WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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APRIL • 1943

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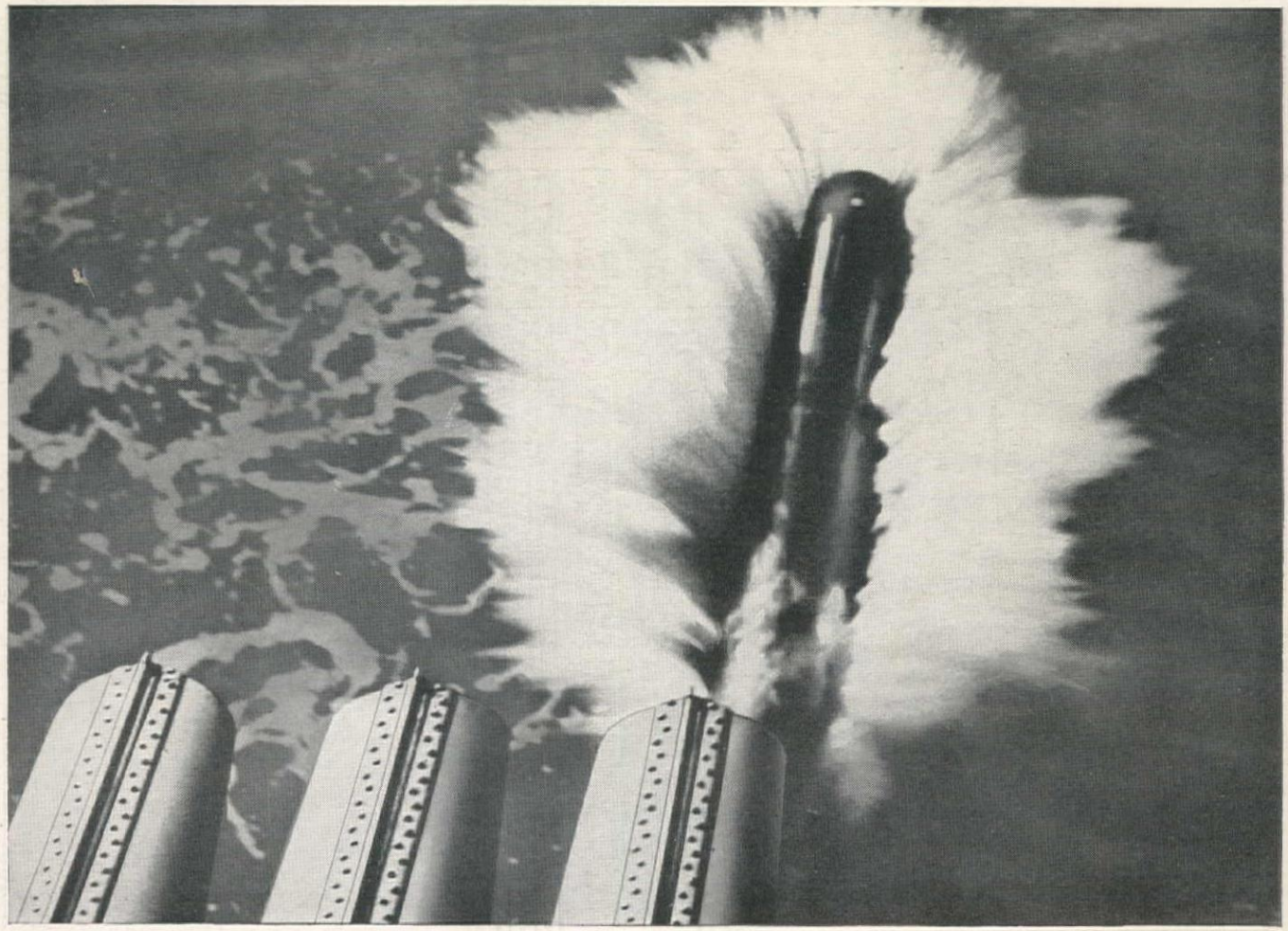
IN THIS ISSUE

THE FINAL STEP in preparation of the drum gates at a Bureau of Reclamation reservoir is painting to protect from rust, shown under way at Grand Coulee



Official U.S. Navy Photo

AIMED AT THE AXIS . . . via Compressed Air

DRIVING "tin fish" out of torpedo tubes and through the water to their Axis targets are exciting uses of compressed air.

In less exciting but just-as-important jobs throughout all industry, thousands of air compressors are delivering maximum output . . . lubricated with Texaco.

Texaco Alcaid, Algol or *Ursa Oils* keep compressors free from harmful gum, sludge and hard carbon deposits. Valves open wide and shut pressure tight; rings stay free, ports and air lines clear.

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 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.

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

TEXACO

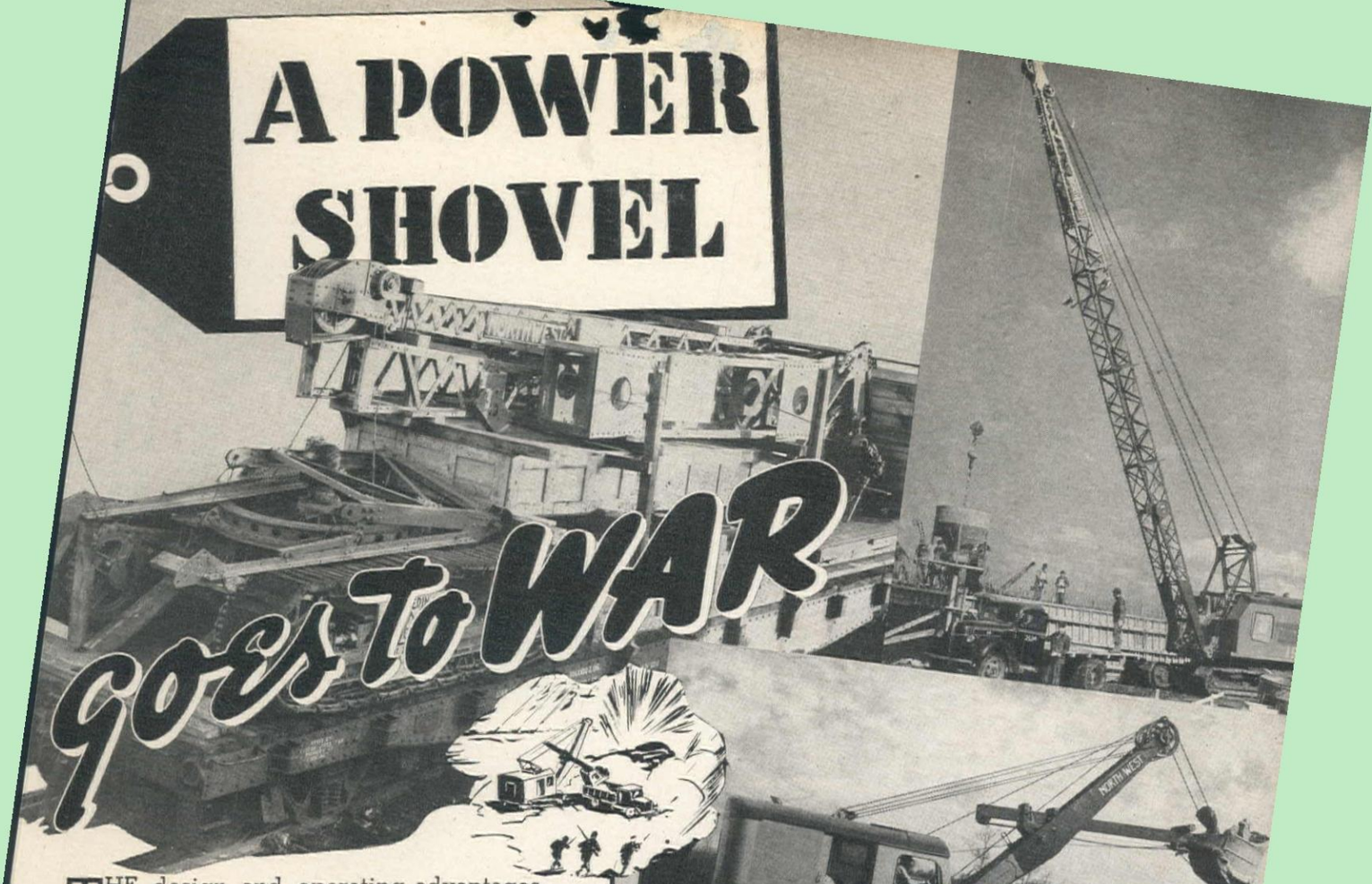
REG. T.M.

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

A POWER SHOVEL goes to WAR



THE design and operating advantages that made money in peace times can and are helping to speed defense in war times.

And in reverse, the performance of machinery in war times can teach a lesson to peace time operators.

Take Northwest for instance—Northwest simplicity—few shafts, few gears, simple arrangement! This means easier assembly in far away ports, easier upkeep—easier understanding on the part of green men!

There is a time coming when you will be able to get Northwests again! When that time comes, the competitive angle is going to be a little tougher.

Northwest simplicity and ease of upkeep is only one of the many features Northwest will have for you that will make future contracts more successful.

Buy war bonds. And watch and plan for a Northwest on that first job after the "duration".

NORTHWEST ENGINEERING COMPANY

1736 Steger Bldg. • 28 E. Jackson Blvd. • Chicago, Ill.

After VICTORY Buy NORTHWEST

NORTHWEST

Branch Offices: 255 Tenth Street, San Francisco, California; 1234 Sixth Ave., South, Seattle, Washington; 3707 Santa Fe Avenue, Los Angeles, California

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, Arizona

GIVE 'EM THE ONCE OVER EVERY DAY

● Built to haul heavy excavation in off-the-highway service, Rear-Dump and Bottom-Dump EUCLIDS are moving countless tons of earth, ore and rock on jobs that are vitally important to our war program. Like other material moving equipment, new EUCLIDS are obtainable only for high priority jobs so units now in service must be kept rolling.

Because it may be difficult to obtain replacement parts promptly, regular servicing and inspection is more important than ever if capacity production of your equipment is to be maintained. This daily check list may help to reduce idle equipment time:

1. Check crank case oil, radiator fluid, tire pressures, air reservoir and battery.
2. Service air cleaner and oil filler breather.
3. Check oil filter cartridge, and replace if dirty.
4. Tighten all bolts, nuts and connections.
5. Lubricate according to Euclid instruction manual.

This is only a partial list of the points that should be checked and serviced regularly — refer to your Euclid Instruction Manual for detailed instructions or write our Service Department if you have a special problem.

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 April, 1943

J. M. SERVER, JR.
Editor

SUBSCRIPTION RATES

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Pays You

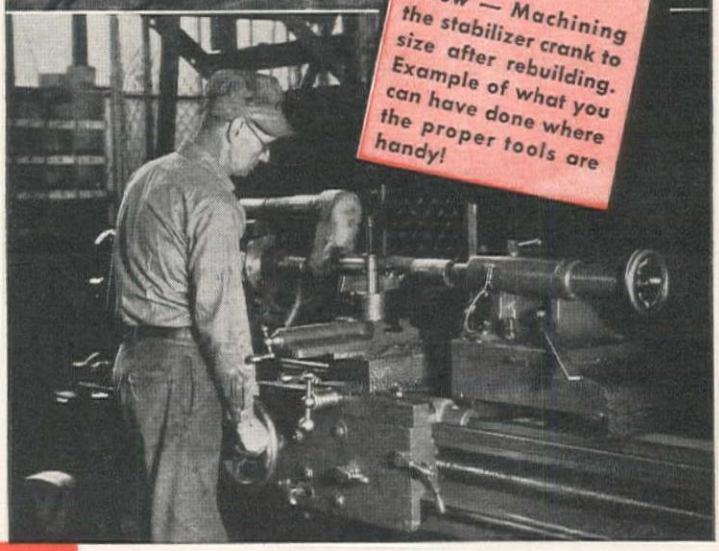
TO HAVE SERVICING HANDLED IN DEALER'S SHOP!

Ample, comfortable service quarters, with all tools and parts handy, enable Allis-Chalmers factory-trained mechanics to quickly turn out highest-grade jobs.

Above — Rebuilding a stabilizer crank by welding.

• • •

Below — Machining the stabilizer crank to size after rebuilding. Example of what you can have done where the proper tools are handy!



Common sense tells you, you will get superior workmanship if your equipment servicing is handled under ideal conditions. That is why more and more equipment owners are hauling their units into Allis-Chalmers dealer shops for repairs, rebuilds, replacements. They are taking care of their hard-to-replace machinery... the best way... the shop way! Dealer mechanics, working in comfort, with proper illumination, the right-type tools and genuine parts... plus the expert help and advice of the shop foreman, can speedily turn out better jobs. Delicate Diesel parts are handled more carefully, too, in clean surroundings!

Next time your outfits need servicing... try this better, faster, shop plan. It will repay you many times over! Your machines will be back to work about as soon... will be ready to put in many extra hours of work with less downtime. Call your Allis-Chalmers dealer. Make arrangements to haul 'em in!

ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE, WIS., U. S. A.

ARMY E NAVY

To Allis-Chalmers... the Army-Navy "E", first such award for tractor production.

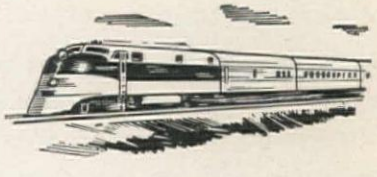
WAR JOBS WELL DONE MEAN LOWER FUTURE POWER COST

SCARCELY anything you can name fills so many different war jobs as the General Motors Diesel engine. In tanks, landing boats, patrol boats, trucks, tractors and auxiliaries—everywhere sturdy dependability is needed—they're supplying power for our fighting forces.

The result is that though plant facilities have mushroomed and production records are broken time and time again, everything we can make is hustled off to war.

But there is this important compensation. These accelerated war demands are advancing GM Diesel production and technique years faster than could the demands of ordinary peacetime manufacture.

So we can look forward to lower-cost power and to new peacetime applications for these engines when the war is won—to broadened fields where this power will serve.



New eras of railroading follow in the footsteps of war. Another new era of railroading is assured in the wake of this war. General Motors Diesel locomotives already are establishing new standards of transportation.

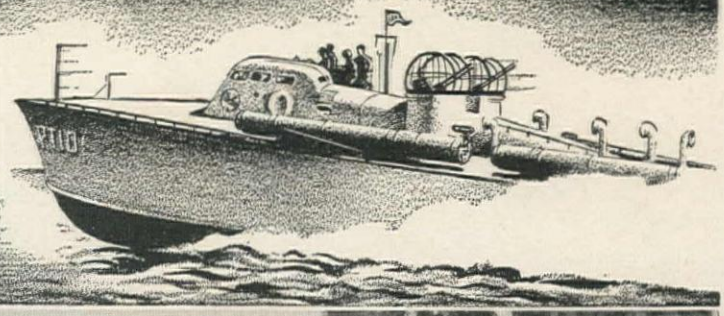
GM
GENERAL MOTORS
DIESEL POWER

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

ENGINES . 300 to 2000 H.P. CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

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

SPEED



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
Lowry Equipment Company, Redding
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, Klamath Falls
UTAH—The Lang Company, Salt Lake City
WASHINGTON
Howard-Cooper Corp., Seattle, Spokane, Walla Walla

*Company Operated Branches

★ ★ ★ Just as SPEED allows PT boats to roar in, do their jobs and get away quickly so their high transport speeds and wide range of working speeds enable Adams Motor Graders to get to a job quickly, finish it in a hurry, and get on to the next with minimum loss of valuable working time . . . SPEED is but one of the features of Adams Motor Graders that will help you to complete your jobs quickly, economically and profitably!

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.

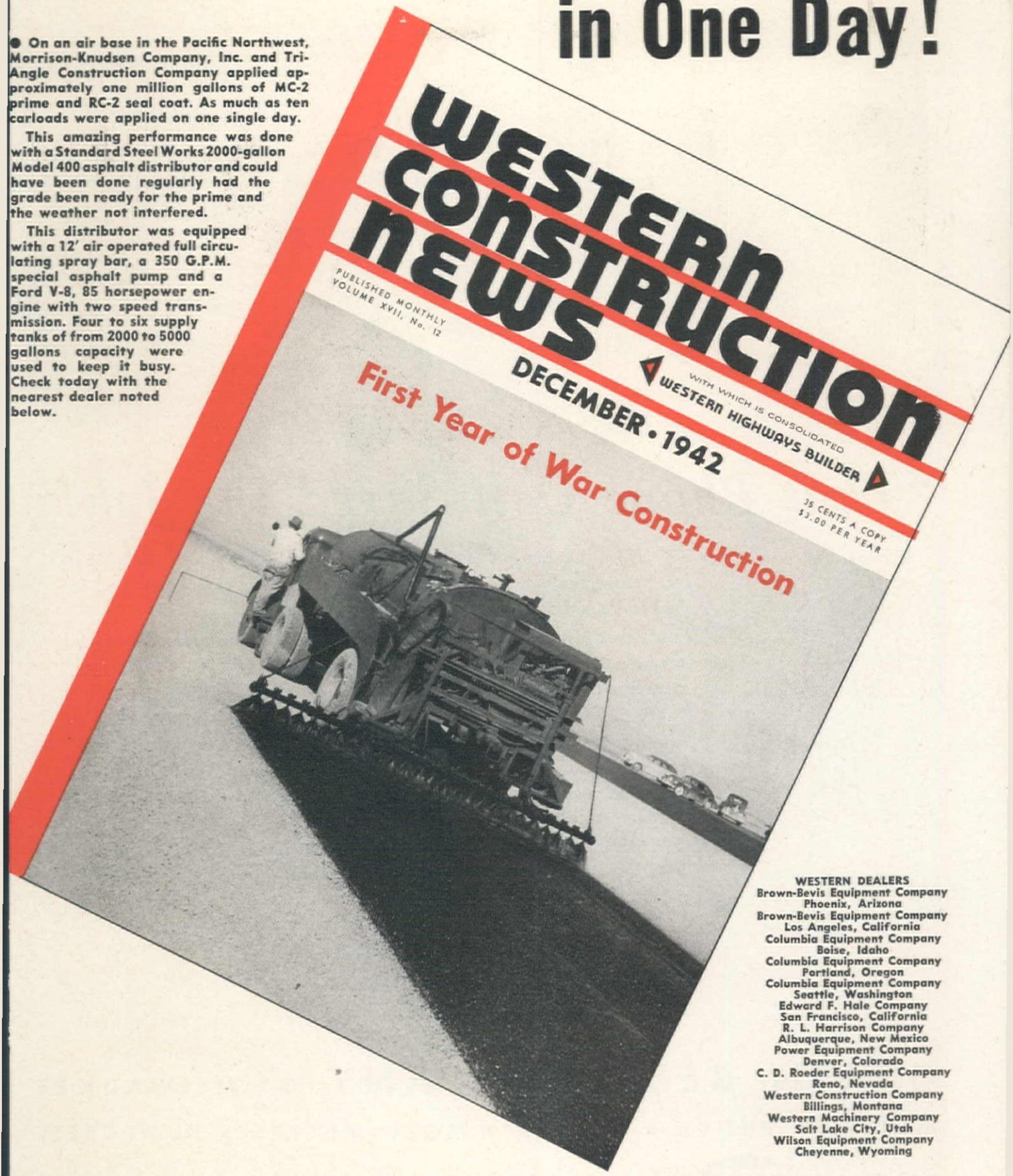
Adams
ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

100,000 Gallons of Seal-coat in One Day!

● On an air base in the Pacific Northwest, Morrison-Knudsen Company, Inc. and Tri-Angle Construction Company applied approximately one million gallons of MC-2 prime and RC-2 seal coat. As much as ten carloads were applied on one single day.

This amazing performance was done with a Standard Steel Works 2000-gallon Model 400 asphalt distributor and could have been done regularly had the grade been ready for the prime and the weather not interfered.

This distributor was equipped with a 12′ air operated full circulating spray bar, a 350 G.P.M. special asphalt pump and a Ford V-8, 85 horsepower engine with two speed transmission. Four to six supply tanks of from 2000 to 5000 gallons capacity were used to keep it busy. Check today with the nearest dealer noted below.



WESTERN DEALERS
Brown-Bevis Equipment Company
Phoenix, Arizona
Brown-Bevis Equipment Company
Los Angeles, California
Columbia Equipment Company
Boise, Idaho
Columbia Equipment Company
Portland, Oregon
Columbia Equipment Company
Seattle, Washington
Edward F. Hale Company
San Francisco, California
R. L. Harrison Company
Albuquerque, New Mexico
Power Equipment Company
Denver, Colorado
C. D. Roeder Equipment Company
Reno, Nevada
Western Construction Company
Billings, Montana
Western Machinery Company
Salt Lake City, Utah
Wilson Equipment Company
Cheyenne, Wyoming

Standard Steel Works

NORTH KANSAS CITY, MO., U.S.A.

DEPEND ON YOUR REX DISTRIBUTOR. *If there's a job in the offing, he'll know about it. And you'll find he'll gladly rent you a machine in a pinch. His shop is equipped to repair or rebuild your old machines and he can give you good repair part service. See him* first *for rentals, repairs, remodeling.*

"That Phone Call Saved the Job!"

THIS job came out of a clear sky. I'd put in my figure six weeks before, and forgot it. Then—here it was right in my lap—and it had to be started "yesterday."

My Rex Mixer was in shape all right. But the job required a batch meter—and I didn't have one. Well, there's just one place to go in a case like that—the Rex Distributor.

My heart fell when he said he didn't have one—but only for a minute. "Say," he said, "there's a batch meter on a new 10S mixer out here on my floor. I'll take it off and send Sam over to help you put it on *your* machine. That'll get you going and I'll get one from the factory to replace it."

While Sam and I were hooking up that batch meter, I couldn't help but think of all the big and little things my Rex Distributor has done for me. He's tipped me off to jobs—has given me many a hint on operating that's saved me money. And his Rex equipment certainly helps me place concrete at a profit. He's a swell guy to know.

CHAIN BELT COMPANY OF MILWAUKEE

MIXERS • PUMPS • PAVERS • MOTO-MIXERS • PUMPCRETE

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

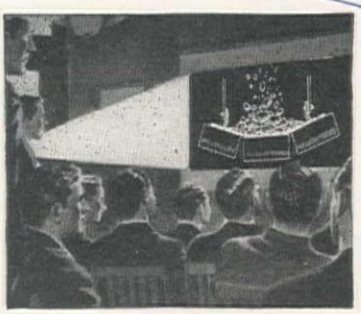
Arnold Machinery Co., Salt Lake City, Utah; Brown-Bevis Equipment Co., Los Angeles, California; Brown-Bevis Equipment Co., Phoenix, Arizona; Construction Equipment Co., Spokane, Washington; Contractors Equipment and Supply Co., Albuquerque, New Mexico; Corson Machinery Co., Ray—Denver, Colorado; Hall-Perry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

26,985

PLANT AND FIELD OPERATING MEN USE THIS MANUAL

You can get far longer life from your precious belting, hose and other rubber products by following the conservation practices recommended in this authoritative manual, prepared by the G.T.M. – Goodyear Technical Man.

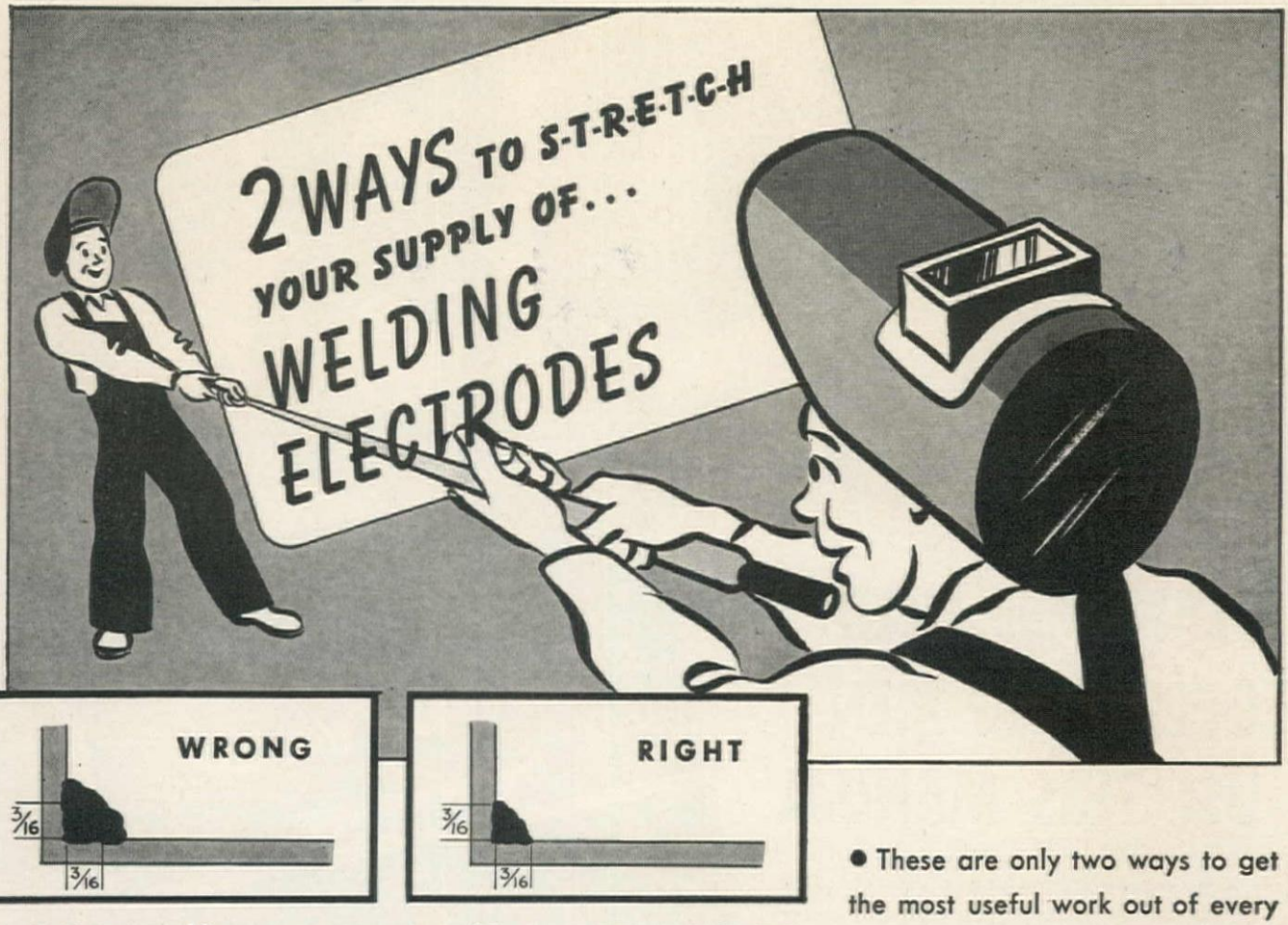
More than twenty-six thousand field and factory maintenance men are now using it, after seeing its rubber-saving helps demonstrated in the interesting slide film "GOODYEAR WAGES WAR ON WASTE." To have this important film shown to a group meeting at your offices, and to obtain copies of the manual for your key operating men, write Goodyear, Akron, Ohio or Los Angeles, California – or phone the nearest Goodyear Mechanical Rubber Goods Distributor. Remember many rubber products cannot be replaced – the Goodyear conservation plan will help you save them!



