-off, important to the Uncompahgre project in Colorado, will be about average. The Grand Valley (Colorado) irrigation power project is served by diversions from the Colorado. The Moon Lake, Strawberry Valley and Sanpete irrigation projects in Utah are served by tributaries of the Colorado River where the indications are of a fair run-off.

The run-off in the headwaters of the Colorado, which is expected to be above average, is an important factor in power and food production in the Pacific Southwest. Lake Mead, the largest storage reservoir in the world, is fed from the Colorado and supplies Boulder power plant, the world's largest, which provides power to war industries in Nevada and California. Water releases from Boulder Dam also produce power downstream at Parker Dam and on the Yuma project in Arizona. Boulder releases also assure an adequate irrigation supply for the highly productive areas of Imperial Valley, California, and Yuma Valley, Arizona.

The carry-over in the reservoirs of the Salt and Verde rivers, Arizona, which provide water for the Salt River Reclamation project, may be sufficient for this year's operations even though the snow coverage in the headwaters of these two streams is disappointing. Power from Parker Dam and standby plants will protect the power needs of that area in event water is not adequate.

Accumulative precipitation in the northern half of Utah assures an abundant water supply in 1943 for the reclamation projects served by that drainage area, the Hyrum, Ogden River and Weber River.

An increase of 57 per cent over last year is expected in the run-off of the Klamath Lake Basin. The Klamath Project in Oregon and California, an outstanding potato-producing area in the West, will benefit from the additional supply.

California Report

A BULLETIN has been issued by the California Division of Water Resources containing the results of the main snow survey measurements made at every snow course in the state, together with forecasts of runoff, low water, and Delta salinity concentrations.

Precipitation during March was above normal over most of the Sierra Nevada, causing a considerable increase in the snowpack during the past month. The surveys indicate that in the various watersheds of the Sierra there now exists a snowpack ranging in general from 10 per cent below normal to 10 per cent above. Taken as a whole the snowpack at the present time is slightly above normal.

The outlook is for a good water year, with ample supply to operate all installed hydroelectric generating facilities, and more than enough for irrigation, industrial, municipal and domestic uses.

Water will again flow into Tulare Lake from the Kings, Kaweah and Kern rivers, as the unregulated discharge of these rivers during the snow-melt season promises to exceed the normal irrigation demand of the agricultural areas which they ordinarily supply.

The snowpack figures indicate a fluctuation in the watersheds north of the Kings River, between a low of 92 per cent and a high of 105 per cent of normal. South of the Kings River in the watershed of the Kaweah and more especially in that of the Kern, the influence of the heavy March storm is revealed in the heavier snowpack of that area. On the Kaweah watershed the snowpack averages 109 per cent of normal and for the Kern River watershed lying inland behind the Kaweah the snowpack is 124 per cent of normal.

The figures for seasonal precipitation listed as percentages of normal are somewhat higher than the corresponding

snowpack percentages, but in general follow the same pattern of distribution. North of the Kings River the precipitation percentages range from 110 per cent to 130 per cent. In the Kaweah area the seasonal precipitation to date is 135 per cent of normal while for those stations representing conditions in the Kern River watershed the precipitation to date averages 160 per cent of normal.

South of the Tehachapi Mountains precipitation to date has been relatively heavier. The Los Angeles area reports precipitation so far this season at 175 per cent of normal, the San Gabriel region reports 170 per cent while the Santa Ana vicinity averages 135 per cent of normal.

At the south end of the State, reports from the Pacific Slope Basins of San Diego County indicate that precipitation in that area this season has in general been 90 per cent of normal.

The forecasts of run-off of the Sierra streams during the four months' melting period April 1st to July 31st range from a low of 88 per cent of normal for the Pit River to a high of 124 per cent for the Kern.

The low water flow of the Sacramento River at Red Bluff is not expected to fall below 3,700 second feet. Due to pumping from the river between Red Bluff and Colusa the low water at Colusa is expected to drop to 2,400 second feet. Low water stages in the Feather and American Rivers and in the lower reaches of the Sacramento and San Joaquin Rivers should be very similar to those experienced during the summer of 1942.

Salinity penetration into the rivers and sloughs of the Delta region will be light—perhaps slightly more than during the past two years but less than in 1940. Saline concentrations to a degree dangerous for the irrigation of growing crops should not extend beyond Emmaton on the Sacramento and Jersey on the San Joaquin River.

Boise River Overflows Banks; Damages Bridges, Roads, Weirs

FLOOD WATERS which swirled down Boise Valley, Idaho, in the heaviest flood in the history of the Boise River, Apr. 17-26, did some damage to permanent installations such as roads and bridges, and flooded nearly 40 sq. mi. of rich farm land, much of it seeded.

The river, which normally runs in mid-April at about 9,000 sec. ft., and seldom exceeds 13,000 sec. ft., rose to as high as 23,000 sec. ft. at the peak of the flood. Fortunately, a cold snap halted the melting of the snow, and the flood subsided just as engineers had despaired of saving several bridges on the main river. This peak flow was reached with every outlet ditch running to capacity.

Incidentally, aside from the crop and livestock loss, which was heavy, the principal damage was to various irrigation installations, such as headgates, weirs, and the dikes along ditches.

The flood was far from unexpected. William E. Welsh, Boise river watermaster and secretary of the Idaho Reclamation Association, foretold as early as mid-December that in view of snow depths on the higher levels, an early, warm spring might well bring complete disaster.

Acting on this warning, backed by the advice of William H. Tuller, manager of the Boise irrigation project, a vigilante committee was at once formed, consisting of Welsh, Tuller, State Reclamation Commissioner James Spofford, Joe D. Wood, state commissioner of public works, representatives of the army engineers, and representatives of the two leading contracting firms in the valley, Morrison-Knudsen Co. Inc., and Quinn-Robbins.

Steps were immediately taken to widen and dredge the channel, straighten dangerous meanders, raise dikes, and take other protective measures.

The first warning of impending trouble came after two days of unseasonable warm weather, when More's creek, principal sizeable tributary of the Boise River below the impounding reservoir at Arrowrock dam, began to rise, reaching within a few hours the unprecedented peak of 5,100 sec. ft.

More's creek flows through Idaho City, capital of the district, and joins the main Boise some 25 mi. below. As it surged through Idaho City the stream undermined homes and barns, washed out several small concrete bridges, and seriously weakened the oiled surfacing of the highway, causing the state highway bureau to close the road to all traffic. Since this access road is the only life line to the Idaho City country and its tributary mines, a serious food shortage threatened for a time. The situation was remedied, however, by routing supplies over a long unused mountain road, difficult and dangerous, but passable for horse-drawn traffic.

Arrowrock reservoir had purposely been kept at a low level to serve as a cushion when the crest of the upper Boise reached it. The reservoir capacity is rated at 282,000 ac. ft., less some reduction due to the accumulation of silt in the 30 years since the dam was built. In five days, on April 17, the water went over the spillway.

As the crest came down the river, the Eagle bridge, an old steel span, was the first to be closed. The north pier settled nearly 18 in., causing a decided sag, and water flowed over the bridge floor for some time. The bridge is on a connecting link between U.S. Highway 30 and Idaho Highway 44, which parallel one another along the river and serve a rich farming section. Much of the approaches were washed out, and the road seriously weakened beneath its bituminous coating for more than a mile on either side. Other steel spans on the same stretch of the river were promptly closed, though showing no signs of immediate danger. Approaches, however, were scoured away, and in many low places water covered the bituminous surfacing.

The Fairview concrete arch bridge, most modern in the valley, was threatened by undermining of its southern approach, which crosses more than a mile of low swampy land. It is the most heavily traveled bridge in the state, being on strategic Highway 30, which carries an immense amount of military traffic to and from the west coast. It was closed for five days, while crews labored to repair damages.

The steel span at Star, 16 mi. west of Boise, was early completely under water and a concrete culvert, carrying water of a slough, had to be blasted to preserve the main structure.

Of the 15 bridges across the main Boise river, only the Capitol Boulevard Memorial bridge, on Highway 30, and another at Caldwell, 30 mi. west, were pronounced safe for travel. Some of them are still impassable, because of washed out approaches.

The first breach of the emergency defenses erected during the winter came at the Plantation Golf Course, 6 mi. west of Boise. There the river broke through the dike, and swirled for almost a mile, so weakening the asphalt paving on State Highway 44 that all traffic was routed over a narrow and little-used dirt road to the north. Four hundred army engineers, stationed at a nearby camp, were rushed to the break, and it was repaired. Later, another break occurred at the same spot, requiring a repetition of the procedure.

Most serious breach however, occurred at Parma, an important truck farming center about 5 mi. east of the river delta. Here a huge 20-ton concrete headgate and weir of a local irrigation company gave way and waters flooded some of the richest bottom land of the valley. At this point the river swept a mile on either side of its natural channel and 200 families had to be evacuated.

High water also temporarily closed several roads on other southern Idaho watersheds, but no damage was reported. At the present time, no estimate has been made of the financial loss caused by the flood.

Billion Dollars More For Navy Public Works

ADDITIONAL naval public works in the amount of $1,250,000,000 have been authorized for construction by the Congress of the United States. Of this amount, $725,000,000 is to be used for advance naval bases outside the continental United States. The remainder will be used in expansion of aviation and naval facilities within the bounds of the country itself. The largest proportion of this amount will be spent on the Pacific Coast.

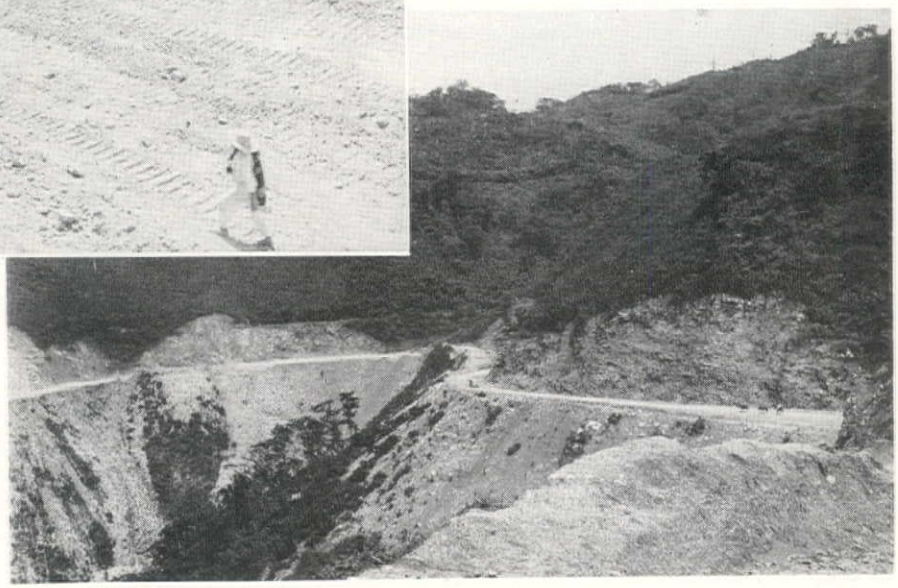
Mexico Highway Development

Nearly $400,000,000 has been spent on Mexico's highways since 1925, giving a network of modern roads which is contributing much to the development of the nation—Program continuing rapidly

By CARLOS BAZAN
Director General
Office of Costs and Statistics
National Highway Authority
Mexico, D. F.

A LONG STEP FORWARD in the advancement of Mexico is the development of its highway system. For many years great areas of the country were hampered by inadequate or non-existent communications. Farmers could not transport foodstuffs to markets and manufacturers were unable to distribute their products to consumers. The processes of government and news dissemination were slow and poor. In recent years, however, an intensive program of highway construction has changed this, and cultural, as well as business activities are increasing and improving. A large continuing program is projected for the future.

The National Highway Authority, a department under the Secretary of Communications and Public Works, is the organization charged with the construction and conservation of the roads in the Republic of Mexico. Roads are classified as "Federal Roads" and "Roads in Cooperation with the States." The former are those built for account of the Federal government, either by force account or by contract. Maintenance operations by the Authority follow the same classifications. The "Roads in Cooperation" are those being built under the "Act for Cooperation . . . 1933," providing for equal contributions from the Federal government. Construction and adminis-



MODERN MACHINERY employed on construction of the Mexico City-Tuxpan highway section between Huauchinango and Poza Rica, State of Vera Cruz. Lower picture shows a stretch of surfaced road in the mountains between Huauchinango and Tuxpan on the same highway. Mexican highways today are first-class as to roadbed, surfacing, maintenance.

TYPICAL jungle country encountered on the Mexico City-Tuxpan highway, and at the right, a section of finished graded road built in cooperation with the state of Oaxaca, between Oaxaca and Pto. Angel.

trative work are under the local Councils for Roads.

From the point of view of construction, the two classes of roads may be classified by the surfaced width of road, which in federal roads is 10 meters, and in those constructed through cooperation, 7 meters.

The road network in Mexico is made up of Federal roads—the trunk roads between main marketing centers—fed by those constructed "in Cooperation," which link the principal towns and productive centers within each state.

Since 1925 (the year in which the National Commission of Roads, predecessor of the present Authority, was founded) until 1942 inclusive, there has been executed in the construction of federal roads the following work: 8,879 kms. of road location, 5,166 kms. of grading, 4,600 kms. of surfacing and 3,464 kms. of paving, at a grand total cost of $374,-739,586.13. (Note: all costs cited are in Mexican monetary units.) During the past year the work executed on federal roads was as follows: 1,143.9 kms. of road location, 580.2 kms. of grading, 592.2 kms. of landscaping, 555.5 kms. of surfacing, and 169.5 kms. of paving, work which represented a considerable endeavor, considering that in addition to natural difficulties (such as mountainous terrain, etc.) there must be remembered the difficulties caused by the war influence, such as scarcity of machinery and essential repair parts. Expenditure in 1942 totaled $92,538,634.13. In addition maintenance and repair work was carried out on federal highways already completed totaling 3,550.2 kms. at a cost of $7,677,383.00. In cooperation with the governments of the states from 1933 to 1942, inclusive, the completed projects are 11,038 kms. of location surveys, 9,843 kms. of grading, 8,420 kms. of surfacing and 2,820 kms. of paving, at a total cost of $208,400,686.36. In the year 1942 the roads constructed through cooperation were the following: 1,237.8 kms. of location surveys, 1,002.9 kms. of grading, 735 kms. of landscaping, 1,358.1 kms. of surfacing, and 275.5 kms. of pavement. These works cost a total of $39,186,-000.00. In this work, the same difficulties mentioned above were encountered.

The principal federal roads now under construction are the following:

Mexico-Suchiate is the second section of the Pan American Highway in Mexico, having a length of 1,587 kms., and its present state of construction is as follows: 910 kms. of location surveys, 780 kms. of grading, 720 kms. of landscaping, 670 kms. of surfacing, 257 kms. of pavement. The work on this road is being expedited, employing a daily force of 12,871 men in addition to modern machinery.

Nogales - Guadalajara, length 1,869 kms. On this road there are: 962 kms. of location surveys, 489 kms. of grading, 465 kms. of landscaping, 381 kms. of surfacing, and 62 kms. of pavement, employing in addition to the necessary machinery a force of 4,100 men daily.

Mexico-Ciudad Juarez, a more westerly alternate to the highway already completed from Laredo, Tex., to Mexico City, length 2,219 kms. On this road there are 1,203 kms. of location surveys, 869 kms. of grading, 907 kms. of landscaping, 828 kms. of surfacing, and 520 kms. of pavement. On the execution of the work for this road there are employed daily 5,984 men, in addition to machinery.

Mexico - Tuxpan, length 352 kms. There are employed daily on this work 2,966 men, and machinery. At present under construction are: 352 kms. of location surveys, 280 kms. of grading, 245 kms. of landscaping, 286 kms. of surfacing, and 142 kms. of pavement.

Zacatepec - Nautla - Poza Rica. This road has a length of 262 kms. and is of great importance because it carries the traffic from the Capital of the Republic to the principal oil field of the country; at the present date the work executed is: 262 kms. of location survey, 200 kms. of grading, 158 kms. of landscaping, 104 kms. of surfacing, and 5 kms. of pavement.

Acapulco - Zihuatanejo, length 220 kms. The work executed is the following: 172 kms. of location surveys, 110 kms. of grading, 77 kms. of landscaping, and 53 kms. of surfacing. On this road 150 men are employed daily, and much machinery is being used.

In cooperation with the state governments, many very important roads are being constructed such as: San Hipolito-Cordoba-Veracruz, Valles-Tampeco, Chiapa-Pichucalco, Guadalajara-Barra de Navidad, Chihuahua - Hermosillo, Campeche-Los Chenes, and many others, employing many thousands of workers.

The 1943 projected expenditure for Federal road construction and maintenance is, in round numbers, $89,000,000; for "Roads in Cooperation" $44,000,000 will be contributed by the Federal government and the several States.

Cement Use Anticipated Less Than During 1942

DOMESTIC consumption of portland cement for 1943 is estimated by the War Production Board at 107,788,000 barrels, a decrease of 39 per cent from the 1942 figure of 177,480,000 barrels.

The estimate should furnish an approximate indication of the probable drop in requirements for sand and gravel used in construction, the Building Materials Division, WPB, points out.

Domestic cement requirements estimated for the western states, follow:

Texas — Estimated requirements for 1943 are 5,575,000 barrels, or 5.2 per cent of the national total and a decrease of 51 per cent from 1942, when they were 11,402,000 barrels, or 6.4 per cent of the national total.

Colorado, Idaho, Montana, New Mexico, Utah and Wyoming — Estimated requirements for 1943 are 3,990,000 barrels, or 3.7 per cent of the national total and a decrease of 39 per cent from 1942, when they were 6,551,000 barrels, or 3.7 per cent of the national total.

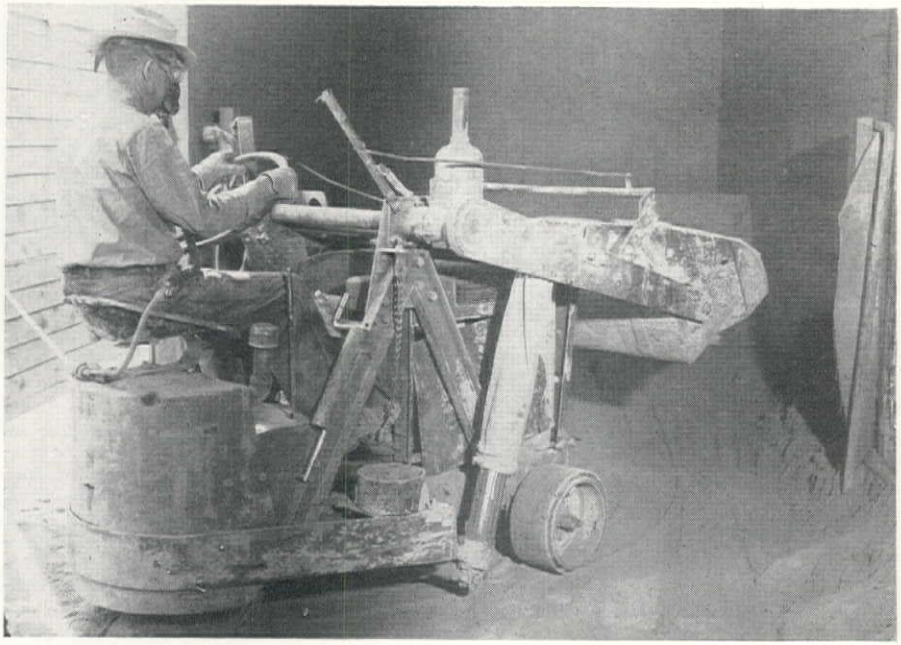
Arizona, California and Nevada—Estimated requirements for 1943 are 14,-878,000 barrels, or 13.7 per cent of the national total and a decrease of 26 per cent from 1942, when they were 20,086,-000 barrels, or 11.3 per cent of the national total.

Oregon and Washington—Estimated requirements for 1943 are 6,210,000 barrels, or 5.8 per cent of the national total and an increase of 6 per cent from 1942 when they were 5,840,000 barrels, or 3.3 per cent of the national total.

The estimates for 1943 requirements were made as of February 15 this year.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK



Hose Reel Used to Overcome Cement Handling Dust Hazard

By FRANK NEWTON
Safety Engineer
Industrial Indemnity
San Francisco

THE UNLOADING of bulk cement from box cars is accomplished by one of three methods. One method is to use a hand-held scraper attached to a two-drum hoist, the operation being similar to that of a dragline. The second is by means of a cement pump. The third method, and one that is becoming increasingly popular, is the use of a shovel mounted on a jeep or so-called cement hog. In this latter method, the cement is scooped up by the hog and then transported to the door of the car and dropped into a chute.

All three methods have one hazard in common, and that is the large amount of dust created which causes discomfort to the operator in trying to breathe. The introduction of the cement hog has brought in a second more serious hazard and that is the exhausting of the carbon-monoxide fumes from the gasoline engine inside the box car. This latter could be serious under certain conditions, and even under the best conditions is bound to result in lowered efficiency of the operator through the absorption of the carbon-monoxide poisoning.

At Keswick Dam, near Redding, Calif., a method was developed by the Atkinson-Kier Company, contractor on the project, whereby these hazards could be overcome. Through the cooperation of E. M. Jennett, project manager, M. M. Mulchahay, concrete superintendent, and the writer, the following method was developed.

The operator of the hog was provided with an air line respirator, this in turn was connected to an air hose controlled by a Balcrank No. 20 hose reel, similar to that seen in many garages and service stations, mounted on the chute dock, outside the car door. Between the hose reel and the source of the air, an air filter was installed to remove all traces of organic vapors and oils. The amount of air supply to the operator was controlled by means of a pressure reducing valve placed at the operator's waist and all tension from the air line was removed from the operator by having the air line fixed to the back of the hog. A quick make-and-break union was located alongside the operator in such a way that by a simple motion he could disconnect his air line respirator from the air line feed. Thus, it was not necessary to disconnect the entire hose should the operator desire to get on or off the apparatus.

In addition to the air line respirator,

TO ELIMINATE the severe dust hazard created when using cement hogs to unload bulk cement from box cars, this air line respirator with an air filter was used. Note the hose reel attachment to the operator's air line shown below. A convenient make-and-break union can be seen at operator's side.

the man was provided with dust-proof goggles.

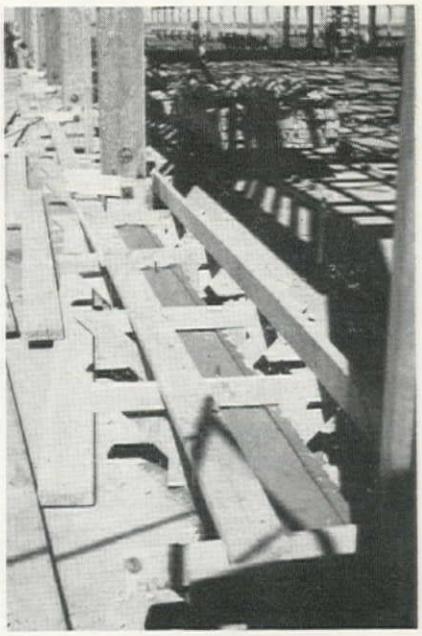
Since installing this equipment, none of the operators have complained of being affected by cement dust or noxious gas. It has also been found that the use of the air line respirator has speeded up the unloading operations as it is now unnecessary for the operator to take time out to get fresh air outside and to clean and change filter papers in his respirator.

Collapsible Portable Forms Used on Wall Curb Addition

ON A BUILDING at the Umatilla Ordnance Depot near Umatilla, Ore., the original specifications called for no siding, but due to winds and resultant dust it was decided to add side walls. This necessitated pouring a curb wall between concrete column bases which were already in.