SEE HOW TO GET UP TO 50% LONGER WEAR FROM BELTS AND HOSE — *it's clearly shown in the slide film "Goodyear Wages War on Waste" — with complete instructions in the Goodyear Manual.*

GOODYEAR

THE GREATEST NAME IN RUBBER



1. DON'T "OVER-WELD" FILLET JOINTS

If a job calls for a 3/16" fillet, don't pile on extra electrode metal to play safe. Proper joint design includes an ample safety factor, and exceeding design dimensions merely wastes electrodes. For instance, if dimensions are doubled—to 3/8" legs instead of 3/16"—four times as much deposit metal is used. Check with your fillet weld gauge whenever in doubt.

2. USE THE LARGEST ELECTRODE AVAILABLE

Using larger diameter electrodes speeds up deposition of metal, and choosing an 18" length instead of 14" means fewer electrode changes for a given length of weld.

Following this method will increase welding speed 25% to 50% and also save 3%-4% stub loss.

• These are only two ways to get the most useful work out of every electrode. More suggestions are shown below. Follow these rules and see that all your welders observe them. In this way you can stretch your supply of electrodes during the present shortage.

CONSERVE ELECTRODES FOR VICTORY!

Use electrodes down to a 2" stub
Make legs of fillet welds equal
Make face of fillet welds flat
Store welding electrodes in a dry place

AIR REDUCTION

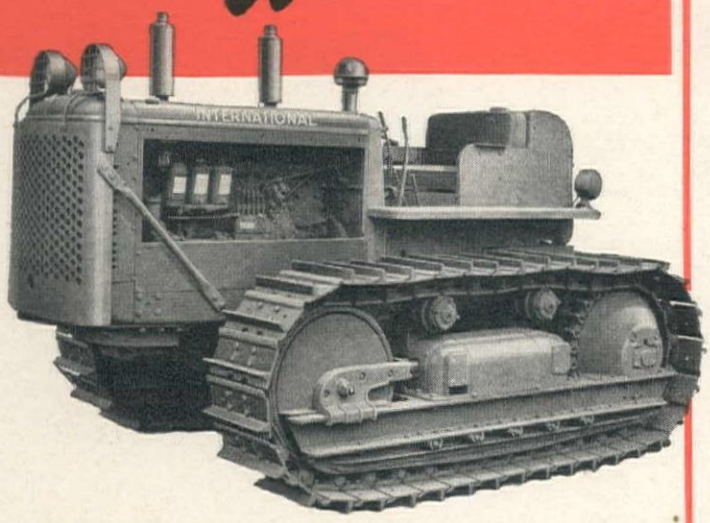
AIRCO

General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.
IN TEXAS:
MAGNOLIA-AIRCO GAS PRODUCTS CO.
General Offices: HOUSTON, TEXAS
OFFICES IN ALL PRINCIPAL CITIES
Western Offices: SAN FRANCISCO, CALIF. • EMERYVILLE, CALIF.
PORTLAND, ORE. • LOS ANGELES, CALIF. • SEATTLE, WASH.

Free copies of this poster available.

IDLE CYLINDERS ARE PRODUCTION SLACKERS: KEEP 'EM ROLLING FOR VICTORY!

OUR "1943 Models" Are Dedicated to Victory



INTERNATIONAL
VICTORY TracTracTors

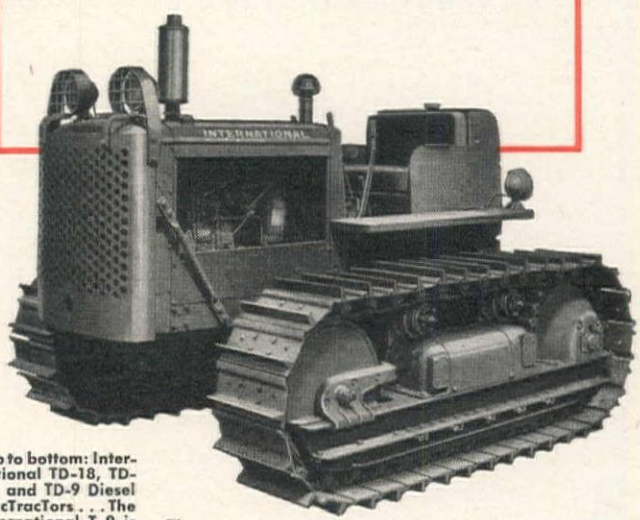
Built to Victory Specifications—for Release to Users on Essential Construction Work

Although traditional "new models" have been discontinued for the duration, there's a great line of International TracTracTors rolling off the assembly lines. We call them Victory TracTracTors. Most of them are going to the Armed Forces; a few are available for civilian use on *essential construction jobs*. Ask the International Industrial Power dealer about these tractors and your eligibility. Meanwhile, take good care of the Internationals you have. Rely on International Service to help keep them operating efficiently. Yours for Victory.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL INDUSTRIAL POWER DEALERS—

Allied Equipment, Inc., Reno, Nev.; Bonniksen & Sorensen Co., Arcata, Calif.; Brown Tractor Co., Fresno and Reedley, Calif.; Butte Tractor & Equipment Co., N. Sacramento, Calif.; Clark County Wholesale Mercantile Co., Inc., Las Vegas, Nev.; Harry Cornelius Co., Albuquerque, N. Mex.; J. H. Degnan, Inc., Hanford, Calif.; Exeter Mercantile Co., Exeter and Visalia, Calif.; Farmers' Mercantile Co., Salinas, Hollister, and Watsonville, Calif.; Gallagher Tractor & Implement Co., Merced, Calif.; Gordon Hansen Co., Ltd., Rio Vista, Calif.; Howard-Cooper Corp., Seattle, Spokane, Eugene, Wash., and Portland, Ore.; Industrial Equipment Co., Billings, Mont.; Intermountain Equipment Co., Boise, Idaho; The Lang Co., Salt Lake City, Utah; Lohman Tractor & Implement Co., Napa, Calif.; Lowry Equipment Co., Redding, Calif.; H. W. Moore Equipment Co., Denver, Colo.; North Valley Tractor & Equipment Co., Chico, Calif.; Smith Booth Usher Co., Los Angeles, Calif.; Stanislaus Implement & Hdwe. Co., Modesto, Calif.; O. S. Stapley Co., Phoenix, Ariz.; Stevenson Farm Equipment Co., Santa Rosa, Calif.; Thompson-Morton, Inc., Stockton, Lodi, Tracy, Calif.; Valley Equipment Co., San Francisco, San Jose, Calif.; Wilson Equip. & Sup. Co., Cheyenne, Wyo.



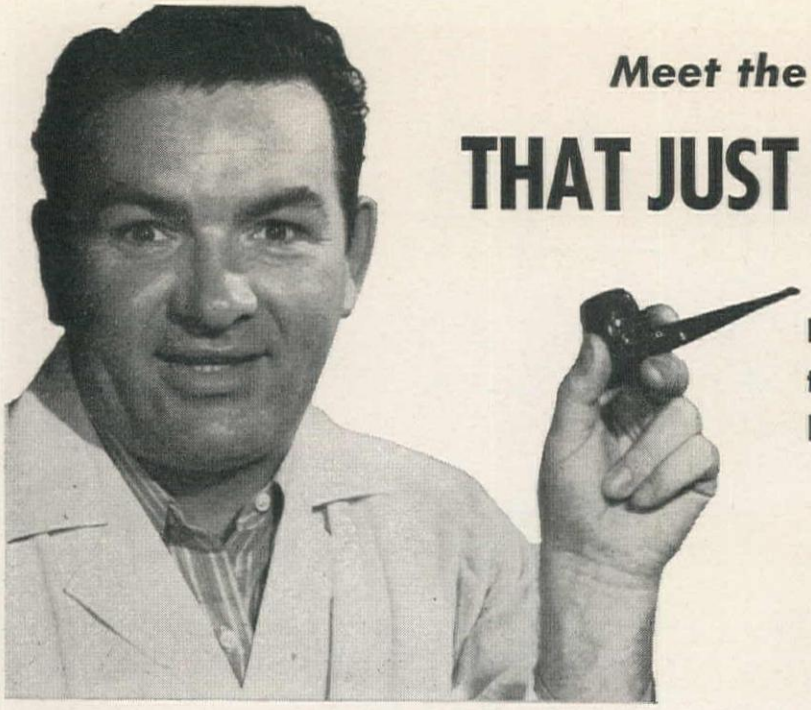
Top to bottom: International TD-18, TD-14, and TD-9 Diesel TracTracTors . . . The International T-9 is not shown.

INTERNATIONAL HARVESTER

BUY MORE WAR BONDS

Meet the Chassis Lubricant

THAT JUST WON'T GIVE UP!



It's Red Line—the toughest, tackiest, workin'est chassis lube ever put in a can.

1 Red Line Chassis Lubricant is hard to beat. Tests made under every conceivable condition have proved that when you put it on a job, *it stays there!* It's tough and tacky, sticks like glue. Even the terrific shock of "knee-action" won't squeeze it out.

2 Furthermore, Red Line Chassis Lubricant is *extremely water resistant.* No matter how wet the job, it won't wash out of chassis fittings...it stays right there to protect moving parts from mud and grit.

3 In other words, when you lubricate your equipment with Red Line, you can relax and enjoy life. It keeps wear at a minimum. And it prevents chassis squeaks the full *1000-mile period* between lube jobs.

4 Phone your Union Oil Resident Manager right now. He will be glad to give you more information about our outstanding product. Order a supply today. You'll be mighty satisfied.

OIL IS AMMUNITION—USE IT WISELY

UNION OIL COMPANY

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

RED CHASSIS LUBRICANT LINE

To Earthmovers Planning to Use Fast-Moving Rigs

Tournapulls Can Lower Your Yardage Costs

You get big loads like this in 60 to 90 seconds, with a Super C, have plenty of surplus rimpull to accelerate up to 14.3 M.P.H. quickly and to pull through tough spots without delays. Fleet user Johnson, Minnis & Moody, Schriver.

More Than 800 Now Cutting Costs in 43 States and 13 Foreign Countries ...They Can Do the Same For You

Save on Rigs and Manpower

When you use Tournapulls you begin your savings by requiring less equipment and fewer men. No big, expensive loading unit needed. One pusher tractor easily handles pusher loading of 3 to 4 Tournapulls, depending on length of haul. What's more Tournapulls spread their own loads on the move, require no investment in special spreading tools, add substantially to compaction, too. Finally, because Tournapulls are fast-moving and have big capacity, you get greater production with fewer units and consequently with fewer men.

Job Proved by 5 Years Use

Today's Tournapull design is based on more than 5 years of job proof on some of the world's largest and toughest earthmoving projects. 800 are now in use by over 100 successful earthmovers —most of them fleet users—in the U. S. and 13 foreign countries.

Backed by World's Best Dealer Service

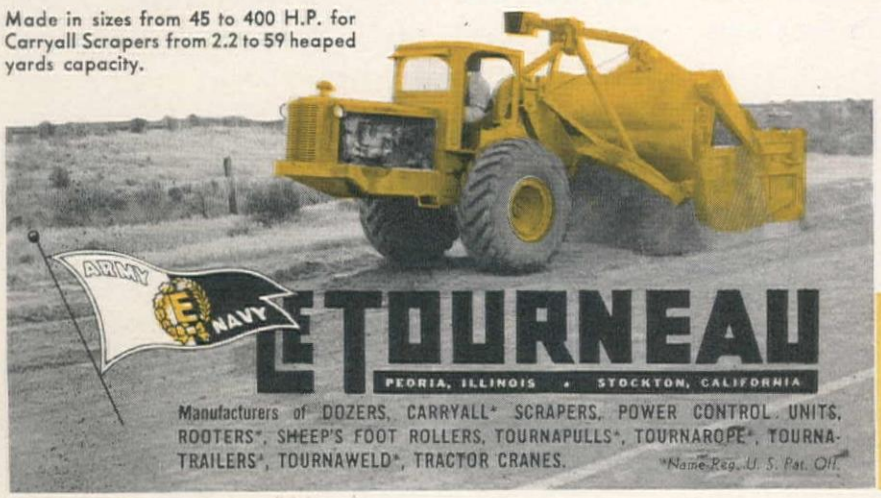
Tournapulls are stoutly constructed to cut lost time to a minimum. The best of equipment, though, requires repair occasionally. Then you'll find quick, expert service available from 182 LeTourneau-"Caterpillar" dealers and branches in the U. S.

No other fast earthmoving rig today offers you: (1) so much yardage so quickly and cheaply, (2) job-proved assurance of profit, (3) quick service everywhere. Ask your LeTourneau-"Caterpillar" dealer about Tournapulls—a few are available for high priority projects.

OPERATION SIMPLE

Tournapulls are easy to operate. They shift like a truck, steer like a track-type tractor. Power Control Unit for controlling Carryall Scraper loading and spreading is same as that job-proved on thousands of tractor-scraper outfits. Powerful, sure-acting brakes on both Tournapull and Carryall assure quick stopping and complete control on grades.

Made in sizes from 45 to 400 H.P. for Carryall Scrapers from 2.2 to 59 heaped yards capacity.



(Left) Tournapulls spread their own loads on the move, do away with need for special spreading tools. Same time, large pneumatic tires enabled this 11 heaped yard Model C to cross existing highway without pavement injury on widening U. S. Hy. 30, near Mt. Home, Idaho. The contractor: C. E. Nelson.

SOLD FIRST

A YEAR OLD BABY NOW MAKES ITS

Thor

1/4" ELECTRIC DRILL

WITH HOUSINGS OF

THORITE PLASTIC

Check these OUTSTANDING ADVANTAGES

- MORE POWER PER POUND
- LIGHTER
- COOLER TO HANDLE
- STRONG and STURDY
- COMPACT
- GREATER PROTECTION FROM SHOCK

Under Army Contract for almost a year, Thor plastic-housing 1/4" Electric Drills now are available for general distribution.

OUT OF THOR LABORATORIES a year ago this April, there came the first successful 1/4" electric drills to appear on the market with housings of "THORITE" Plastic. First sale on these machines, went, naturally, to Uncle Sam. The Army, a year ago this May, contracted for them—and a companion machine made of pressed steel—in an unheard of quantity. Into immediate production went these new "THORITE" plastic drills to be supplied in ever-increasing numbers for duty all over the world.

Pioneered by Thor, they were the first successful major electric tool development to conserve aluminum. Actual, day-after-day use has **PROVED** that these Thor "plastic" drills can take it and stand up under the toughest conditions to provide dependable performance and more power per pound than any other heavy-duty 1/4" electric drill on the market today! Modernly designed with the entire case made of new, strong, specially-developed "THORITE" plastic, these Thor drills are lighter, cooler to handle, safer, sturdy and powerful.

With current military requirements nearing completion, these Thor "plastic" drills are now available to war industries.

TO UNCLE SAM!

PUBLIC APPEARANCE!

"Thorite" GEAR CASE COVER

Held in position with metal protection nut threaded directly to inner metal skeleton frame and locked against metal centerplate.

These "THORITE" plastic drills are powered by the famous Thor hevi-duty motor; have "Silent Type" over-size fan to provide abundant ventilation; and over-size pitch, alloy-steel gearing for efficient power transmission.

"Thorite" FIELD CASE

Slides over skeleton frame, is held in keyed position against metal centerplate and locked by grip handle which is securely screwed to inner metal frame.

Bearings, gears, stator, armature, centerplate and other internal power unit parts are supported on a sturdy, inner metal skeleton frame to insure close tolerance in alignment of working members.

"Thorite" GRIP HANDLE

Slides over end of inner metal frame, is held securely against field case in keyed position and locked directly to inner frame by screws.

The plastic housing does not support any working members of the machine, but serves simply as a protective covering for the inner, independent assembly of the tool.

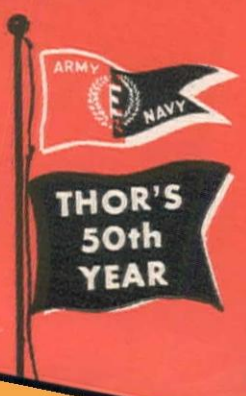
Thor

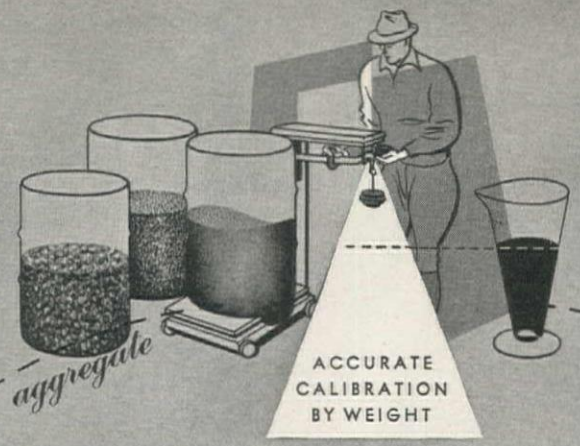
Portable Pneumatic and Electric Tools

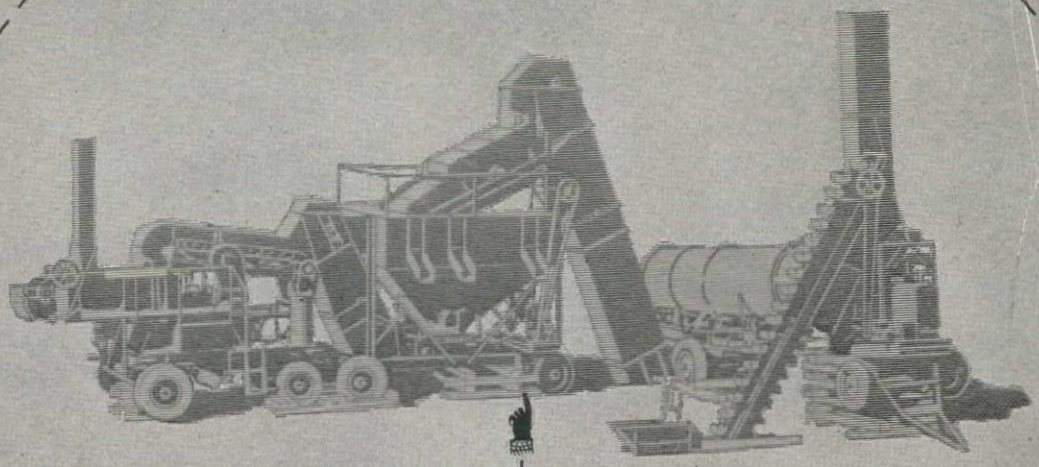
INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO, ILL.

Branches in Principal Cities



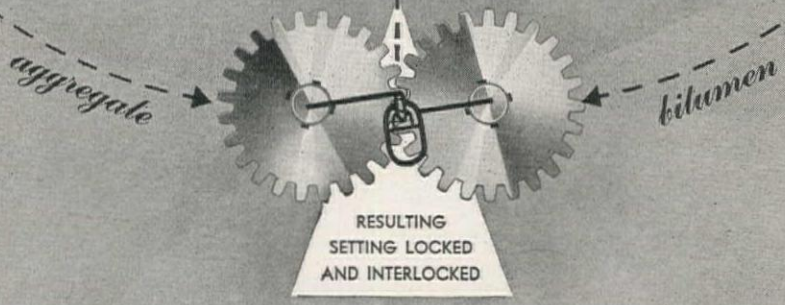




Only

WITH A BARBER-GREENE

Continuous Mixer



The simple procedure illustrated above accounts for the untiring accuracy of the Barber-Greene. The desired quantity of each size aggregate is weighed, and the feeder gates locked at this setting. The bitumen metering pump is set for the desired ratio, and mechanically interlocked with the aggregate feeder. The Barber-Greene achieves POSITIVE PROPORTIONING in bituminous mixing. Feeding these accurately proportioned materials into the twin pugmill in a proportioned continuous stream, the Barber-Greene easily delivers a uniform mix, ton after ton—mile after mile. The Barber-Greene has set entirely new standards for short inexpensive moving and set-up time. Investigate this ingenious machine. Complete literature on request. Barber-Greene Company, Aurora, Illinois.

41-16

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.

Navy "Sea Bees"

b-u-z-z right through

ROEBLING *"Blue Center"* is in there with them!

Trained and equipped to work *and* fight, our U. S. Navy Construction Battalion—"Sea Bees"—are erecting needed bases and facilities in the South Pacific today as fast as the terrain can be reasonably cleared of Japs. As often as not, before turning to jobs like the generator installation above, these versatile recruits from America's construction industry lend a hand with the "terrain clearing" themselves . . .

Wherever these work-wise veterans are working—hacking an airport out of New Guinea jungle, installing a generator to furnish light and power for beach installations in the Solomons, building roads and barracks and bases the world around—they use wire rope they know they can depend on to work and fight right along with them. Rope that has the right qualifications—type, size, construction—for the job on hand.

That's why you'll find Roebling "Blue Center" Steel Wire Rope on the job today where you find tough going like this. For with the know-how gained in more than 100 years of wire-rope engineering, Roebling men build into "Blue Center" the extra value that helps it meet the most difficult conditions unflinchingly. As battle-wise and work-wise as the "Sea Bees" themselves, "Blue Center" Rope is giving a fighting account of itself in thousands of installations—on cranes and bull-dozers and shovels, on ships and hoists and drilling lines.

ROEBLING

"Blue Center"

STEEL WIRE ROPE

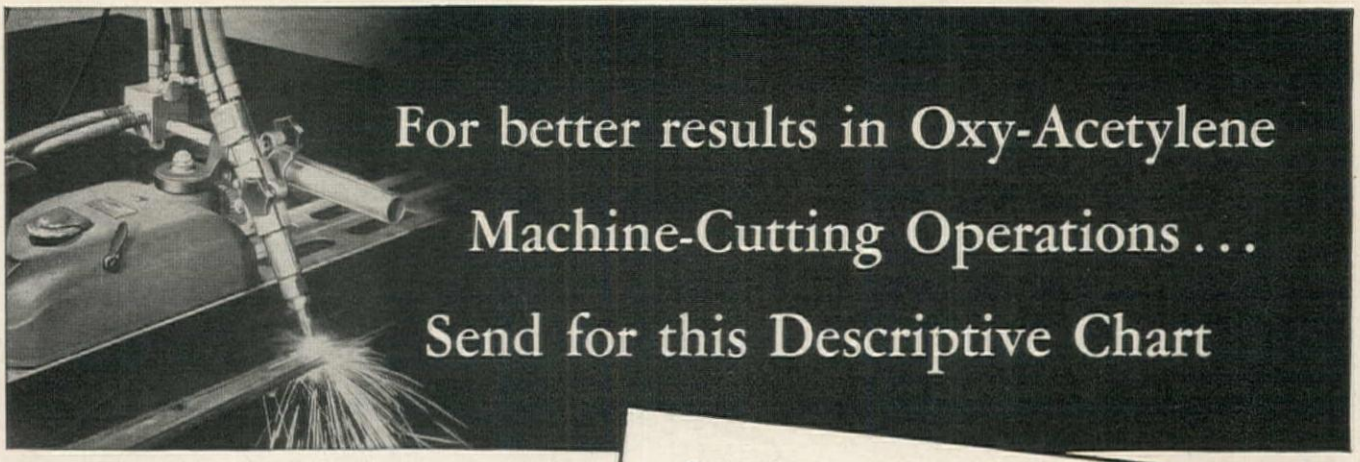
PREFORMED OR NON-PREFORMED

ARE YOUR ROPES WORKING . . . OR FIGHTING TO WORK?

You can help your ropes work better, longer by relieving them of the necessity of *fighting* against worn sheaves, lack of proper lubrication, incorrect installation procedure . . . To help you do just that, Roebling has assembled a store of conservation data—summarized it on a handy 4 x 5 inch tag that you can put right onto your equipment. It's a simple, direct way of keeping your operating men constantly posted on the correct way of handling and using wire rope on the job. Copies of this tag are yours for the asking. Our nearest office will furnish you with as many as you need. Ask for Tag "A".

JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA

San Francisco • Los Angeles • Seattle • Portland



For better results in Oxy-Acetylene Machine-Cutting Operations . . . Send for this Descriptive Chart

Good results in oxy-acetylene machine-cutting depend not only upon the use of efficient equipment, but also upon flame adjustment, oxygen and acetylene pressures, cutting speeds, and correct operation of the machine. The chart illustrated is a convenient reference containing helpful information on how to increase machine-cutting accuracy. One photograph shows the excellent surface obtained as a result of correct cutting techniques. The other photographs clearly show the results of some of the most common faults of machine-cutting procedures. Operators can use this chart as a means of comparing the actual results of their cutting operations, and thereby help to maintain a high level of workmanship. Large reprints (9 by 11¼ inches) of these charts are available from any Linde office without charge. Ask for Form 4346.

Instruction Literature

For information on correct gas pressures, nozzle sizes, and cutting speeds, refer to the Instructions furnished with your Oxweld cutting machines. Duplicate copies of these Instructions are available from any Linde office.

MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

General Office: New York, N. Y. UCC Offices in Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto

LINDE OXYGEN . . . PREST-O-LITE ACETYLENE . . . UNION CARBIDE
OXWELD, PUROX, PREST-O-WELD APPARATUS . . . OXWELD SUPPLIES

The words "Linde," "Prest-O-Lite," "Union," "Oxweld," "Purox," and "Prest-O-Weld" are trade-marks of Units of Union Carbide and Carbon Corporation.

a jungle gets a "Shave"!

Baker Hydraulic Bulldozers Do the "Barbering"

Contractors and road builders who have piloted Bakers through piney woods and forests would get a kick out of the way cat-skinners in uniform are using them to clear patches of jungles that are as tangled as spaghetti, sloshing through mangrove swamps that were yesterday thought impenetrable.

When the peace treaties are signed and the big post-war rebuilding job gets underway, ask the vets who saw the amazing job Bakers did—ask the boys who ran them what they think of *direct hydraulic lift and full down pressure on the blade*—of Baker's fast, positive action and ease of maintenance. Then, you'll want Bakers, too!

THE BAKER MFG. CO.

"If it concerns Victory, it concerns us"

542 Stanford Avenue
Springfield, Illinois

News from "Down Under"

War Correspondent: "This isn't like the Spanish-American War, is it?"

Army Engineer: "Hell, no! Malaria, typhoid and dengue were our worst enemies then, I believe."

W.C.: "This war seems more than a matter of fighters and guns. I notice a lot of construction machinery in use in this neck of the woods."

A.E.: "Yes, this war tops all others when it comes to the use of equipment such as you see along highways and around building projects all over the States in peace-time. Take those bulldozers over there—it'd be tough goin' without those babies—not only here, but on all our fronts."

W.C.: "I suppose it would be a tough job carving landing fields and roads out of that dense tropical growth without those rigs?"

A.E.: "Tough job? It would be practically impossible! You see, those dozers bowl over trees, tear out matted bougainvillaea, grub out roots that would quickly start growing again if you didn't eradicate them, fill up the holes that are left and level smooth as a pool table, ready for surfacing—do it single-handed."

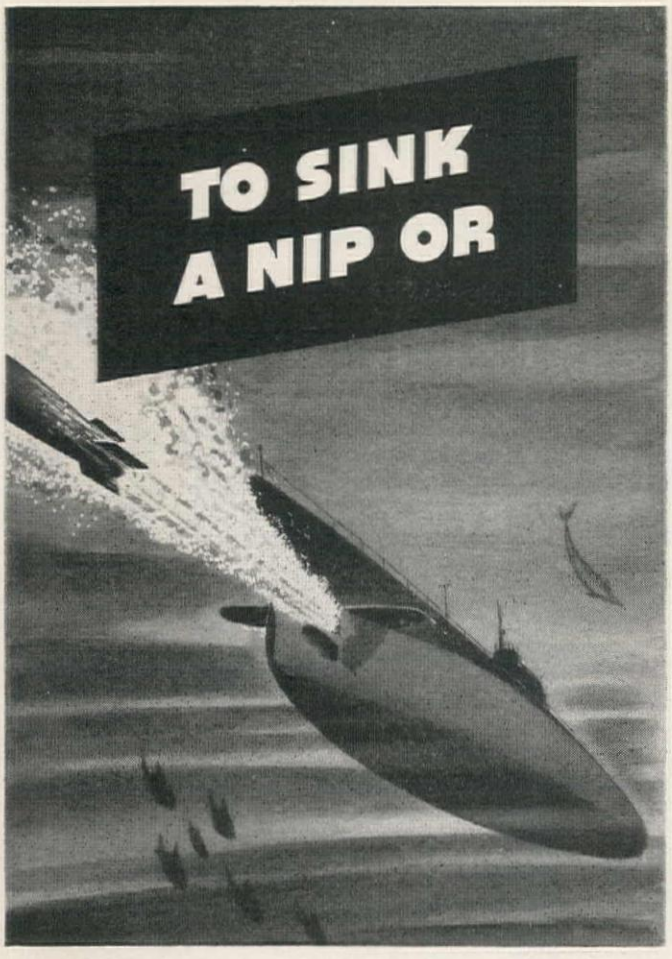
W.C.: "How do the Nips do it?"

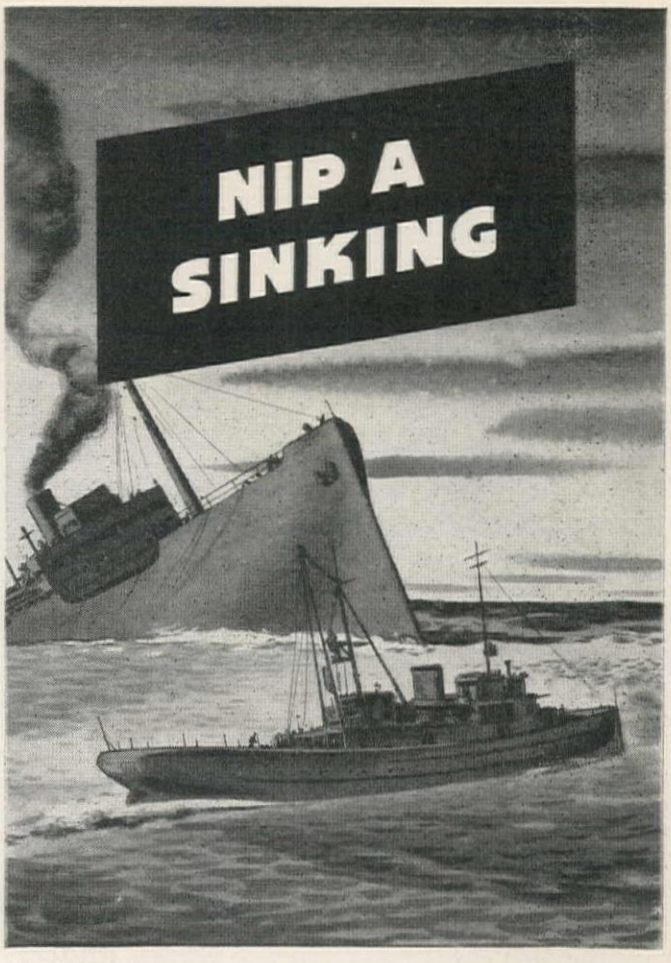
A.E.: "Mainly with 'rice burners,' using picks and shovels. These bulldozers are our ace in the hole. When Nip captives see how we do it, they lose their superiority complex, but pronto."

(Based on a news story, "Yank Engineers 'Lift' Faces of South Sea Isles," by E. R. Noderer, Chicago Tribune ace war correspondent.

BAKER

The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE





...the Navy uses RPM DELO!

The men who fight in U. S. Navy submarines believe that Japan is entitled to half the Pacific—the bottom half! That's where they're sending thousands of tons of enemy shipping.

But this isn't a one-way war. Many of our ships have been damaged, too — and would have sunk except for rescue by one of the Navy's ocean-going tugs. These sturdy ships are vital units of the Fleet, constantly on the alert to hold down our losses by towing crippled ships to bases where they may be repaired to fight again.

Submarines and tugs of the Navy both use RPM DELO to lubricate their powerful Diesel engines. So do other types of Navy craft. Day in and day out, RPM DELO in Navy Diesels is meeting and beating some of the toughest lubricating problems in history.

In *your* Diesels, too, RPM DELO will give dependable protection, freedom from ring-sticking and sludge trouble. No other oil combines its anti-oxidant, cleaning and non-corrosive properties. Switch now to RPM DELO.

STANDARD OF CALIFORNIA

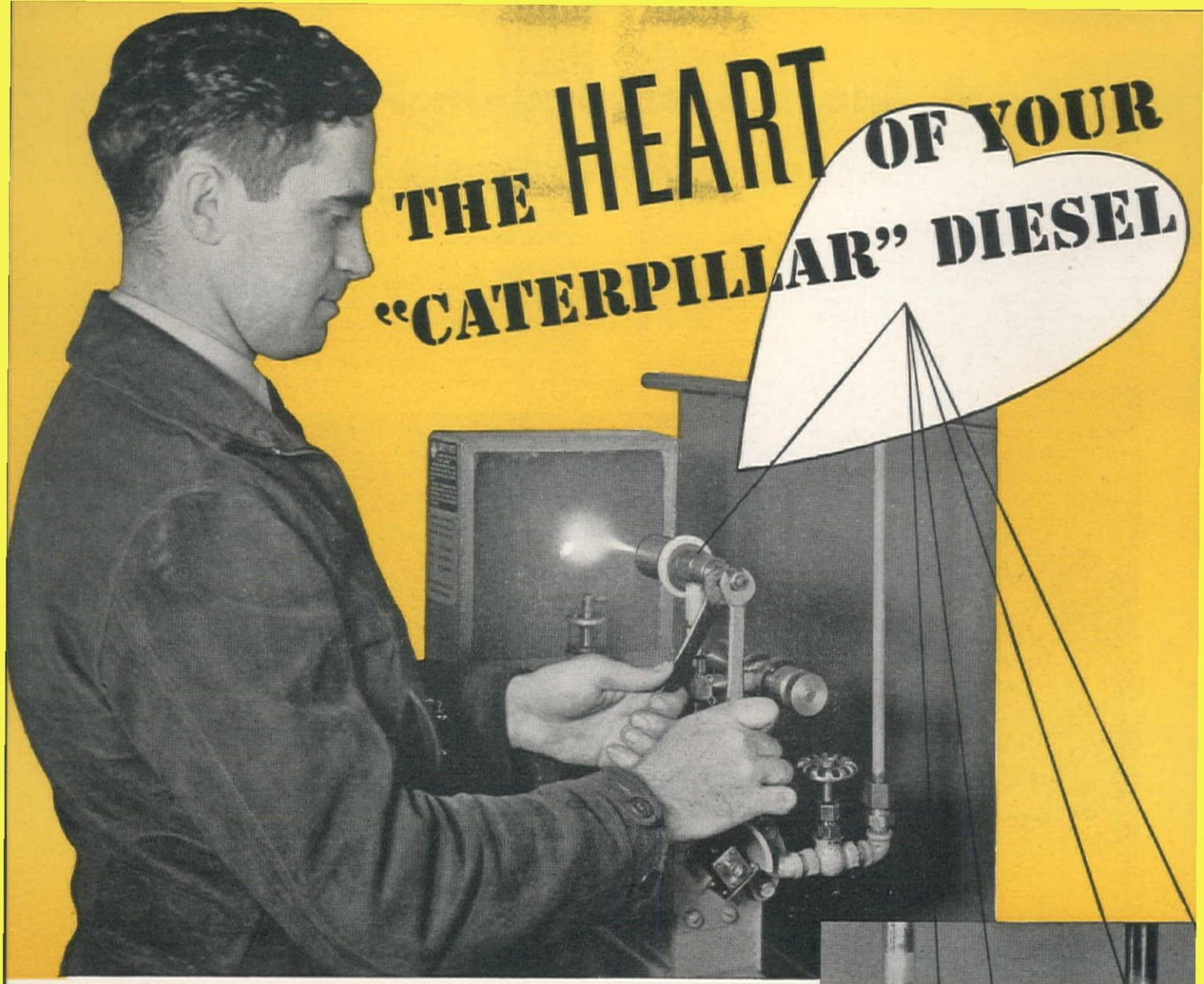
RPM DELO
REG. TRADE MARK
DIESEL ENGINE LUBRICATING OIL

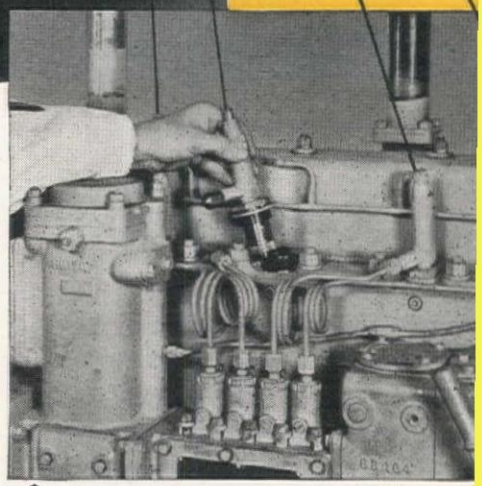
ORDER RPM DELO FOR YOUR DIESELS

Get extra performance with STANDARD DIESEL FUEL

Standard Diesel Fuel is 100% distilled—"vapor-cleaned" for long injector and fuel pump life. You get extra performance for your money — more complete combustion because of carefully controlled self-ignition values and other characteristics.

THE HEART OF YOUR "CATERPILLAR" DIESEL





Removing a "Caterpillar" Fuel Injection Valve is a quick, easy job. Both valves and pumps are readily accessible and easily removed for an inspection and testing.

WHAT makes your "Caterpillar" Diesel Engine "tick"? What gives it such outstanding power, flexibility, dependability and economy? Primarily it's the fuel injection system — vital *heart* of the engine.

The "Caterpillar" fuel system is in many ways unique. It is simple and durable, yet made with greater precision than a fine watch. It is built to give long, satisfactory service without operating adjustment.

But when fuel injection pumps and valves become worn, engine performance falls off.

Consulting your Operator's Instruction Book and following its directions will pay dividends by insuring the long life of your fuel injection equipment. Here are some reminders:

1. Buy clean fuel and keep it clean.

2. Watch the fuel filter. Its job is to keep all foreign matter out of the fuel. As soon as the pressure gauge indicates that the filter is clogged and the flow of fuel restricted, the filter should be replaced.

3. If you believe the fuel injection system is in need of any kind of attention, take it to your "Caterpillar" dealer for testing. He has special equipment that shows quickly whether anything is wrong.

In times like the present, when all the nation's horsepower is working longer and harder in the victory effort, you can rely on your "Caterpillar" dealer for expert help. He has dedicated his excellent repair facilities and mechanical skill to the task of keeping your equipment on the job, without waste of time or materials, until the final battle is won.

CATERPILLAR *DIESEL*

REG. U.S. PAT. OFF.

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

TO WIN THE WAR: WORK—FIGHT—BUY WAR SAVINGS BONDS!

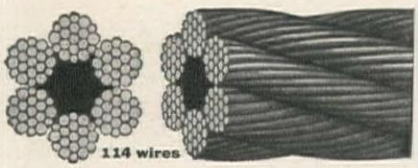
A Short Breaking-in Period Extends Wire Rope Life

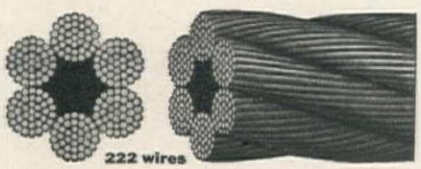
{This is Number 14 of a series of informative articles on how to get the most out of wire rope. It is directed to those who want to do everything they can to lengthen wire rope life and conserve steel. Other articles in the series are available on request.}

* * *

Cooperation in the present emergency is a vital necessity to success. It is a basic fundamental without which wars cannot be won, freedom cannot be maintained.

Cooperation within a piece of wire rope is just as essential to its success, but, being wire rope, it needs our help to do its job.





There are 114 or more wires in the average wire rope. They need to cooperate together by each carrying their share of the load. Illustrated above are two standard ropes showing number of wires in each.

The process of manufacture lays these wires into a rope and manufacturers ship this rope to you prepared to do its task.

The rope's success depends a great deal on how it becomes adapted to the equipment and to the work it must do.

WHAT "BREAKING IN" MEANS

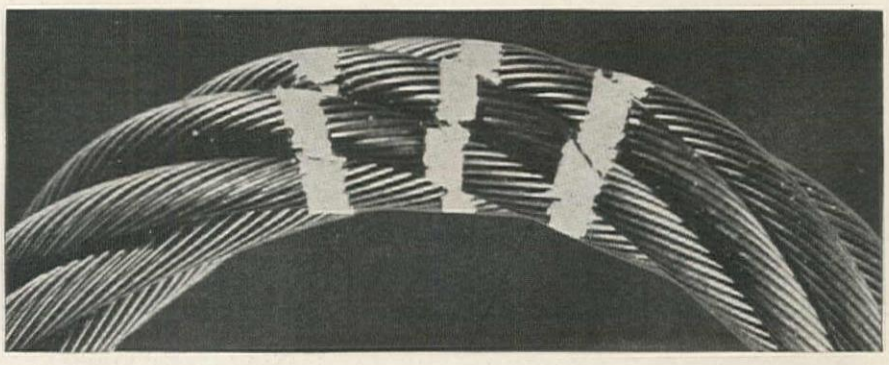
For example, we all know that the life of a book depends upon proper handling at the start. To simply grab a book and pop it open injures the binding, but by gradually and carefully opening the book at different points, it becomes "broken in" and its life is greatly extended.

Wire rope is a complex machine that has many wires, like a book has many pages. When the rope is put into use, a little care in handling and operating it at first, pays dividends later. Haste makes waste, which you want to avoid.

The breaking-in period gives the rope a chance to adapt itself to the track or path in which it must travel. It becomes accustomed to the arc of bending, becomes comfortably seated in the groove and assures the operator, after a short "trial run," that it is ready to go to work safely.

"BUT WE CAN'T TAKE THE TIME TODAY!"

The actual time taken to properly break in a rope is a small percentage of the time it takes to install a rope. If you must replace rope often and you can cut down the number of replacements by extending rope life, you will be conserving steel, reducing costs, and actually saving time.



BENDING DOES THIS

To get the picture (above) three white stripes were painted around a 5/8" 6x37 PREformed wire rope before bending. Then the wire rope was flexed by hand and this picture taken. Notice how the paint cracked up and separated, caused by the movement of the wires and strands to make the bend. Getting the rope accustomed to this flexing and wire and strand movement is a job of breaking in.

"WHAT SHALL WE DO?"

First, as has been explained in previous articles of this series, the equipment should be in good repair.

Second, as explained in article 9 of this series, the rope should be unwound from the reel or coil so as to avoid twisting and kinking.

Third, the rope should be firmly attached to the equipment, taking care to seize it with wire to prevent it untwisting.

Fourth, after rope is attached and reeved around sheaves and drums, operate it without load a few times, until you see that it is flexing easily over sheaves and winding correctly on the drum.

Fifth, gradually increase the speed and load until the rope is operating up to its normal loading and speed.

WHAT ABOUT PRE-FORMED ROPE?

During the manufacture of the rope, the process of PREforming adjusts the wires and strands into the helical shape they take in the rope. This is often called a "breaking-in" process that helps prepare the rope for quick use and therefore it should not require as much "breaking in" on the job.

However, whether PREformed or non-preformed, it pays to handle the rope carefully and give it a chance to get accustomed to the operation of the equipment.

DESIGN FOR ROAD-MIX!

ARMOR-PLATING A WOOD ROADMIXER JOB

Use Local Materials, Save Trucks, Freight, Hauling Equipment and Manpower... *And Get Faster Pavement Construction*

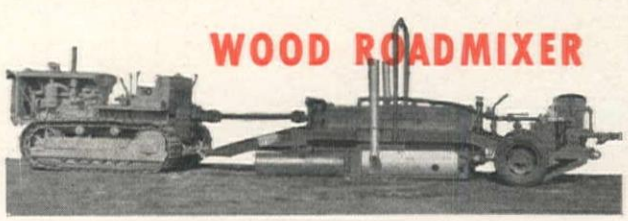
The road-mix method of pavement construction utilizes native and local materials lying *at or near the job.* These materials are picked up by a traveling mixing plant, mixed with liquid binder and deposited in windrows for spreading and finishing.

Road-mix methods eliminate or largely reduce hauling of aggregate, use fewer pieces of equipment, and far less manpower than ordinary methods of pavement construction. Road-mix methods deliver greater production of top-quality paving at far less cost.

Road-mix methods add up to more miles of paving for your tax dollar.

Design your next job for road-mix, whether it be a road, street, highway, airport, landing strip, or *any* paving job.

WOOD ROADMIXER



A COMPLETE TRAVELING MIXING PLANT — The original and leading traveling plant method of rapid, low-cost construction of all types of asphaltic mats and stabilized bases, either emulsion or soil-cement. Is pulled and powered by any of these crawler tractors: Caterpillar D-8, RD-8, Allis-Chalmers Model L, LO or HD-14. Only other piece of equipment needed is binder supply truck which is towed behind the Wood Roadmixer. Tractor can be disconnected for other work when not in use with the Wood Roadmixer. The Wood Roadmixer can be hauled on a truck from job to job, or towed by a patrol for short moves ... Absolute volume control on aggregate and liquid binder, regulated mixing action to fit conditions of job ... Add a Wood Roadmixer to your present equipment. It costs less to buy, less to operate and less to maintain than any other proven mixer ... Design and build Road-mix!

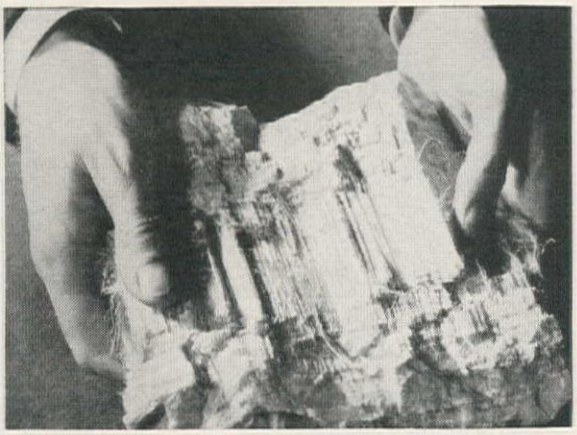
Write for detailed and illustrated Wood Roadmixer bulletin, "The Fastest Method of Low-Cost Paving."

WOOD ROADMIXER

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

One of Nature's most

MAKES POSSIBLE THIS DURABLE, EFFICIENT *TRANSITE PIPE* FOR WATER LINES

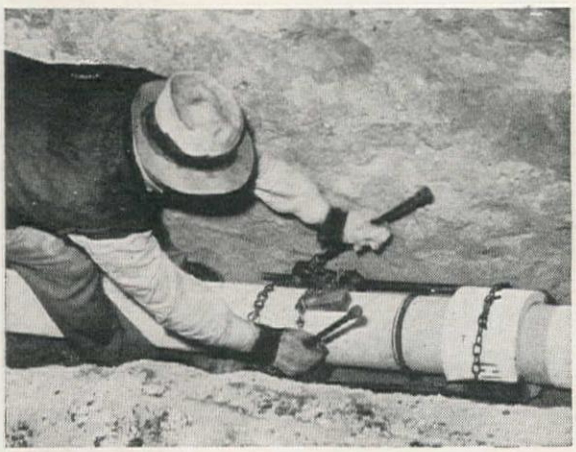


ASBESTOS. This is asbestos—a magic mineral with the permanence of stone. Asbestos fibers in J-M Transite Pipe serve as reinforcement—make possible Transite's combination of strength and light weight.

ASBESTOS is undoubtedly one of the most remarkable products of inorganic nature. As found in the natural rock, asbestos itself is as dense as the rock in which it occurs. Yet when picked apart or "teased up," it separates into a mass of fibers, silky in appearance but amazingly strong. The tensile strength of asbestos fibers runs from 100,000 lb. to 400,000 lb. per sq. in.