Special collapsible portable forms were devised to fill this purpose. Two struts per panel, both of the same length, and extending from the bottom of the upper framing to the form were used to insure proper elevation. Yokes holding the forms made of 2-in. siding are shown in the accompanying illustrations, and the forms were wedged up so as to tighten themselves against the struts. The use of these collapsible forms saved considerable time in erection on succeeding pours and no loss was experienced from splitting or breaking during removal.

Paul N. Odegard and Associates, Portland, Ore., were awarded the building contract on this big ordnance depot. Howard H. Spence was construction superintendent and Herbert Dunham, the assistant superintendent.



COLLAPSIBLE FORMS in place on the wall curb. When the yokes are removed, the forms fall away without rupture and may be easily moved to another location. The template struts for fixing the proper elevation of the tops of the forms have been removed in this view.

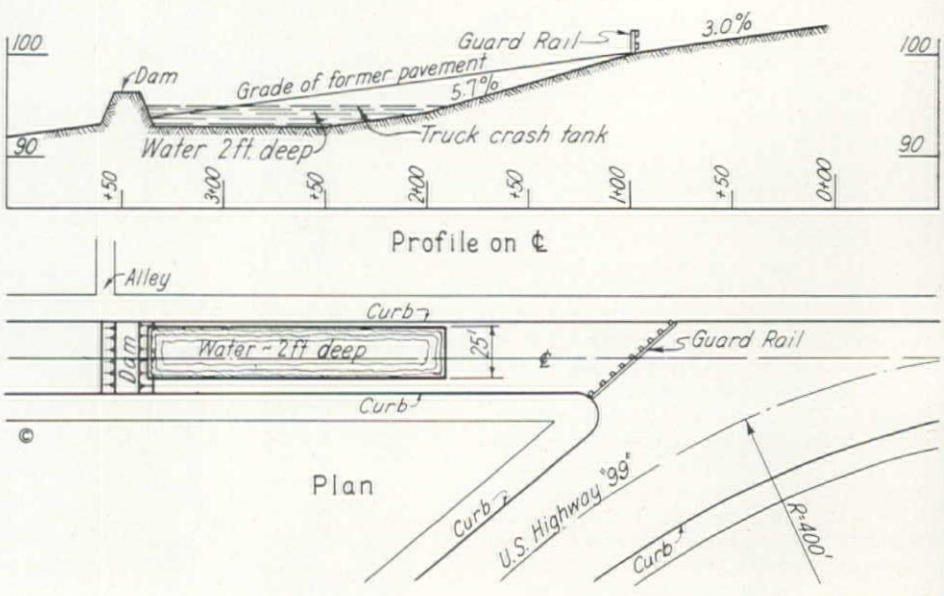
Water Trap Built to Retard Runaway Trucks at Redlands

A WATER TRAP to retard runaway trucks has been designed and built by George Hinckley, city engineer of Redlands, Calif., at a particularly hazardous curve on U. S. Highway 99 as it passes through that city.

As the highway approaches the city from the south, it descends a steep grade from the Beaumont plateau. The last two miles of this grade are on a northerly tangent, with a gradually decreasing gradient. As this tangent approaches the center of the city, the slope is actually about three per cent, but appears to be almost flat. Drivers of trucks and other vehicles are frequently deceived by this appearance and fail to apply their brakes early enough to permit safe turning of the 400-ft. radius curve entering the city.

The highway tangent some years ago continued directly to a right angle intersection with the main east-west highway, however this has been blocked off and the road re-routed around the more gradual 400-ft. curve in order to eliminate the former right angle turn, and a school has been built covering the abandoned right-of-way. In several instances heavily loaded trucks, having failed to slow down for the curve, have crashed into the school yard. Fortunately, no children have been injured, but drivers have been both injured and killed.

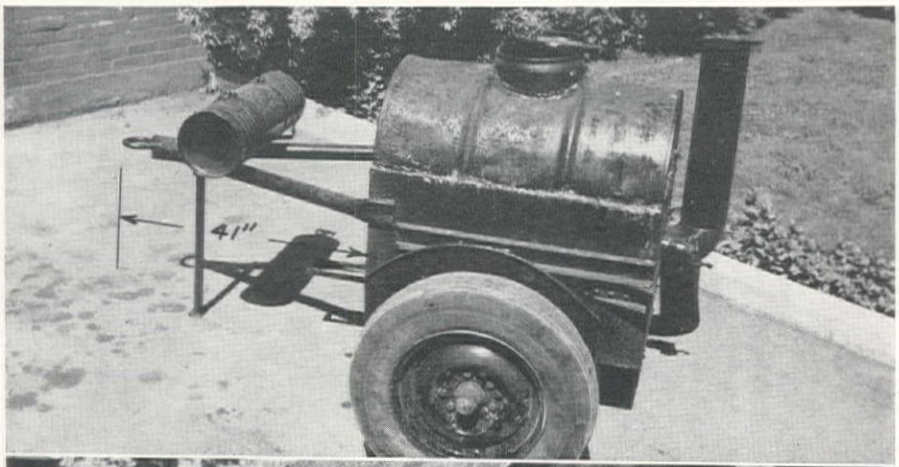
In an effort to prevent this type of accident in the future, the city has erected a heavy timber guard rail at the curve, and behind it has excavated a 25x150-ft. depression and filled it with 2 ft. of water. It is believed that a truck running into this body of water will be sufficiently braked that the small earth dam at its lower end and its own brakes will bring it to a complete stop before any damage can be committed.

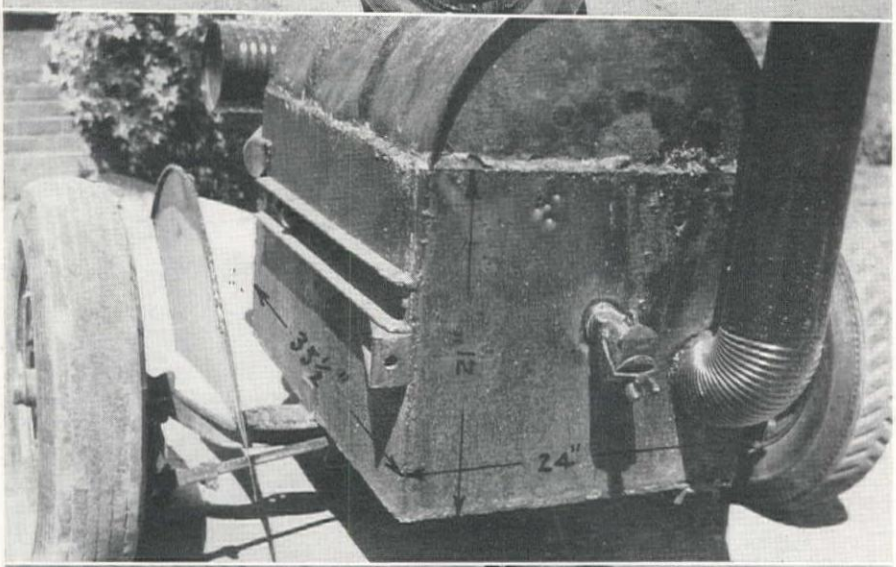


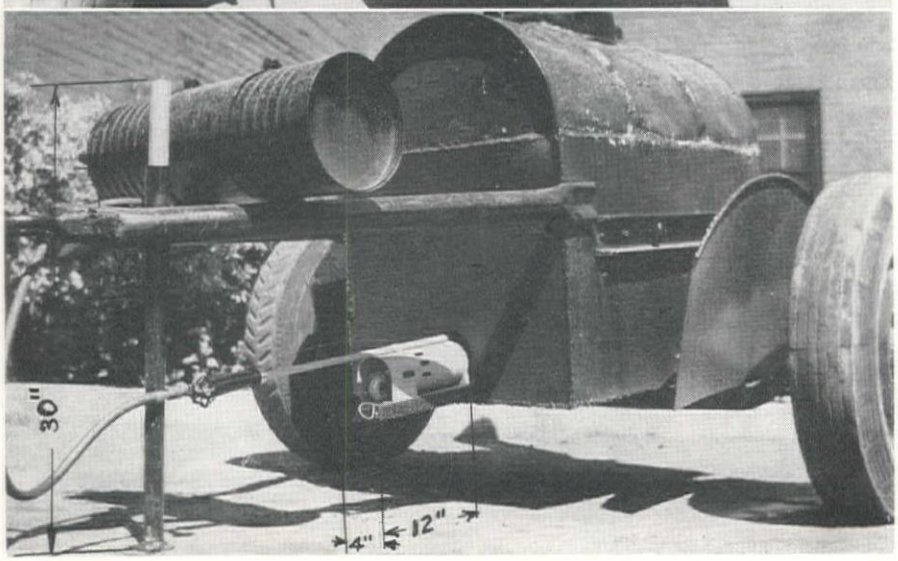
Tar Kettle Built From Scrap Parts in Boise Highway Shops

A TAR KETTLE made almost entirely of scrap was developed in the Pocatello shops of the Idaho state highway department, from a design originated by Walt Hynes, the shop foreman.

An old 50-gallon drum was utilized for the tank, the axles and wheels were from a wrecked Ford and Chevrolet, the tires were salvaged, and the steel was obtained from a discarded army tractor which was issued to the highway department after the first world war. The only parts not from scrap were the heating unit and the stove pipe stack. This portable unit has a trailer hitch frame 41 in. long on which the fuel tank is mounted. A baffle plate for heat protection is attached to the axle between the kettle and the tires. The overall dimensions of the kettle are 35½ x 24 in.





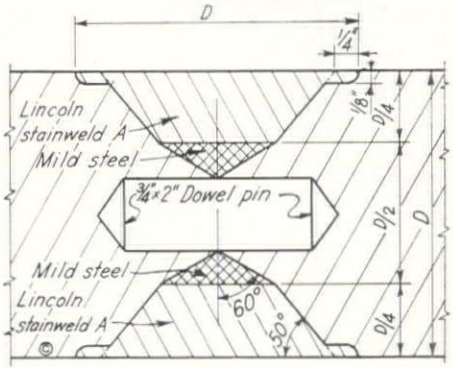


The total cost of the unit is about $70.00 using the state's cost figures. The unit costs are $35.84 for labor, $25.00 for the heating unit, and $10.00 for the tires.

For patching operations and jobs requiring but a small amount of hot oil application, this tar kettle trailer has been found very useful, since it is not necessary to drive a heavy truck and other expensive equipment to the site of the job. Being a completely self-contained unit, it may be detached, if required, and left with one or two men at the job while the truck moves on to some other work.

The photos and material for this article were furnished by T. Matt Hally, formerly director of highways, Boise, Idaho.

Repairing Broken Grader Axle Shaft



THIS PRACTICAL method has been used by the division of highways at Fresno, Calif., for repairing broken grader and tractor axles. The procedure was as follows: a chuck and steady rest was used to center the broken shaft, which was then machined to shape, the steady-rest was replaced and the ends of the broken shaft drilled for the dowel pin.

After the pin was inserted, welding proceeded in this order: it was first spot welded on four sides and a bead was run between spots opposing each run, after which the axle was checked and straightened for axial offset. Next a mild steel weld was applied to a diameter equal to half that of the shaft, after which it was again checked and straightened if necessary. Finally the balance of the breech was filled with a hard steel electrode, the shaft straightened while hot, and the weld machined as much as necessary to produce a smooth surface.

Broken axles treated in this manner have been found to stand up under hard usage almost as satisfactorily as new equipment, and the repair cost is but a fraction of the price of a new axle.

This idea was furnished to *Western Construction News* by F. F. Green, equipment superintendent for the California Division of Highways at Fresno. R. H. Stalnaker is equipment engineer and G. T. McCoy is state highway engineer.

NEWS OF WESTERN CONSTRUCTION

MAY, 1943

Electrification Projects to Proceed With Construction

THIRTY-TWO Rural Electrification Administration projects stopped by the War Production Board on July 21, 1942, have been re-examined in the light of current farm needs for power and will be completed as rapidly as possible, WPB Chairman Donald M. Nelson has announced.

The projects now average 71 per cent complete, he said, varying individually from 50 to 89 per cent completion. Approximately $1,800,000 had been invested in them up to the time work was halted and expenditure of another $800,000 will complete all 32 projects. The construction involved will total 2,861.2 mi. of line.

The principal critical materials needed to complete the projects, Mr. Nelson said, are 1,000 tons of steel wire, 560 tons of copper wire and 80 tons of weatherproof copper wire. All of this except 750 tons of steel wire either is on hand or is obtainable from frozen stocks or excess inventory. From a practical standpoint, no other use exists for these frozen stocks comparable to the benefits to be obtained from completing the electrification of these farms.

"While this action does not represent a lessening of the critical situation in the metals field," Nelson explained, "it does represent a decision to make the best possible use of materials on hand."

The western projects reinstated are:

Intermountain Rural Elec. Assn.—114.9 mi. in Jefferson Co., Colo.

Calloway Co. Elec. Coop. Assn.—27.3 mi. in Calloway Co., Mo.

R. S. R. Electric Cooperative—177 mi. in Sargent Co., North Dakota.

Clearwater Valley Light & Pow.—57.8 mi. in Nez Perce Co., Idaho.

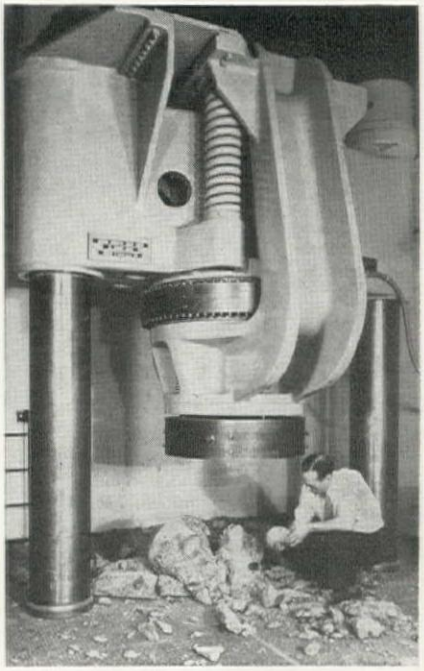
Fort Belknap Elec. Coop.—205 mi. in Young Co., Texas.

Dawson County Pub. Pow. Dist.—120 mi. in Dawson Co., Nebraska.

Douglas Electric Cooperative—15 mi. in Douglas Co., Oregon.

West River Elec. Coop.—60.5 mi. in Pennington Co., S. D.

Columbia County Rural Elec. Coop.—64 mi. in Columbia Co., Washington.



LAB TESTS SHASTA CONCRETE

CONCRETE CORES from Shasta dam are sent to the Bureau of Reclamation testing laboratory in Denver, where various tests are applied. Here a 22-in. core has been crushed by a machine capable of measuring compressions up to 4,000,000 lb. The specimen failed under a load of 2,000,000 lb., a strength several times that required to resist maximum pressure in the base of structure.

Lumber Consumption May Exceed 1943 Production

THE TOTAL lumber requirements for construction and all other uses will total approximately 31,500,000,000 bd. ft. in 1943, it was announced today by the War Production Board.

The lumber consumption estimate, which includes the lumber which may be required by this country for use outside of the United States, was prepared by the War Production Board and the U. S. Department of Agriculture Forest Service. It includes lumber to be used in boxing, crating, factory, and construction, as well as for military uses.

The present forecast provides for prospective construction under severe limitations and does not provide for any unusual catastrophe or for replenishing depleted stocks. Since lumber stocks are at the lowest point in several years, it is not at all certain that production will be high enough to enable consumers of lumber for war purposes to get what they need during the year. While active steps are being taken to increase production, so that the major war consumers can be assured of their requirements, consumption of lumber must be limited to actual production.

Lumber requirements for new construction in the United States in 1943 will total approximately 11,000,000,000 bd. ft.

Sewage Works Association Will Convene in Fresno

THE CALIFORNIA Sewage Works Association has changed its program for 1943 to eliminate the spring and fall meetings and hold but one gathering. The dates for this season's meeting have been set for June 11-13, and Fresno has been selected as the most central place for the meeting.

Engineer Corps Seeking Construction Workers

THE U. S. ARMY Corps of Engineers is in need of skillful construction workers. They may volunteer for induction and assignment to the Corps by applying through any Area or District Engineer of the U. S. Army Engineer Department. They will receive a letter to the Commanding Officer of their Armed Forces Induction Station, directing that they be assigned to Engineer Replacement Training Centers. Classifications now required include:

Automobile mechanic
Blastman or powderman
Bridge builder
Construction carpenter
Construction foreman

Power shovel operator
Electrician
Operating engineman
Water supply filter operator
Machine shop foreman
Utility repairman
Rigger
Tractor driver
Tractor mechanic
Quarryman
Jackhammer operator
Heavy construction equipment operator
Railway section foreman
Water supply foreman
Well driller
Motorboat operator
Lumberjack
Sawyer
Lumber grader
Sawmill millwright
Timber cruiser

Large Facility Contract Awarded at Vancouver

COMPLETE FACILITIES for the row-house projects in the Vancouver, Wash., area are included in the contract awarded recently to A. J. Goerig Construction Company of Seattle. The projects to be served include Bagley Downs, 2100 units; Burton Holmes, 1500 units; and a portion of McLoughlin Heights, 1000 units.

Included in the contract are an 8,000,000-gal. reservoir to be constructed on McLoughlin Heights, six wells to be drilled near Hudson House, and distribution facilities. These water facilities, in addition to a 1,500,000-gal. storage system now nearing completion, are calculated to be an adequate supply for the new residence area. Total cost of the water services will be $364,203. The sewer system, costing $293,214, included in the same contract will provide for handling 18,000,000 gals. of sewage daily, pumping it for discharge into the Columbia River. Road work valued at $96,490 will provide a 4-lane highway, linking the principal areas and service roads in the several developments. A fourth portion of the contract is electric service lines. This contract is for $57,340.

Five Dams Proposed for Santa Barbara County

PROPOSALS have been made to erect five dams in Santa Barbara County, Calif., to solve the water conservation and flood control problems in that area. This county has been selected as one of three experimental areas of the United States by the National Resources Planning Board in which efforts are being made to completely coordinate the activities of all governmental agencies.

Jerome Fertig of the Bureau of Reclamation has proposed the five dams to the committee in charge of this county-wide development. Three of them are suggested for Santa Ynez region. One in the Gibraltar area will supply water for the city of Santa Barbara and the coastal part of the county. Another at Cachuma will supply the middle Santa Ynez area, and a third at Santa Rosa will supply the water needs of Lompoc and Camp Cooke. Two other dams are to be located on the Santa Maria River to supply the city of Santa Maria and surrounding farm areas.

U. S. Construction Companies Now Incorporated in Canada

THREE United States construction firms have registered for business in Canada as extra-provincial companies. They are the Hamilton Construction Co., of Kansas City, Mo., the Kansas City Bridge Co., of Kansas City, Mo., and the Metcalfe Construction Co., of Omaha, Nebr. They have all established Canadian offices at 918 Victoria St., Victoria, B. C.

CAA Approves Airport For Twin Falls, Idaho

A COMMERCIAL Class-3 airport has been approved for construction by the War Department and the Civil Aeronautics Authority between Kimberly and Twin Falls, Idaho. A total of $761,000 will be supplied for the development by the CAA, and additional financial requirements and right-of-way will be supplied by the city of Twin Falls. The airport will be known as Joslin Field in honor of Flying Officer Joslin of Filer, Idaho, the first aviation officer of that area to be lost in action. It was originally planned that the airbase now under construction near Mountain Home, Idaho, would be in the Kimberly-Twin Falls area, but the army's decision to move the permanent base brought about the order for the Class-3 airport.

Clearfield Naval Depot Finished in Fast Time

THE NAVAL Supply Depot at Clearfield, Utah, the second largest of its kind, has been completed in record time by the combination contracting firm of Winston Bros., C. F. Haglin & Sons, Missouri Valley Bridge & Iron Co., and Sollitt Construction Co. It was taken over by the Navy on April 10. Included in the facilities at the depot are 32 mi. of railroad track, 6.5 mi. of sanitary sewers, 18 mi. of storm sewers, 12 mi. of water supply line, and 12.5 mi. of highway. The original contract award of June 4, 1942, called for an expenditure of $35,000,000. Architectural and supervisory services on the project were rendered by Ashton & Evans and L. S. Hodgson, architect-engineers of Salt Lake City.

Construction Engineer Positions Now Open in South and Central America

THE CONSTRUCTION program of the Division of Health and Sanitation, Office of Inter-American Affairs, in Central and South America is rapidly reaching a stage where there will be a need for experienced construction engineers. The work is scattered through fourteen of the twenty republics at present.

About 100 men under 50 years of age will be required in this service. Ordinarily consideration will be given only to men with dependents and over 38 years of age, or to men without dependents and over 44 years of age.

Inasmuch as the work is being directed by the Office of Inter-American Affairs as a concrete evidence of the "Good Neighbor Policy" the men selected must be of exemplary character, tactful, able to cooperate with officials of the other American republics, and well qualified to direct and expedite construction as well as to facilitate design when necessary.

The base pay varies with the qualifications of the men chosen but subsistence allowances should be ample in every case to care for a man living alone in the best available quarters, so that the base pay is clear. First-class transportation is provided to his post and back. The Office cannot assist in making arrangements for transportation of the man's family, and he is not encouraged to try to have his family join him. Health conditions are generally good in sections where construction is to be active.

The type of construction covers the wide field of hospitals, dispensaries, health centers, sewerage systems, drainage systems for malaria control, and water supply. Because the materials for water supply construction are critical, that type of work is limited.

Men of experience and of the proper temperament to undertake this work should send for further details to Theodore Reed Kendall, Consultant on Construction, Division of Health and Sanitation, Office of Inter-American Affairs, 470 Fourth Avenue, New York City.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

Washington, D. C.—It is generally understood here that through no fault of their own the West slope steel industries are falling behind schedule. The plate production anticipated this month is now not considered probable until next winter. The Western delegation in Congress, and in the permanent agencies of the Federal Government, naturally have kept close watch on this phase of West slope war activities. Whatever discussion you may already have seen or heard is probably only the forerunner of much more acidulous debate that will happen when the Western delegation really begins to make close enquiry. It is definitely told here that responsibility for the delay is up to the brass hats of WPB who do the scheduling. They say part of it has happened because these brass hats have been deliberately holding back because they knew certain materials have outrun the schedule and because production has been out of line with shipping facilities. You also hear that part of the imbalance of scheduling and production is due to the turmoil that beset WPB when the fight arose which had Ferdinand Eberstadt as its chief casualty.

Incidentally, that mess is not yet cleared up. The recent fight over the Civilian Supply Administration Bill, which Nelson fought stubbornly and Byrnes supported tentatively, appears to mean that Nelson is still farther out on the limb. The bill was finally reported exactly as Nelson did NOT want it by unanimous recommendation of the Senate Banking and Currency Committee, headed by Senator Wagner of New York. Moreover, when the bill went on the calendar it had the specific blessings of the Speaker of the House and the Floor Leader of the Senate and several other faithful followers of the President. It does not take clairvoyance to sense that the Civilian Supply Administration Bill, bitterly opposed by Nelson, is a White House measure. The general assumption here is that he either is scheduled actually to go, or is rapidly becoming more and more an imposing ornament.

Highway prospects

It appears there is some relaxation in the supply of some basic materials. The very appearance of a hope of some metals apparently has caused many WPB officials to feel that activities now utterly choked off may expect some slight modification of the strangulatory technique. There is a whisper abroad that highways may soon be placed on the list of projects that might be allowed some materials and equipment and workers. Bear in mind it is whisper only. Roughly, they tell us there are between 35 and 40 highway projects on the West slope which might benefit from the growth of this whisper into fact. Byron Scott, one of the newly elevated brass hats in the Commodities and Utilities Bureau of WPB is the focal point for the hopes and pleas of those who seek better highways on the West slope.