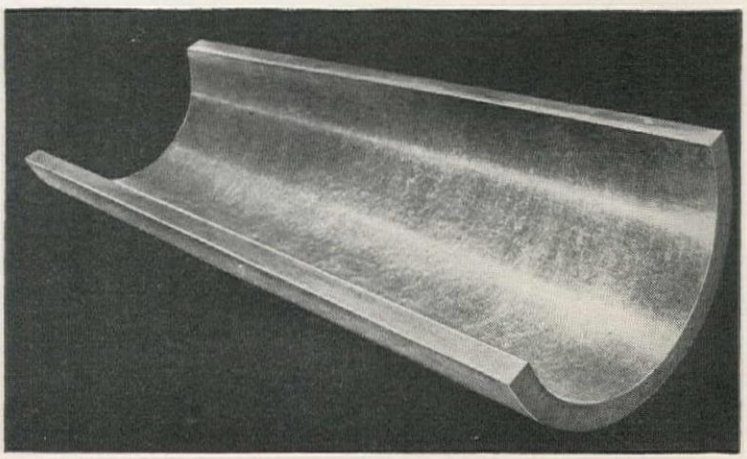
In producing Johns-Manville Transite Pipe, these virtually indestructible asbestos fibers are thoroughly mixed with cement where they serve as reinforcement, making possible Transite's uniformly high strength and light weight.

These features, in combination with Transite's long life, ease of installation, operating efficiency and minimum maintenance, have



RAPID ASSEMBLY. The absence of hot-poured jointing materials eliminates the necessity of maintaining heating equipment at the trench and makes the assembly of Simplex Couplings a fast, economical operation easily accomplished by unskilled workmen.

EASY TO HANDLE. Light in weight . . . requires fewer men for handling . . . and only the larger sizes require mechanical handling equipment.



HIGH CARRYING CAPACITY. Because Transite is non-metallic, its original smooth interior surface remains permanently unaffected by the destructive effects of tuberculation.

Indestructible Materials -- *Asbestos*

LONG LIFE WITH MINIMUM MAINTENANCE. Made of asbestos and cement, Transite Pipe's inherent corrosion resistance and maintained strength assure long life with minimum maintenance.

resulted in its selection for the water transportation and distribution systems of thousands of cities, towns and villages, as well as for military camps and bases.

Available today to supply military and essential civilian needs, Transite Pipe offers a combination of economic advantages not found in any other pipe material. For complete details, write for copy of the Transite Pressure Pipe book TR-11A.

For information on Transite Sewer Pipe for lower cost sewage disposal systems, ask for book TR-21A. Johns-Manville, at Los Angeles, San Francisco or Seattle.

TRANSITE PIPE IN THE WAR. Virtually all new Transite Pipe is now being used for military camps and bases, and for essential civilian needs.

JOHNS-MANVILLE

JOHNS-MANVILLE JM PRODUCTS

Transite Pipe

AN ASBESTOS PRODUCT

FOR EFFICIENT, ECONOMICAL WATER AND SEWER LINES

NO PRIORITIES ON
WAR BONDS

Next to the Stars and Stripes, Cletrac is proud to be flying the Minute Man flag. Over 95 per cent of Cletrac employees are purchasing War Bonds by pay roll deduction.

UP hill and down vale—through valleys and over mountains, Cletrac power makes hundreds of thousands of swings daily against the Axis.

That's why Cletrac power is fighting power—patriotic power—which deserves every means you have of making it serve as long as possible.

Fortunately, Cletracs have always been *"Built to Endure"*—not only in use but even with abuse. However, like all machinery, Cletracs perform better with longer life if you inspect them frequently, lubricate them properly and maintain them carefully by replacing worn parts promptly.

In this conservation of equipment your Cletrac dealer is ready to give you substantial help. Keep your Cletracs swinging it by asking him for his advice and suggestions.

THE CLEVELAND TRACTOR COMPANY • CLEVELAND, OHIO

Cletrac Crawler Tractors

GASOLINE AND DIESEL

FOR VICTORY
BUY UNITED STATES WAR BONDS AND STAMPS

A "JOE MAGEE"

A "JOE MAGEE", to you laymen and folks who haven't spent your lives around construction camps, means doing a job in an unorthodox engineering manner. Sometimes when the Superintendent is stymied or stuck for lack of proper equipment, he will devise a quick, original method for getting the job done.

That's what happened at Basic Magnesium where Ziebarth Construction was handling the prime contract on the largest single electrical installation in the history of American construction. Ziebarth crews have never failed to complete a contract in specified time and in this instance, they were so far ahead of schedule that a crane which had been ordered could not be delivered on time to help. War and the pouring of Magnesium for tracer bullets, flares, and fighting plane parts could not wait!

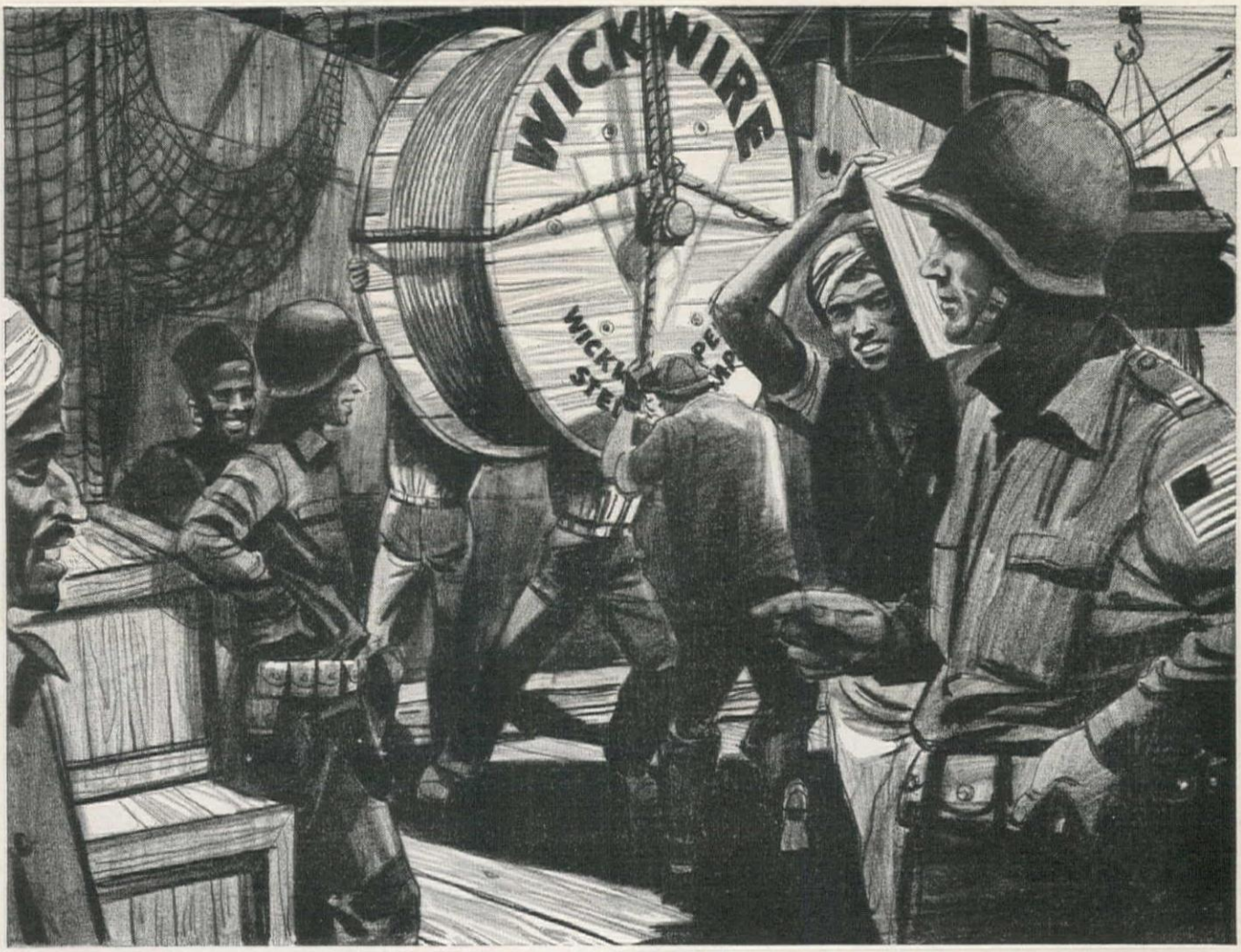
Problem: how to lift 10 transformers, each of which weighs 110 tons when completely assembled! A temporary wooden structure was built to straddle the railroad siding, and a five-sheave, typical oil field crown block and "draw works" outfit was used. It was first tested by rolling a standard 10,000-gallon railroad tank car full of water under the hook, and this 70-ton load was picked up easily. "Joe Magee" rode again—with the result that once more Ziebarth could proudly turn over a job—ahead of schedule!

In any field of heavy construction, if you have a tough job—that must be completed *on time*, please call on us.

Want to learn how Ziebarth can help in your construction plans? Request "The Story of Ziebarth Construction" — it's complimentary to executives.

ZIEBARTH CONSTRUCTION

FRITZ ZIEBARTH • 823 West Esther Street, Long Beach, California
Reno, Nevada



"Buddy, meet an old friend"

You who use this friendly, long-life wire rope here at home can imagine what it would mean to you. Old side kicks who used to work with you are now in distant parts. If ever dependability counted in wire rope, it's doubly vital there. So when a Wickwire-rigged Liberty Ship gets through to them, and from its cargo unloads this reel with the friendly, trusted name, you can be sure it brings cheers.

The boys out there came from every American industry. They know that *you* need Wickwire Rope, too. So they're mighty thankful when you make what you have last longer, so that more can be spared for new shipping and for *their* heavy work along the fronts.

But when you do need more wire rope, please order it without reels, if lengths will permit, so our boys can have this greater convenience Will you? Wickwire Spencer Steel Company, 500 Fifth Ave., New York, N.Y.

First Maritime M and Victory Fleet Flag in all New England was awarded to Wickwire for outstanding production achievements.

DO YOUR MEN UNDERSTAND STRETCH?

The free book, "Know Your Ropes," tells them just what to expect, and what to look out for. In addition it pictures splicing methods, life-extension rules, etc. This book can save you money—and save wire rope for the war fronts. Send for your free copy.

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCTS

Wartime Tips

EMERGENCY REPAIRS for ATHEY Equipment

EVERY MACHINE of yours in full production is an implement of war fighting the Axis.

That's why emergency repairs have been developed to help you keep your Athey Equipment going. You can now recondition certain parts in Athey Forged-Trak Wheels and make a considerable savings in critical material for the war effort. Many of these repairs can be made by welding, thus avoiding excessive downtime. Nearly all Athey-"Caterpillar" Dealers have complete welding facilities and necessary equipment to do these repair jobs for you. Your dealer also has skilled servicemen and especially designed tools to make fast work of every equipment reconditioning job.

See your Athey-"Caterpillar" Dealer, or write us for our new descriptive manual "Care and Repair Tips."

YOU'LL BE SAVING STEEL AND MAKING YOUR ATHEY EQUIPMENT SERVE LONGER

BUILDING UP TRACK RAILS

When track rail surfaces become worn, they can be built up to original rail thickness by welding. To get longest life and efficiency from your Athey Wheels keep track rails in good condition.

RENEWING TRACK SPINDLES

Spindles may be salvaged by welding worn surfaces and machining to proper size. You can thus conserve critical material, maintain steady production with present equipment.

ADDING LIFE TO WHEELS

Many owners report satisfactory results in welding new rims on Athey Wheels — another measure of wartime conservation.

RESTORING TRACK HOOKS

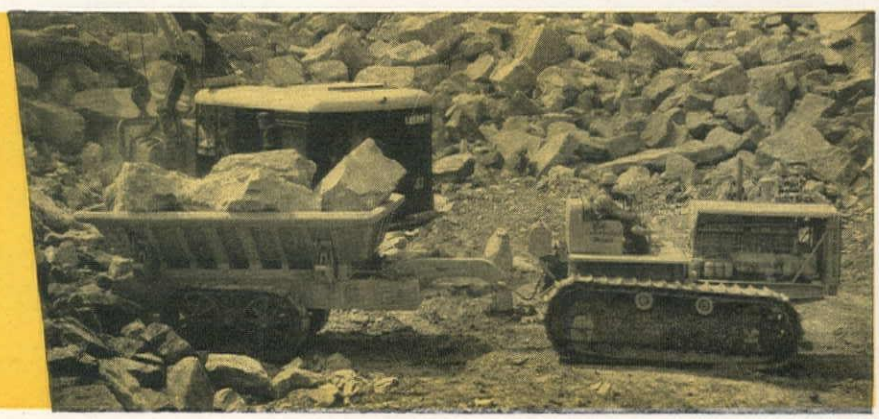
After long operation, the track hook will show wear. This part, too, may be reconditioned by welding and grinding.

For more detailed instructions, get in touch with your Athey-"Caterpillar" Dealer or write us direct.

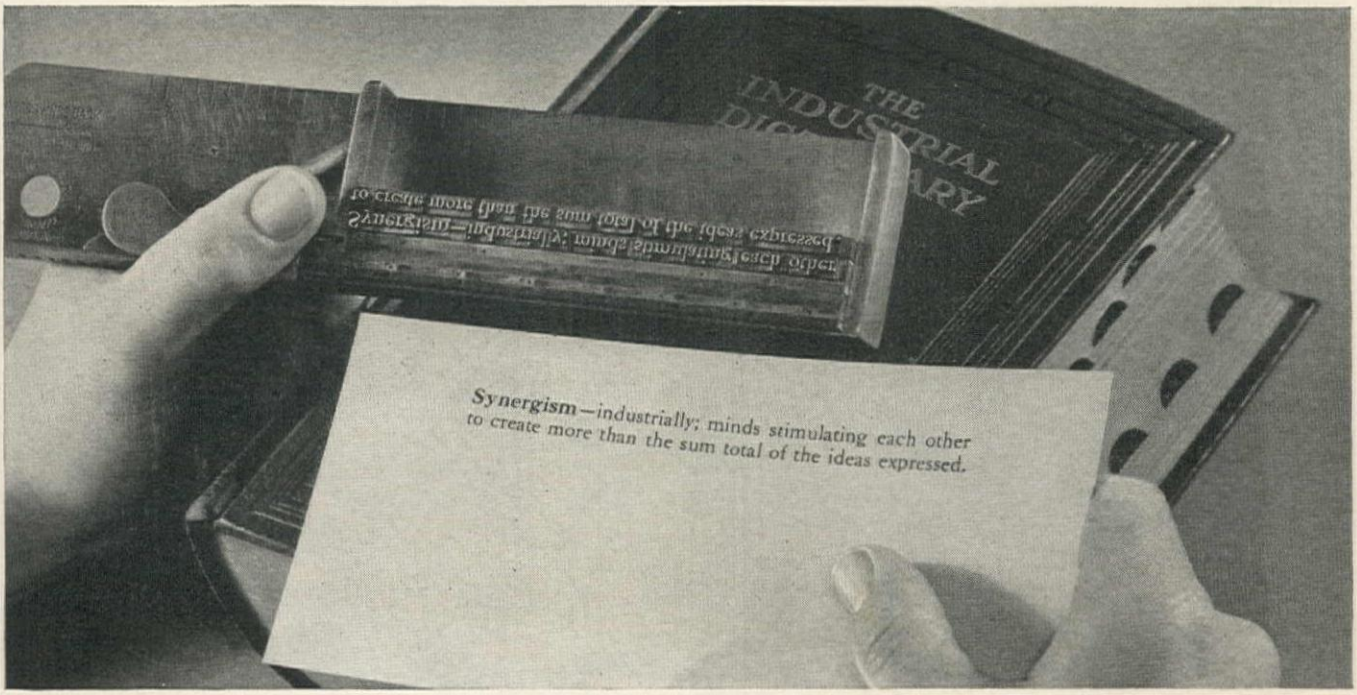
Athey

TRUSS WHEEL CO.

CHICAGO, ILL.



A New Definition



for the Industrial Dictionary

New ideas create new products, new methods, new words to describe them. And out of this war a word is emerging with a new meaning for future industrial progress—"Synergism."

War production has brought gigantic strides in industrial cooperation. Men have banded together to cooperate with a will-to-accomplish in a degree far greater than ever the world has known.

As minds meet to cooperate with the single purpose of accomplishment, they stimulate each other to create more than the sum total of the ideas expressed—"click to give a plus value" might be the slang for it. This is "Synergism."

Synergism is not a new word. It's an old word, with classic Greek roots meaning "working together." It long has had its meaning in chemistry, in medicine, in theology. Basically, it has always meant forces working together to develop a whole greater than the sum of the parts.

And war accomplishment has re-introduced "Synergism" with a significant meaning for Industry. It provides a name for the factor that keeps working miracles in industrial progress.

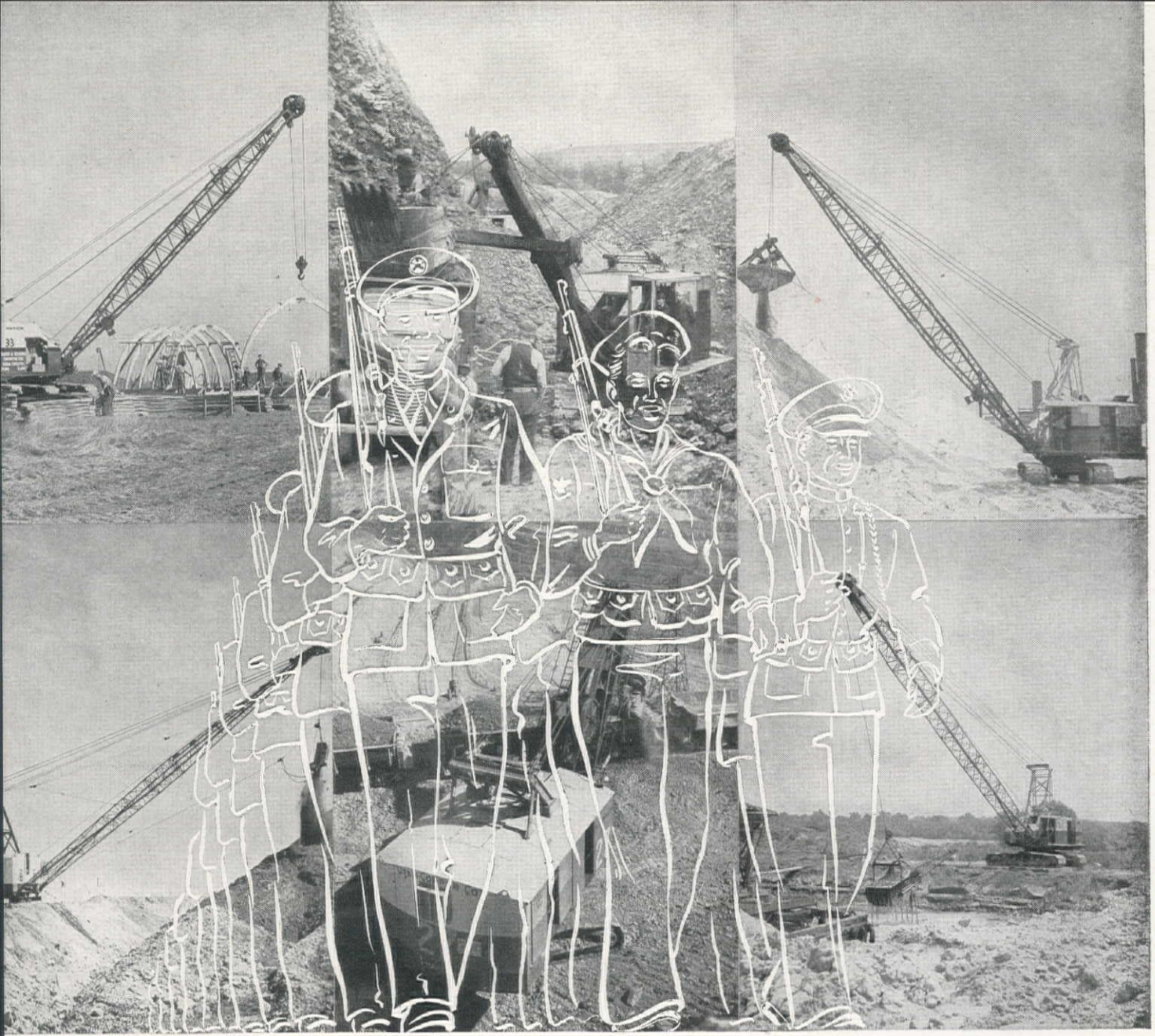
We at Atlas have been practicing synergism in our spheres of chemical production to accomplish some outstanding results in collaboration with other companies. We think our minds will "click" with yours. Let us try the experiment.

ATLAS POWDER COMPANY
WILMINGTON, DELAWARE

San Francisco, Cal. *Offices in Principal Cities* Seattle, Wash.

CHEMICALS ATLAS EXPLOSIVES

Industrial Explosives • Industrial Finishes • Coated Fabrics • Acids
Activated Carbons • Industrial Chemicals • Ordnance Materiel



OLVING THE MAN POWER PROBLEM ON THE IATERIAL HANDLING FRONT . . . . .

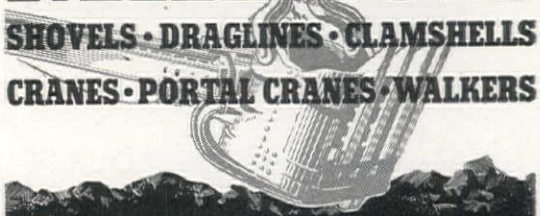
MARIONS' responsibilities are four-fold today. They must clear the way for war plants, army depots, airports, war housing projects, camps and the like. They must dig and ndle vital raw materials to keep our vast war machine rolling to ctory. They must build ships, load and unload cargoes. They ust release men from the material handling front to ease the man wer shortage elsewhere. That these jobs are being done well is nfirmed by MARION records of performance. Twenty-four hour hedules pay tribute to half-a-century of sound engineering.

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

TRIBUTED BY: Brown-Bevis Equipment Co., 4900 Santa Fe Ave., Los Angeles, Calif.; The Marion Steam Shovel Co., 571 ard St., San Francisco, Calif.; Edward R. Bacon Co., Folsom at 17th St., San Francisco, Calif.; Joseph O. Reed, Parklawn s., 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.

"SAVE THE WHEELS THAT SERVE AMERICA"

Ask Your Chevrolet Dealer to check your truck

SUPER CHEVROLET SERVICE

- ✓ *Check and rotate tires*
- ✓ *Check lubrication*
- ✓ *Check engine, carburetor, battery*
- ✓ *Check brakes*
- ✓ *Check steering and wheel alignment*
- ✓ *Check clutch, transmission, rear axle*

Chevrolet dealers service *all* makes of trucks.

Chevrolet dealers have had the broadest experience—servicing millions of new and used vehicles.

Chevrolet dealers have skilled, trained mechanics.

Chevrolet dealers have modern tools and equipment.

Chevrolet dealers give quality service at low cost.

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT, MICHIGAN

SEE YOUR LOCAL **CHEVROLET** DEALER TODAY

HEADQUARTERS FOR SERVICE ON ALL MAKES AND MODELS

Get the most out of YOUR TRACTOR with

BUCKEYE CABLE CONTROL

ADDING Buckeye Cable Control to your tractor steps up its output two ways . . . first, you'll get higher output from your cable-controlled equipment with Buckeye's fast, accurate winch; second, your tractor can handle scores of new and *different* jobs with Buckeye's smooth, rugged cable power.

Using a two-drum Heavy-Duty Hoist, one drum can operate your dozer, ripper or scraper, leaving the second drum free to operate another piece of equipment or ready to handle the dozens of cable pulling, hoisting or hauling jobs that turn up on every project. Spooling 350 feet of ½" cable, the wide, husky Buckeye drum gives you over 8,000 lbs. line pull and a line speed of more than 300 ft. per minute. For hoisting jobs, your line can be reeved through single or multi-part sheaves—plenty of cable to work with, plenty of line pull for the tough ones. Simple job-made hoist frames can be mounted at the front, rear or sides of the tractor. Line may be run out directly from the drum to snake logs, pull out stalled equipment or pull cable, fencing, etc. To get the *most* out of your tractor, equip it with Buckeye Cable Control NOW!

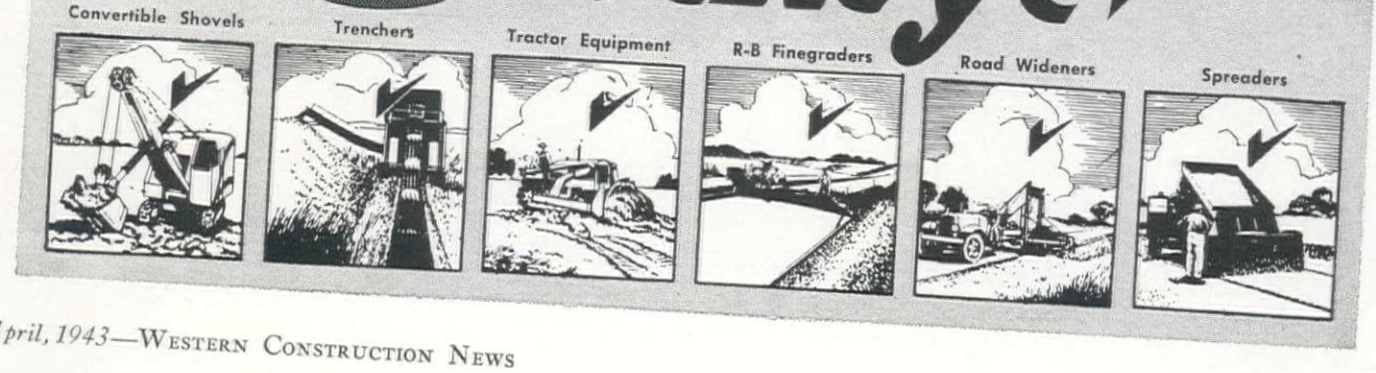
Write for specifications on Buckeye winch models to fit your tractor.