There appears to be the feeling that the West slope may be permitted to start on some frozen projects and that highways, now torn to pieces by heavy duty vehicles, may be really repaired by the desperate State Highway Departments. A straw in the wind is the recent ruling that the California State Department of Public Works, C. H. Purcell, director, may ask for occupational deferment of employees needed to maintain and repair highways and bridges. Obviously a ruling that is good for California also is good for all other States. This may bring down the average of revocations which weekly have been highest in highways and bridges. Meanwhile, WPB continues to urge that the States pool road machinery and equipment. The WPB declares there is no lack of equipment. It states each State has abundant equipment. "The fault," says WPB, "lies in inadequate use of equipment." WPB has issued an amendment to Simplification Order L-217 which reduced the number of models and sizes of bituminous road building machinery. The order cuts away 85% of the seven types of machinery used. The details are to be found in newly published Schedules 9 to 15.

Alaska citation

The first citation in military history for building a highway was published by the War Department in April. The citation is given for meritorious conduct and has been bestowed upon every unit connected with the building of the Alaska highway. The appropriate service mark will appear on the colors and the records of 23 units. They are mentioned as the 18th and 35th Engineer Combat Regiments; 93rd, 95th, 97th, 340th, and 341st Engineer General Service Regiments; 73rd and 74th Engineer Light Pontoon Companies; 133rd, 134th, 140th and 141st Quartermaster Truck Companies; 428 Engineer Dump Truck Company; Company D, 29th Engineer Topographic Battalion; Company A, 648th Engineer Topographic Battalion; Sector Headquarters; Air Forces; Engineer, Medical, Ordnance, Quartermaster, and Signal Corps Detachments. The citation recites: "the units were charged with the task of constructing a 1,600-mile highway from Fort St. John, B. C., Canada, to Slana, Alaska, 'with all speed within the physical capacity of the troops.' The general route selected for the highway lay across vast areas of almost impenetrable wilderness, vaguely mapped and but little known.

"Commencing with the spring thaw and continuing on through the summer floods, the troops overcame the difficulties imposed by mountainous terrain, deep muskeg, torrential streams, heavy forests, and an ever lengthening supply line. By virtue of remarkable engineering ability, ingenious improvisations and unsurpassed devotion to duty, the units assigned to the highway construction completed their mission in one short working season and thereby opened a supply road to Alaska that is of inestimable strategic value to the war effort of their country."

The Alaska Highway is to be widened this summer to 24 ft. It now carries 70,000 tons of cargo per month and this is expected to increase measurably. OPA has authorized an increase of 25 per cent in the maximum monthly rental rates for Alaskan construction and road maintenance equipment. The new rate is expected to release much mining equipment for road work. The current rates were not sufficient to cover the use of equipment under the severe conditions of climate and terrain and primitive protection. The new rates do not apply to daily or weekly rentals or to equipment rented by the Army Corps of Engineers. The National Park Service has been authorized to study the development of the Alaska portion of the Alaska Highway. Allyn P. Bursley, now in Alaska, will do the job for the National Park Service.

Treasury Department recently issued a report by the Committee on Intergovernmental Fiscal Relations, headed by Dr. Luther Gulick, which urged that Federal Government withdraw from collection of gasoline and motor vehicle taxes "as soon as its financial exigencies will permit." The report urges that this particular source of taxation forms "a lucrative and badly needed source of revenue for the States, and one which they are exploiting or might exploit adequately and satisfactorily." The Committee also advises repeal of the automobile use tax; urges elimination of State trade barriers; suggests new residents in a State should be allowed credit for automobile license taxes paid in the same year to another State. The Committee supports the viewpoint of municipalities that States give the cities and towns a greater share of motor vehicle imposts.

Reclamation developments

Your friends here in Congress and outside of the Government have accomplished solid results since the last letter was written. They have finally prevailed on the Department of Agriculture and the Food Administration to accept the formal responsibility of being your claimant agency in the drive to secure WPB authority to extend existing irrigation projects and to initiate new reclamation projects on the West slope. The movement has made such headway that some one has managed to enlist the personal approval of the President, according to reliable information. We are told that the active intercession of Mr.

Roosevelt is responsible for the interest that has animated several important officials and agencies. Apparently the White House has let it be known in vigorously specific terms that it is interested in at least one particular project. This interest is, of course, sufficient to demonstrate that the Executive has been convinced we must have more reclamation to put more land into production to raise the food we need.

The active job of keeping the work moving is under the immediate direction of N. E. Dodd, of the Triple A. He is keenly interested in the productive resources of the projects in the 13 Western states in order to secure more food for distribution. As director of the Western Division he is head of the intradepartmental committee which devotes all its time to the study of preparation of the development plan. This group, together with solid support of the members of the Senate and the House from the West slope states, and Managing Secretary F. O. Hagie of the National Reclamation Association, assisted by a number of Eastern Representatives and Senators, and leaders of industry and business in the East, have presented the whole program as outlined by the staff of Commissioner Page of the Bureau of Reclamation before the Facilities Review Committee of WPB. There is reason to feel that the Committee will approve the program and make the necessary recommendations. This report, presumably covering the plan to make 2,853,805 more acres in 42 projects productive, will go to the final WPB Review Committee, headed by Donald Nelson. The Nelson Committee is the absolute court of last resort. There is no appeal from its decisions. You are not able to appear before the Nelson Committee or to submit briefs; it is virtually an economic star chamber that functions solely upon the recommendations of the lower committees. Usually it validates the findings of the lower committees.

Apparently the only unknown equation of serious consequence is the question of power. The old, old fight between the champions of power and the champions of land use still continues. Bear in mind that the youthful public power tycoon from TVA and Wisconsin, J. A. Krug, Program Vice-Chairman of WPB, also is Director of WPB Office of War Utilities, and ranks next to Charles E. Wilson in the WPB hierarchy. In order to orient the power equation in this land development program, members of the Department of Agriculture committee, with others, have conferred with Krug. It is undoubtedly true that he understands Mr. Roosevelt's views. The overwhelming sentiment in Congress in favor of land if there is an issue which affects power in connection with Western reclamation projects, apparently was clearly defined in the recent hearings of the House Committee on Appropriations. Chairman Clarence Cannon, Missouri, from the Ozarks, frankly did not favor the reclamation program. The members of his Committee, however, deeply impressed with the need for food production, overwhelmingly gave evidence of their desire that Western lands be brought into cultivation by irrigation.

The testimony of National Reclamation Association Manager F. O. Hagie brought out these arresting facts. He indexed the period from 1910 to 1914 as 100. He showed that the index for population in the United States in 1943 has risen to 141.9, while the index for harvest acreage has risen only to 105.4, and the export of agricultural products has dropped to 49.4, despite the huge outpouring of cargoes the past 18 months to support Lend-Lease operations. His figures showed the index for crop production in 1919 was 89, and for livestock and products was 86. In 1942 crops had risen to 125 and livestock and products to 131, while imports of agricultural products in 1940, the last figures available, had risen in complementary quantities to 146, and in supplementary quantities to 104. During the same year exports, in 1919 indexed at 115, had fallen (in 1940) to 25.

Stop-work orders

WPB in April stopped work on 6.05 mi. of construction work on Montana State Route No. 34, near Virginia City. At the same time it revoked previous orders which had stopped work on 3.54 mi. near Moore, Mont.; and on the construction of overhead crossings and approaches on the Rock Springs Airport Road, Wyo. It also permitted installation to be resumed of flashing-light signals at grade crossings near the entrance gate to Camp Lockett, Calif. WPB revoked the authority to begin construction of roadwork which was given to all States under Order L-41-600, and required instead that jobs needing no priorities be initiated by applications on Form PD-200 or Form PR-1-A, filed with the District Engineer of the Public Roads Administration.

Some modification of the Nelson stop-construction orders already is apparent. Ban was lifted on the Lincoln County road needed in the Grand Coulee area. Authority was also given to replace wooden gates at outlet ends of the turbine draft tubes with 27 steel bulkhead gates; also to install other equipment. At Blackfeet, Mont., the irrigation project was permitted to proceed with the construction of a canal and a headgate and to rehabilitate seven miles of canal. At Gila, Ariz., for the development of guayule, permission was given to clear and bring into production 3,000 acres. At Keswick dam, in California's Central valley, two motor-driven, deep-well turbine-type pumping units were authorized. On the other hand, the Bureau of Reclamation has proceeded to proclaim withdrawal of land for reclamation in various areas. At Hassayampa, and Winslow, Ariz., many sections of land are withdrawn from entry. Other lands were withdrawn in the Gibraltar Reservoir site in Santa Barbara County, Calif., and in the San Luis Valley Project, Colo. In Oregon, lands were withdrawn under the Prineville Reservoir site, in the Ochoco Project.

Power development

The Bonneville Advisory Board unanimously adopted a resolution at its recent annual meeting urging WPB to take immediate action to increase the power supply in the Pacific Northwest by installation of additional generating units at Bonneville and Grand Coulee dams; raising the City of Seattle's Ross dam on Skagit River; completing construction of Rock Island dam and hydroelectric plant on the Columbia River; and expediting construction of the City of Tacoma's Nisqually hydroelectric project; and requested that other agencies of the Government complete surveys and investigations to determine which of the many attractive undeveloped power sites in Pacific Northwest are most desirable for early construction to provide additional power for war purposes.

Utah Power & Light Company, Salt Lake City, has applied to the Federal Power Commission for authority to merge the Utah Light and Traction Company, also of Salt Lake City, into its ownership. It proposes to pay $44,000,000 by issuing first mortgage and general mortgage bonds. HR 2482 would authorize Colorado, Kansas and Nebraska to set up a control over the waters of the Republican River Basin. Last year the President vetoed a similar bill on the grounds that it invaded Federal rights. Charges by Rep. Ditter, Pennsylvania, that "collusive knowledge" of the Federal Power Commission, Bonneville Power Administration, and Federal Housing Administration, enabled the Clark County Public Utility District to collect $50,000 annually without giving service in return, has been answered formally by the Federal Power Commission with the statement that the hearing at which the transaction was consummated was attended by representatives of the press, and that the Federal Power Commission has no knowledge of other contracts, except as it has knowledge about hundreds of similar contracts, investigated by other agencies and filed with the Federal Power Commission.

Renegotiation

Sen. Johnson, Colorado, introduced S 992 which is designed to raise the exemption on annual contracts subject to renegotiation from $100,000 to $500,000. The Bill was referred to the Ways and Means Committee and is expected to facilitate renegotiation transactions by reducing the administrative burdens which now are a tremendous problem. The bill was prompted by the recommendations of the Truman Committee. This report demonstrates the difficulties of renegotiation. It states that 80,000 contracts have been found subject to renegotiation, and that the War Department has been able to complete only 140, the Navy 38, and the Maritime Commission 25. The Truman Committee emphasizes the present situation is unfair to contractors, and that a limit should be set upon contracts which may be regarded as retroactively subject to renegotiation. The Army has appointed a new committee for Price Adjustment including Maurice Hirsch, of Houston, Tex.; Arnold G. Stifel, of St. Louis; and Maj. Paul B. Boyd, of the War Department. They will work with the existing Committee consisting of Maurice

Karker, New York; Herbert J. Taylor, Chicago; and Maj. John C. Wood, formerly Executive Vice-President of B. Altman & Co., New York. New forms also have been provided to expedite renegotiation. They simplify financial and cost statements. Those who file the forms are automatically cleared of the obligation to submit to renegotiation unless demanded within a year after filing. The forms may be secured through any of the Four Departmental Price Adjustment Boards, or by writing to Assignment Office, Price Adjustment Board, P. O. Box 2707, Washington, D. C.

Miscellaneous

Copies of the Policy and Procedure of the Wage Adjustment Board for the Building and Construction Industry, issued late in April, may be had by writing George B. McGahan, Executive Secretary, U. S. Department of Commerce, Room 3124, U. S. Department of Labor, Washington, D. C. . . . The latest Navy estimate for funds lists a total of $24,551,070,000, including $9,024,000,000 for repair, replacement and increase of naval vessels; $3,476,800,000 for ordnance; $4,286,211,000 for supplies and accounts; $1,887,000,000 for the Bureau of Ships; and $1,640,000,000 for the Bureau of Aeronautics. . . . Clarence E. Blee, native Californian, many years in hydroelectric and irrigation engineering work on the Pacific Coast, has been chosen as chief engineer of TVA, succeeding Theodore B. Parker, sometime associated with the Utah Power & Light Company. Mr. Parker goes to M. I. T., as head of the Department of Civil and Sanitary Engineering. . . . William Embry Wrather has been appointed director of the Geological Survey, succeeding Dr. Walter C. Mendenhall, who retires from the Government service after 48 years. . . . Henry F. Camp has resigned as OPA Regional Administrator in San Francisco and is succeeded by Frank E. Marsh, who has been his Deputy. . . . Simon H. Ash, of the University of Washington, becomes head of the Office of Civilian Defense Rescue Service. . . . Ralph A. L. Bogan, Chicago, has been appointed to make a survey of civilian transportation in Alaska. . . . The Army-Navy E was recently awarded to William Ainsworth and Sons., Inc., Denver; Bardwell and McAlister, Inc., Hollywood, Calif; B. F. Goodrich Company, Los Angeles; and Cole of California, Inc., Vernon, Calif. . . . Engineer officers newly elevated to the rank of Brigadier General include Don G. Shingler, Clarence L. Adcock, Bernard Robinson, Charles H. Barth, Jr., George Richards, John S. Bragdon, Beverly C. Dunn, James G. Christiansen. . . . Army Engineers are dispersing the vast pool of construction machinery, with the decline of the future construction program. Most of the equipment will be sent abroad for use by the troops. Some will be used for troop training in the United States.

NEW BOOKS . . .

ELECTRICAL AND RADIO DICTIONARY—By Carl H. Dunlap, Chief Engineer, Electrical Division, American School, and Associate Member American Institute of Electrical Engineers; and Enno R. Hahn, E. E., Editor and Consulting Engineer, Popular Mechanics Magazine. Published by the American Technical Society, Chicago, Ill. 110 pages, 5½x8. Price $1.00.

This practical dictionary for the electrical and radio fields contains in addition to the definitions of nearly all the terms likely to be used in this work, many clear drawings and sketches, explanations of the symbols used in architectural plans, numerous formulas, and tables of constants. This is a revised and enlarged edition of the dictionary which first appeared in 1927. It has sufficient scope to make it useful to a wide variety of readers from the novice to the experienced electrical engineer.

* * *

INDUSTRIAL FIRE BRIGADES TRAINING MANUAL—By Emmett T. Cox, Indiana Inspection Bureau, and Assoc. Director, Indiana Fire Service Training Schools; W. Fred Heisler, Assoc. Director, School of Technical Training, Oklahoma A. & M. College, and Chairman of the National Fire Protection Association's Committee on Firemen's Training; and Horatio Bond, Chief Engineer, National Fire Protection Association. Distributed by the National Fire Protection Association International, Boston, Mass. 176 pages, 8½ x 11. Price $1.50 per single copy, $1.00 per copy for 15 or more.

Many large and important industrial plants have enjoyed immunity from serious fires for long periods of time. This is not a matter of luck, but the result of careful planning. It usually means that the plant has an organization among its employees for fire safety, someone who is constantly responsible and alert to adequate safeguards. Probably the most important part of the fire safety organization is the private fire brigade. This training manual is designed primarily for use in classes where employees are assigned to carry out fire fighting duties under the direction of the chief of the private brigade. It is not intended necessarily as a manual on plant inspection.

The sixteen chapters of the book cover a wide variety of fire-fighting techniques, and include chapters on the materials, personnel and equipment which constitute the industrial fire brigade, on forcible entry practices, rope work, fire extinguisher practices, ladder work, fire streams, fire causes and fire hazards, fire fighting procedures, electrical fires, and gas masks and rescue practices.

OBITUARIES . . .

John Lincoln Hall, prominent structural engineer, died recently in Seattle, Wash., after an illness of several months. He was the steel designer on the Metropolitan Life tower in New York City, and also designed the concourse roof of the Pennsylvania railroad station in New York, ranked as an outstanding example of structural steel treated architecturally. After moving to Seattle in 1909 he designed many buildings there, including the Northern Life tower and the Washington Athletic Club. He was a life member of the American Society of Civil Engineers.

* * *

Major John C. Shaw, retired Army engineer, and formerly city engineer of Los Angeles, Calif., died on April 7 at his home in Beverly Hills, Calif. Maj. Shaw was a veteran of the Spanish-American War and of World War I in which he served with the 15th Engineers. He worked on the First Ave. Bridge in San Diego and on the Panama Canal locks.

* * *

Charles R. Richardson, Ogden, Utah, grading contractor, was fatally injured March 17 when a team of horses ran away. He was 66 years of age, and had worked on many Utah defense roads and highways.

* * *

Howard C. Mann, project manager for McNeil Construction Co., Los Angeles, Calif., on projects at San Diego, Calif., and Las Vegas, Nev., died April 17 in Los Angeles, at the age of 57.

* * *

Peter Jackson Woods, 77, Port Angeles, Wash., contractor and bridge builder, died on April 13. He had put in the first paving on the Port Angeles city streets, and directed the paving of the Bothell highway and the Shelton-Olympia highway.

* * *

Joseph R. Laskbrooke, well-known civil engineer, died recently in the Veterans' Hospital in San Fernando, Calif., at the age of 59. For the past two years he had been consulting engineer on the expansion work at some of Los Angeles' largest aircraft plants.

* * *

A. Douglas McBryde, construction engineer of Oakland, Calif., died suddenly April 20, in Oakland. He had built the Stanford University Stadium, Spring Valley dam of the San Francisco water system, and important highway links. He was 64 years old.

* * *

Charles N. Rohaut, Astoria, Ore., building contractor, died in Astoria on April 14 at the age of 63.

PERSONALLY SPEAKING

E. M. Boyd, vice-president of the Northern Construction Co., **M. C. Cameron,** and **Brig. N. D. Lambert** have jointly purchased the interests of the late General J. W. Stewart and A. R. Mann in the business of the Northern Construction Co. and J. W. Stewart, Ltd., one of the largest construction firms in Canada. Included in the purchase are the North Western Dredging Co., and the West Construction Co. of Boston and Seattle.

The new officers are **E. M. Boyd,** president; **Brig. N. D. Lambert,** vice-president and general manager; and **M. C. Cameron,** secretary and assistant vice-president. Brig. Lambert is also deputy quartermaster-general of the Canadian army for the duration.

The firm is at present undertaking several contracts totalling several million dollars in the British Columbia region for the navy, air force, department of public works, and Burrard Dry Dock Co.

* * *

C. L. White, former city engineer of San Bruno, Calif., and head of the College of the Pacific's engineering department, was appointed city engineer of Lodi, Calif., to succeed **Clinton Henning.** Henning was recently called to a training center at Wilmington, Del., by the United States Engineers for a position as senior engineer with a civil service appointment.

* * *

N. L. Hinkson recently accepted a position as chief hydro-electric engineer in the dam design section of the Tacoma City light department's 2nd Nisqually project. He was formerly with Harza Engineering Co. of Chicago on the Santee Cooper project near Charleston, S. C., and was with the T. V. A. prior to that time.

* * *

Col. L. D. Worsham, division engineer of the U. S. E. D. in Chicago, has been transferred to Edmonton, Alberta, Canada, to serve as division engineer in charge of all U. S. Army construction in the Canadian area. He succeeds **Col. Theodore Wyman,** who is transferring to a combat division.

* * *

J. G. McGregor has been elected chairman of the Calgary branch of the Engineering Institute of Canada, at the group's annual meeting. Other officers are: **K. W. Mitchell,** secretary-treasurer; **A. Brownie, H. R. Hayes, A. Higgins,** and **W. E. Robinson,** executive committee members.

* * *

J. Wayne Courter recently accepted a position with the Public Roads Administration as highway bridge engineer on the Inter-American Highway, stationed temporarily at San Jose, Costa Rica.

W. E. ROBEY, bridge construction engineer for the Atchison, Topeka and Santa Fe Ry. at Topock, Ariz., where a new bridge over Colorado River is under construction by the railroad company.

* * *

Henry N. Bacon, formerly with the Kaiser Co. in their Portland, Ore., shipyards as a draftsman on tankers, is now senior draftsman on T2 tankers for the Marinship Corporation at Sausalito, Calif.

JONAS STEIN, right, head of the administration and control section of the Seattle, Wash., office of U.S.E.D. has been transferred to Washington, D. C. His former post in Seattle is filled by CHESTER W. HANSON, JR.

* * *

C. E. Simpson has been promoted from resident engineer with the Washington State Highway Department to District Construction Engineer, with headquarters at Spokane.

* * *

Scott P. Stewart, a civilian engineer at the Salt Lake City, Utah, airbase, has been named register of the Federal Land Office at that city, to succeed **A. S. Brown.**

* * *

John C. Gearhart, an assistant engineer in the office of Stevens and Kuhn, Portland, Ore., has received a commission as ensign in the Seabees.

* * *

Walter E. Kennedy, who has been acting city engineer of Inglewood, Calif., since the death of **A. W. Cory,** has been made city engineer.

* * *

D. B. Willett, who has been serving as acting city manager of Laramie, Wyo., has been given the permanent appointment.

* * *

Fred E. Buck, state engineer of Montana, has been reappointed by the governor of the state to serve another 4-year term.

* * *

Harry Simmers, city plumbing inspector of Vancouver, B. C., has been retired, after having been with the city since 1910. He is succeeded by **Reg Startup.**

* * *

A. L. Porter, formerly assistant engineer of Santa Monica, Calif., is now employed on the Pan-American highway and is located at San Jose, Costa Rica.

* * *

Arthur L. Thomas III, of Salt Lake City, Utah, is with the U. S. E. D. on the Canol project in Canada, working out of the Edmonton office.

* * *

Gordon W. McKay, formerly resident engineer at the Bureau of Reclamation's

SUPERVISING THE JOBS

L. L. LEE, office engineer of the Salt River Valley Water Users Association, Phoenix, Ariz., whose article on clearing brush land appears in this issue.

Phoenix, Ariz., power substation, is now a warrant officer in the Navy "Seabees" and is studying the technique of loading and discharging cargo at the Officers' Training School, New York City.

* * *

Dick Ebeling recently accepted a position with the Curtiss-Wright Corp., Louisville, Ky., as stress analyst on cargo planes of non-strategic materials.

HARRY W. MYERS, with the Bureau of Reclamation at Bartlett dam of the Salt River Valley project and on the Parker dam power project, is now a lieutenant in the air corps, at Luke Field, Ariz.

Roger Greenburg has been named superintendent by Morrison - Knudsen Co., Inc., on a contract for more than $100,000 to construct a sewage disposal plant in Deschutes Co., Oregon. **James W. Rennie** is office manager on the project. **R. D. Thompson** will be carpenter superintendent, and **Harvey Smith** general foreman.

* * *

Tom Burns of Ertz-Burns Co. is project manager for the Mountain Home Builders, Portland, Ore., which is made up of the four firms of Ertz-Burns & Co., Lorenz Brothers, Donald M. Drake, and Parker-Schram Co. who have several contracts for work at a military site in Elmore Co., Idaho. **M. W. Lorenz** of the Lorenz Bros. firm is the general superintendent, **Charles T. Parker** of Parker-Schram Co. is general superintendent for roads, water and sewer installations, and **Wendell H. Judd** is the purchasing agent on the project.

* * *

Earl Stuart recently accepted a position as superintendent for the Isbell Construction Co., Reno, Nev., on a stripping pit for strategic metals near Luning, Nev. He was transferred from Lovelock, Nev., where he was in charge of similar operations in a pit of the Standard Cyaniding Co.