THE BUCKEYE TRACTION DITCHER COMPANY, Findlay, Ohio

WITH BUCKEYE CABLE CONTROL, YOUR TRACTORS CAN DO MORE JOBS!

See our advertisements on pages 45, 76, and 91.

Built by Buckeye



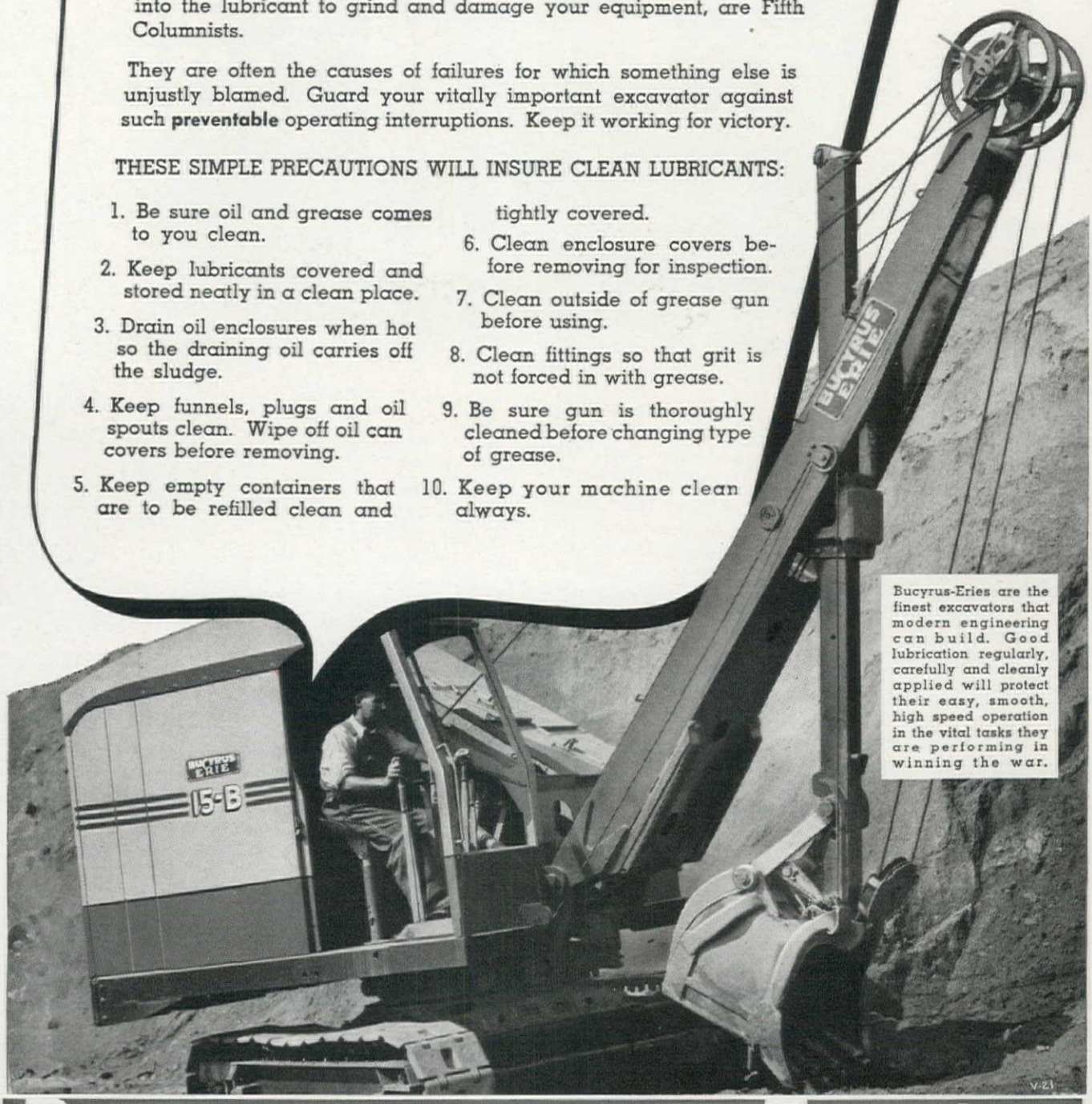
Keep Your Lubricants *Clean!*

Dirt and grit and similar abrasives which are allowed to creep into the lubricant to grind and damage your equipment, are Fifth Columnists.

They are often the causes of failures for which something else is unjustly blamed. Guard your vitally important excavator against such **preventable** operating interruptions. Keep it working for victory.

THESE SIMPLE PRECAUTIONS WILL INSURE CLEAN LUBRICANTS:

1. Be sure oil and grease comes to you clean.
2. Keep lubricants covered and stored neatly in a clean place.
3. Drain oil enclosures when hot so the draining oil carries off the sludge.
4. Keep funnels, plugs and oil spouts clean. Wipe off oil can covers before removing.
5. Keep empty containers that are to be refilled clean and tightly covered.
6. Clean enclosure covers before removing for inspection.
7. Clean outside of grease gun before using.
8. Clean fittings so that grit is not forced in with grease.
9. Be sure gun is thoroughly cleaned before changing type of grease.
10. Keep your machine clean always.



Bucyrus-Eries are the finest excavators that modern engineering can build. Good lubrication regularly, carefully and cleanly applied will protect their easy, smooth, high speed operation in the vital tasks they are performing in winning the war.

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.

Official U. S. Army Photo

Here's What It Takes To Build Your Glory Road

When a Colonel of engineers said the new Alcan Highway—the "Glory Road of America"—was built by "guts and tractors" he stressed the former.

ALTER EGO: And how right he was! When tough "competition" from the west threatened to annihilate us, it jolted us into super-action. Alcan's 1800-mile route through uncharted wilderness — said to be *impassable* — was a confusion of mud, mountains and mosquitos. Under the spur of Jap "competition", we finished this "glory road" in one season.

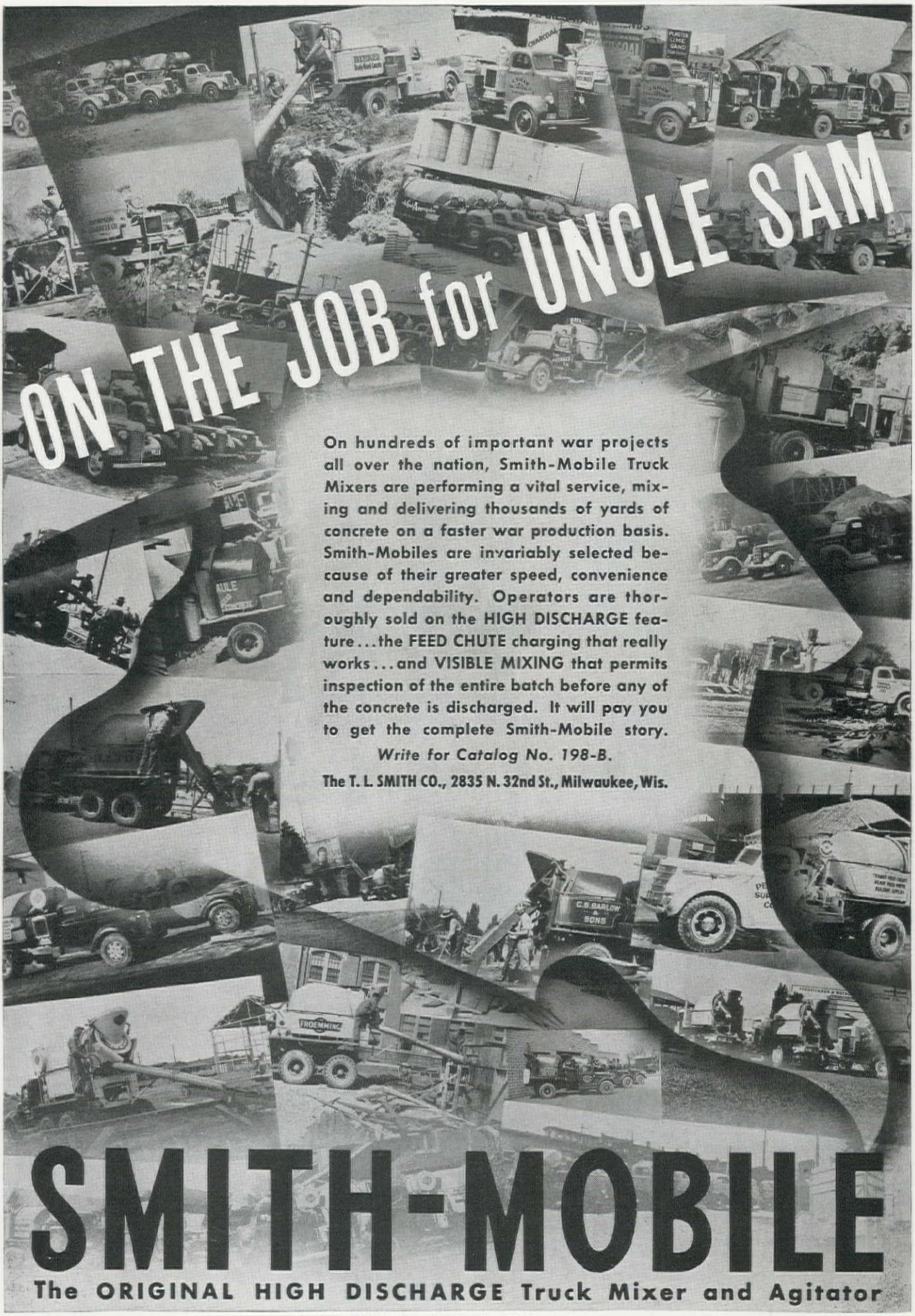
Maybe that's a lesson for us to be on the alert for the tough competition that'll invade all business after the war. Let's jolt ourselves into super-action now.

ALTER EGO: Right! We've got to hack through plenty of uncharted wilderness that seems impassable . . . with little time on our hands . . . and come out with *better products* and *lower costs* than the other fellow. *Will-power* and *ingenuity* will build *this* "glory road".

We have the will-power. Let's acquire the ingenuity by improving our welding knowledge *with Lincoln's aid.*

Ask your inner self if welding knowledge isn't the shortcut to postwar success.

THE LINCOLN ELECTRIC COMPANY • CLEVELAND, OHIO



Distributed by: Garfield & Co., San Francisco; Le Roi-Rix Machinery Co., Los Angeles; The Lang Company, Salt Lake City; The Sawtooth Company, Boise; Clyde Equipment Co., Portland & Seattle; The O. S. Stapley Co., Phoenix; F. W. McCoy Co., Denver; Francis Wagner Co., El Paso.

The **TECO** *Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood . . . brings the full structural strength of lumber into play.*

New Navy Blimp Hangar, 1000 feet long; 153 feet high; clear-span roof 237 feet. Timber treated for fire resistance according to Federal specifications. Trusses prefabricated by Timber Structures, Inc., Portland, Oregon.

TIMBER ENGINEERING COMPANY OF CALIFORNIA
85 Second Street, San Francisco, Cal.

TIMBER ENGINEERING COMPANY
Washington, D. C. Portland, Oregon

OUR NAVY BUILDS WORLD'S GREATEST TIMBER STRUCTURE

mammoth blimp hangar was made possible by

TECO CONNECTOR ENGINEERING

Two announcements of the widest import to American engineering have just come out of Washington.

The U. S. Navy has announced that a giant blimp hangar, engineered entirely in timber, is nearing completion "somewhere in the continental United States."

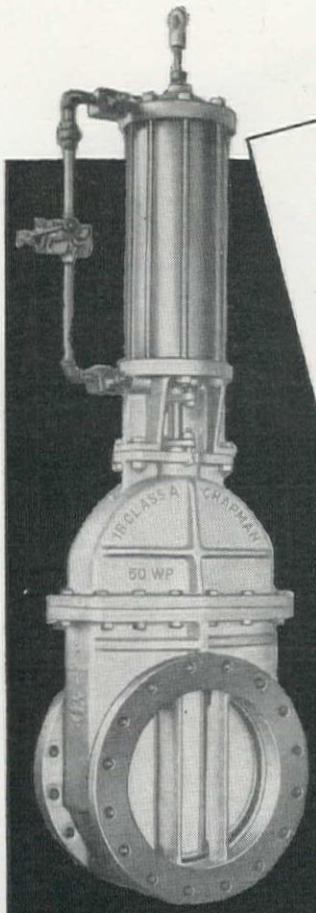
The War Production Board has announced that "such a structure could not have been built of wood by ordinary methods without the use of timber connectors . . . The steel ring timber connector, which is used to increase the strength of joints in wood construction, saved more than 400,000 tons of steel for essential war production in 1942." WPB added that 2,050 tons of structural steel will be saved in this hangar alone.

In erecting this vast, multiple-truss assembly, Navy engineers have accomplished a notable achievement in modern timber connector engineering. The hangar is the latest of scores of large Navy, Army, and Maritime Commission projects built with Teco timber connectors under the revolutionary Teco system of timber engineering. It is one of *over 100,000* heavy-duty structures, of *over 600* types, built under the Teco connector system in the past few years. They include clear-span factories, bridges and trestles, towers, tanks, warehouses, docks, shipyards, and many others.

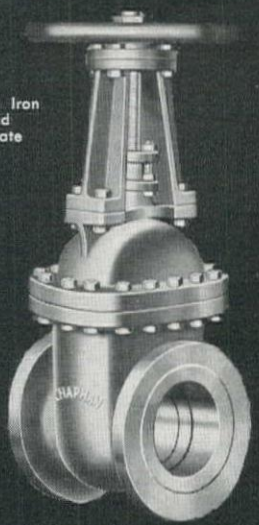
Write today for our FREE Reference Book for engineers and architects showing 45 *"Typical Designs of Timber Structures."*

92 CHAPMAN "Beamed Waterway" GATE VALVES

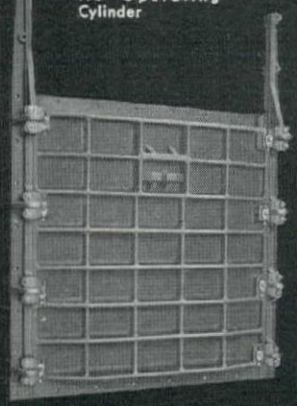
FOR TENNESSEE'S VOLUNTEER ORDNANCE WORKS...



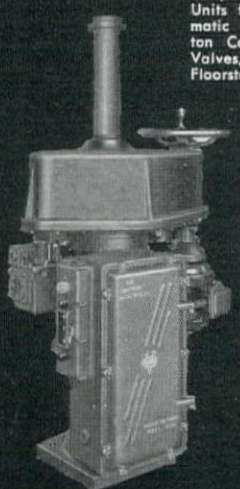
Chapman Beamed Waterway Gate Valve with Hydraulic Operating Cylinder



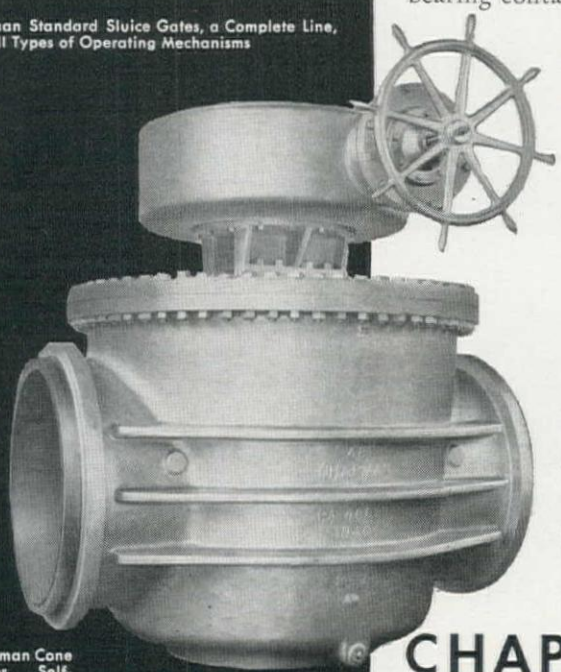
Chapman Iron Body, Solid Wedge Gate Valves.



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.

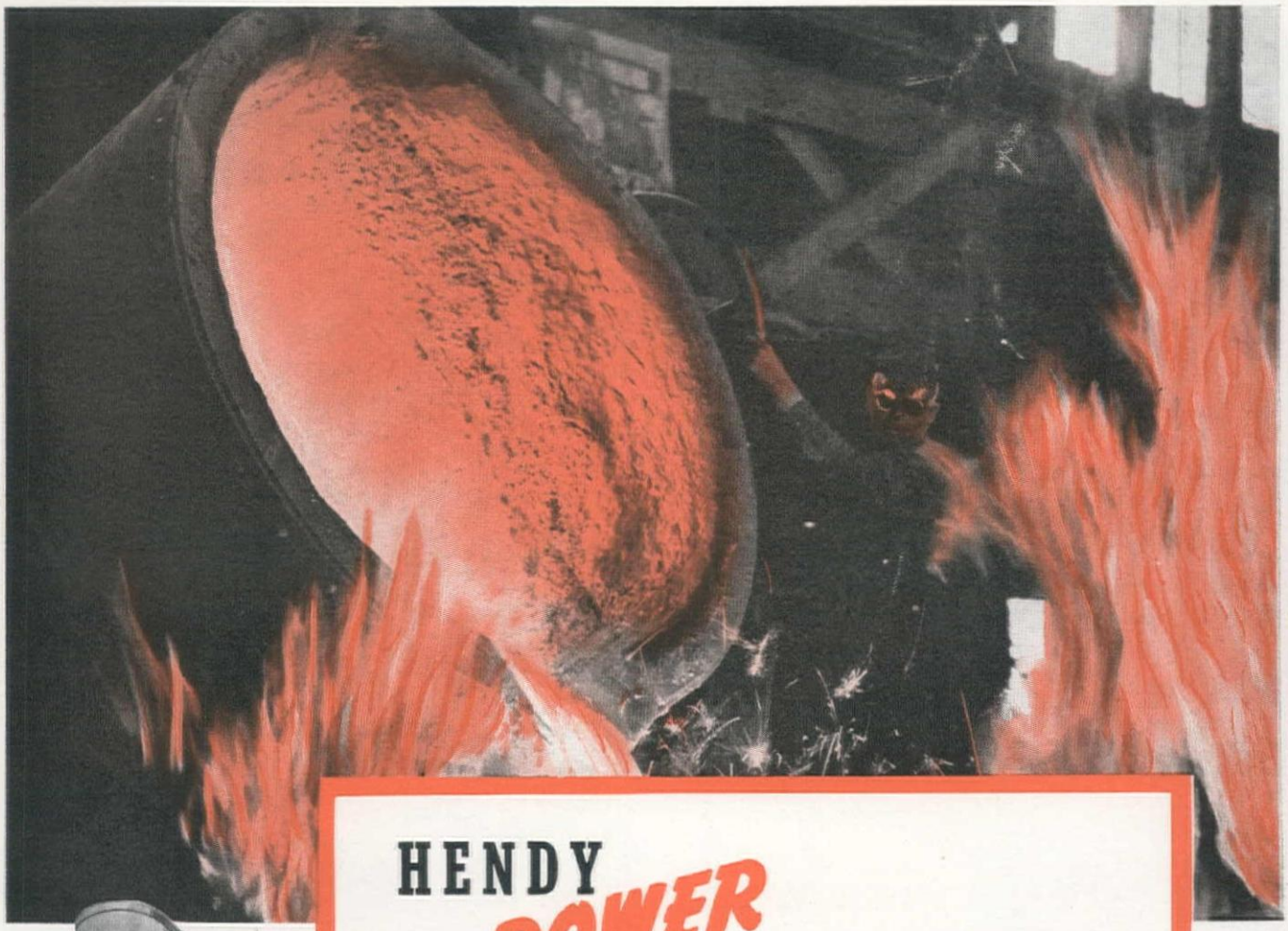


Chapman Cone Valves. Self-Cleaning. Plugs fully seated and fully protected.

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

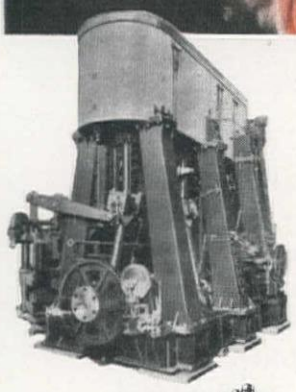


HENDY POWER for the Bridge-of-Ships

Spanning the oceans between production and fighting fronts are mighty flotillas of Liberty Ships . . . the floating bridges for men and munitions...now mass produced on a scale formerly believed impossible.

More than one-third of these vessels are powered with dependable Hendy steam engines . . . the same type of Hendy power plants that carried Yanks to France in 1918. Today, however, the Iron Men of Hendy turn out as many engines in 11 days as they built in two years of World War I.

If Joshua Hendy could see what has been accomplished since 1856 . . . how the Hendy nameplate has become the distinguishing mark of dependable POWER . . . if he could look over the shoulders of Hendy engineers and see their plans for the future . . . he would take justifiable pride in his vision that POWER wins wars and insures peace.



THE IRON MEN OF **HENDY . . .**

. . . now, for the first time in history, build marine steam engines by mass production, assembly line methods These engines stand two-and-one-half stories high and weigh 274,000 pounds.

JOSHUA HENDY IRON WORKS

HOME OFFICE

Sunnyvale, California

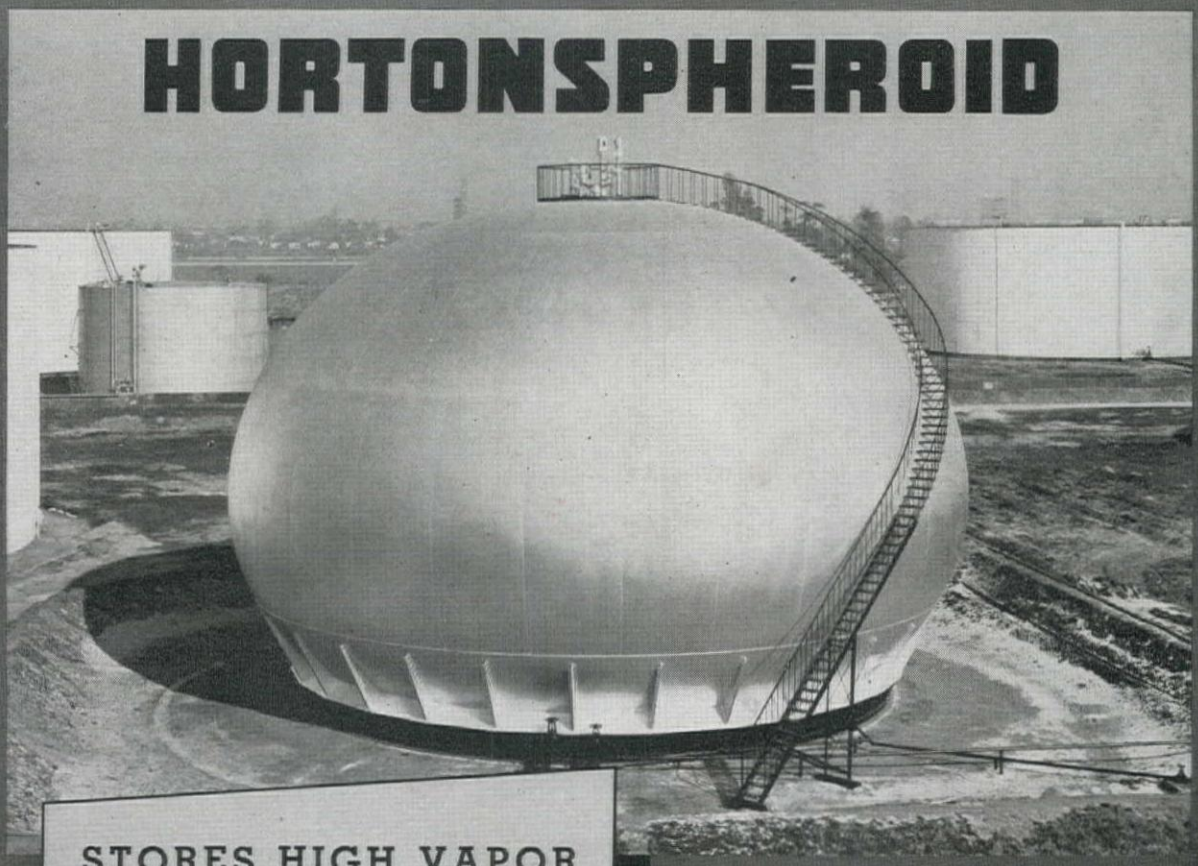
ESTABLISHED 1856

DIVISIONS: *Crocker-Wheeler Electric Manufacturing Company; Pomona Pump Company*

HENDY

MANUFACTURING PLANTS: SUNNYVALE, LONG BEACH, POMONA AND TORRANCE, CALIFORNIA; AMPERE, NEW JERSEY; ST. LOUIS, MISSOURI
BRANCH OFFICES: NEW YORK, WASHINGTON, PHILADELPHIA, PITTSBURGH, CHICAGO, ST. LOUIS, SAN FRANCISCO, LOS ANGELES

HORTONSPHEROID



STORES HIGH VAPOR PRESSURE BLENDING STOCK FOR AVIATION GASOLINE

... at a Western Refinery

• Expansion of cracking and polymerization facilities at a large refinery on the Pacific Coast has helped to increase its capacity for manufacturing aviation gasoline. The high vapor pressure blending stock used in making aviation gasoline is produced in a special fractionating unit at this refinery. To protect this stock from evaporation and deterioration, it is stored in the Hortonspheroid shown above. This unit has a capacity of 25,000 bbls., and is designed to withstand an internal pressure of 15 lbs. per sq. in.