* * *

John C. Gist, superintendent for A. Teichert & Son, Inc., Sacramento, Calif., is now working on the airbase development project in Cochise Co., Arizona, for which the company received an additional contract award of over $100,000. **A. Bauer** is assistant superintendent on the job.

* * *

Jonathan H. Tucker, recently assistant superintendent for McNeil and Zoss Construction Co., Los Angeles, Calif., on a defense housing project in San Diego, is now assistant general superintendent on the Camp Parks project near Dublin, Calif., for McNeil Co.

* * *

Earl Stewart is general superintendent for Isbell Construction Co., Reno, Nev., on excavation of magnesium ore for the defense plant of Basic Magnesium, Inc. The excavation work is at Toiyabe, Nev. **Frank Bernd** is master mechanic on the job.

I. F. Lindsay, formerly with A. Soda & Son, has recently accepted a position as superintendent for Fred J. Maurer & Son, of Eureka, Calif., on the $345,528 contract to build a bridge across the Albion River at Albion, Mendocino Co., Calif. Work on this project has been temporarily halted by a WPB order classifying it as non-essential, but it is hoped to resume work soon.

* * *

HARRY ROTRUCK

Harry Rotruck is job superintendent and **D. L. Gibbons** is foreman for A. Teichert & Son, Inc., Sacramento, Calif., on a $208,971 contract for grading and surfacing of approx. 4.0 mi. of highway in Shasta Co., Calif.

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Edward V. Schulhauser is superintendent for Standard Building Co., San Francisco, Calif., on their housing project in South San Francisco. The contract price was $884,440 for 724 temporary units.

* * *

L. B. McKenney is the general superintendent for the C. Davidson Co. on a housing project in Bremerton, Wash. **Cecil Downey** is the field engineer on the job; **Ralph Auck,** general foreman, and **John Corliss,** office manager. 250 units are being built at a cost of about $500,000.

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John B. Paroline has been named job superintendent by Piazza & Huntley of San Jose, Calif., for a highway project in Kings Co., Calif. The $270,974 award is for 10.8 mi. of grade and plantmix surfacing near Lemoore.

* * *

In addition to personnel named in the March issue as being on the Union Paving Co. job between Reno, Nev., and the Nevada-California state line, **F. E. Gillespie** is crusher foreman and **A. L. Millholland** is foreman of structure erection.

* * *

WALTER S. COOK is superintendent for Oberg Bros., Los Angeles, Calif., on the contract to place a reinforced concrete blanket on cracked portions of the Los Angeles outfall sewer, a $60,500 job.

R. G. Campbell is job superintendent and **W. Lambly,** engineer, for R. Campbell Contracting Co., Ltd., Vancouver, B. C., on a contract valued at $300,000 for 13.33 mi. of 20-ft. graveled road along the Skeena River between Cedarvale and Kitwanga.

* * *

Phil McInnis is the job superintendent for Clifton & Applegate and Henry Georg, Spokane, Wash., on a housing project of 400 temporary units in Spokane Co. **Otto Mootz** is in charge of sidewalks, and **Ed Culver** is directing work on the streets, sewers, and water supply. The total contract is for $819,113.

* * *

Clifford Craig has been named job superintendent by the Nilson - Smith Construction Co., Great Falls, Mont., for their $309,789 contract for clearing, grading, draining, surfacing and oiling on the highway between La Grande and Elbe in Pierce Co., Wash.

W. R. Engstrom, vice-president of the Austin Co., Seattle, Wash., is personally directing the work as project manager on a housing project and air base in Washington, on a contract awarded the Austin Co. **A. Nygaard** is the general superintendent on the job; **Dave Anderson** is superintendent; **Henry Hightower** is foreman and **E. C. Hart** is carpenter foreman; **Thomas Arnold** is equipment foreman, and **John Sprouse** is concrete foreman.

* * *

Elmer J. (Jake) Jacoby is foreman of the swing shift in the field for the Johnson-Minnis & Moody-Vista contract at Bow Lake airport near Seattle, Wash. In the March issue of *Western Construction News*, his name was erroneously reported as "John."

* * *

Zay Clopton is superintendent for Del E. Webb Construction Co. of Phoenix, Ariz., on the $361,444 contract for 200 family dwelling units near Phoenix, and on another $60,000 Webb contract to build a city-county health center at Phoenix.

* * *

A. J. Haney is superintendent on the additional contract of over $50,000 for grading and paving at an airfield in Chaves Co., New Mexico, secured by the Allison, Armstrong, and Thygesen Co. of Roswell, New Mexico.

* * *

Charles Parren has been named superintendent by M. J. King Co., Inc., San Francisco, for the construction of a Junior High School building in Vallejo, Calif. The award was made on a bid of $287,444.

* * *

William Rodthe is superintendent for Daley Brothers, San Francisco, Calif., on a contract valued at over $50,000 for temporary frame buildings in Marin Co., Calif.

* * *

John D. Myers has been named superintendent by the E. A. Kaiser Co., Beverly Hills, on a housing project of 100 temporary units in Las Vegas, Nevada. The contract is valued at $307,862.

* * *

David Peterson is the superintendent and **George Howard,** the office manager on a building contract in Stanislaus Co., Calif., awarded to Trewitt-Shields & Fisher, of Fresno, Calif., at more than $100,000.

* * *

C. C. Dana is general superintendent and **Paul Lafton** is foreman for the Summerbell Roof Structures Co. on their contract for erecting roof trusses at an airport near Fairfield, Calif.

Roy Isbell is project manager and general superintendent for Isbell Construction Co., Reno, Nev., on their project to pave the runways of the Reno airport. Others supervising portions of the work are **Jack Ward,** general foreman, **Jack Fell,** grade foreman, and **H. R. Watts,** hot plant foreman. **W. B. Knudsen** is the shovel operator on the job, which should be finished about June 30.

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R. E. Metzger is general superintendent for the Bremerton Ready Mix Concrete Co., Bremerton, Wash., sub-contractors to Wright & Hoffman Co. on a housing project in Port Orchard, Wash.

* * *

C. L. Stephens, formerly a construction superintendent for Bressi-Bevanda and A. Teichert and Son, Sacramento, Calif., is now operating his own dairy farm in McDonald Co., Missouri.

* * *

J. Everett Young is superintendent for the Peter Seerie Co., Denver, Colo., on a contract at over $100,000 for buildings and utilities in Denver, Colo.

* * *

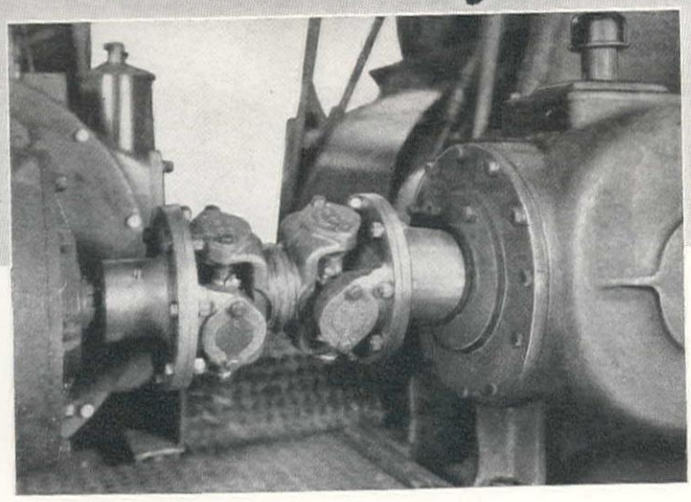
JOHN J. ROMANO, superintendent for his father, Toney Romano, Seattle, Wash., contractor, on removal of 59,000 ft. of street car tracks and resurfacing of the roadways in many Seattle streets.

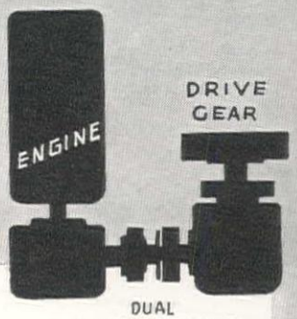
Milo Tullis is superintendent-foreman for Earl S. Paul on the contract of $375,000 for an addition to the Thomas D. Dee Memorial Hospital in Ogden, Utah.

* * *

E. Parsons has been named superintendent for the D. W. Nicholson Corp., of San Leandro, Calif., on a contract valued at over $1,000,000 to build army cargo vessels at Stockton, Calif.

This drive helps "Wean" the Buckeye Clipper Shovel!





The *dual right angle drive* on the Buckeye Clipper provides a smoother flow of power from engine to drive shaft. It's direct and positive like the differential of a tank, truck or car. It's easier on the engine. Acceleration is smooth and fast. Result: *More yards daily with less gas or distillate.*

Fuel conservation is urgent today—after the war Clipper owners can pocket the savings that result from lower fuel requirements. Get the rest of the story in "The Age of Clippers," sent on request.

Buckeye Traction Ditcher Co.
Findlay, Ohio

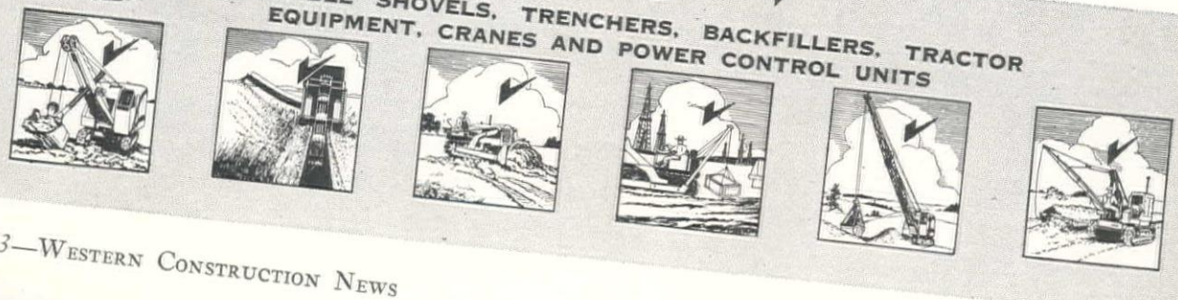
★ Wars demand scrap. Invest in War Bonds. No laying down on jobs.

50 YEARS OF PROGRESS BUCKEYE 1893 1943

See other Buckeye equipment on Pages 55, 77 and 83.

Buckeye

CONVERTIBLE SHOVELS, TRENCHERS, BACKFILLERS, TRACTOR EQUIPMENT, CRANES AND POWER CONTROL UNITS



UNIT BID SUMMARY

Highway and Street . . .

California—Kings County—State—Grade & Surf.

Piazza & Huntley, San Jose, were low bidders to the California Division of Highways, Sacramento, with a bid of $270,974 for 1.5-mi. grade and surf. with plant-mixed surf. betw. Lemoore Flying School and the junction with Houston Ave. The state is to furnish railroad rails to be split and used as reinforcing steel for the project. The following unit bids were submitted:

(A) Piazza & Huntley $270,974
(B) Calowell Construction Co. 278,654
(C) N. M. Ball Sons 282,121
(D) A. J. Raisch 282,483
(E) Phoenix Construction Co. 300,327
(F) Brown, Doko, & Baun 305,870
(G) Pacific Rock & Gravel Co. & M. W. Stanfield Co. $306,164
(H) Louis Biasotti & Son 310,518
(I) J. E. Haddock, Ltd. 316,157
(J) Guerin Brothers 331,025

(1) 20 cu. yds. removing concrete
(2) 26,500 cu. yds. roadway excavation
(3) 650 cu. yds. structure excavation
(4) 100 cu. yds. ditch excavation
(5) 58,500 cu. yds. imported borrow
(6) Lump sum Dev. water supply and furn. watering equipment
(7) 3,000 M. gals. applying water
(8) 10.82 mi. finishing roadway
(9) 119,000 sq. yds. prep. mixing and shaping surf. (B.S.T.)
(10) 1,070 T. liq. asph. RC-2 or RC-3 (B.S.T.)
(11) 29,500 T. mineral aggregate (P.M.S.)
(12) 1,625 T. paving asphalt (P.M.S.)
(13) 180 T. asphaltic emulsion (paint bind., sl. ct. & cur. sl.)
(14) 1,150 T. screenings (seal coat)
(15) 9,750 T. mineral aggregate (cem. tr. base)
(16) 4,400 bbls. portland cement (cem. tr. base)
(17) 175 cu. yds. Class "A" P.C.C. (structures)
(18) 2,000 lbs. placing railroad rails
(19) 14,000 lbs. bar reinforcing steel
(20) 15 ea. monuments
(21) 700 lin. ft. laminated guard railing
(22) 70 ea. resetting guide posts and markers
(23) 0.25 mi. moving and resetting fence

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	13.00	12.00	10.00	4.25	5.00	10.00	13.00	5.00	6.00	7.00
(2)	.60	.38	.35	.54	.68	.60	.50	.35	.45	.75
(3)	2.60	2.00	1.80	1.50	1.50	1.50	3.00	2.50	1.50	5.00
(4)	2.60	2.00	1.10	1.50	1.15	1.00	1.25	1.00	1.80	3.00
(5)	.65	.75	.92	.80	.88	.75	.95	.70	.80	1.05
(6)	400.00	500.00	400.00	$1,300	500.00	$1,000	$5,000	750.00	$2,000	500.00
(7)	1.50	1.75	1.40	1.50	1.50	1.50	2.00	1.25	2.00	1.85
(8)	200.00	450.00	200.00	170.00	264.00	500.00	200.00	$4,500	600.00	500.00
(9)	.13	.10	.10	.154	.065	.20	.10	.08	.08	.08
(10)	19.00	16.50	17.00	16.20	15.50	17.00	17.00	17.00	16.00	20.00
(11)	3.10	3.60	3.50	3.30	4.05	3.50	3.60	3.25	4.50	3.90
(12)	16.50	15.00	15.00	15.00	15.00	15.00	16.00	15.00	15.40	18.00
(13)	35.00	30.00	28.54	31.50	22.12	50.00	30.00	40.00	27.50	33.00
(14)	4.00	3.50	4.40	4.60	4.50	4.00	5.00	4.00	4.50	4.50
(15)	1.80	2.10	2.00	1.86	2.20	2.80	2.50	2.25	2.40	2.50
(16)	3.50	3.00	3.30	3.08	3.15	3.00	3.40	3.10	3.40	3.00
(17)	40.00	32.00	33.00	52.00	40.00	40.00	30.00	35.00	35.00	40.00
(18)	.04	.08	.05	.08	.10	.07	.11	.15	.05	.15
(19)	.08	.075	.08	.07	.075	.10	.11	.10	.08	.10
(20)	3.00	4.00	3.00	3.40	7.00	4.00	5.00	4.00	4.00	5.00
(21)	2.00	3.00	2.00	2.70	.85	2.00	2.00	2.50	1.50	2.00
(22)	1.50	1.00	3.00	2.30	2.00	1.00	4.00	1.50	3.00	2.00
(23)	450.00	320.00	800.00	600.00	214.00	500.00	$1,200	800.00	400.00	$1,400

Utah—Weber County—State—Surf.

Wheelwright Construction Co., submitted the low bid of $21,310 and was awarded the contract by the Utah State Road Commission, Salt Lake City, for 0.61 mi. of gravel surf. on Second St. in Ogden. The unit bids were as follows:

(1) Wheelwright Construction Co. $21,310
(2) A. O. Thorn & Sons Construction Co. ... 29,990
(3) Engineer's estimate $22,200

		(1)	(2)	(3)
9,800	T. crushed rock or crushed gravel surface course	1.00	1.30	.90
7,200	T. gravel or crushed rock base course	.95	1.30	.90
7,000	cu. yd. unclassified excavation	.50	.75	.50
35,000	sta. yd. overhaul, Class "A"	.02	.03	.03
2,500	yd. mi. overhaul, Class "B"	.20	.20	.20
180	1000 gal. watering	2.00	3.00	2.00
100	hr. rolling	5.00	5.50	6.00

California—San Diego County—State—Grade & Surf.

Calowell Construction Co., Long Beach, submitted the low bid of $111,711 for about 7.5-mi. of grade and surf. with road-mix surf. betw. Route 2 and Route 77 on the Miramar Road. The unit bids were as follows:

(A)	Calowell Construction Co.	$111,711	
(B)	Bressi & Bevanda Const. Co.	118,524	
(C)	Basich Brothers	123,352	
(D)	V. R. Dennis Construction Co.	153,418	
(E)	Oswald Brothers	160,187	
(F)	George Herz & Co.	$167,831	
(G)	Daley Corporation	193,334	
(H)	B. G. Carroll	193,816	
(I)	R. E. Hazard & Sons Contracting Co.	199,090	
(J)	Griffith Co.	221,063	

(1) 335 cu. yds. removing concrete
(2) Lump sum Clearing and grubbing
(3) 45,500 cu. yds. roadway excavation
(4) 4,500 cu. yds. imported borrow
(5) 900 cu. yds. structure excavation
(6) 250 cu. yds. ditch and channel excavation
(7) 960,000 sta. yds. overhaul
(8) Lump sum Developing water supply and furnishing watering equipment
(9) 1,250 M gals. applying water
(10) 397 sta. finishing roadway
(11) 150 T. liquid asphalt MC-2 or 3 (pr. ct. and pen. tr.)
(12) 1,650 T. liquid asphalt MC-2 or 3 (R.M.S.)
(13) 18,500 cu. yds. mineral aggregate
(14) 146,000 sq. yds. mixing and compacting road-mixed surf.
(15) 114 T. asphaltic emulsion (seal ct. and paint binder)
(16) 755 T. screenings (seal coat)
(17) 20 cu. yds. Class "A" P.C.C. (structures)
(18) 120 lin. ft. laminated guard railing
(19) 56 ea. culvert markers
(20) 28 ea. guide posts
(21) 364 lin. ft. 12-in. unreinf. conc. pipe (2000-D)
(22) 48 lin. ft. 15-in. unreinf. conc. pipe (2000-D)
(23) 464 lin. ft. 18-in. unreinf. conc. pipe (2000-D)
(24) 100 lin. ft. 36-in. std. strength reinf. conc. pipe
(25) 175 lin. ft. salvaging existing pipe culverts
(26) 175 lin. ft. relaying salvaged C.M.P.
(27) 1 ea. removing and resetting headwall
(28) 300 lbs. bar reinforcing steel
(29) Lump sum Engineers office

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	3.00	6.00	2.50	4.00	6.00	9.00	6.00	3.25	4.50	5.00
(2)	500.00	500.00	$3,000	$1,000	$3,500	$2,100	$1,000	900.00	$1,500	500.00
(3)	.38	.35	.50	.65	.56	.88	.65	.78	.90	.85
(4)	.60	.75	.70	.75	1.00	1.16	.55	.54	.90	1.00
(5)	2.50	1.00	2.00	4.00	2.50	2.85	3.00	3.00	3.00	3.00
(6)	1.70	1.00	1.00	2.70	2.00	2.15	2.40	3.00	3.00	2.50
(7)	.006	.01	.005	.008	.0075	.01	.01	.015	.01	.015
(8)	$1,700	640.00	$2,700	$1,000	$5,000	$1,750	410.00	$3,000	$2,000	400.00
(9)	1.60	1.55	1.50	2.00	2.25	2.75	3.00	1.25	5.00	2.00
(10)	8.00	10.00	5.00	25.00	8.00	11.25	9.00	12.00	15.00	10.00
(11)	19.00	17.00	20.00	18.50	16.00	21.25	18.50	17.00	20.00	40.00
(12)	14.50	16.00	15.00	18.50	16.00	18.70	18.25	17.00	19.50	18.00
(13)	1.25	1.60	1.50	1.75	2.50	1.75	4.10	3.50	3.00	3.50
(14)	.10	.08	.10	.10	.11	.09	.12	.14	.12	.25
(15)	20.00	25.00	22.00	24.00	35.00	40.00	24.35	30.00	26.50	40.00
(16)	3.50	1.75	4.00	4.00	4.50	5.25	3.30	3.50	5.00	4.00
(17)	36.00	40.00	30.00	60.00	30.00	51.00	54.00	45.00	60.00	50.00
(18)	2.75	2.00	2.50	2.00	2.00	2.50	2.60	2.50	3.00	3.00
(19)	2.50	3.50	2.50	2.50	3.00	5.00	6.30	2.50	6.00	3.00
(20)	2.75	5.00	2.50	2.50	4.00	5.50	6.00	2.50	6.00	3.00
(21)	2.40	1.70	2.00	3.00	2.40	3.30	2.40	2.00	3.50	3.00
(22)	2.90	2.10	2.50	3.50	2.80	4.00	2.75	2.25	4.00	3.50
(23)	3.50	2.50	3.00	4.00	3.50	4.70	3.30	2.50	5.00	4.00
(24)	7.80	6.50	7.00	8.00	8.00	8.50	7.30	6.25	10.00	6.00
(25)	.75	1.00	.90	1.75	1.50	1.25	.60	1.00	2.00	.50
(26)	.50	.60	.90	1.00	1.50	1.10	.60	.50	2.00	.50
(27)	50.00	50.00	25.00	40.00	60.00	30.00	30.00	25.00	50.00	40.00
(28)	.10	.10	.12	.10	.08	.13	.12	.20	.12	.15
(29)	500.00	750.00	150.00	600.00	100.00	360.00	660.00	500.00	$1,200	$1,000

Wyoming—Sweetwater County—State—Grade & Surf.

Wyoming Construction Co., Laramie, was low bidder and was awarded the contract at $99,418 by the Wyoming Highway Department, Cheyenne, for work on the Rock Springs Airport road. The project includes 3.68-mi. of grade., drain., surf., oil treatment by the road-mix method, a stone chip seal coat, and a treated timber bridge. The following unit bids were submitted:

(1)	Wyoming Construction Co.	$99,418	
(2)	C. C. Warrington	115,232	
(3)	Northwestern Engineering Co.	109,544	
(4)	Inland Construction Co.	$117,937	
(5)	H. W. Read	100,758	
(6)	Leach Brothers	117,317	

	(1)	(2)	(3)	(4)	(5)	(6)
162,000 cu. yds. excavation	.18	.28	.23	.29	.19	.28
20,000 sta. yds. overhaul	.015	.015	.015	.015	.015	.015
19,500 cu. yd. mile haul	.20	.15	.18	.22	.15	.20
1,660 M. gal. watering (emb.)	2.50	2.50	2.35	2.80	3.00	2.50
960 hr. sheepsfoot roller operation	3.50	4.00	3.00	2.60	3.00	3.50
30 hr. pneumatic tired roller operation	6.00	4.00	5.00	3.70	3.50	5.00

(Continued on next page)

WE'RE GIVING OUR BOYS A FIGHTING CHANCE

The men and women of MARION are taking this war seriously. They are giving everything they've got to building MARIONS for war work at home and behind the world's many fighting fronts. They are keeping cranes rolling off the assembly lines so that more ships can be built and loaded. They have earned the coveted Maritime Award and Victory Fleet flag. They are investing 10 per cent and more of their pay checks in war bonds month after month. This is how the men and women of MARION are helping to win this war for they, too, have sons, brothers and husbands in the Armed Services to whom they owe a fighting chance. » »

THE MARION STEAM SHOVEL COMPANY, Marion, Ohio, U. S. A.

DISTRIBUTED BY: Brown-Bevis Equipment Co., 4900 Santa Fe Ave., Los Angeles, Calif.; The Marion Steam Shovel Co., 571 Howard St., San Francisco, Calif.; Edward R. Bacon Co., Folsom at 17th St., San Francisco, Calif.; Joseph O. Reed, Parklawn Apts., 2504 N. E. Hoyt St., Portland, Ore.; Walling Tractor and Equipment Corporation, 1033 S. E. Main St., Portland, Ore.

MARION

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • PORTAL CRANES • WALKERS

WORKING FOR VICTORY: DIGGING — Coal • Magnesium Iron Ore • Copper Ore • Bauxite • Manganese • Nickel Molybdenum • Sand & Gravel • Clay

MATERIAL HANDLING — Shipbuilding and Cargo Loading

BUILDING — Airports, Ordnance Plants, Arsenals, Army Camps, Marine Bases, etc.

50 cu. yds. excavation for pipe culverts	1.50	2.00	.75	1.50	1.50	1.50
558 lin. ft. 18-in. V.C.P.	2.50	3.00	2.50	2.65	2.60	3.00
80 hr. mechanical tamping	3.00	4.00	4.50	3.00	2.00	4.00
120 cu. yds. Class 1 riprap	6.00	10.00	4.50	4.50	4.00	6.00
40 cu. yds. grouted riprap	10.00	18.00	10.00	12.00	8.00	10.00
2 ea. timber project markers	20.00	15.00	15.00	15.00	10.00	15.00
17,800 T. pit run gravel base course (3-in. max.)	.825	.80	.88	.80	.90	.90
3,950 T. crushed gravel base course (1-in. max.)	1.13	1.20	1.30	1.20	1.19	1.10
4,600 T. crushed gravel surfacing (¾-in. max.)	1.13	1.50	1.30	1.15	1.19	1.10
445 T. stone chips	4.00	4.00	4.50	3.50	2.83	4.00
150 T. base treatment MC-1	22.05	20.00	26.00	26.00	24.30	24.00
77 T. seal coat RC-3	22.05	20.00	27.00	27.00	25.40	24.50
300 T. M. liquid asph. dist. MC-3	22.05	20.00	23.00	23.00	25.00	24.00
45,400 sq. yd. processing roadway	.06	.05	.07	.045	.045	.06
350 M. gal. watering (base)	2.50	2.00	2.50	2.80	3.00	3.00
220 hr. roller operation (base)	5.00	4.00	4.50	3.70	2.70	4.00
2,800 lin. ft. shaping and tamping curb	.10	.20	.08	.08	.05	.15
80 lin. ft. shaping and tamping spillway	.30	.25	.20	.40	2.05	1.25
100 cu. yds. structure excavation	2.00	2.00	1.30	1.75	1.00	2.00
26.041 M.B.M. new treated timber	174.00	185.00	183.00	200.00	185.00	185.00
29.148 M.B.M. salvaged treated timber	53.30	50.00	45.00	60.00	50.00	50.00
1,666 lin. ft. treated timber piling	1.66	1.75	1.85	2.00	1.75	1.75
1.650 M.B.M. untreated timber	150.00	165.00	150.00	200.00	165.00	165.00
Lump sum Removal of 4 timber bridges	$3,000	$1,900	$2,000	$1,900	$1,900	$2,300
50 hr. patrol hours	9.00	6.00	6.00	7.50	5.30	5.00

California—Shasta County—State—Grade & Surf.

A. Teichert & Company, Sacramento, was low bidder to the California Division of Highways, Sacramento, at $208,971 for approx. 4.0 mi. of grade and surf. with plant-mixed surf. over cement-treated base betw. ½ mi. south of Clear Creek and Redding Subway. The metal parts for the guard railing are to be furnished by the state. The following unit bids were submitted:

(1) A. Teichert & Co. $208,971
(2) Elmer J. Warner 210,852
(3) M. W. Stanfield Co. 214,740
(4) M. J. Ruddy & Son 219,788
(5) Hemstreet & Bell $223,894
(6) Marshall S. Hanrahan 228,027
(7) A. J. Raisch 239,954
(8) Oilfields Trucking Co. 256,464

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
210 cu. yds. removing concrete	5.00	4.00	4.00	6.00	4.00	5.00	3.50	10.00
Lump sum Clearing and grubbing	$2,400	$2,000	$2,000	$1,800	$3,500	$2,000	$3,000	$3,500
20,000 cu. yds. roadway excavation	.60	.35	.30	.70	.50	.48	.50	.66
2,300 cu. yds. structure excavation	1.50	2.00	1.70	1.75	1.50	2.00	1.45	2.50
1,900 cu. yds. ditch and channel excavation	1.00	1.25	1.15	1.50	1.00	1.50	1.30	2.00
100 roller hrs. rolling original ground	7.50	5.50	5.70	7.00	8.00	10.00	10.00	7.00
83,000 T. imported borrow	.66	.48	.78	.70	.70	.57	.75	.90
1,500 cu. yds. top soil	1.10	1.00	1.50	1.75	1.50	2.00	1.50	5.00
Lump sum Developing water supply and furn. watering equipment	$1,000	$1,000	$1,700	500.00	300.00	$2,000	500.00	$1,000
2,400 M. gals. applying water	1.25	1.50	1.30	1.50	1.75	1.50	2.00	2.00
207 sta. finishing roadway	8.00	8.00	11.00	8.00	10.00	8.00	15.00	15.00
700 T. paving asphalt (P.M.S.)	22.00	19.00	19.50	19.00	20.00	18.00	21.00	18.00
12,500 T. mineral aggregate (P.M.S.)	2.30	3.60	2.75	2.50	2.75	3.25	3.00	3.15
1,700 T. mineral aggregate (P.M. non-skid surf.)	4.00	3.60	4.50	3.00	3.50	4.50	3.00	3.85
16 T. liquid asphalt MC-5 (seal coat)	32.00	25.00	28.00	25.00	35.00	25.00	30.00	40.00
200 T. screenings (seal coat)	4.00	5.50	5.50	3.50	5.00	4.00	4.00	5.00
15,500 T. mineral aggregate (cem. tr. base)	2.20	2.90	2.15	2.60	2.75	3.30	3.00	2.20
5,800 bbls. portland cement (cem. tr. base)	3.50	3.20	3.40	3.50	3.50	3.25	4.00	4.00
46 T. asph. emul. (cur. seal and paint binder)	50.00	25.00	31.00	30.00	40.00	40.00	45.00	50.00
33 cu. yds. Class "A" P.C.C. (structures)	50.00	35.00	35.00	40.00	40.00	40.00	40.00	40.00
118 cu. yds. Class "B" P.C.C. (curbs)	30.00	32.00	15.00	30.00	30.00	38.00	30.00	35.00
50 ea. curb dowels	2.00	1.00	1.50	1.00	.50	.20	1.00	.50
8 ea. monuments	5.00	4.00	3.50	4.00	4.00	5.00	4.50	7.00
300 lin. ft. placing metal guard railing	1.60	1.50	1.75	1.25	1.00	2.50	1.50	.50
35 ea. culvert markers	4.20	3.00	4.00	4.00	4.00	10.00	3.50	7.00
4 ea. guide posts	5.00	3.00	4.00	3.50	4.00	10.00	4.50	7.00
4 ea. clearance markers	5.00	4.00	5.00	7.00	8.00	10.00	10.00	7.00
1 ea. Redwood cover for junction box	25.00	20.00	25.00	15.00	40.00	10.00	15.00	25.00
633 lin. ft. 12-in. unreinf. conc. pipe (2000-D)	1.60	1.75	1.60	1.75	1.70	1.50	1.75	2.25
846 lin. ft. 18-in. unreinf. conc. pipe (2000-D)	2.25	3.00	2.25	2.50	2.40	1.95	2.40	2.90
375 lin. ft. 24-in. unreinf. conc. pipe (2000-D)	3.70	4.00	3.65	3.60	4.00	3.50	3.70	4.25
63 lin. ft. 30-in. reinf. conc. pipe	5.00	5.50	5.00	5.00	5.00	5.00	5.25	5.75
123 lin. ft. 36-in. reinf. conc. pipe	7.00	6.50	6.40	7.00	6.50	7.00	7.20	7.00
201 lin. ft. 18-in. unreinf. conc. pipe (2000-D siphons)	2.50	3.00	2.40	2.60	3.00	2.25	3.00	3.25
186 lin. ft. 24-in. unreinf. conc. pipe (2000-D siphons)	4.00	4.00	3.75	4.40	4.00	3.75	4.50	4.00
264 lin. ft. 36-in. reinf. conc. pipe (siphons)	7.50	6.50	6.60	7.00	7.20	7.50	7.50	7.00
14 ea. 30-in. reinf. conc. pipe drop inlets	95.00	20.00	80.00	85.00	80.00	10.00	80.00	35.00
3 ea. 36-in. reinf. conc. pipe drop inlets	105.00	20.00	90.00	100.00	100.00	15.00	95.00	37.50

Oregon—Grant County——State—Stockpiling

Chester T. Lackey, Ontario, submitted the low bid of $57,970 to the Oregon State Highway Department, Portland, for furn. 19,000 cu. yds. of crushed material in stockpiles on the John Day-Beech Creek and John Day-Burns highways. The unit bids were as follows:

(1) R. O. Dail & Warren Brothers $57,970
(2) D. C. & A. L. Williams 58,500
(3) Chester T. Lackey $45,350

(Continued on next page)

ADAPTABLE TO ANY JOB

Let These Distributors Service Your Equipment

ALASKA—Glenn Carrington Co., Fairbanks
ARIZONA—O. S. Stapley Company, Phoenix
CALIFORNIA
*J. D. Adams Co., San Francisco, Los Angeles
COLORADO—McKelvy Machinery Co., Denver
IDAHO—Intermountain Equip. Co., Boise, Pocatello
MONTANA—Industrial Equipment Co., Billings
NEVADA—Allied Equipment, Inc., Reno
NEW MEXICO
McChesney-Rand Equip. Co., Inc., Albuquerque
OREGON
Howard-Cooper Corp., Portland, Eugene
UTAH—The Lang Company, Salt Lake City
WASHINGTON
Howard-Cooper Corp., Seattle, Spokane, Walla Walla

*Company Operated Branches

DESIGNED to be *adaptable to any job* the Marines may be called upon to do is the Corps' new "Alligator Tank" which travels on water or land. Equally *adaptable to any grading job* are Adams Motor Graders. . . . Smart operators utilize Adams power, traction, strength and speed on grading jobs that range from bank cutting to ditching and from heavy scarifying and oil mix to high-speed maintenance. They take jobs as they come and quickly adapt their Adams machines to them. . . . Today Adams machines are proving their adaptability in government service. Tomorrow they will prove even greater versatility on your peace-time jobs!

J. D. ADAMS COMPANY • INDIANAPOLIS, INDIANA

Adams motor graders, leaning wheel graders, elevating graders, hauling scrapers, tamping rollers, bulldozers and road maintainers are used by allied forces throughout the world.

Adams
ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

	(1)	(2)	(3)
3,900 cu. yds. 1¼-in. - ¾-in. crushed material in stockpile	2.95	2.95	2.35
6,800 cu. yds. ¾-in. - ½-in. crushed material in stockpile	2.95	2.95	2.35
5,100 cu. yds. ½-in. - ¼-in. crushed material in stockpile	2.95	2.95	2.35
3,200 cu. yds. ¼-in. - 0-in. crushed material in stockpile	2.80	2.95	2.35
All specified Clearing and grubbing of stockpile sites	2.00	12.00	7.75
All specified Levening of stockpile sites	5.00	12.00	16.75

Bridge . . .

Oregon—Multnomah County—State—Bridge, Grade & Pave.

Henry L. Horn, Caldwell, Idaho, submitted the low bid of $318,116 to the Oregon State Highway Department, Portland, for grade., pave., and a bridge on the Denver Ave. junction of Pacific Highway East. The unit bids were as follows:

(1) C. J. Montag & Sons $355,068
(2) E. C. Hall Co. 347,294
(3) Berke Brothers 349,166
(4) Henry L. Horn $318,117
(5) Edlefsen-Weygandt 339,224

	(1)	(2)	(3)	(4)	(5)
All specified Clearing and grubbing	$2,000	$1,100	$5,000	$3,000	$10,000
4,800 sq. yds. removal of pavement	.75	.75	1.00	.30	.50
1,600 lin. ft. removal of curbs and toe walls	.35	.50	.50	.30	.14
360 sq. yds. removal of traffic islands	1.00	1.00	1.00	.75	1.00
620 lin. ft. removal of traffic separators	.50	.50	.50	.30	.75
5 only removal of light standards	10.00	10.00	30.00	10.00	40.00
5 only delivering light standards to island station	10.00	10.00	5.00	5.00	10.00
800 lin. ft. re-establishment of lighting circuit	.60	.48	2.00	.55	2.75
1,300 cu. yds. structure excavation, unclassified	3.50	2.00	4.00	2.00	2.00
15,700 cu. yds. general excavation, unclassified	.75	.60	.45	.75	.40
110,000 cu. yds. borrow excavation, unclassified	.85	.80	.75	.70	.70
All specified Finshing roadbeds, slopes and graded areas	12.50	4.00	30.00	15.00	30.00
1,500 lin. ft. 4-in. sewer pipe	.40	.50	.75	.35	.40
1,600 lin. ft. 8-in. sewer pipe	.75	.75	1.00	.65	.70
2,400 lin. ft. 12-in. sewer pipe	1.25	1.50	1.50	1.00	1.20
350 lin. ft. 18-in. sewer pipe	2.50	3.00	3.00	1.80	2.00
500 lin. ft. extra for installing pipe under pavement	2.00	2.00	1.50	1.00	2.00
30 only concrete curb inlets	50.00	30.00	35.00	40.00	30.00
10 only concrete inlets (wood grating)	50.00	50.00	35.00	30.00	30.00
1 only Type "A" manholes (concrete cover)	150.00	50.00	150.00	50.00	85.00
11 only Type "A" manholes (wood cover)	150.00	40.00	150.00	50.00	85.00
1,100 lin. ft. salvaging and rebuilding wire guard rail	2.50	2.00	2.50	.75	1.10
1,350 lin. ft. painting wire guard rail	.60	.50	.50	.15	.90
1,000 lin. ft. wood guard rail	1.50	2.00	1.50	1.00	1.50
370 cu. yds. concrete curbs	40.00	40.00	35.00	20.00	33.00
300 sq. yds. concrete walks	3.00	.50	4.00	1.80	2.50
120 lin. ft. expansion joints in walks	.10	.10	.15	.15	.12
40 cu. yds. concrete traffic separators	40.00	50.00	70.00	40.00	50.00
260 cu. yds. concrete traffic islands	35.00	30.00	35.00	40.00	35.00
15 only concrete junction boxes	30.00	10.00	25.00	20.00	20.00
All specified Constructing recesses for traffic control markers	5.00	3.75	2.50	5.00	1.75
3,800 lin. ft. ¾-in. electrical conduit	.30	.26	.30	.30	.50
150 lin. ft. 1-in. electrical conduit	.30	.35	.40	.40	.70
26 only metal junction boxes	9.00	20.00	10.00	20.00	15.00
All specified Construct and remove detour bridges	$17,100	$15,000	$12,500	$20,000	$15,000
80 M.F.B.M. transporting and storing salvaged lumber	5.00	7.00	10.00	3.50	6.00
1,600 lin. ft. furnish untreated piles	.40	.35	.40	.40	.40
24 only drive untreated piles	50.00	35.00	40.00	50.00	40.00
60 M.F.B.M. untreated lumber in place	95.00	70.00	110.00	80.00	125.00
10,200 cu. yds. 3-in. - 0-in. screened gravel in base	2.50	2.50	2.00	2.40	2.75
1,700 cu. yds. 1¼-in. - 0-in. crushed material in base	3.10	3.00	2.50	3.00	3.25
700 cu. yds. ¾-in. - 0-in. crushed material in shoulders	3.10	3.00	3.00	3.00	3.50
120 cu. yds. ½-in. - 0-in. material in cushion course	3.10	3.00	3.00	3.00	3.05
500 M. gals sprinkling	2.50	2.00	2.50	2.00	2.75
5,800 T. Class "B" asphaltic concrete	7.25	7.50	7.60	7.00	7.50
1,500 T. Class "C" asphaltic concrete	7.25	7.50	7.60	7.00	7.50
All specified Shoring, cribbing, etc.	100.00	35.00	35.00	35.00	15.00
1,700 cu. yds. excavation for bridges and retaining walls	3.00	4.00	4.00	2.00	3.50
100 cu. yds. excavation below elevations shown	6.00	6.00	6.00	2.00	5.00
1,700 cu. yds. Class "A" concrete	29.00	32.50	32.50	32.00	36.50
800 sq. yds. precast slope pavement in place	2.50	4.00	3.00	3.00	2.60
253,000 lbs. metal reinforcement	.055	.0625	.0625	.08	.06

California—San Mateo County—State—Reinf. Conc.

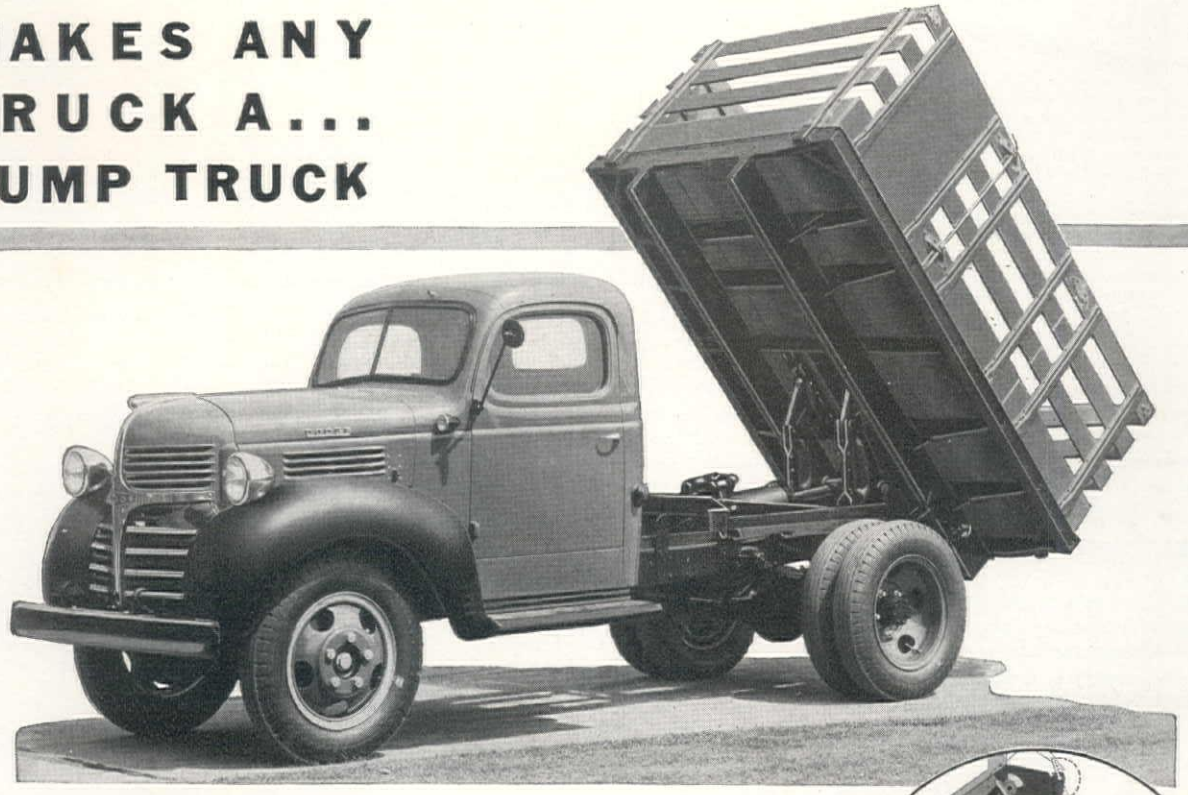
Wm. E. Thomas Concrete Construction Co., Sacramento, bid low at $14,070 to the California Division of Highways, Sacramento, for a reinf. conc. bridge with connection and widenings to be graded and surf. with plant-mixed surf. on crusher run base, on San Bruno Ave. at the Bayshore Highway Intersection. The state is to furnish the R.R. rail for the rail steel bar reinforcement. The following bids were submitted:

(1) W. E. Thomas Concrete Const. Co. $14,070
(2) Guerin Brothers 15,752
(3) James B. Allen 15,228
(4) S. J. Amoroso Const. Co. 16,160
(5) Dan Caputo $17,618
(6) N. M. Ball Sons 22,126
(7) Peter Sorensen 226,669

(Continued on next page)

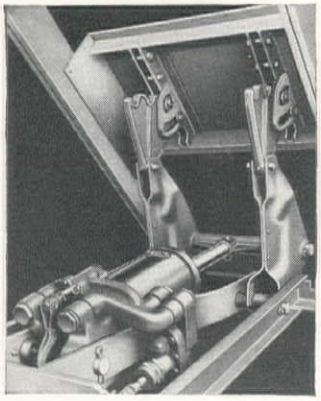
A HERCULES HYDRAULIC BOOSTER HOIST

MAKES ANY TRUCK A... DUMP TRUCK



Install HERCULES DOUBLE-ARM HYDRAULIC HOISTS under your platform, stake, express or special bodies, which are now idle. Unload the easy way!

With wartime restrictions preventing your purchase of all the new equipment you need, it's more important than ever that present equipment be used at maximum efficiency.



Model KXE Hercules Booster Hoist, with 6″ cylinder, for bodies up to 12 feet long. Rated capacity of 4 tons with a 9 foot body. Control valve is operated from the driver's seat, and the low oil pressure required assures long life of unit.

Reinforcing plate relieves lifting strains. Assembly includes 12 foot steel sills for reinforcement of wood body sills.

UTILITY TRAILER SALES, Seattle, Wash.; NEWELL TRUCK EQUIPMENT CO., Portland, Oregon; A. PASTERIS CO., Oakland, Calif.; STANDARD CARRIAGE WKS., INC., Los Angeles, Calif.; STANDARD IRON WORKS, San Diego, Calif.; SAWTOOTH CO., Boise, Idaho; WESTERN CONSTRUCTION CO., Billings, Montana; WYOMING AUTOMOTIVE SUPPLY CO., Casper, Cheyenne, Rock Springs, Sheridan, Wyoming; McKELVY MACHINERY CO., Denver, Colo.; MORROW & CO., Albuquerque, New Mexico.

HERCULES STEEL PRODUCTS CO.