Here's one example of the manner in which Hortonspheroids are being used to reduce costly evaporation losses from volatile oil products. Many other types of pressure storage problems are being solved daily through use of the Hortonspheroid.

CHICAGO BRIDGE & IRON COMPANY

San Francisco.....1013 Rialto Bldg.	Houston.....5621 Clinton Drive	New York.....165 Broadway Bldg.
Birmingham.....1598 N. Fiftieth Street	Tulsa.....Hunt Bldg.	Philadelphia....1700 Walnut St. Bldg.
Chicago.....McCormick Bldg.	Cleveland.....Guildhall Bldg.	Washington.....330 Bowen Bldg.

Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PA. *In Canada:* HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER
April, 1943 Vol. 18, No. 4

Flood Control Dividends

IT WOULD scarcely be possible to find a better example of the value of flood control than is to be seen in a comparison of recent storms in Oregon and southern California. The comparison is particularly appropriate since the floods occurred within a few weeks of each other.

Los Angeles County, California, has been visited numerous times by disastrous floods, which have cost millions of dollars, many lives, and incalculable loss of time and social disarrangement. It is subject to "flash" floods, violent swirling deluges from the mountain canyons, which carry trees, boulders, mud and any objects which stand in their path onto the lowland valleys and plains, grinding every man-made development to dust and frequently scouring new channels through highly developed areas. This destruction occurs very quickly and in a day or two, the channels are once more dry "washes." Such a flood occurred on Jan. 21-23 of this year.

The Willamette River in Oregon is also subject to frequent flooding. The type of inundation in this case is the slow continuous rise, and gradual recession, rather than the "flash" type, since heavy timber stands in the mountains and less urban and paved areas tend to retard and flatten out the peak flow. During the first days of January this year, continuous high rainfall caused that peak in the Willamette to reach a level not equalled in the past 20 years.

Following a particularly disastrous flood in the Los Angeles area during the winter of 1913-14, the Los Angeles County Flood Control District was organized. Because of financial limitations, the comprehensive program worked out by its engineers was never completely developed, and numerous of the projects were known to be of inadequate or light construction. Even these were of demonstrable protective value, but more or less serious damage continued to be experienced from time to time until 1938, when a serious flood caused excessive loss.

At this point the U. S. Engineer Department stepped in with large funds and manpower, cooperating with the county agency and adopting much of its program, while adding other projects of its own. As a result, the damage from the very severe storm of Jan. 21-23, which at one point established a nation-wide rainfall record of 26.12 in. in 24 hr., was negligible, the only trouble arising in Rubio Canyon, lower San Gabriel River, and a few other minor localities, where completion of projects had been delayed by the war. No damage occurred to any defense or industrial area.

In the Willamette valley, two dams of a U. S. E. D. program of seven, had been completed. These two functioned perfectly, and undoubtedly contributed to a reduction of the loss in the lower part of the valley. However, they were woefully insufficient to completely restrain or retard the water, with the result that an industrial dam, a bridge and various wharfs were damaged, railroads, streets, and residence and industrial areas were inundated. Damage estimated at $5,000,000 was listed.

No criticism of the Oregon program is intended, since it, like much other needed construction, has been stopped or retarded by war activity. But a comparison of the damage arising from the two storms which occurred so close together presents such telling evidence of the value of a well-planned comprehensive flood control program that *Western Construction News* feels it should be brought to the attention of its readers.

There are many other areas in the West which are unprotected or in which inadequate flood control systems have been constructed. Governing bodies in these areas might well engage competent engineers now for an immediate start on designing such work for construction in the post-war period, and capable fiscal authorities to investigate the financing. Doing the job right means a great deal of study of rainfall, runoff, channels, damsites, and economics. The complete program includes dams, both major ones and check dams near tributary sources, channel protection, spreading areas, reforestation, and proper discharge outlets. This program cannot be prepared in a few days or months, but requires much and competent direction.

Unemployment Among Civil Engineers

A GREAT BOOM in war construction is inevitably followed by a gradual slowing-down of activity. In line with this problem, the Board of Directors of the American Society of Civil Engineers appointed a committee last year to study the date and extent of this prospective unemployment as applied to civil engineers.

The committee found two conditions to be apparent, that the war construction program reached its peak both in volume of construction and number of engineers employed during August 1942, and that the program was nearly over early in 1943 so far as employment of engineers is concerned.

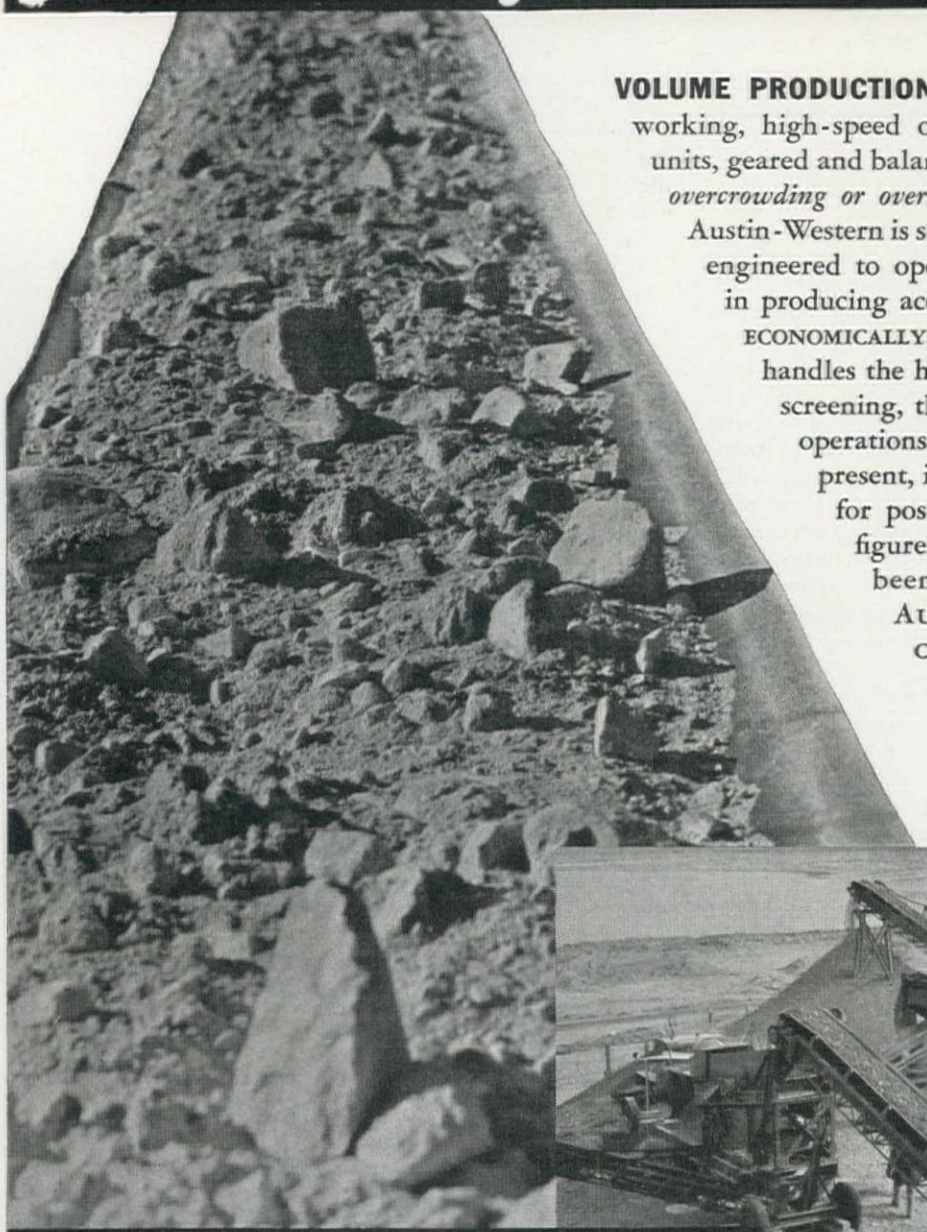
The Secretary of the Interior in a general statement said that the peak month of war construction was August 1942 when 1,675,000 persons were employed in publicly financed construction. By midsummer of 1943 the expected figure will be reduced to 48.5 per cent of the peak, and later in the year only 24 per cent of the maximum 1942 peak will be employed. These figures cover employment of all classes, thus for engineers the downward trend was realized much sooner.

The War Department program of about eight billion dollars in 1942 will drop to about one billion dollars in 1943, and the 1943 expenditure will be largely unfinished construction requiring only routine supervision.

More factual data could be stated here but this sketch is enough to convince one that the retrenchment in the ranks of civil engineering is already here. A modifying factor is that many of the engineers employed in the early part of the war construction program have already joined the various services, so that the interpretation of the employment figures isn't altogether correct.

Several solutions to this condition are possible, as recommended by the committee. One is that engineers will have to seek employment in the war industries rather than in war construction activities, another partial solution is the transfer into the technical units of the armed forces where there is still a large amount of construction to be done, and finally in the development of post-war engineering projects to relieve the pressure of unemployment after the war.

Yardage that yields PROFIT!



VOLUME PRODUCTION PAYS, but it takes a steady working, high-speed outfit. One with big capacity units, geared and balanced to operate *without fear of overcrowding or overloading*. The new Twin Unit Austin-Western is such a job. It's a two-plant team engineered to operate together (or separately) in producing accurately sized aggregate VERY ECONOMICALLY, IN EXTRA LARGE VOLUME. One handles the heavy or primary crushing and screening, the other the fine or secondary operations. Though built for war use at present, it is well to keep them in mind for post-war work. Verified tonnage figures, of plants now in use, have been extremely favorable. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois, U. S. A. Distributors in Principal Cities. Cable Address: AWCO, Aurora.

Twin-Unit teamwork on this important war job kept the stone requirements well ahead of schedule.

BUILDERS OF ROAD MACHINERY

Austin-Western

SINCE 1859

These plants including **POWER GRADERS, ROAD ROLLERS, STREET SWEEPERS, SHOVELS, CRANES AND KINDRED EQUIPMENT** *are Sold and Serviced by*

ARIZONA:
Smith Booth Usher Co.
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CALIFORNIA:
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San Francisco
Smith Booth Usher Co.
Los Angeles

COLORADO:
Liberty Trucks and Parts Co.
Denver

NEW MEXICO:
The Harry Cornelius Co.
Albuquerque

OREGON:
Columbia Equipment Co.
Portland

MONTANA:
Western Construction Equipment Co.
Billings

NEVADA:
C. D. Roeder Euipment Co.
Reno

UTAH:
Western Machinery Co.
Salt Lake City

WASHINGTON:
Columbia Equipment Co.
Seattle

WYOMING:
Wilson Equipment & Supply Co.
Cheyenne

WESTERN CONSTRUCTION NEWS
APRIL • 1943

Pan-American Road Rushed

SURVEYOR'S CABLE CROSSING over the Rio Union in Costa Rica. The hazardous preliminary surveys through the wild jungle country were started by the United States Engineer Department in July, 1942.

Because of its effect on continental solidarity and its long-range military value, the Pan-American Highway is rapidly being pushed to completion through the Central American republics by the efforts of the Corps of Engineers, the P.R.A., and private contractors

By HAROLD E. SPICKARD
Major, Corps of Engineers
Executive Assistant, Pan American Highway
United States Engineer Office
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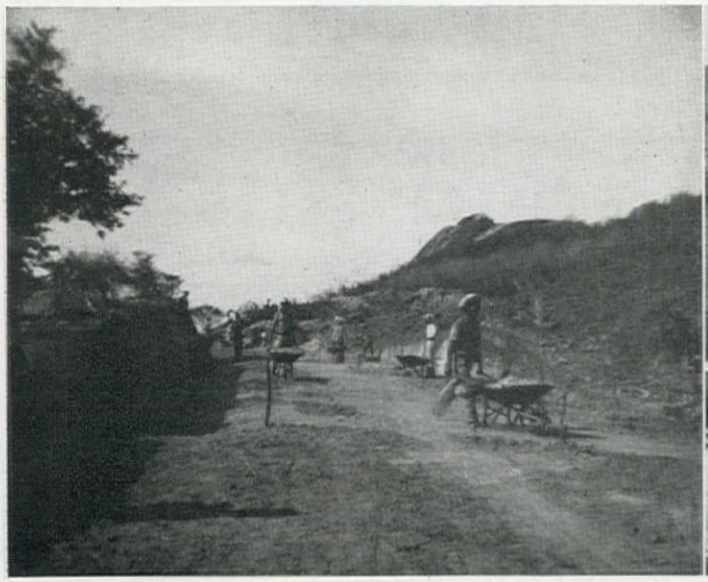
DURING JUNE of 1942, the War Department decided that the uncompleted portions of the Pan American Highway through Central America should be constructed more rapidly in the interest of continental solidarity and for its long range military value.

Following this decision, orders were issued appointing Colonel Edwin C. Kelton, Corps of Engineers, as Director for the Pan American Highway. Colonel Kelton at that time was District Engineer for the Los Angeles Engineer Office, where he had been serving since September, 1939.

Conditions of the constructed portions at this time are as follows: In Mexico, from Nuevo Laredo to Oaxaca, southerly of Mexico City, the road has been paved for a total distance of 1,108 mi. Between Oaxaca and the Guatemala border there remains 530 mi. to be constructed. All work in Mexico is being handled by the Mexican Government. However, there exists a standard gage railroad through Mexico from the United States to the Guatemalan border at the Suchiate River crossing. A contract has recently been awarded for improving the southerly 500 mi. of this railroad. Therefore, supplies can be shipped to Guatemala over standard gage railroads from any point in the United States.

The work being done by the Corps of Engineers in the Central American Republics consists of the survey and construction of the uncompleted portions of the Pan American Highway as an all weather pioneer road throughout the Central America republics.

In Guatemala the work consists of reconditioning existing roads and relocations to shorten the route over a total distance of 307 mi. In El Salvador, the road is already paved from the Guatemalan border to San Miguel. The portion from San Miguel to the Honduras border at the Goascoran River is now under construction, a distance of 37 mi. In Honduras the road is under construction from the Salvador border to the Nicaragua border, a distance of approximately 92 mi. In northern Nicaragua, from the Honduras border to Sebaco, the road is under construction for a distance of 73 mi. From Sebaco via Managua to Diriamba, the road is completed for a distance of 94 mi. From Diriamba to the Costa Rica border, the road is under construction for a distance of 65 mi. In Costa Rica, from the Nicaragua border to San Ramon, the road is under construction for a distance of 152 mi. From San Ramon to Naranjo the pavement is being reconstructed for a distance of 13 mi. From Naranjo via San Jose to Cartago, the road is completed, a distance of 48 mi. From Cartago to San Isidro del General, the road is being constructed under the supervision of the Public Roads Administration, a distance of 70 mi. From San Isidro to the Panama border the road is under construction for a distance of 91 mi. In Panama, from the Costa Rica border to David, the road is under construction for a distance of 67 mi. From David to Panama City, the road is completed and passable, although narrow



ROADWORK performed by native hand labor in El Salvador is pictured at the left, while construction of a masonry bridge pier on the Rio Viejo in northern Nicaragua, is shown at the right.

and rough over some portions for a distance of 308 mi.

In summary, there are 898 mi. either being reconstructed or new road being built under the supervision of the Corps of Engineers and an additional 70 mi. being constructed under the supervision of the Public Roads Administration, or a total of 968 mi. being built or reconstructed to complete the gaps between the Mexico-Guatemala border and Panama City.

The work was planned and is being carried out in collaboration with the Public Roads Administration and with the approval of each Republic through which the road passes. Permanent bridges on the alignment of the Inter-American Highway were determined to be the obligation of the PRA. A contract has been let by the Public Roads Administration for the construction of seventeen steel bridges, four of which are located in Nicaragua, ten in Costa Rica, two in Honduras and one on the El Salvador - Honduras border. In addition, concrete box culverts and corrugated pipe culverts are being constructed after approval by PRA along the regular alignment of the Inter-American Highway, the installation being done by the contractor working under the supervision of the Corps of Engineers. All other temporary bridges and culverts are designed and constructed by the Corps of Engineers throughout the six republics.

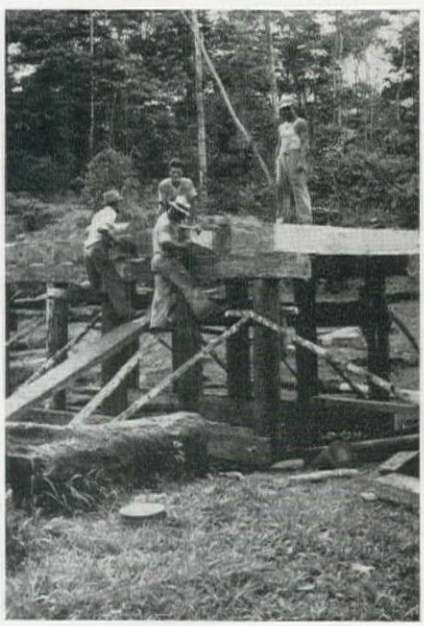
Costs of the construction of the pioneer road and temporary bridges and culverts will be paid from funds furnished by the War Department and the costs of permanent bridges constructed under the supervision of PRA will be paid from funds as provided by Public Law No. 375.

Contracts

In Guatemala, a contract was entered into between the governments of Guatemala and the United States for construction of the road within the Republic of Guatemala; in El Salvador, a contract was entered into between the governments of El Salvador and the United States for the construction of the uncompleted portions of the highway within El Salvador. In the Republic of Honduras the contract was negotiated with Swinerton-McClure-Vinnell, Los Angeles, Calif., for the construction of the highway within Honduras. This contractor also is constructing the road in the northern section of Nicaragua. For the southern section of Nicaragua the contract was entered into between Nicaragua and the United States for the construction of approximately 65 mi. of road.

In northern Costa Rica the United States Engineers are constructing the road with Government owned equipment and on a hired labor basis. Between San Ramon and Naranjo the contract was entered into between the governments of Costa Rica and the United States for the reconstruction of the pavement between those points. From a point beyond Cartago near El Empalme to San Isidro del General the contract was entered into by the PRA and the Ralph Mills Company, Roanoke, Va., for the construction of that section of the road. For the southern portion of Costa Rica and the northerly portion of Panama the contract was entered into between the Martin Wunderlich Company, Jefferson City, Mo., and the United States for construction of that portion of the road. The bridges being constructed under the supervision of the Public Roads Administration are in accordance with the contract entered into with the Frederick Snare Corporation.

TEMPORARY timber culverts are built in place by American workmen of timbers cut from the forests nearby. Bridge work is under direction of the Public Roads Administration, and contractors.



The plans call for a graded roadway with a minimum roadway width of 16 ft. for the narrowest portion and a minimum width of 22 ft. for embankments. Widened portions are constructed at intervals to provide ample room for passing of convoys. The entire road is to be surfaced with gravel or crushed stone. The maximum ruling grade is 7 per cent with 10 per cent being permitted in extraordinary cases. The minimum curvature attempted is 10 deg. with an increase to 20 deg. under unusual conditions.

Survey parties were employed in the latter part of June and were transported to Central America by July, 1942, traveling from the United States by air. Survey camps were established along the road to be surveyed as rapidly as possible. This was during the rainy season and means of access to these points were very difficult. In many cases it was necessary to travel from the base headquarters to points along the line by air, and also to furnish supplies to the parties by plane. Travel by the parties from the camps was generally accomplished on horses, or mules, or on foot during the entire rainy season.

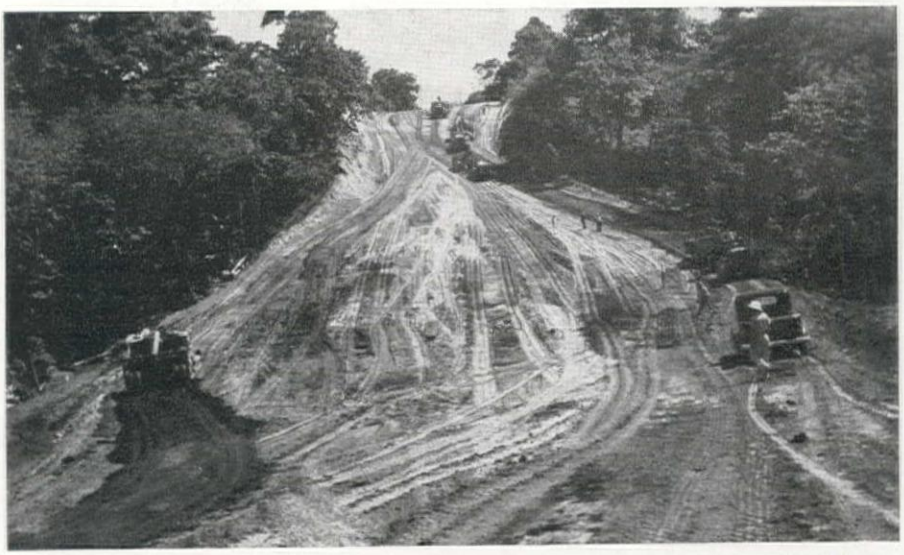
Equipment and labor

Shipments of equipment were made from the United States and some from

the Panama Canal zone. Many obstacles were encountered in obtaining shipping, and consequently there was considerable delay in beginning construction. At the present time work is progressing in most of the republics at a rate which is considered satisfactory. In others, due to the delay in obtaining equipment at the site and the fact that rains have continued during the so-called dry season, the progress has been slow. In most of the countries pilot access roads have been provided which are satisfactory to pass over with equipment and supplies to carry on the work during the dry season, but these access roads, which are not surfaced, will be practically impassable during the rainy season.

Skilled labor has been obtained in the United States and transported to Central America by the American contractors. Approximately 90 per cent of the employees on work being performed by the United States contractors are natives and on the contracts being performed by the various republics practically 100 per cent of the labor are natives of the country.

No definite date can be given at this time for the final completion of the road, and it must be emphasized, there is no access by highway to the northerly portion in Guatemala, between Oaxaca in Mexico, and the Mexico-Guatemala border. Therefore, it cannot be considered likely that the use of this road for tourist travel can possibly be made until after the war is ended. It will have a military value as required, and can be used for that purpose during the emergency as soon as grading and surfacing have been completed.



HEAVY CONSTRUCTION machinery engaged in heavy cut and fill excavation in southern Nicaragua. Maximum grades are kept at 7%, except in unusual circumstances. It is interesting to compare this picture with that of hand labor, opposite page.

Historical

At the Fifth International Conference of American States, held in Santiago, Chile, in April, 1923, a resolution was drawn which called for study by the Pan American Union of an Inter-American Highway. In June of the following year, thirty-eight of the leading highway experts representing Latin American countries visited the United States in order to study highway development in this country. The Pan American Confederation for Highway Education was organized during the course of this visit. In the following year, 1925, eight delegates from the United States attended a meeting of the Pan American Congress of Highways in Buenos Aires.

The Sixth International Conference of American States met in Havana, Cuba, in February, 1928. The Seventieth U. S. Congress in March, 1929, under Public Resolution No. 104, appropriated a fund of $50,000 to be used for a reconnaissance survey of an Inter-American Highway. In October of the same year the First Inter-American Highway Congress assembled at Panama City with delegates from the United States and each of the Central American Republics. The Pan American Union was requested to recommend that construction of connection roads in each country be completed within five years.

In June, 1930, the Department of State granted approval for designation of a technical committee to cooperate on a reconnaissance survey; field surveys were begun the same month in Panama and by May, 1933, the field reconnaissance was completed. The report of this investigation by the Bureau of Public Roads, "Proposed Inter-American Highway" was published the following year. The routing was planned on the basis that "so far as possible" use would be made of existing highways and connecting, if feasible, all capital cities of the Republics. The line of survey totaled about 1,400 mi.

Cooperation was secured from all of the countries to be traversed, although El Salvador and Mexico did not officially request that surveys be conducted there since the route through those countries had already been largely determined. Mexican officials stated that work was progressing on the Nuevo Laredo-Rio Suchiate route and it was hoped that this highway when completed would constitute a section of the proposed Inter-American Highway. The report concluded that between Laredo, Texas, and Panama City the Inter-American Highway would total 3,247 mi. Along this route it was determined that 1,300 mi. were already constructed to a suitable standard, and 260 mi. were being constructed.

From the first conception of the work outlined above, discussions and plans favored construction of an Inter-American Highway which would serve to connect centers of trade and culture in the two Americas. Shortly after the declaration of war on the Axis, it was decided to proceed immediately to complete the essential portions of a military road through the Republics of Central America which would terminate at Panama City. Public Law No. 375, passed December 26, 1941, by the 77th Congress, authorized appropriation of $20,000,000 to construct and complete such a highway, provided one-third of all expenditures be met by the interested countries.

MODERN MACHINERY is invading the jungle of Guatemala for construction of the important Inter-American Highway, making progress that astounds native laborers.

Post-War Construction Plans

Tremendous population increases in the West, combined with new industries, power resources, and transportation facilities, indicate great construction needs at the war's close, including homes, water supply, sanitation, commercial structures

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ONCE A TEMPORARY post-war scarcity of building materials and construction equipment is overcome by resurgent peacetime industry, there should be sufficient demand for new construction in the western states to keep contractors and building trades workers operating at a high level for years to come. This will be especially true if the United States, through careful management of fiscal policy and full utilization of its resources, achieves full employment and a higher peacetime national income. Prospects for realizing these objectives are increasing.

The war has lifted the West to a position of greater importance in the economic life of the Nation. Not only have the states west of the Rocky Mountains gained a larger proportion of the national population; they have acquired new basic metal industries, tremendous electric power capacity, new air transport and ocean shipping facilities, and new sources of raw materials. The stage is set for post-war expansion of trade within the western region, between the West and other sections of the Nation, and between the Pacific Coast and Alaska, Australia and the Orient.

All this represents opportunity for the construction industry. But just how great will be the magnitude of the building program that may be expected? How many construction workers can be employed by 1950? What are some of the problems that face the building industry in the West?

Population growth

Population growth is a rough index of construction needs. While figures are not available for all the western states, estimates of increases in states that have experienced notable wartime expansion may serve to give some idea of the work to be done when the Axis has been defeated. Between April, 1940, when the last census was taken, and war peak, which should be reached late in 1943 or early 1944, it is estimated that the resident civilian population of California will have increased more than 700,000, that Arizona will have gained more than 50,000, and Utah more than 90,000. Not all this wartime upswing in population can be attributed to migration from other states, for Dr. Stork has been busier than usual since the war began. But even if 25 per cent of those who came from other states return to their former homes after the war, the new peacetime population will be impressively larger than in 1940. And there is always the possibility that the West may be the magnet for a new influx after this war as after World War I.

The wartime population gain has not been spread evenly throughout the West. Since most of the aircraft plants, shipyards, military establishments, and munitions plants built in the past three years have been concentrated in major industrial areas, these centers have received the bulk of the newcomers. The San Diego metropolitan district, for example, has grown as fast or faster than any other metropolitan area in the West. At the war peak it will have gained more than 100,000 new residents, an increase of 40 per cent or more. Greater numerically but less proportionately is the estimated increase for the San Francisco-Oakland metropolitan district. At war peak this area probably will have nearly 400,000 more civilian residents than in 1940. This will be a gain of more than 25 per cent.

Little rural growth

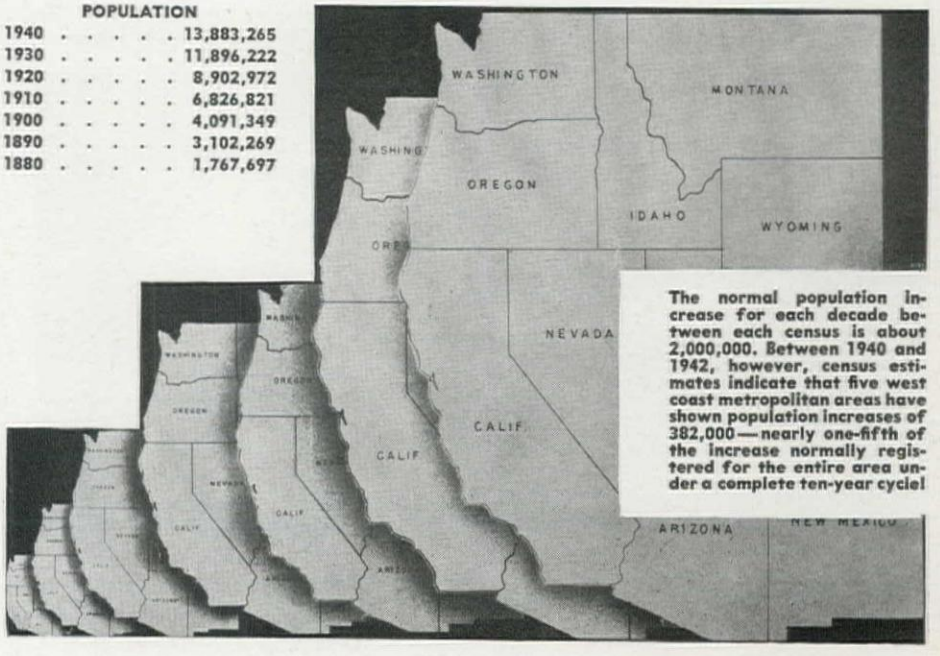
After the war, most of the people living and working in the urban areas probably will endeavor to stay where they are rather than drift to the rural areas. Some new farm acreage will be opened to settlement in the post-war years, but no great increase in agricultural employment over pre-war figures may be expected. The farms are becoming more mechanized and farming more commercial. Labor-saving devices and skilled management are reducing employment opportunities in the fields and orchards as in many types of manufacturing.

Construction activities after the war will be concentrated in urban areas, except for such major developmental projects as dams, state highways, bridges, and aqueducts. Metropolitan districts, especially, will require the services of builders. Since not even Federally-aided public works programs enabled these communities to keep abreast of construction needs during the 1930's, the amount of unfinished business before their engineers was large when the war began. With huge population increases since 1940, these areas have added to their agenda a long list of post-war "musts." These include not only repair work on existing facilities, but new sewers, storm drains, extensions to water supply systems, schools, parks, recreation centers, streets and freeways, and public buildings. Obsolescent neighborhoods need rebuilding, temporary war housing must be replaced, and whole new subdivisions of family dwellings must be constructed to provide for people who have been cramped into pint-size quarters during the war.

Projects now prepared

Already a number of cities, counties,

POPULATION	
1940	13,883,265
1930	11,896,222
1920	8,902,972
1910	6,826,821
1900	4,091,349
1890	3,102,269
1880	1,767,697



The normal population increase for each decade between each census is about 2,000,000. Between 1940 and 1942, however, census estimates indicate that five west coast metropolitan areas have shown population increases of 382,000—nearly one-fifth of the increase normally registered for the entire area under a complete ten-year cycle!

and states have begun to prepare six-year programs of public works to be undertaken when the war ends. These programs not only will enable governmental units to catch up on long-postponed capital improvements but will provide considerable employment for fighting men returning from overseas and for displaced war workers. The State of Nevada; San Mateo County, Calif.; the Bureau of Engineering of the City of Los Angeles; Reno, Nevada; and Inglewood, Calif., recently have completed programming needed public works. San Diego has issued a preliminary report on its post-war program. Phoenix, Arizona, soon will complete its "shelf" of necessary projects, while Tucson, Arizona, is actively working on its program. In Utah the cities and counties in the vital Wasatch Front war area, which includes Salt Lake City, have submitted public works projects as part of a comprehensive developmental plan for the area.

The California State Planning Board has published a preliminary report on a proposed Ten-year State Public Works Plan. Thus far, 20 state agencies have submitted approximately 2,800 projects, estimated total cost of which would be $600,000,000. Agencies not yet fully represented will increase this figure. Highway projects will bring the total to more than $2,000,000,000.

As these proposals constitute far too large a volume of work to complete within a decade, the State Board has recommended that a State Public Works Committee be created by the Legislature to determine the order of priority of all projects.

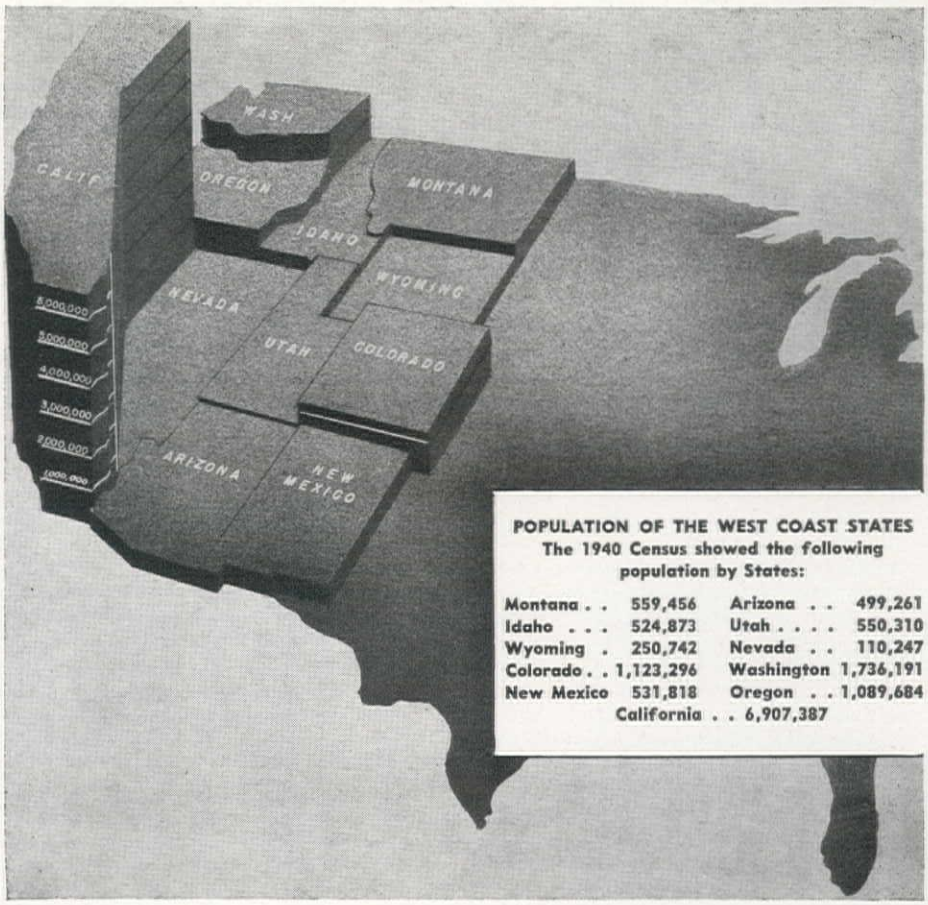
To stimulate programming activities, the National Resources Planning Board is furnishing consultant services to localities and states. In its recent report entitled "Post-War Plan and Program" the Board stated, "The public construction we shall undertake when the war is over should be planned now, and adequate authority and funds for such planning should now be made available by Federal, State, and local governments. The program to be planned for should be of such a character that it will facilitate, and carefully avoid hindering, our post-war industrial conversion to peacetime production, and should be designed, first, to bring our public facilities plant up to its proper level of serviceability, and then, to develop further the economic possibilities of the Nation."

The danger of planning too great a volume of public and private construction immediately after the war, when building material will be scarce, is that construction costs would tend to rise rapidly, as during 1919 and 1920, after World War I. As costs rose, popular dissatisfaction would increase, until before long numerous projects might be suspended, throwing men out of work and disrupting efforts toward readjustment.

Private enterprise encouraged

A post-war price rise can be avoided, however, if responsible public officials regulate their building programs so as not to place a strain on available supplies of material, equipment, and managerial talent. Private enterprise will want to initiate many projects after the war and should be encouraged to do so. These projects may utilize the preponderance of building material during the first year or two after victory. Still, there will be sufficient supplies for a reasonable volume of public construction. So long as private enterprise is able to provide large employment in construction, the public program can be restricted. But if private efforts falter, the value of a reservoir of public works plans can be demonstrated.

Lest the impression become widespread that public works alone could prevent unemployment and distress in the post-war period, the National Resources Planning Board points out that "the main reliance for an effective consumer demand must come from private activities taking the lead in opening of new enterprises and in using our new productive capacity. The Board is under no illusion that the construction industry, which now, with public and private activity combined, is at a peak of 11-14 billions, can control a national income of 110 billions."



POPULATION OF THE WEST COAST STATES
The 1940 Census showed the following population by States:

Montana . .	559,456	Arizona . .	499,261
Idaho . . .	524,873	Utah	550,310
Wyoming .	250,742	Nevada . .	110,247
Colorado . .	1,123,296	Washington	1,736,191
New Mexico	531,818	Oregon . .	1,089,684
		California . .	6,907,387

War-boom areas

The primary problem facing the war-boom communities after the war is not so much improvement and redevelopment of their physical features, important as these are, as it is reorganization of their manufacturing industries and trade and service activities. A post-war up-surge of business cannot be sustained unless continuous employment can be provided for the greatly enlarged working forces of the metropolitan areas. Establishment of new industries, conversion of war plants for peacetime production, development of better methods of distributing goods, and extension of public and private services must bring the building demand which the construction industry anticipates.

Examination of wartime and probable post-war changes in employment will disclose the task confronting the business and industrial interests of the West. Studies under way in the Berkeley, California, Field Office of the National Resources Planning Board indicate that in California, most populous of the western states, employment will have risen from 2,525,000 in 1940 to 3,350,000 or more by war peak. Suppose one-fourth of the workers who migrated to the state during the war depart when Hitler and Hirohito surrender and that one-half of the women who were employed after 1940 no longer desire to work. Suppose also that during the first year after victory only one-third of the Californians who served in the armed forces are demobilized and that employment in every major activity remains fairly high, considering the times. Even under these favorable circumstances some 500,000 workers probably would be temporarily out of a job.

This is only slightly more than the number who were unemployed in California at the beginning of the war. Presumably many of these jobless men and women gradually could be reemployed as plants were retooled and converted and as new retail ventures sprang up and the service trades revived. In a few years

nearly everyone who wanted to work might be hired. Under these circumstances the State's construction industry would enjoy a relatively rapid post-war comeback and might be providing employment for 200,000 or more workers annually, compared with 152,000 in April, 1940.

But suppose adverse conditions beset the Nation and the West and unemployment one year after the war rose to 1,000,000 or more in California. The State then might be a decade or more reshaping its economy and creating steady jobs for its unemployed. The revival of the construction industry might be short-lived.

Communities alert

Fortunately, business men and public officials in western communities show no disposition to drift into the post-war period minus plans for action. Post-war councils and post-war planning committees are springing up in localities throughout the West. In general, these groups include not only representatives of commercial and industrial organizations, but members of local planning commissions, civic clubs, welfare agencies, churches, educational institutions, and private research organizations. Their purpose is to survey carefully the problems the community must face after the war and to mobilize all available resources to weather the difficult transition period and build a better peacetime economy.

The Wasatch Front Area Plan now being developed under the auspices of the Utah State Department of Publicity and Industrial Development with the co-operation of the National Resources Planning Board is an example of community planning for the post-war era. The Salt Lake City-Ogden-Provo area has had one of the greatest relative wartime expansions in the Nation. Huge military establishments, a new steel mill, and several large war plants have been thrust upon this trade and transportation center in the past three years, disrupting the former pattern of activities and causing population curves to swing suddenly upward. Community leaders foresee the possibility of hard times unless concerted efforts are made to guide readjustments, convert war plants, revive trade and services, and provide more water and power. The State University, State Agricultural College, various Federal agencies operating in the area, business groups, and local officials are making significant contributions to the program for the years ahead.

The construction industry has much to gain by contributing to both national and community post-war planning. Since it is extremely sensitive to the ups and downs of the national economy, probably no other industry has been more in need of finding an economic climate relatively free from speculative heat waves and deflationary blizzards. The lot of the builders has been feast or famine—lush contracts in good times, stagnation or public subsidy in depression. This may be one of the reasons why that section of the industry represented by the Producers' Council already has established a Post-War committee which is working with groups representing government, finance, real estate, contracting, and labor.

Building industry's part

Because building has a continuing part to play in the advancement of American civilization, it merits a place on local post-war councils and committees. Local planning when combined with farsighted regional and national programs can aid materially in sustaining construction operations in the West on a high level.

Along with consideration of the broader aspects of planning, many leaders in construction already have begun to study possible industrial reorganization. Present-day building is a paradox of progress and reaction. In some types of construction the most advanced materials and methods have been adopted. In others, notably housebuilding, traditional handicraft methods persist. Now the war has hastened technological changes. Simplification and mechanization of the building process have gone forward rapidly. If some of the thorny problems of financing, overly stringent building codes, and various restraints imposed by labor and by manufacturers can be solved, the industry can play a larger role in the post-war economy than it has in the past.

The potential housing demand alone is enormous. In a recent National Resources Planning Board pamphlet entitled "The Role of the Housebuilding Industry," Miles Colean asserts that "the country could absorb anywhere from 900,000 to 1,200,000 new dwellings a year for the decade after the war and still be in need of a very large volume of repair during the same period." Streamlining production to bring costs down will open larger markets for housing.

The broader economic base which the war has given the West heightens the possibility that important prefabrication industries will be established in this region after victory. New sources of steel, aluminum, magnesium, plastics, and plywood have been created close to major western industrial areas. Much of the plant needed for prefabrication assembly lines already exists in the form of huge war plants that can be converted when military production is curtailed. Nor is western enterprise without tentative plans for mass production of houses. Two firms, for example, are thinking of manufacturing steel houses. Others are considering the use of plywood, light metals, and plastics.

The West, a growing region, can benefit from advance in construction to a greater extent than most sections of the country. Because of its wartime population expansion, it will require a huge number of dwellings, commercial structures, and public works. These can all be constructed by the latest methods and with the newest materials. Deterrents to technological improvement in building should be fewer in the West than in industrially more developed sections because western enterprise is still in a formative state and eagerly seeking innovations. Furthermore, the community planning movement seems to be gaining support more rapidly in western centers than elsewhere. If the desire for civic improvement ever becomes a popular driving force west of the Rockies, it can generate a momentum that will sustain a record volume of construction in the post-war years.

NOTE: This article is one of a series dealing with post-war construction planning for the West. The series, which began in the January issue, will continue in forthcoming issues.—*Editor.*

WPB Field Office Opens in Honolulu

COINCIDENT with the return to Hawaiian civil authorities on March 10 of certain functions now being performed by the Military Governor, the War Production Board will open an office in Honolulu to take over the administration of priorities in the Islands, it was announced by Chairman Donald M. Nelson.

Under the new arrangement, the new WPB field office in Honolulu will be under the jurisdiction of the San Francisco Regional Office. Immediate work in the Islands will be initiated by C. H. Mattheissen, Jr., formerly Director of the Bureau of Priorities in Washington, who will be assisted by Gilbert Kneiss, appointed to act for the San Francisco office by Regional Director Harry H. Fair. It is expected that the personnel of the Division of Materials and Supply, which has been passing on requests for shipping priorities received in Honolulu before their submission to the military government, will be taken over by the WPB office.

Full authority to assign preference ratings to orders to be delivered in the Islands has been delegated by Nelson to the San Francisco Regional Director, who may also grant exemptions from the provisions of WPB limitation and conservation orders, upon authorization by the Director General for Operations.

San Francisco Sewer Budget Shows Increase

SAN FRANCISCO Public Works Department has established a budget of $2,844,000 for sewer construction, reconstruction and repair during the 1943-44 fiscal year. This is an increase of $707,644 over the current fiscal year. In requesting a budget increase, the Public Works Department indicated that the construction of new sewers was considered essential to properly maintain the system, and that designs selected for construction in the next fiscal year are such that a minimum of critical materials would be required.

Barges of Concrete Found Economical

Construction has started in San Francisco on 350-ft., 10-hold ship-shaped concrete barges to help alleviate war shipping shortage—Craft being built by well-known construction contractor

CONCRETE POURING has begun on the first of 26 ship-shaped barges being constructed in Belair shipyard, San Francisco, Calif., for the Maritime Commission, by Barrett & Hilp, general contractors of San Francisco, who hold an $18,000,000 contract for that number of vessels.

The pouring of hull No. 1 climaxes 8 months of sustained, intensive effort which had transformed 70 acres of worthless mud flat into an efficient, well-planned, and completely equipped shipyard with all necessary facilities for actual construction. Grading was started for the yard on July 26, 1942, and the first concrete was placed in the hull on March 26, 1943.

Shipbuilding has come a long way since primitive man lashed a few logs together to make the first floating craft for transporting himself and his belongings. From stem to stern, today's ships are complicated engineering structures, upon which the finest technical designers are employed for days and months of careful calculation and tests. Concrete barges, built in standard ship shape are no less technical and complex than those built of steel.

Concrete ships are not new, vessels of concrete and steel having been built during the first World War. The program was adopted at that time because of the shortage of other materials, and it was felt that it was at least partially justified by a speed of construction which compensated for the excessive weight.

This weight factor cut down tonnage capacity and in some cases, engine vibration caused the rigid concrete hulls to crack. In the barges being constructed at the present time, changes have been instituted which are calculated to overcome the most serious objections to the older models.

Design improvements

The knowledge acquired during the past 25 years on the subject of concrete aggregates has been utilized to materially reduce the weight of the vessels, while the density and strength of their walls have been increased. The self-propelling feature has been eliminated, and the hulls will be used as barges, to be towed by ocean-going tugs. This will remove the factor of engine vibration and by saving the space required for both the engines and fuel storage, markedly increase cargo space. It is believed that these changes, combined with the ship-shaped design, affording the least possible resistance to the water, have developed a practical and efficient carrier, by all standards of appraisal.

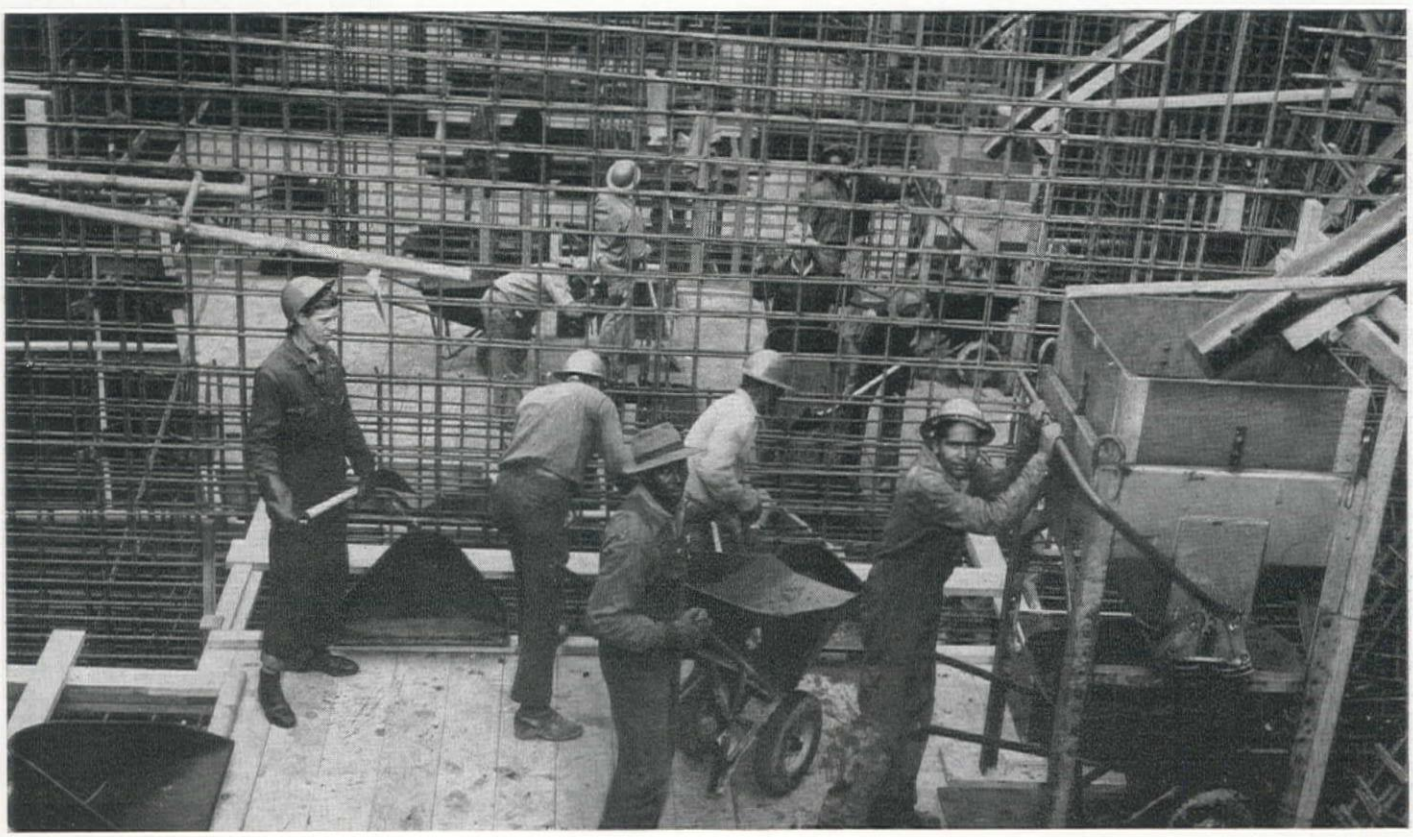
Each of the barges will be 350 ft. long, with a draft of from 26 to 28 ft. The concrete walls are 6 in. thick. They are designed to carry a load of approximately 5,000 deadweight tons.

About 2,400 cu. yd. of concrete will be used for each barge, and reinforcing steel weighing 1,000 tons will be required. This figure is noted as a comparison with the 2,500 tons of steel used in a steel ship of corresponding size.

Cargo space will be divided by transverse bulkheads into 10 holds, separated by concrete walls. The barges will be equipped with towing machines, pumps, generators and accommodations for a crew of 10 men. The pumps and other machinery will be operated by diesel engines.

Concrete and steel

Reinforcing steel is shaped and prefabricated in the yard, and is carried to its placement position by transit cranes.