GALION OHIO

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	cu. yds. roadway excavation	1.20	1.00	1.30	1.25	1.25	2.00	1.50
75	cu. yds. structure excavation	2.50	3.00	2.60	6.00	5.00	3.00	3.00
300	cu. yds. imported borrow	3.00	3.00	4.00	3.60	3.25	4.00	2.50
480	T. crusher run base	3.60	3.00	3.60	4.00	3.65	4.00	3.00
4	T. liq. asphalt, MC-2 (pr. ct. and pen. tr.)	30.00	33.00	66.00	60.00	50.00	30.00	33.00
160	T. min. aggre. (P.M.S.)	5.60	6.00	7.20	6.00	6.00	6.00	5.00
8	T. liq. asph., MC-5 (P.M.S.)	22.50	20.00	30.00	26.00	24.00	25.00	30.00
1	T. asphaltic emulsion (sl. ct.)	40.00	35.00	66.00	60.00	50.00	40.00	30.00
17	T. screenings (sl. ct. and pen. tr.)	5.00	5.00	6.00	6.00	5.00	6.00	4.20
118	lin. ft. timber bridge railing	2.00	3.00	1.50	2.50	2.50	2.00	3.00
125	cu. yds. Class "A" P.C.C. (structures)	26.75	40.00	28.00	37.00	48.00	48.00	52.00
6	cu. yds. Class "B" P.C.C. (curbs)	26.75	30.00	28.00	60.00	40.00	48.00	30.00
1,300	lin. ft. furnishing tr. tim. piles	1.50	1.25	1.60	1.25	1.50	1.60	1.36
26	ea. driving piles	70.00	73.50	90.00	65.00	100.00	125.00	80.30
21,000	lbs. bar reinforcing steel	.07	.10	.06	.055	.045	.08	10.00
11	ea. moving and resetting guide posts	1.00	2.00	2.00	5.00	2.00	3.00	3.00
18	ea. guide posts	1.90	3.50	6.00	6.00	3.00	4.00	4.00
24	ea. red reflectors	2.00	2.50	1.50	3.00	2.00	5.00	1.50
Lump sum	Misc. bridge items of work	500.00	200.00	200.00	780.00	500.00	$3,000	$1,500

California—Marin County—State—Grade Separation

N. M. Ball Sons, Berkeley, were low bidder to the California Division of Highways, Sacramento, at $82,913, on the project near Waldo Point of 0.4-mi. grade and surf. with plant-mix surf. on imported rock base, and a reinf. conc. grade separation struct. The R.R. rail for the bar reinforcing steel is to be furnished by the state. The unit bids were as follows:

(1)	N. M. Ball Sons	$82,913	
(2)	A. G. Raisch	84,947	
(3)	Healey-Moore Co.	86,521	
(4)	Macco Const. Co.	89,483	
(5)	Guy F. Atkinson Co.	$98,272	
(6)	Parish Brothers	99,281	
(7)	Louis Biasotti & Son	99,924	
(8)	Peter Sorensen	919,214	

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
40	cu. yds. removing concrete	5.00	10.00	6.25	4.00	3.88	10.00	5.00	11.00
Lump sum	Clearing and grubbing	$1,000	250.00	300.00	$1,000	323.25	800.00	$1,000	800.00
34,000	cu. yds. roadway excavation	.71	.84	.82	.83	.775	.98	1.10	.95
540	cu. yds. structure	4.00	5.00	3.00	3.00	4.52	2.75	4.00	3.00
50	cu. yds. ditch and channel excavation	1.50	2.50	1.85	2.00	1.94	1.65	1.00	3.00
270	cu. yds. trench excavation	2.00	2.50	2.50	2.00	6.47	1.25	1.00	2.50
775,000	sta. yds. overhaul	.005	.006	.007	.01	.0032	.01	.005	.015
Lump sum	Developing water supply and furn. watering equip't	300.00	500.00	375.00	$1,000	$1,293	200.00	800.00	700.00
340	M. gals. applying water	2.00	1.50	1.85	2.00	2.59	2.00	1.50	2.00
Lump sum	Finishing roadway	$1,000	$1,500	625.00	$1,000	646.50	$1,000	$1,000	300.00
3,500	cu. yds. imported rock base	1.25	1.80	1.20	1.50	4.33	2.75	1.75	1.60
22	T. asphaltic emulsion	25.00	30.00	31.00	20.00	22.00	38.00	40.00	30.00
250	T. screenings	5.00	4.00	5.00	3.00	4.40	5.00	4.50	4.20
90	T. liq. asph., MC-5 (P.M.S.)	22.00	20.00	16.00	20.00	19.80	24.00	15.00	34.00
1,600	T. min. aggregate (P.M.S.)	4.50	5.00	5.00	5.00	4.95	4.80	5.10	5.30
15	ea. raised bars	10.00	5.00	15.00	15.00	9.05	6.00	10.00	10.00
3	M.F.B.M. Redwood timber (pipe foundations)	110.00	100.00	150.00	150.00	181.00	200.00	140.00	150.00
176	lin. ft. timber bridge railing	1.90	2.00	2.50	3.00	1.75	2.70	4.00	3.00
68	lin. ft. low timber guard railing	2.00	2.00	3.00	2.00	2.59	2.75	4.00	3.00
440	cu. yds. Class "A" P.C.C. (bridge struct.)	37.50	37.50	40.50	40.00	43.96	35.00	44.00	48.00
81,000	lbs. bar reinforcing steel	.07	.04	.0625	.06	.05	.07	.065	10.00
6	cu. yds. Class "B" P.C.C. (structures)	42.00	50.00	50.00	25.00	38.79	38.00	45.00	40.00
100	cu. yds. Class "B" P.C.C. (curbs)	45.00	25.00	42.50	22.00	45.25	32.00	40.00	29.00
110	cu. yds. Class "B" P.C.C. (sidewalks)	26.00	20.00	22.50	22.00	32.32	29.00	25.00	24.00
20	ea. monuments	4.00	4.00	3.75	4.00	6.46	4.00	4.00	4.50
70	lin. ft. laminated guard railing	2.25	2.00	2.80	3.00	2.59	2.75	3.00	3.00
8	ea. culvert markers	3.00	3.00	3.75	4.00	5.17	3.00	4.00	4.50
6	ea. moving and resetting guide posts	3.00	3.00	1.85	3.00	5.17	2.00	3.00	3.00
24	lin. ft. 12-in. unreinf. conc. pipe (2000D)	2.00	3.00	2.15	2.50	2.59	1.75	2.00	2.00
176	lin. ft. 18-in. unreinf. conc. pipe (2000D)	3.00	5.00	3.05	4.00	3.88	2.75	2.50	2.50
Lump sum	Misc. items of bridge work	$2,000	500.00	950.00	$1,500	$1,422	$1,800	$1,000	$12,000

Sewerage . . .

California—Los Angeles County—City of Los Angeles—Sewer

R. A. Wattson Co., North Hollywood, at $81,842 submitted the low bid to the Board of Public Works, Los Angeles, for a sewer in the Rhodes Ave.-Moorpark St. Sewer District. The engineer's estimate was only slightly under the award figure. The following unit bids were submitted:

(A)	R. A. Wattson Co.	$81,842	
(B)	George Miller	83,220	
(C)	Burch & Bebek	88,106	
(D)	V.C.K. Construction Co.	90,779	
(E)	Artukovich Brothers	91,681	
(F)	P. & J. Artukovich	$ 92,553	
(G)	Martin Construction Co.	106,628	
(H)	B. D. Zaich & Sons	109,050	
(J)	Carlo Bongiovanni	177,624	
(K)	Engineer's estimate	81,567	

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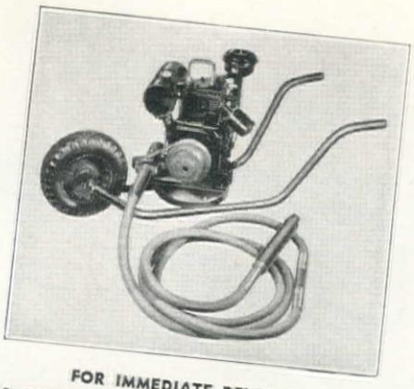

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MASTER #23 GAS-POWERED CONCRETE VIBRATOR

The Contractors' Standard on "Time Limit" Contracts

Master Equipment is competitive in price, utmost in performance and quality.

Manufacturers of

- **Gas-Electric Generator Plants, 650 Watts to 9400 Watts—AC or DC.**
- **Concrete Vibrators—Gas or Electric.**
- **Concrete Surfacing Attachments.**
- **Master Power Blow Hammers and Tools.**
- **Complete line of High Speed Tools.**

Master Distributors: California: Elrick Equipment Co., Los Angeles; Kerr Equipment Company, San Francisco. Oregon: Andrews Equipment Service, Portland. Washington: Star Machinery Co., Seattle; Andrews Equipment Service, Spokane. Montana: Midland Implement Co., Billings. Colorado: F. W. McCoy Company, Denver. Utah: The Lang Company, Salt Lake City. Arizona: Brown-Bevis Equipment Co., Phoenix. New Mexico: R. L. Harrison Co., Albuquerque.

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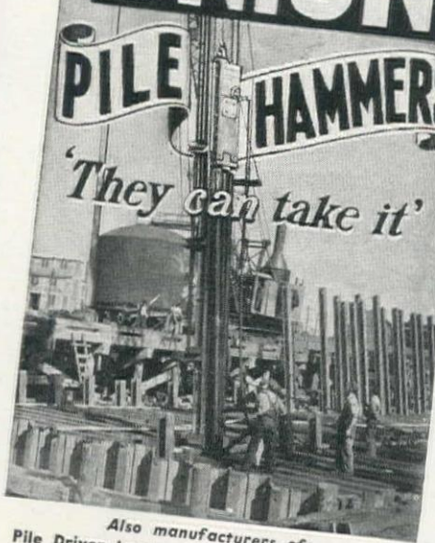
MASTER VIBRATOR CO.
DAYTON, OHIO

UNION

PILE HAMMERS

'They can take it'



Also manufacturers of:
Pile Driver Leads, Grout Mixer and Ejector, Mine and Shaft Cages, Skips and Buckets, Air Locks, Subaqueous Equipment, Tunnel Shields, Pile Driver Hoists.

EST. 1900
Union Iron Works, Inc.
ELIZABETH, New Jersey

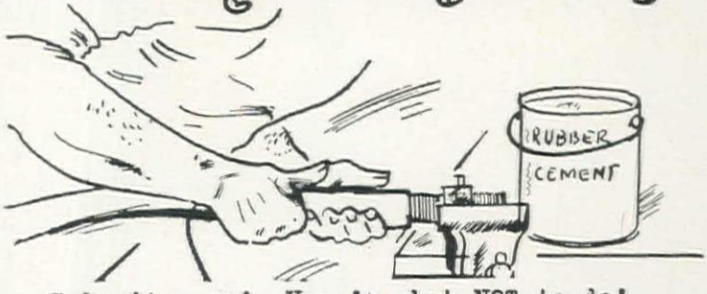
---

(1) Lump sum, 21,853 lin. ft. 8-in., 10-in. 24-in. and 30-in. vitr. clay main line sewer
(2) 7,080 lin. ft. house connections
(3) 55,904 sq. ft. Class AC-4 resurfacing
(4) 528 sq. ft. Class AC-8 resurfacing
(5) 460 sq. ft. Class C resurfacing
(6) 863 sq. ft. driveway resurfacing
(7) 225 sq. ft. gutter resurfacing
(8) 609 sq. ft. sidewalk resurfacing

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
(1)	$63,350	$66,428	$67,000	$71,331	$75,800	$67,695	$87,000	$90,916	$100,000	$150,008	$65,018
(2)	1.40	1.25	1.25	1.66	1.20	2.50	1.50	1.35	1.50	3.00	1.38
(3)	.135	.1225	.20	.13	.12	.10	.15	.14	.20	.10	.11
(4)	.26	.255	.50	.25	.25	.12	.25	.30	.30	.20	.22
(5)	.50	.50	.50	.25	.50	.15	.30	.40	.25	.35	.35
(6)	.50	.50	.40	.10	.15	.25	.20	.30	.15	.25	.20
(7)	.50	.40	.35	.15	.15	.30	.40	.25	.15	.35	.34
(8)	.20	.35	.35	.10	.25	.25	.15	.15	.15	.25	.17

FIELD NOTES

How to lubricate hose to attach tight fitting couplings



Take it easy! Here's what NOT to do!
DON'T use oil or grease for fitting the couplings.
DON'T ream out the hose tube.
To lubricate couplings that fit tightly,
DO use Rubber Cement which can be obtained in tubes and other containers from auto supply houses. Cementing the coupling shank will help it slide on the hose easily and help set it in place.

RUBBER HELPS WIN

Every person within industry can help the all-out war effort by making present materials last longer. This is keenly true with reference to industrial rubber belting and hose. It is our mutual obligation to take immediate steps to assure the last bit of long life from every piece of rubber in use today.
PIONEER RUBBER MILLS, 353 Sacramento St., San Francisco, Calif.

PIONEER

Jot Tailored

INDUSTRIAL HOSE

Building War Birds Nests on Time!

ARL E. NELSON, Logan, Utah delivers over 100,000 TONS of Blacktop for the War Effort in less than Six Months!

WITH the enemy battering at the door, the whole nation is watching output. High averages are the index to production for Victory. Ninety to one hundred tons an hour average for blacktop production means nests for war birds in a hurry, and it's the best possible evidence of the trouble-free service that Cedarapids Asphalt plants give. That's the daily average of Carl E. Nelson of Logan, Utah with one Cedarapids Asphalt plant on four jobs and in spite of three moves, from widely divergent points.

Iowa Cedarapids plants are simple in design. They are compact, easily moved — even to the great Model E plant, the largest fully portable plant built today — they get on the job and are producing in a hurry! When you buy a Cedarapids, you are buying an *asphalt factory* engineered to your particular problem from proved units and tested by some of the leading producers of the country.

Wartime performance can teach much for peacetime operation. The advantages that Cedarapids equipment brings for getting the war jobs done will help you meet competition after the "duration."

It's time to learn about Cedarapids equipment!

Cedarapids

Built by IOWA

OWA MANUFACTURING CO. Cedar Rapids, Ia.

ward-Cooper Corp., Seattle, Spokane, Portland;
ll-Perry Machy. Co., Butte, Montana;
ermountain Equip. Co., Boise, Idaho;
rtham Machy. Co., Cheyenne, Wyoming; Lund Machy. Co., Salt Lake City, Utah; Brown-Bevis Machy. Co., Los Angeles, Calif.;

CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month Except for certain instances, contracts amounting to less than $10,000 are not listed Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information on many of these projects is often available, and will gladly be furnished upon your request to the Editor, WESTERN CONSTRUCTION NEWS, 503 Market Street, San Francisco.

Large Western Projects...

CONTRACTS AWARDED

Henry L. Horn, Caldwell, Ida., at $318,116, received the contract to grade, surface and pave the Denver Ave. junction section of the Pacific Highway East, from the Oregon State Highway Commission, Portland.

S. Birch & Sons Construction Co., Great Falls, Mont., was awarded the contract at over $500,000 for stripping, excavating, and grading, at the Ellensburg airbase in Kittitas Co., Wash., by the U. S. Engineer Office, Seattle.

Carl E. Nelson, Logan, Utah, was awarded the contract to clear, grade, and pave the Winnemucca, Nev., airport, at $300,966, by the Civil Aeronautics Administration, Santa Monica, Calif.

Strong & McDonald, Inc. and **White Bros.,** Tacoma, Wash., at $1,495,933, secured the contract to construct an airport near Newport, Wash., from Civil Aeronautics Administration, Seattle, Wash.

A. J. Goerig Construction Co., Seattle, Wash., at $364,203, has been awarded the contract to construct an 8,000,000-gal. reservoir and drill wells at McLoughlin Heights, Vancouver, Wash., by the Vancouver Housing Authority, also a $293,214 contract from the same agency for a sewer system in the Vancouver war housing area.

Del E. Webb Construction Co., Phoenix, Ariz., bidding $361,444 was awarded contract to erect 200 family dwellings of masonry construction near Phoenix, by Phoenix Housing Authority.

K. E. Parker Co., San Francisco, Calif., was awarded a $2,122,000 contract for additional facils. at the Naval Hospital, Oakland, and the Naval Air Station, Alameda, by Bureau of Yards and Docks, Washington, D. C.

P. J. Walker Co., Los Angeles, Calif., a $2,250,000 contract for buildings and facils. at the Naval Hospital, Long Beach, Calif., by Bureau of Yards and Docks, Washington, D. C.

William Simpson Construction Co., Los Angeles, Calif., a $3,850,000 contract for addtl. bldgs. and facils. at the Naval Hospital at Norco, Calif., by Bureau of Yards and Docks, Washington, D. C.

Standard Building Co., San Francisco, Calif., bidding $884,440, was awarded the contract to erect 724 temporary dwelling units in South San Francisco, by Federal Public Housing Authority, San Francisco.

Tri-State Construction Co., Portland, Ore., has a contract of $616,309 to construct 325 housing units in Portland, from the Federal Public Housing Authority, Portland.

Taylor & Wheeler Construction Co., Los Angeles, Calif., over $1,500,000 for a housing project of 200 apartment units and 139 single dwellings in Provo, Utah, by Federal Public Housing Authority, Salt Lake City.

The Austin Co., Seattle, at $1,088,000 won an additional contract for bldgs. at the Sand Point Naval Air Station, by Public Works Officer, Sand Point.

C. F. Davidson, Tacoma, Wash., was awarded a $920,000 contract for 500 temp. dwelling units at Bremerton, by Bremerton Housing Authority.

MeNeil Construction Co., Los Angeles, Calif., $11,972,524 for addtl. facils. at Pleasanton, Calif., by Bureau of Yards and Docks, Washington, D. C.

Pittsburg-Des Moines Steel Co., San Francisco, Calif., have received a contract valued at approx. $3,500,000 for a high-pressure wind tunnel at Moffett Field, Sunnyvale, Calif.

Morrison-Knudsen Co., Inc., Boise, Ida., has been awarded a contract to construct a 110-mi. 66,000-volt power line from Emmett to Stibnite, Idaho, by Idaho Power Co., Boise.

Highway and Street . . .

CONTRACTS AWARDED

Arizona

COCONINO CO. — **Fisher Contracting Co.,** 516 S. 7th St., Phoenix—$232,802, for 2.8 mi. grade, drain, aggr. base course, and conc. pave. easterly from Flagstaff, on the Flagstaff-Winslow Hwy.—by Ariz. Highway Department, Phoenix. 4-26

California

CONTRA COSTA CO.—**Macco Construction Co.,** Ferry & Freight, Oakland—for widening 22-ft. by-pass road on Cutting Blvd., betw. 8th and Nye Sts., Richmond—by Richmond Shipbuilding Co., Richmond. 4-14

FRESNO CO.—**J. E. Haddock, Ltd.,** Pasadena—over $50,000, for streets and sidewalks—by U. S. Engineer Office, Sacramento. 3-31

KINGS CO.—**Piazza & Huntley,** 175 S. Montgomery St., San Jose—$270,974, for 10.8 mi. grade and plantmix surf., betw. Lemoore flying school and the junction with Houston Ave., 1.5 mi. west of Lemoore—by California Division of Highways, Sacramento. 4-12

LOS ANGELES CO.—**Calowell Co.,** 1835 E. Wardlow, Long Beach—less than $50,000, for paving open storage area at a depot—by U. S. Engineer Office, Los Angeles. 3-29

LOS ANGELES CO.—**C. J. Paradis,** 2320 Idell St., Los Angeles—less than $50,000, for patrol roads at an airport—by U. S. Engineer Office, Los Angeles. 4-19

LOS ANGELES CO.—**United Concrete Pipe Corp.,** Box 1, Station "H," Los Angeles—over $100,000, for pave. and fences at army air forces supply depot—by U. S. Engineer Office, Los Angeles. 4-19

MENDOCINO CO.—**E. A. Forde,** 640 Sir Francis Drake Blvd., San Anselmo—$41,465, for 6.7 mi. armor coat betw. Hopland & Crawford Ranch—by California Division of Highways, Sacramento. 4-6

ORANGE CO. — **Sully-Miller Construction Co.,** 1500 W. 7th St., Long Beach—for street improv.—by U. S. Engineer Office, Los Angeles. 4-16

RIVERSIDE CO. — **Calowell Construction Co.,** 1835 E. Wardlow Rd., Long Beach—less than $50,000, for roads for a gasoline fuel system at an airfield—by U. S. Engineer Office, Riverside. 4-6

SAN BERNARDINO CO.—**L. J. Coughlin,** 980 Edgehill Rd., San Bernardino—less than $50,000, for a perimeter patrol road at an air depot—by U. S. Engineer Office, San Bernardino. 4-13

SAN DIEGO CO.—**Calowell Construction Co.,** 1835 E. Wardlow Road, Long Beach—$111,711, for 7.5 mi. grade and road-mixed surf. on Miramar Road betw. Rt. 2 and Rt. 77—by California Division of Highways, Los Angeles. 4-16

SHASTA CO.—**M. J. Ruddy & Son,** Box 1122, Modesto—$39,562, for 8.5 mi. plantmix surf. on portions betw. Redding and Bass Hill—by California Div. of Highways, Sacramento. 4-23

SHASTA CO.—**A. Teichert & Sons, Inc.,** Box 1113, Sacramento—$208,971 for approx. 4.0 mi. grade. and surf. with plantmix surf. over cem. treated base betw. ½-mi. south of Clear Creek and Redding subway—by California Division of Highways, Sacramento. 3-31

TRINITY CO.—**Clements & Co.,** 941 Atherton St., Hayward—$35,960, for 14.5 mi. plantmix surf. betw. Helena and Weaverville—by California Division of Highways, Sacramento. 4-23

VENTURA CO.—**Basich Bros.,** 20530 S. Normandie Ave., Torrance—$175,260, for 9.1 mi. grade and untreated rock base and plantmix surf. over existing pave. and newly const. base on roads and streets in vicinity of Hueneme—by California Division of Highways, Los Angeles. 4-8

UNANNOUNCED CO.—**John Carlin Construction Co.,** Box 698, Arcata—two contracts for roads in northern Calif.—by U. S. Engineer Office, San Francisco. 4-6

Idaho

KOOTENAI CO.—**Roy L. Bair,** 1220 Ide Ave., Spokane, Wash.—$26,950, for furnishing crushed gravel and cover coat material in stockpiles on the North and South Highway betw. Garwood & Athol—by Commissioner of Public Works, Boise. 3-29

KOOTENAI CO.—**Max J. Kuney,** Hutton Bldg., Spokane—$63,938, for road mix bitum. surf. on 7.8 mi. Spirit Lake-Athol Hwy.—by Commissioners of Public Works, Boise. 4-21

Kansas

COFFEY CO.—**Reno Construction Co., Inc.,** 5401 Merriam Blvd., Merriam—$16,101, for 19.4 mi. sing. asph. surf. treat.—by State Highway Commission, Kansas. 4-19

EDWARDS CO.—**Yant Construction Co.,** Omaha, Nebr.—$10,905, for 15.6 mi. sing. asph. surf. treat.—by State Highway Commission, Kansas. 4-19

PAWNEE CO.—**Yant Construction Co.,** Omaha, Nebr.—Three contracts totalling $29,236 for asph. surf. treat. on 46.6 mi. of road—by State Highway Commission, Kansas. 4-19

RUSH CO.—**Chas. Hulme,** Great Bend—Two contracts totalling $27,566, for 40.4 mi. of single asph. surf. treat.—by State Highway Commission, Kansas. 4-19

Nevada

CLARK CO.—**Gibbons & Reed,** 259 West Third South St., Salt Lake City, Utah—for 12 mi. road, involving 40,000 tons plantmix, at the Basic Magnesium Co. plant near Las Vegas—by McNeil Construction Co., Las Vegas. 3-31

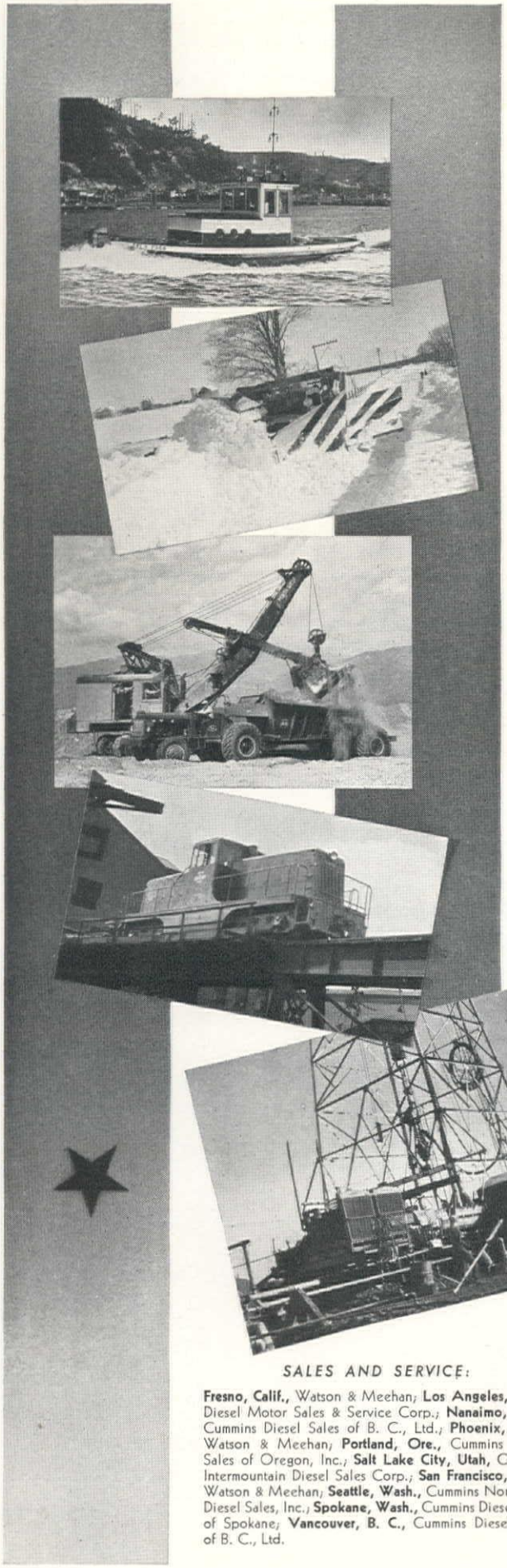
Oregon

GRANT CO.—**Chester T. Lackey,** Ontario—$45,350, for furn. crushed rock or crushed gravel in stockpiles, on John Day Rock Production project on three state hwys.—by State Highway Commission, Portland. 4-7

HARNEY AND MALHEUR CO.—**Oscar E. Joelson,** Eugene—$25,400 for approx. 7,000 cu. yds. cr. rock or cr. gr. in stockpiles on the Drinkwater Pass—Juntura rock production project—by Oregon State Highway Commission, Portland. 4-7

JACKSON CO.—**Tru-Mix Concrete Co.,** 248 McAndrews Road, Medford—$10,000 (approx.) for an access road—by U. S. Engineer Office, Portland. 4-12

MULTNOMAH CO.—**Henry L. Horn,** 816 Logan St., Caldwell, Idaho—$318,116, for grade., surf., pave. & bridge on Denver Ave. Junction Sect. of the Pacific Hwy. East—by State Highway



At its best . . . when the going is

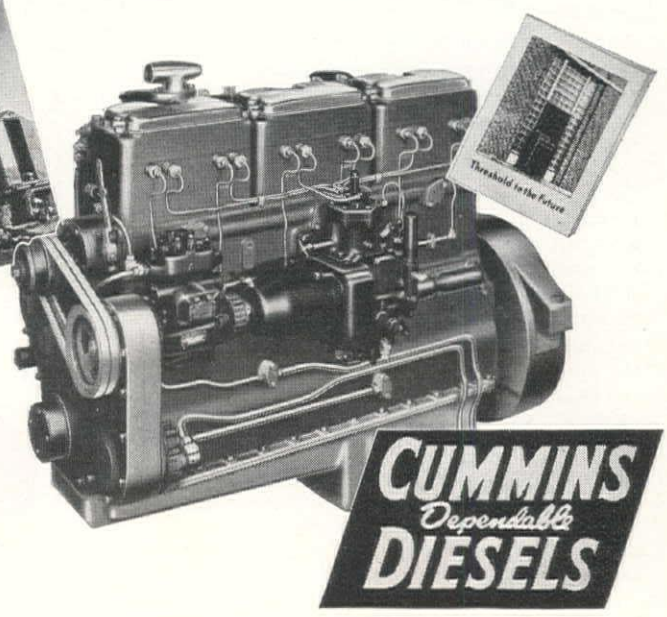
Tough

The first Cummins high-speed Diesel was offered to the public in 1932. From that day to this, the Cummins Diesel has never asked for the easy jobs . . . but has consistently proved itself in the face of the longest odds . . . on the toughest, the longest and the hardest pulls . . . on the jobs which demand the delivery of an engine's full rated horsepower day after day.

Now, after a decade of conditioning, the Cummins Diesel is ready for action—*is in action*—on every front in this global war. Its quick starting has been tested in the sub-zero arctic cold. Its cool running has been demonstrated in flaming desert heat. Its simple, easy service and maintenance has been proved in the world's most inaccessible, out-of-the-way places.

In short, the Cummins Diesel has proved its ability to uphold the highest American tradition . . . to do its best job when the going is toughest. CUMMINS ENGINE COMPANY, Columbus, Indiana.

Out of the experiences of owners during the past 10 years—plus new tests which the engine is meeting daily—a newer and better Cummins Diesel is now building . . . one which will do your job at a lower cost, for a longer time, with fewer parts replacements and service requirements. When all-over economy again becomes the yardstick of value, this new Cummins Diesel will be your first choice. The new booklet, "Threshold to the Future" will tell you why. Ask for your copy.



SALES AND SERVICE:

Fresno, Calif., Watson & Meehan; **Los Angeles, Calif.,** Diesel Motor Sales & Service Corp.; **Nanaimo, B. C.,** Cummins Diesel Sales of B. C., Ltd.; **Phoenix, Ariz.,** Watson & Meehan; **Portland, Ore.,** Cummins Diesel Sales of Oregon, Inc.; **Salt Lake City, Utah,** Cummins Intermountain Diesel Sales Corp.; **San Francisco, Calif.,** Watson & Meehan; **Seattle, Wash.,** Cummins Northwest Diesel Sales, Inc.; **Spokane, Wash.,** Cummins Diesel Sales of Spokane; **Vancouver, B. C.,** Cummins Diesel Sales of B. C., Ltd.

Commission, Portland. 4-19

MULTNOMAH CO.—**Porter W. Yett,** 3525 NE 17th St., Portland—$18,815, for 0.27 mi. grade., surf., and pave., on West Vanport Connection on the Swift Secondary Hwy.—by State Highway Commission, Portland. 4-19

SHERMAN CO.—**E. C. Hall Co.,** First National Bank Bldg., Eugene—$48,635 for furn. approx. 16,500 cu. yds. cr. rock in stockpiles on the Moro-Wasco County Line rock production project on the Sherman Highway—by Oregon State Highway Commission, Portland. 4-7

Texas

DALLAS CO.—**Texas Bitulithic Co.,** Box 5287, Dallas—less than $50,000 for grade., pave., fence.—by U. S. Engineer Office, Denison. 3-31

NUECES CO.—**Cage Bros., Palmer & Winters,** Bishop—over $100,000, for surf.—by U. S. Engineer Office, San Antonio. 4-9

TARRANT CO.—**Austin Bridge Co.,** Dallas—less than $50,000, for street improv.—by U. S. Engineer Office, San Antonio. 4-9

Utah

SALT LAKE CO.—**W. W. Clyde & Co.,** Bowers Bldg., Springville—$206,572, for 9.82 mi. 2½-in. road mix bitum. surf. road betw. Copperton and Magna—by State Road Commission, Salt Lake City. 4-12

UTAH CO.—**J. M. Sumsion,** Springville—$9,600 for gravel surf. stockpile in Provo Canyon—by State Road Commission, Salt Lake City. 4-8

WEBER CO.—**Reynolds Construction Co.,** Springville—$98,000 for street paving—by U. S. Engineer Office, Salt Lake City. 4-22

WEBER CO.—**Wheelwright Construction Co.,** 2434 Monroe Ave., Ogden—$21,310, for 0.61 mi. gravel surf. road on Second St. in Ogden—by State Road Commission, Salt Lake City. 4-8

Washington

CLARK CO.—**A. J. Goerig Construction Co.,** 4508 E. 38th St., Seattle—$96,490, for a four lane access road from Burton Homes housing project to 18th St. and the Grand Ave. access road and widening of Blandford Drive from McLoughlin Heights, housing project—by Housing Authority, Vancouver. 4-5

GRANT CO.—**McAtee & Heathe,** E. 3527 Trent Ave., Spokane—over $50,000 for road, walk and parking areas—by U. S. Engineer Office, Wenatchee. 4-26

KING CO.—**Toney Romano,** 1833 Dearborn St., Seattle—$61,342, for removal of street car tracks and resurf. on East 55th and other streets, Seattle—by Board of Public Works, Seattle. 3-29

PIERCE CO.—**Nilson-Smith Construction Co.,** Old Great Northern Freight Depot, Great Falls, Mont.—$309,789, for clear., grade., drain., surf. and oiling on primary state hwy. No. 5, La Grande to Elbe—by Director of Highways, Olympia. 4-9

SPOKANE CO.—**Northwest Pavers,** Box 135, Spokane—over $100,000, for pave. streets—by U. S. Engineer Office, Seattle. 4-22

PIERCE CO.—**Woodworth & Co., Inc.,** 1122 East "D" St., Tacoma—$17,639, for improv. of east 11th St. from east approach of the Milwaukee viaduct to Taylor Way by subgrade., pave., resurf. and drain.—by Board of Contracts & Awards, Tacoma. 4-19

Wyoming

NATRONA CO.—**Peter Kiewit Sons' Co.,** 1024 Omaha National Bank Bldg., Omaha, Nebr.—less than $50,000, for road excav., pit run gravel, timber bridge, etc.—by U. S. Engineer Office, Omaha, Nebr. 4-20

PLATTE CO.—**C. C. Warrington,** Cheyenne—$57,521, for 10.15 mi. base course surf., base treatmt., sand seal coat and misc. work on Wheatland Chugwater Rd.—by State Highway Commission, Cheyenne. 4-14

Canada

BRITISH COLUMBIA—**R. Campbell Contracting Co., Ltd.,** 355 Burrard St., Vancouver—approx. $300,000, for 13.33 mi. of 20-ft. grav. road along the Skeena River between Cedarvale and Kitwanga—by Department of Mines & Resources, Ottawa.

PROPOSED PROJECTS

Utah

WEBER CO.—Plans are being prepared for 1.56 mi. of state road between Roy and Riverdale, involving 20,170 sq. yd. of conc. and 183,000 cu. yds. exc., to cost approx. $350,000—by Utah State Road Commission, Salt Lake City. 4-5

PARSONS

TRENCHERS Speedily Build Home Defense

Long, wide crawlers, three point suspension, overload clutch, two speeds on buckets and conveyor along with 16 digging speeds are a few of Parsons' Trenchers outstanding features.

Finishing ahead of schedule means only one thing—SPEED. That's how the Parsons' Trenchers have built and will continue to build a home defense that will not be penetrated by the enemy. With sixteen digging speeds ranging from eleven to thirty-nine inches per minute how could they help but be a home defense weapon. Add to this sixteen forward speed changes and four different reverse accelerations. The traveling speed of these rugged metal soldiers is one and three-fourths miles per hour. An added speed feature is the two speeds on the bucket line. For SPEED as well as clean and deep digging, Parsons has been the accepted standard for over thirty-five years.

THE PARSONS COMPANY • NEWTON, IOWA

TRENCHING EQUIPMENT

PARSONS

Washington

GRANT CO.—The War Production Board authorized a road on the Grand Coulee dam project to replace one inundated by high water in the reservoir, to cost less than $366,000. 4-8

KITSAP CO.—The State Highway Department, Olympia, is planning the improv. of addtl. roads leading into Bremerton to cost $300,000, funds to be appropriated by the Public Roads Administration. 4-16

Canada

BRITISH COLUMBIA—An allocation of $5,000,000 has been made for the Prince Rupert-Terrace-Cedarvale highway to link Prince Rupert with the interior highway system—by Dept. of Mines and Resources, Ottawa.

Bridge . . .

CONTRACTS AWARDED

California

SAN MATEO CO.—**California Paving Co.,** 363 North Eldorado, San Mateo—$20,105, for conc. arch culvert and 0.4 mi. grade. and bitum. surf. treatmt. at Finney Creek—by California Division of Highways, Sacramento. 4-23

SAN MATEO CO.—**W. E. Thomas Concrete Construction Co.,** General Delivery, Sacramento—$14,069, for reinf. conc. bridge, road conn. and plantmix surf. on crusher run base, San Bruno Ave. at Bayshore intersection—by California Division of Highways, Sacramento. 4-2

Wyoming

SWEETWATER CO.—**Woodward Construction Co.,** Rocksprings—$79,932, for one overhead crossing over U. P. R. R. track near Baxter, and 0.44 mi. grade., drain, base course surf., oil treatmt. by road mix method and misc. work on the Rock Springs Airport Road—by State Highway Commission, Cheyenne. 4-14

Canada

ALBERTA AND YUKON TERR.—**American Bridge Co.,** Frick Bldg., Pittsburgh, Penn., and **Pedersen Brothers, Inc.,** Montevideo, Minn.—bridges over the Liard, Muskwa and Sikanni Rivers on the Alaskan Highway. 4-2

PROPOSED PROJECTS

Montana

PRAIRIE CO.—A temp. bridge crossing the Yellowstone River at Fallon is planned to replace the one washed out by floods this winter, to cost $15,000—by State Highway Department, Helena.

Airport . . .

CONTRACTS AWARDED

Arizona

MOHAVE CO.—**Morrison-Knudsen Co.,** 411 W. 5th St., Los Angeles, Calif.—less than $50,000, for wide. taxiways at a flexible gunnery school—by U. S. Engineer Office, Kingman. 4-8

PIMA CO.—**Arizona Constructors,** 304 Home Builders Bldg., Phoenix—less than $50,000, for conc. pave. for hangar at a basic flying school—by U. S. Engineer Office, Phoenix. 4-22

PIMA CO.—**M. M. Sundt Construction Co.,** 440 S. Park Ave., Tucson—less than $50,000, for parking apron service stands at an airfield—by U. S. Engineer Office, Phoenix. 4-19

PINAL CO.—**Tanner Construction Co.,** 731 North 19th Ave., Phoenix—over $100,000, for runway ext. and addtl. taxiways at auxiliary operating base—by U. S. Engineer Office, Phoenix. 4-2

California

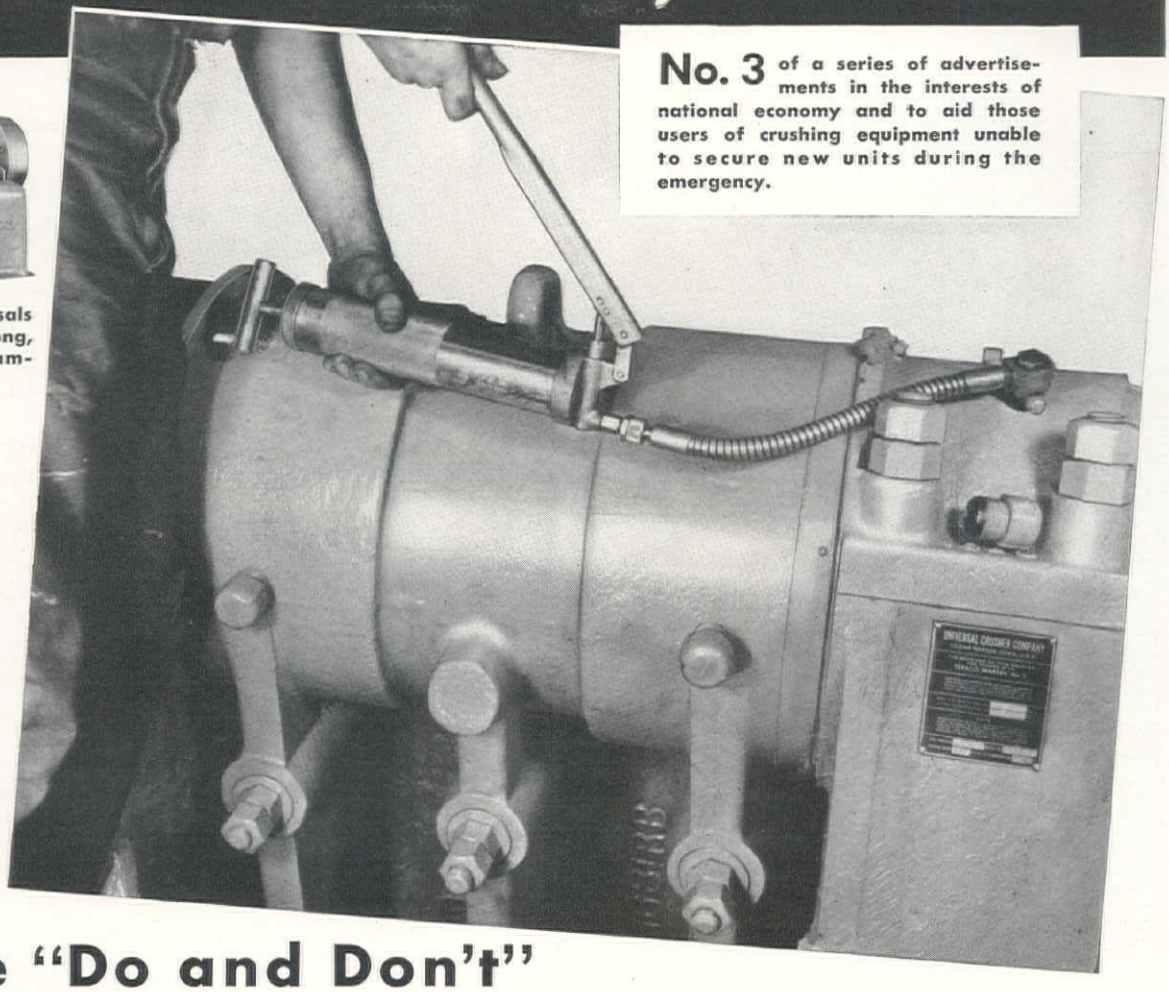
KERN CO.—**Davies & Keusder,** 118½ N. Larchmont Blvd., Los Angeles—over $100,000, for addtl. const. at an air base—by U. S. Engineer Office, San Bernardino. 4-12

LASSEN CO.—**Stolte, Inc.,** 1405 San Antonio Ave., Alameda—less than $50,000, for ramps and connecting roadways—by U. S. Engineer Office, Sacramento. 3-31

The Care and Maintenance of Rock Crushers

Only Universals feature strong, light, streamlined bases.

No. 3 of a series of advertisements in the interests of national economy and to aid those users of crushing equipment unable to secure new units during the emergency.



The "Do and Don't" of Crusher Lubrication

Today lubrication is more important than ever before. Lack of grease can cause costly bearing failures and bearings are made of vital, much needed alloys.

These ten simple rules, strictly observed, will help your crusher to stay on the job until the day when parts are plentiful and new crushers obtainable.

1. Don't keep lubricant containers near crushing plant—as float dust is penetrating and a little grit in your grease may ruin a bearing.
2. Don't put oil or grease in bearings or fittings until they have been wiped off with clean rags. Flush them with a thin oil—don't use kerosene.
3. Use only clean containers.
4. Make it a practice to inspect bearings often—at least four times daily with bronze bearings; once daily with roller bearings—checking them for over-heating.
5. Don't use cheap lubricants—they cost more in the long run. Use only tested lubricants as indicated on name plate.
6. Place a burlap bag saturated with crank case drainings on top of the lower end of the toggle—it helps keep out dirt and lubricates the lower toggle seat.
7. Keep adjustment wedges and screws clean. Oil regularly to prevent rust. Unless already enclosed, wrap screws with cloth, tied on, to keep out grit.
8. Squirt out a shot of grease from gun before greasing to clean nozzle.
9. Don't over-oil or grease. Too much lubricant can overheat bearings. Bearings have to "breathe" but should be able to contact grease. Use thinner lubricant in cold weather. Notice oil level plugs or name plates indicating quantity to use.
10. Don't keep adding oil when it should be changed. Changing gets rid of any dangerous accumulation of dirt.

EVERYBODY EVERY PAYDAY AT LEAST 10%

We're 100% Ten Percenters!

UNIVERSAL ENGINEERING CORP., Formerly UNIVERSAL CRUSHER CO.

323 8th Street West, Cedar Rapids, Iowa

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADERROLLERS, PORTABLE ASPHALT PLANTS

LOS ANGELES CO.—**Bondiman-McCain,** 1709 West 8th St., Los Angeles—less than $50,000, for hardstandings and conn. taxiways at an air transport command base—by U. S. Engineer Office, Los Angeles. 4-19

LOS ANGELES CO.—**Goode & Schroeder,** 3035 Treadwell St., Los Angeles—less than $50,000 for taxiway and roads for gasoline dist. sys. at an airport—by U. S. Engineer Office, Los Angeles. 3-31

LOS ANGELES CO.—**Loyd Wright,** 5215 Biloxi, North Hollywood—less than $50,000, for pave. hangar taxiways at an airport—by U. S. Engineer Office, Los Angeles. 3-29

SACRAMENTO CO.—**A. Teichert & Son, Inc.,** 1846 - 37th St., Sacramento—less than $50,000, for field grading and paving—by U. S. Engineer Office, Sacramento. 4-2

SAN DIEGO CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—over $500,000, for facil.—by U. S. Engineer Office, San Diego. 3-29

Colorado

EL PASO CO.—**Newstrom-Davis & Co.,** Denver—less than $50,000—for addtl. work at an airfield—by U. S. Engineer Office, Denver. 4-23

PUEBLO CO.—**Driscoll Construction Co.,** Box 516, Pueblo—for wide. taxiways at an airbase—by U. S. Engineer Office, Denver. 4-14

Nebraska

BUFFALO CO.—**Western Contracting Corp.,** Sioux City, Iowa—over $100,000, for taxiway widening—by U. S. Engineer Office, Omaha. 4-13

HALL CO.—**Abel Construction Co., Booth & Olson, Inc., A. A. Dodson,** and **G. G. Robinson,** 900 N. 16th St., Lincoln—over $500,000, for unclass. excav., overhaul, conc. pave., apron outlet service cable, storm sewer and pipe, etc.—by U. S. Engineer Office, Omaha. 4-13

SCOTTS BLUFF CO.—**Inland Construction Co.,** 3867 Leavenworth St., Omaha—over $100,000, for addtl. conc. apron, surf., taxiway widening and misc. work.—by U. S. Engineer Office, Omaha. 4-13

Nevada

HUMBOLDT CO.—**Carl E. Nelson,** P. O. Box 397, Logan, Utah—$300,966, for clear., grad., pave. and drainage at Winnemucca Airport—by Civil Aeronautics Administration, Santa Monica, Calif. 3-30

PERSHING CO.—**Axman & Miller,** McMinnville, Oregon—for clear., grad., pave., drain., etc. at the Lovelock Airport—by Civil Aeronautics Administration, Washington, D. C. 4-1

New Mexico

BERNALILLO CO.—**Walter L. Denison,** 207 S. Hermosa Ave., Albuquerque—over $50,000, for dust palliative treatment—by U. S. Engineer Office, Albuquerque. 4-20

CURRY CO.—**Martin Cowart,** Albuquerque—less than $50,000 for grade. and pave. at an airfield—by U. S. Engineer Office, Albuquerque. 4-12

Oregon

COOS CO.—**Kuckenburg Construction Co.,** 11104 N. E. Holman, Portland—for 1,000,000 cu. yds. of fill for an airport extension at North Bend—by U. S. Engineer Office, Portland. 4-10

LINCOLN CO.—**Strong & McDonald, Inc.,** and **White Bros.,** 1101 East F St., Tacoma, Wash.—$1,495,933 for an airport near Newport—by Civil Aeronautics Authority, Seattle, Wash. 3-31

South Dakota

PENNINGTON CO.—**Summit Construction Co.,** Rapid City—less than $50,000, for gravel surf. and drainage system—by U. S. Engineer Office, Fort Peck, Mont. 4-20

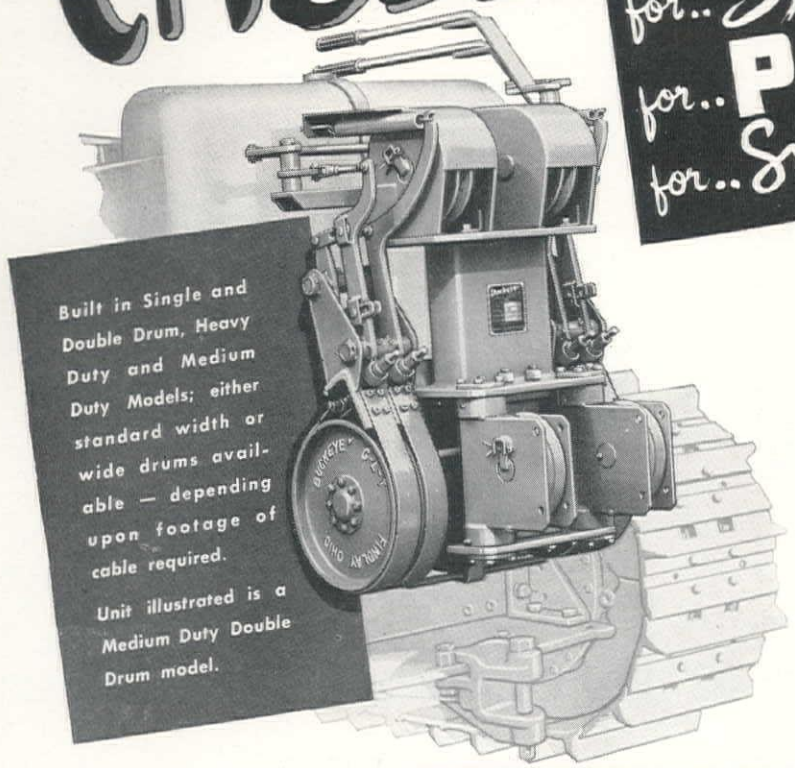
Texas

HUNT CO.—**McGinnis & Parks,** Dallas—over $50,000, for airfield turfing, main field and auxiliary fields—by U. S. Engineer Office, Denison. 3-25

GREY CO.—**Herbert J. Hall** and **West Counties Construction**

Buckeye CABLE control....

for.. SPEED for.. POWER for.. Smooth Action



Built in Single and Double Drum, Heavy Duty and Medium Duty Models; either standard width or wide drums available — depending upon footage of cable required.

Unit illustrated is a Medium Duty Double Drum model.

FOR operating any cable controlled tractor equipment and for 101 miscellaneous cable jobs as well, Buckeye Power Control Units offer you these big advantages·

FAST ACTION—*a touch of the controls and the cable sings into action at a line speed of 300 ft. per min. or more.*

PLENTY OF PULL—*a line pull of 8500 lbs. is a cinch for a Buckeye winch.*

NO JERK ON THE LINE—*here's a cable-saving, equipment-saving feature doubly important in wartime. Buckeye Hoists take hold smoothly with a cushioned action.*

Buckeye Power Control Units are built for hard usage. Big, cool-running brakes and clutches, cable-saving fair-lead action, high leverage controls within easy reach, gears running in oil, rugged construction—all factors that make Buckeye Winches your logical choice for any make or model of tractor. Write today.

Backfilling a trench in frozen soil with Buckeye Dozer and Winch.

Buckeye Power Control Units for Bulldozers and Scrapers in Panama.

BUCKEYE TRACTION DITCHER CO.
Findlay • Ohio

See other Buckeye equipment on Pages 77, 83 and 235.

Built by Buckeye

Convertible Shovels

Trenchers

Tractor Equipment

R-B Finegraders

Road Wideners

Spreaders

Co., Kansas City, Mo.—over $500,000, for airfield—by U. S. Engineer Office, Tulsa, Okla. 4-20

DALLAM CO.—**Randall Construction Co., Inc.**, Box 1013, Amarillo—over $100,000, for addtl. airfield facil.—by U. S. Engineer office, Tulsa, Okla. 3-31

Washington

KITTITAS CO.—**S. Birch & Sons**, 314 Ford Bldg., Great Falls, Mont.—over $500,000, for grade., pave., etc., exten. of runways, at Ellensburg airport—by U. S. Engineer Office, Seattle. 4-12

Wyoming

NATRONA CO.—**Cahill-Mooney Construction Co.**, 220 E. Front St., Butte, Montana—over $100,000, for addtl. airfield facil.—by U. S. Engineer Office, Omaha, Nebr. 4-6

NATRONA CO.—**Peter Kiewit Sons' Co.**, 1024 Omaha National Bldg., Omaha, Nebr., and **Big Horn Construction Co.**, Sheridan—over $100,000, for taxiway—by U. S. Engineer Office, Omaha, Nebr. 4-20

PROPOSED PROJECTS

California

LOS ANGELES CO.—Authorization has been granted for an air force instal. to cost more than $5,000,000—by War Department, Washington, D. C. 4-14

Idaho

LATAH CO.—Plans are being prepared for a new airport one mile east of Moscow, for war training service at the Univ. of Idaho, to cost $65,000—by Civil Aeronautics Authority, Washington, D. C.

TWIN FALLS CO.—The War Department and the Civil Aeronautics Authority have approved expenditure of $761,000 for a class 3 airport between Kimberly and Twin Falls, the city of Twin Falls to furnish the remainder.

VALLEY CO.—Plans are being prepared for a hangar and landing field near Stibnite to service the antimony and tungsten mines—by Bradley Mining Co., Yellowpine.

Oregon

JEFFERSON CO.—An air force instal. has been authorized for Madras, to cost over $2,000,000—by War Department, Washington, D. C. 4-14

Texas

EL PASO CO.—Authorization has been granted by the Civil Aeronautics Authority for exp. of the El Paso municipal airport, to cost $1,000,000. Project includes length. and wid. runways, grade., grubbing, and new bldgs. 3-31

Washington

GRANT CO.—Authorization has been granted for expan. of an army air force instal. to cost over $3,000,000—by War Department, Washington, D. C. 4-12

Water Supply . . .

CONTRACTS AWARDED

Arizona

GILA CO.—**Roscoe Moss Co.**, 4360 Worth St., Los Angeles, Calif.—less than $50,000, for drilling a water well—by U. S. Engineer Office, Phoenix. 4-20

MARICOPA CO.—**Vinson & Pringle**, 2020 West Grant, Phoenix—less than $50,000, for water supply facil. at a park—by U. S. Engineer Office, Phoenix. 4-6

MOHAVE CO.—**Morrison-Knudsen Co.**, 411 W. 5th St., Los Angeles, Calif.—for addts. to water supply system at an air force flexible gunnery school—by U. S. Engineer Office, Kingman. 4-1

California

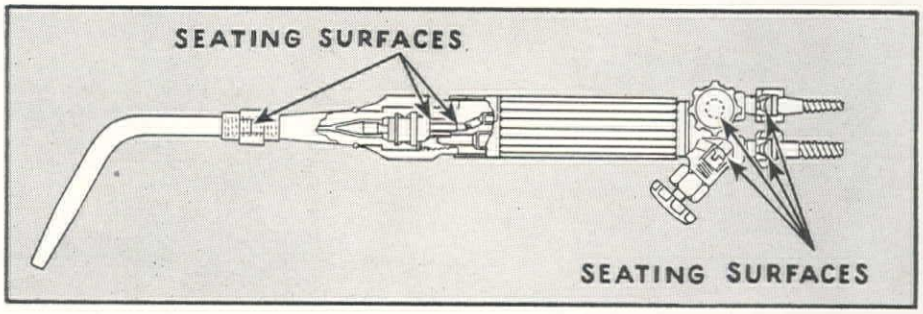
LOS ANGELES CO.—**United Concrete Pipe Corp.**, Box 1, Station "H," Los Angeles—over $100,000, for water, sewer and drain systems at an army air force supply depot—by U. S. Engineer Office, Los Angeles. 3-30

Are you taking advantage of LINDE AIDS to conserve Oxy-Acetylene Equipment and Supplies?

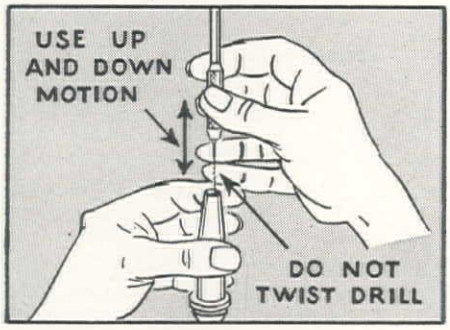
MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

The Linde organization supplies without charge booklets, manuals, and reprints to help make oxy-acetylene apparatus, gases, and supplies go further. One of the most useful of these is the booklet, "Precautions and Safe Practices." Some of the main points to bear in mind in your efforts toward conservation of these vital materials are outlined below. More specific information, as well as "Precautions and Safe Practices," can be obtained by sending the coupon.

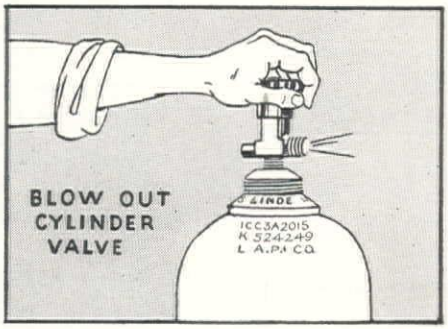
Welding Rod—Use up stub ends by tacking them to new rod—Don't overreinforce the weld—Don't use bronze rod if another kind will do—Reduce to minimum tolerances bronze deposits to be machined—Reduce the number of rod sizes you order by selecting an average suitable for many applications.



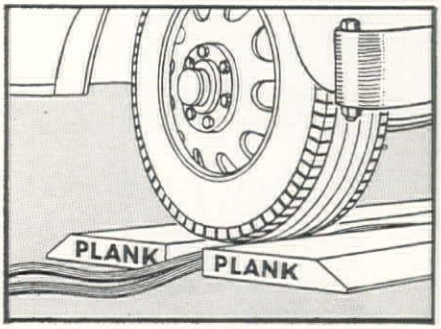
Blowpipes—Keep seating surfaces clean and gas tight—Never tighten a welding head onto a blowpipe by twisting the stem—Always use a wrench, not pliers, in making connections where a nut is provided—Don't use blowpipes as hammers or for any purpose other than those for which they are intended—Determine and correct cause of flashbacks before using apparatus further.



Hand-Cutting Nozzles—Keep gas passages clear with correct size of drill—Occasionally use Oxweld Nozzle Cleaning Compound—Square up flame end of nozzles by rubbing them on emery cloth—If a nozzle is bent, straighten it carefully—Clean nozzle seats to remove scale and eliminate dents.



Regulators—Blow dust out of cylinder valves before connecting regulators—Always release gas pressure from regulators when equipment is not in use—To prolong life of the diaphragm, release pressure-adjusting screw after relieving pressure—Test for and replace leaky valve seats periodically—Replace broken gauge crystals.



Hose—If hose must cross the path of vehicles, protect it with planks—Protect hose from oil and grease—Avoid kinks and abrasion—Test hose and connections regularly for leaks—Repair leaky hose with Oxweld hose splices—Do not use tape—Use short lengths of hose—Purchase hose only when actually needed.

Apparatus Instruction Booklets

Duplicate copies of the instruction booklets which were packed with your Oxweld, Purox, or Prest-O-Weld apparatus can be obtained, without cost, from any Linde office. *Be sure to specify the style or number and the type of equipment you have.*

THE LINDE AIR PRODUCTS COMPANY
30 East 42nd Street, New York, N. Y.

Please send me sample copies of conservation material. ☐

Instruction Booklets for Blowpipes specified below.

Oxweld Type..... Purox Type..... Prest-O-Weld Type.....

Name.....

Street and No.....

City and State.....

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
30 E. 42nd St., New York UCC Offices in Principal Cities
In Canada: Dominion Oxygen Company, Limited, Toronto

The words "Linde," "Oxweld," "Purox," and "Prest-O-Weld" are trade-marks.

RIVERSIDE CO.—**Roscoe Moss Co.,** 4360 Worth St., Los Angeles—less than $50,000, for drill. wat. well—by U. S. Engineer Office, Riverside. 4-20

SAN BERNARDINO CO.—**General Construction Co.,** and **J. Walter Johnson,** 5205 Hollywood Blvd., Los Angeles—less than $50,000, for wat. sup. improv. at an army flying school—by U. S. Engineer Office, San Bernardino. 3-30

SAN BERNARDINO CO.—**Roscoe Moss Co.,** 4360 Worth St., Los Angeles—less than $50,000, for drilling water well—by U. S. Engineer Office, Los Angeles. 4-13

SAN FRANCISCO CO.—**MacDonald & Kahn, Inc.,** 200 Financial Center Bldg.—for water tank and pumping plant for a housing project at Hunter's Point—by City and County of San Francisco. 4-14

SOLANO CO.—**Pacific Pipe Line Construction Co.,** 8732 Juniper St., Los Angeles—$18,903 for a fire protection water system at Benicia—by Federal Works Agency, Los Angeles. 4-22

VENTURA CO.—**J. S. Barrett,** 412 First National Bank Bldg., Santa Ana—less than $50,000, for wat. sup. system at an army air force flight strip—by U. S. Engineer Office, Santa Maria. 4-27

UNANNOUNCED CO.—**Clyde W. Wood,** 816 W. 5th St., Los Angeles—less than $50,000, for instal. a water supply system on an island off the coast of southern Calif.—by U. S. Engineer Office, Los Angeles. 3-29

UNANNOUNCED CO.—**Clyde W. Wood,** 816 W. 5th St., Los Angeles—less than $50,000, for instal. a 2-in. wat. pipe line at a landing field in southern Calif.—by U. S. Engineer Office, San Pedro. 4-28

Oregon

WASHINGTON CO.—**Inter-City Sand & Gravel Co.,** Eugene—$47,000, for water system for Glenwood Dist. betw. Eugene & Springfield—by Glenwood Water Board. 4-7

Texas

BEXAR CO.—**G. W. Mitchell,** 612 Builders Exchange Bldg., San Antonio—over $50,000, for conc. water tank—by U. S. Engineer Office, San Antonio. 4-20

PRESIDIO CO.—**R. H. Fulton & Co.,** Lubbock—less than $50,000, for water facil. at an airfield—by U. S. Engineer Office, Albuquerque, N. Mex. 4-15

Washington

CLARK CO.—**A. J. Goerig Construction Co.,** 4508 E. 38th St., Seattle—$364,203, for an 8,000,000-gal. reservoir on McLoughlin Heights, and drilling six wells at various locations—by Housing Authority, Vancouver. 4-5

GRANT CO.—**Clyde M. Ludberg Co.,** West 326 First Ave., Spokane—less than $50,000 for an addtl. water supply system—by U. S. Engineer Office, Seattle. 4-8

PIERCE CO.—**Paine-Gallucci, Inc.,** 1521 South Grant Ave., Tacoma—$11,553, for instal. a 16-in. watermain in Portland Ave., betw. East 48th and 64th Sts., and a 12-in. main from East 44th to East 48th St., in Tacoma—by Board of Contracts and Awards, Tacoma. 3-30

PROPOSED PROJECTS

Montana

CASCADE CO.—The City of Great Falls is planning a new water reservoir with a capacity of 4,000,000 to 5,000,000 gals. 4-8

Sewerage . . .

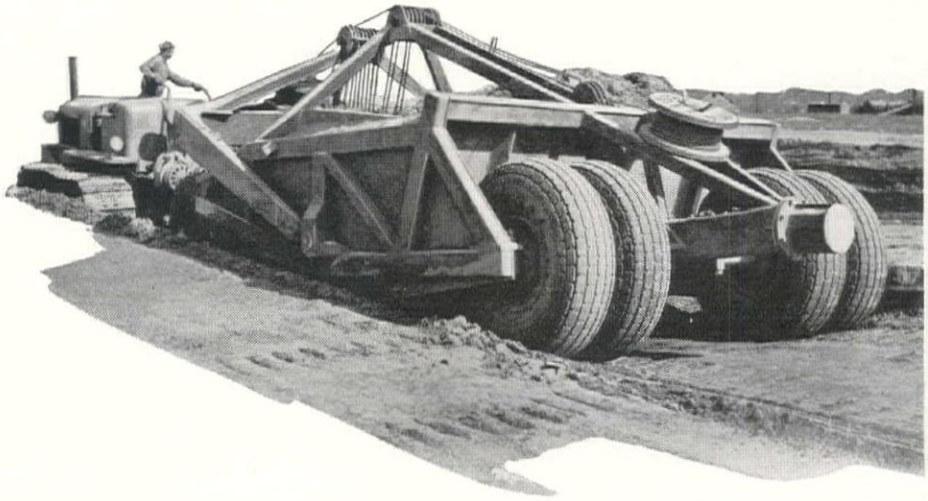
CONTRACTS AWARDED

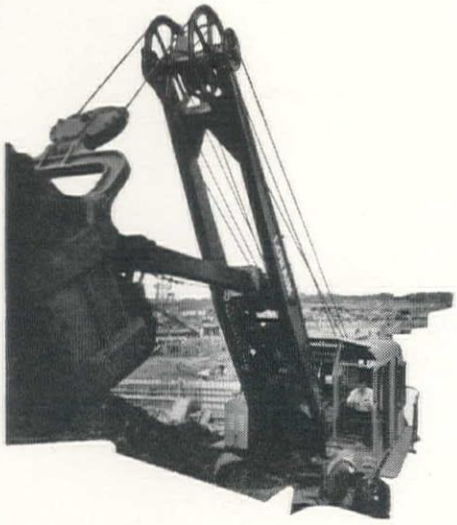
California

CONTRA COSTA CO.—**Conner & Brant,** Redwood City—less than $50,000, for water, gas, san. sewer and elec. dist. systems—by U. S. Engineer Office, Sacramento. 4-

KERN CO.—**P. & J. Artukovich,** 3834½ W. Slauson Ave., Los Angeles—less than $50,000, for sewer, water, and elec. distrib. systems for hosp. at an army air base—by U. S. Engineer Office, San Bernardino. 4-1

KERN AND MONTEREY COS.—**General Air Conditioning Corp.,** 1614 East 15th St., Los Angeles—$5,860 (Soledad) and $16,951 (Shafter) for sew. disp. system, wat. sup. system and elec





Use the wire rope that's cut out for today's jobs

There's no place for slack in industry-under-arms—or in the wire rope that literally carries so much of the load. To accelerate production, to strengthen your defense against equipment shutdowns, you need the workability and durability of Preformed Yellow Strand. With this time-tested rope as prime mover, shovels, draglines and scrapers can dig in and take the full bite. Hoists, derricks and cranes can utilize high speeds with safety. All cable-using machines can move closer to capacity operation and put off replacements.

These gains result from pointing up Yellow Strand's stout, drawn-to-order steel wires with the limberness of preforming. The rope reeves easily . . . runs freely around small sheaves . . . spools evenly despite overloads. Still every length is as tough as ever—highly resistant to shock, abrasion and drum crushing. Today time-and-labor saving cable counts *double* in production. Install Preformed Yellow Strand and help your men and machines deliver to the limit.

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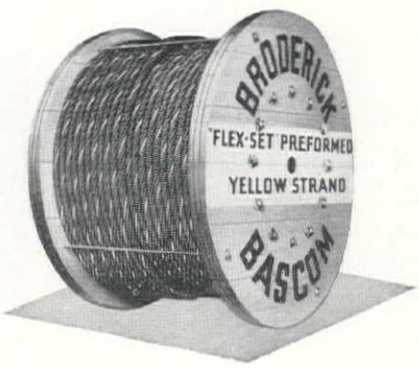

A MAINSTAY OF WAR PRODUCTION

dist. system at labor camps—by U. S. Dept. of Agrc., Emergency Rubber Project, Los Angeles. 4-20

KERN CO.—**Vinson & Pringle,** 2020 Grant St., Phoenix, Ariz.—less than $50,000, for addtl. bldg. at sewage disposal plant at a reception center—by U. S. Engineer Office, Los Angeles. 4-8

LOS ANGELES CO.—**Edward Green,** 3001 Coolidge Ave., Los Angeles—less than $50,000, for exten. to sewer, elec. and water systems at a ferrying command—by U. S. Engineer Office, Los Angeles. 4-20

LOS ANGELES CO.—**Gogo & Rados,** 1326 E. Garvey Blvd., San Gabriel—less than $50,000 for sewers, water sup., elect. dist., and roads at a depot—by U. S. Engineer Office, Los Angeles. 4-12

LOS ANGELES CO.—**V. C. K. Construction Co.,** 629 S. Atlantic Blvd., Los Angeles—$71,315, for sewer in Mammoth Ave. and Davana Terrace sewer dist.—by Board of Public Works, Los Angeles. 4-9

RIVERSIDE CO.—**Burch & Bebek,** 8003 S. Broadway, Los Angeles—less than $50,000, for sewage effluent storage reservoir, at a camp—by U. S. Engineer Office, Riverside. 4-13

RIVERSIDE CO.—**L. P. Scherer & T. C. Prichard,** Box 423, Redlands—$27,796, for grade., sewer, water and elec. systems for 100-unit trailer camp in Arlington—by Riverside County Housing Authority. 4-16

SAN BERNARDINO CO.—**Tomei Construction Co.,** 4737 Orion Ave., Van Nuys—over $50,000, for a storm drain system at an air depot—by U. S. Engineer Office, San Bernardino. 4-16

SANTA BARBARA CO.—**R. A. Wattson Co.,** 5528 Vineland Ave., North Hollywood—less than $50,000, for sewer, water systems, and roads at an air base—by U. S. Engineer Office, Santa Maria. 4-22

SANTA CLARA CO.—**A. Tonelli,** 9 Mariposa Ave., Los Gatos—$1,113, for a storm drain on Bay View Ave. and Pennsylvania Ave.—by City Clerk, Los Gatos. 4-21

Kansas

ELLIS CO.—**Burt & Binford, Contractors,** Hutchinson—over $50,000, for excav. addt. to wat. sup. system, addt. to sew. disp. plant, etc.—by U. S. Engineer Office, Kansas City. 4-15

Montana

FERGUS CO.—**Utility Builders,** Great Falls—less than $50,000 for a sewer system—by U. S. Engineer Office, Seattle. 4-23

VALLEY CO.—**M. R. Johnson,** Glasgow—less than $50,000 for a sewer system—by U. S. Engineer Office, Seattle. 4-23

New Mexico

DEBACA CO.—**Walter L. Denison,** 207 S. Hermosa Ave., Albuquerque—less than $50,000, for addtl. drainage facil. at an airfield—by U. S. Engineer Office, Albuquerque. 3-29

Oregon

BENTON CO.—**Natt McDougall Co.,** 552 Sherlock Bldg., Portland—over $50,000, for drain. facil. and appurt.—by U. S. Engineer Office, Portland. 4-7

DESCHUTES CO.—**Morrison-Knudsen Co.,** Box 1518, Boise, Ida.—over $100,000, for a sewage disp. plant—by U. S. Engineer Office, Portland. 4-6

Texas

BEXAR CO.—**English & Wilson,** San Antonio—less than $50,000, for storm water drainage—by U. S. Engineer Office, San Antonio. 4-9

CAMERON CO.—**McGough Brothers,** Houston—less than $50,000, for sewage treatment plant—by U. S. Engineer Office, Galveston. 4-3

EL PASO CO.—**Hayner & Burn,** Las Cruces, New Mex.—less than $50,000, for addtl. outfall sewer—by U. S. Engineer Office, Albuquerque. 4-15

Utah

SALT LAKE CO.—**Mullins, Wheeler & Tempest,** 22½ E. 1st So., Salt Lake City—$7,032 for instal. a sewer and drain and