ON A STAGE half-way down the hull, concrete is poured into chutes for distribution below. Welded reinforcing rods for the hold wall reduce available working space.

CONCRETE moves from the mixer to the hull in mixer trucks, and is chuted to hoppers inside. Outside plywood shell forms and reinforcing rods can be seen at the right of the photograph.

superstructure and miscellaneous items. Each pour is continuous until the section is completed. It is anticipated that the rate of pouring will approximate 43 cu. yd. per hr.

About ten days are allowed to elapse between each of the three pouring operations. After the final pour, another 10-day curing period will be allowed before the ship is launched.

The joints between the several pours will be sand-blasted to assure a tight-fitting connection and water-tightness. The completed vessel will thus be virtually a monolith.

One batching-plant will feed all six of the graving docks, delivery being made by mixing truck. Elevator buckets carry the concrete to hoppers just above the deck level, from which it is carried to the first set of chutes in rubber-tired concrete buggies. These chutes conduct it to stages half-way down the hull-side into secondary hoppers from which point other buggies take it to swinging jointed chutes reaching to the bottom of the ship for distribution. All concrete is tamped with mechanical vibrators to insure maximum density and smooth surface.

JOINTED swinging chutes enable workmen to distribute the concrete in the bottom of the hull. Air-driven vibrators tamp the concrete to make it dense, watertight and smooth-surfaced.

The 350-ft. rods for the bilges are butt-welded and pulled into the hulls through large tubes. After all the sections of reinforcing steel framework are set in place, they are welded into a single structure.

The concrete is placed in 3 pours for each barge. The first pour completes the bottom and bilges to a height of 8.3 ft. The second carries the hull and bulkheads to a point just below the deck level, and the third completes the deck,

Floating

The ships will not be "launched" in the accepted sense of the word. The forms are set up and the hull is poured in basins excavated to an elevation below sea level. When the barge is constructed and adjudged seaworthy, valves in floating gates at the ocean end of the basin are opened and water pours in. When the level inside reaches that of the water outside, the gates are floated back and the vessel is drawn out by a tug and removed to the outfitting docks. The hulls are placed in the ways with the prow pointing out, as contrasted to the backward launching usually used in steel ship construction.

When the Belair yard is completed and in full operation, the contractors feel that they will be able to complete one barge every two weeks.

George McKeever is general superintendent of the yard for Barrett & Hilp, and has supervised location and construction of stockpiles, shops, welding benches, steel fabricating and concrete batching plants, mold lofts and roadways so that they will be coordinated for the highest working efficiency.

Bureau of Reclamation Projects Given High Priorities to Speed Construction

FOUR BUREAU of Reclamation projects in the West have been given high priority ratings for critical materials to expedite power, rubber, and food output.

The projects are under construction in four states. One rating is for a transmission line to deliver power from a hydro-electric plant at Shasta Dam nearing completion on the Central Valley project in California. The Gila project in Arizona is given a rating for limited irrigation facilities to be available for the production of guayule rubber or food supplies. The other two relate to irrigation facilities for food production on the Buffalo Rapids (Montana) and the Buford-Trenton (North Dakota) projects.

The rating provided for the Central Valley transmission line will enable the Bureau to build facilities with wooden poles to carry electric energy from Shasta Dam to northern California points. Shasta power plant, to be completed in January 1944, will begin operation with two generators having a combined capacity of more than 140,000 kilowatts. Installation of these was cleared by the War Production Board last October to meet the increasing demand for power from war industries in northern California.

The Gila project near Yuma, Arizona, received a rating for the extension of facilities to irrigate 5,500 acres of land on the Yuma mesa. This acreage will be available next winter for the planting of guayule rubber if required by the Forest Service under the emergency rubber program. Otherwise, as soon as water is available it will be planted to alfalfa which is a standard crop in great demand in the Pacific Southwest to feed livestock for milk production.

Army authorities also endorsed the Gila development as a means of protecting installations at the new Yuma Air Base from damage by dust storms.

A rating was given for the completion of the Terry and Shirley units of the Buffalo Rapids (Montana) irrigation project. The facilities on these units are under construction and, on their completion this spring, water will be provided for the irrigation of 8,150 acres of productive land near Glendive, Montana. Construction on the Fallon unit of this project has ceased under a WPB stop-work order.

The Buford-Trenton irrigation project nearing completion near Williston, North Dakota, was given ratings which will provide materials to insure the irrigation of 14,800 acres this spring.

The principal products of the lands under the Montana and North Dakota projects will be alfalfa for meat and dairy commodities, sugar beets, and feed grains.

In each of these cases, the original work stoppage order issued by the War Production Board was removed or modified because the area affected will produce food or materials vitally needed in the war effort, and now short in production. No general grant of higher priorities for all Bureau projects has been issued, however, and none is contemplated. Projects which will not easily and quickly be put in production are not affected.

Salvage Tacoma Bridge Metal

The need for critical materials in the war program has caused Washington authorities to dismantle the wrecked Tacoma Narrows Bridge now, a project which would normally be part of the contract for the construction of a new bridge

BUILDING A BRIDGE is not unusual, even the building of a huge suspension span. It has been accomplished numerous times in the West. But the dismantling of one of these structures is a new experience for construction men, and one requiring nearly as much genius and originality as the original problem of erection.

When the 5,000-ft. Tacoma Narrows suspension span was opened for traffic in July, 1940, it was hailed as a construction triumph. When, however, previously uncalculated aerodynamic pressures caused longitudinal undulations in the deck of the bridge, on November 7, 1940, the structure collapsed.

The destruction of the bridge was so complete that no portion of the structure was available for re-erection. The entire main span deck was lost in the channel. Approach spans were broken and bent. Suspender cables were nearly all broken off short and the main cables were distorted and numerous of their individual wires were broken. Release of the weight of the main span caused deflections in the supporting towers and warping of their plates to such an extent that these also were unfit for re-use. The only parts of the structure which remained salvageable were the tower piers and cable anchorages.

A new bridge has been designed to replace the wrecked structure. It will also be a suspension bridge, but will have a much smaller length-width ratio, since it is being designed so as to accommodate a 4-lane highway. The girders on the new structure will be of the truss type rather than solid as in the original design, and other features discovered in the aerodynamic laboratory of the University of Washington will be incorporated.

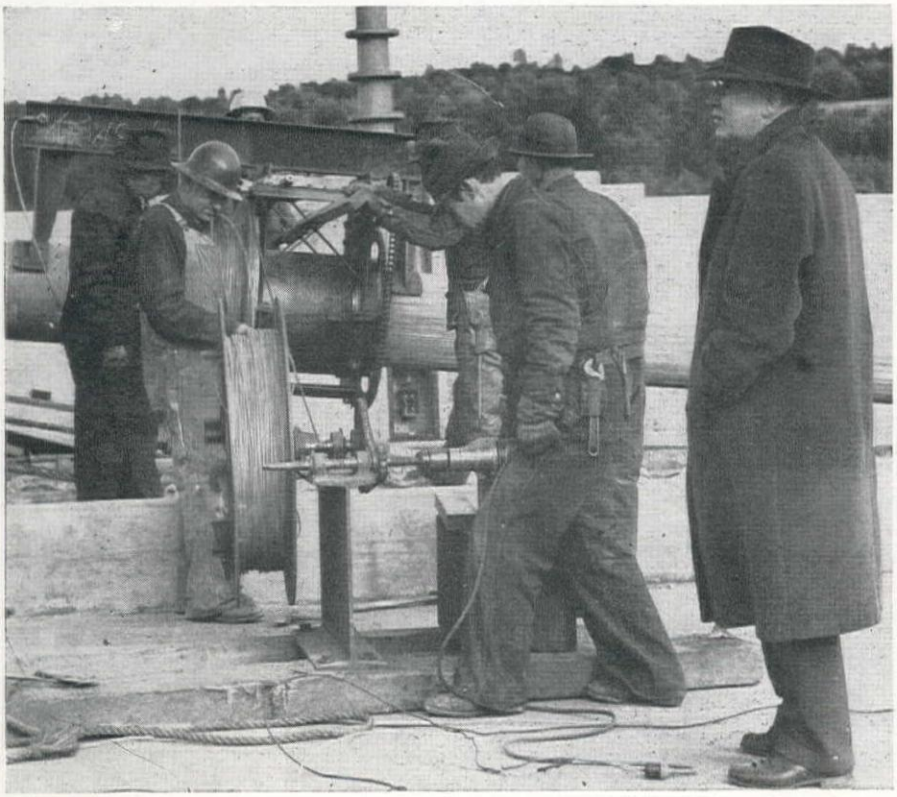
The normal procedure would be to include the final dismantling of the remains of the wrecked span in the construction contract for the new one. However, the need for scrap steel in the war effort is so pressing at this time that it was decided to proceed at once with the wrecking.

PERSONNEL for the contractor on the project are, left to right, "BUCK" BUCKNER, foreman; GROVER A. McCLAIN, general superintendent; ANDREW ZORE, general foreman.

The first proposal was discarded because the bids were too high. The job is now proceeding on a cost-plus basis, the contract being awarded to J. Philip Murphy of San Francisco, Calif., and Woodworth & Co., Inc., of Tacoma, Wash. It is estimated that there are over 3,900 tons of wire in the cables and that 3,800 tons of structural steel remain standing in the towers. In addition there are some miscellaneous items of electrical equipment, lead, zinc, etc.

Because of shortages of material, it was impossible to purchase any machinery to use in this interesting dismantling operation and ingeniously contrived rigs have been conceived and built of scrap metal on the site of the job. Axles and gears taken from old motor trucks have been used for power transmission. Parts of three of the four original maintenance scaffolds, which remained intact after the collapse of the bridge, were rigged together to form one, which travelled along the cables with power supplied through Beebe hoists, thus eliminating the need of a catwalk. Cylinders, reels, and power transmission equipment were all salvaged on the spot.

REMOVING the wrapping wire from the unwinding machine. The machine was entirely homemade, and used a ¾-in. electric drill for power to turn reel and cylinder.



Removal of wrapping wire

The first operation was the removal of the 120 tons of wrapping wire from the main cables. A homemade unwrapping machine was devised, consisting of a split cylinder about 4 ft. long, which was mounted so as to rotate in a frame which slides along the cable. Outside of this cylinder a free floating reel on ballbearings rolled concentrally with it against the lay of the wire which fed through a guide made from a piece of curved pipe, the only connection between cylinder and reel being the wire. Being larger in diameter than the cylinder, the reel rotated at a slower speed, and a tension was maintained by braking it slightly. Power was transmitted to this setup by

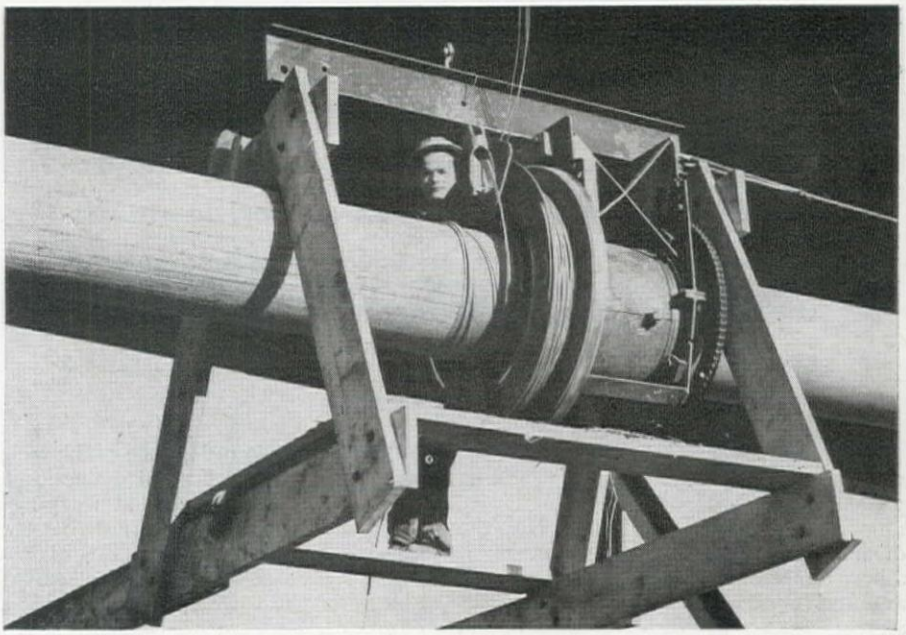
means of electric drills which rotated the cylinder at approximately 50 r.p.m. until about 200 lb., or 3,500 lin. ft. of wire were wound on the reel. The wire was then cut and rewound on a collapsible swift, removed as skeins and lowered to a boat in the channel below. By means of this procedure the entire wrapping wire and all cable bands were removed in twenty days. The hangar ropes (approximately 30,000 lin. ft. of 1¼-in. wire rope), lead calkings and zinc fillers were salvaged as the moving scaffold proceeded from one end to the other.

Main cable removal

The second step of the demolition project was that of unspinning the two main cables. Four machines were set up at the east anchorage, each carrying six 54-in. demountable reels. Individual wires in the main cables were cut at either end and attached, one to each of these 24 reels. The reels were then rotated simultaneously, pulling in 6,000 ft. of No. 6 bridge wire per "trip."

The outer rim of these reels was demountable in order to facilitate removal of the wire coils. Each 6-reel unit was driven by a 35 h.p. slip-ring motor through reduction gears made from truck rear axles and sprockets and chains.

As the retrieved strands were wound in they rode along the main cables supported by "Molly Hogans," or U-shaped loops of wire suspended from the two original hand ropes running about 3 ft. above the cables and about 8 ft. apart, the loops extending under and around the body of the cable. Comparatively little difficulty has been experienced with the wire running, with the exception of a few snarls towards the end of the job and an occasional wire that was hard to start. Approximately 115 tons of wire were removed during an average day's run of 8 hrs. All cable wire and hand rails have now been removed and the third step of the operation, namely, dismantling the towers, has begun.



THE WRAPPING wire unwinding rig is shown being operated by "Kelly" Currah at the west end of the bridge under the approach span.

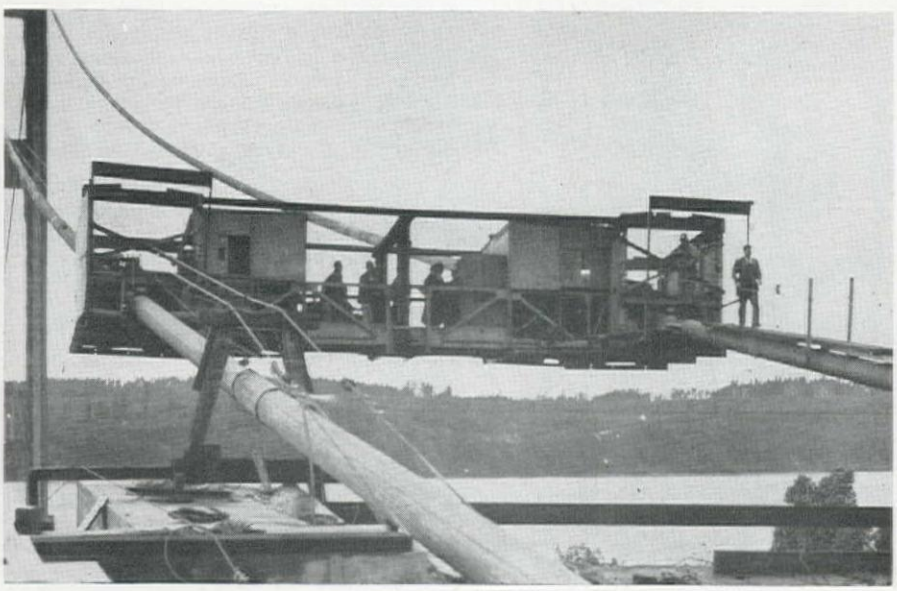
Tower demolition

The structural steel in the towers, most of which is in the form of usable plate, will be removed by Chicago booms especially designed for the job and constructed entirely of salvage material. These booms will be stepped up from bottom to top of each tower leg, which will serve as the boom mast. A boom seat will be fastened at the bottom of each leg in alternating order and each boom will lift the other until they reach the top of the 420-ft. towers. The whole procedure will be reversed after the top lifts are removed and the work progresses downward. There will be eleven 40-ton lifts on each tower leg. The progressive boom seats will be secured by bolting through rivet holes in the leg plates.

At the present time the saddles and top castings, as well as the higher plates, have been removed from the east, or Tacoma tower, and it is anticipated that by July 1 the work of removing both towers will be completed.

Charles E. Andrew, Chief Consulting Engineer for the Washington Toll Bridge Authority, is in charge of the project and was also in direct charge of the original erection. Grover C. McClain, who was superintendent for Roebling Bros. during the spinning of the cables, is also superintendent on the demolition contract. K. B. Arkin is resident engineer for the State of Washington on the project. Dexter R. Smith of the Washington Toll Bridge Authority assisted these men in designing the unusual equipment made from salvaged material.

THE PLATFORM which moved over the cable span for unwinding the wrapping wire was made of parts of three of the four original maintenance scaffolds, thus eliminating the need of a catwalk. Power was supplied through Beebe hoists.



High Voltage Power Line For West Central Idaho

A 110-MI. high-voltage power line to provide for maximum production of vital minerals and important savings in vital fuel oil and transportation facilities is being installed from the Snake River Valley to the Stibnite-Yellowpine area of west-central Idaho, according to information released by C. J. Strike, manager of the Idaho Power Company, at Boise.

Bradley Mining Company, producers of tungsten and antimony, as well as Bonanza Mines, Inc., producers of mercury, will be the largest consumers of power from this line. Electricity is now supplied to this area by diesel generators, and the diesel power units now in use will be available for other war purposes. Fuel oil savings estimated at 1,200,000 gal. per year will be instigated by construction of this line.

Preliminary Design Chart . . . VII

Steel Penstock Selection

Allowable stress, various costs and sale value of electric power are considered simultaneously in a chart to secure simply the most economical diameter and flow factors of a steel penstock

By A. E. NIEDERHOFF
Senior Structural Engineer
U. S. Army Engineer Office
Portland, Oregon

THE SELECTION of the proper economical diameter of a long penstock and the determination of flow, velocity, frictional loss of head and thickness of steel plate making up the pipe are facilitated by the use of the chart reproduced in the adjoining columns. If the maximum discharge and the maximum head are known, the diagram will give all the other factors in a minimum time. Actually, it takes less than 60 seconds to get all of the answers that normally would take several hours of computation after the correct formulae had been unearthed from several text books.

Diameter of penstock

The chart has had its widest use in the preliminary planning and investigation of alternate hydro-electric projects. Some of the factors that enter into the economical size of power penstocks are: (1) annual fixed charges on plant, (2) cost of steel pipe per pound in place, (3) sale value of a kilowatt hour of power at the bus board and (4) the allowable unit stress in a steel pipe. Using Government financing at 3 per cent the annual fixed charges covering interest, depreciation, maintenance, operation and payments in lieu of taxes total 6 per cent. The cost of the pipe per pound was assumed as ten cents and the allowable stress limited to 16,000 lb. per sq. in. The stress may appear high for ordinary pipe design, but with the advent of arc welding in the fabrication and erection fields the designer may raise stresses with complete confidence that the pipe joints will hold. The sale value per kilowatt hour of energy has been fairly well established by the Bonneville Power Administration at 2 mills for the Pacific Northwest.

Low head projects, and particularly those using large discharges, are outside the scope of this diagram. The reasons are: (1) a minimum steel thickness is necessary in addition to that required for internal pressures only, and (2) the ring formula for determining pipe stresses is not applicable when the diameter is large and the operating head is small. It is entirely possible for the invert of a large penstock to have higher pressures than the top of the penstock. A separating line has been drawn between 100 and 200 ft. of head in the upper left quarter of the chart to the left of which it is not advisable to indiscriminately select diameters based only upon discharge and total head. Points falling in this restricted chart area should have the determination of diameter investigated further, using the indicated value as a guide only.

Experience with the use of the chart indicates that a close approach to an economical diameter is obtained by assuming a bend in the sloping diameter lines in the top left quarter of the diagram. This bend, or change in direction, takes place at the separating line between 100 and 200 ft. of head. The lines for diameters to the left of the separating line give good results if the sloping lines are made horizontal as illustrated by one example for a 10 ft. diameter pipe. The remaining diameter lines were not changed because a mathematical approach to the problem does not allow this change in direction.

The whole purpose of the diagram is to give a preliminary selection of diameter and determination of penstock characteristics. Final design, based upon sound judgment as to the possibility of accidental loads, varying head losses because of increased friction, losses through valves, bends and fittings, and a change in regional economics, will probably deviate slightly from the diameter given by this chart. Instead of making the chart less useful these unknown factors enhance the value of chart selection of penstock diameters. Too much refinement in analytical methods based upon doubtful assumptions is time consuming, misleading and unwarranted.

For short penstocks extending through a dam and terminating in a powerhouse immediately below, as at Shasta dam on the Sacramento River or Ariel dam on Lewis River in Washington, the diameter is a function of the turbine capacity and of the head. The reason for this appears to be that the larger the penstock opening in the dam the smaller the cost of the concrete entering into a dam. This is only true within a very small limit of opening and for low heads. A more sound reason is that the governors on turbines controlling the wicket gates give smoother operation if the penstock above is generous in size. Correlating operational experience with design dimensions on several large high head hydro-electric plants shows that the penstock diameter may be computed by the formula given below:

$$D = \frac{(P).466}{(H)}$$

where D is the diameter of the penstock in feet,

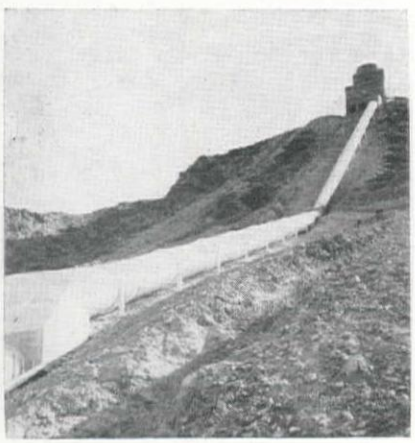
P is the rated horsepower on the Francis turbine.

H is the rated head on the Francis turbine.

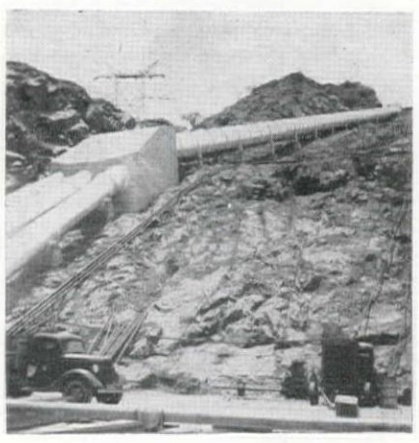
Friction losses and velocities

The second quarter of the chart gives the head lost per thousand feet of pipe due to friction. Modern values were used based upon Scobey's formula influenced by field testing of a large power penstock

STEEL PIPE on the Eagle Mountain lift of the Colorado aqueduct in southern California. Long spans between pipe supports are made possible by the complete ring or diaphragm at each support. The surge tank appears at top of hill.



THE INTAKE lift of the Colorado River aqueduct near Parker dam. Massive concrete block acts as an anchor. Both diaphragm and concrete pipe supports are used on this line. Desert heat is reflected by aluminum painting the pipe, making thermal expansion problems less critical.



by the Washington Water Power Company described in 1936 edition of Transactions of the American Society of Civil Engineers. Hydraulic laboratory experiments recently completed on the flow of water through model penstocks for Stevens dam in Washington also gave valuable data from which a determination was made of the constant and exponents to be used in Scobey's formula. In this connection the use of arc welding on the penstock has the distinct benefit of providing far less frictional resistance to the flow of water than that offered by riveted pipe.

The third quarter or lower right portion of the chart gives the average velocity in the pipe. Velocity is a function of the diameter and frictional head loss. The plotting is based upon Scobey's formula modified as described above.

Because of the danger of cavitation and erosion in steel pipe the maximum velocity for continuous flow should be limited to 20 ft. per sec. The chart shows velocities as high as 40 ft. per sec. to cover every possibility including intermittent or occasional use of the pipe under these extreme conditions. Overloaded turbines at the end of the penstock may demand more water for a short period which can be supplied by the same diameter penstock at a higher velocity.

Thickness of pipe

The last quarter of the chart in the lower left hand corner gives the plate thickness in inches for the steel pipe. It is based upon a unit stress of 16,000 lbs. per sq. in. The thickness varies directly with the product of the head and diameter and covers a range in excess of practical requirements. Stiffener rings are not considered on this chart. Because of the fact that certain minimum thickness is required for assurance against local buckling during erection and to guard against corrosion, a limiting line has been superimposed on this part of the diagram to the left of which it is considered unwise to go.

In this connection it might be mentioned that modern practice for the support of large pipe lines recognizes the economy of long spans between supports. The older cradle supports spaced closely together contribute to local buckling and distortion from a true round shape of pipe unless the support is under more than the bottom 120 deg. of pipe circle. With diaphragm supports instead of cradles, longer spans can be used but to achieve maximum economy of material the pipe shell thickness must vary throughout the span. Toward the center of the span the shell thickness is a minimum and it increases and becomes a maximum at the diaphragm support. These refinements have not been included in this diagram because of their complexity and the result is that a somewhat heavier pipe is indicated by the chart. Final design should take these factors into consideration and a saving in cost made over the preliminary estimate.

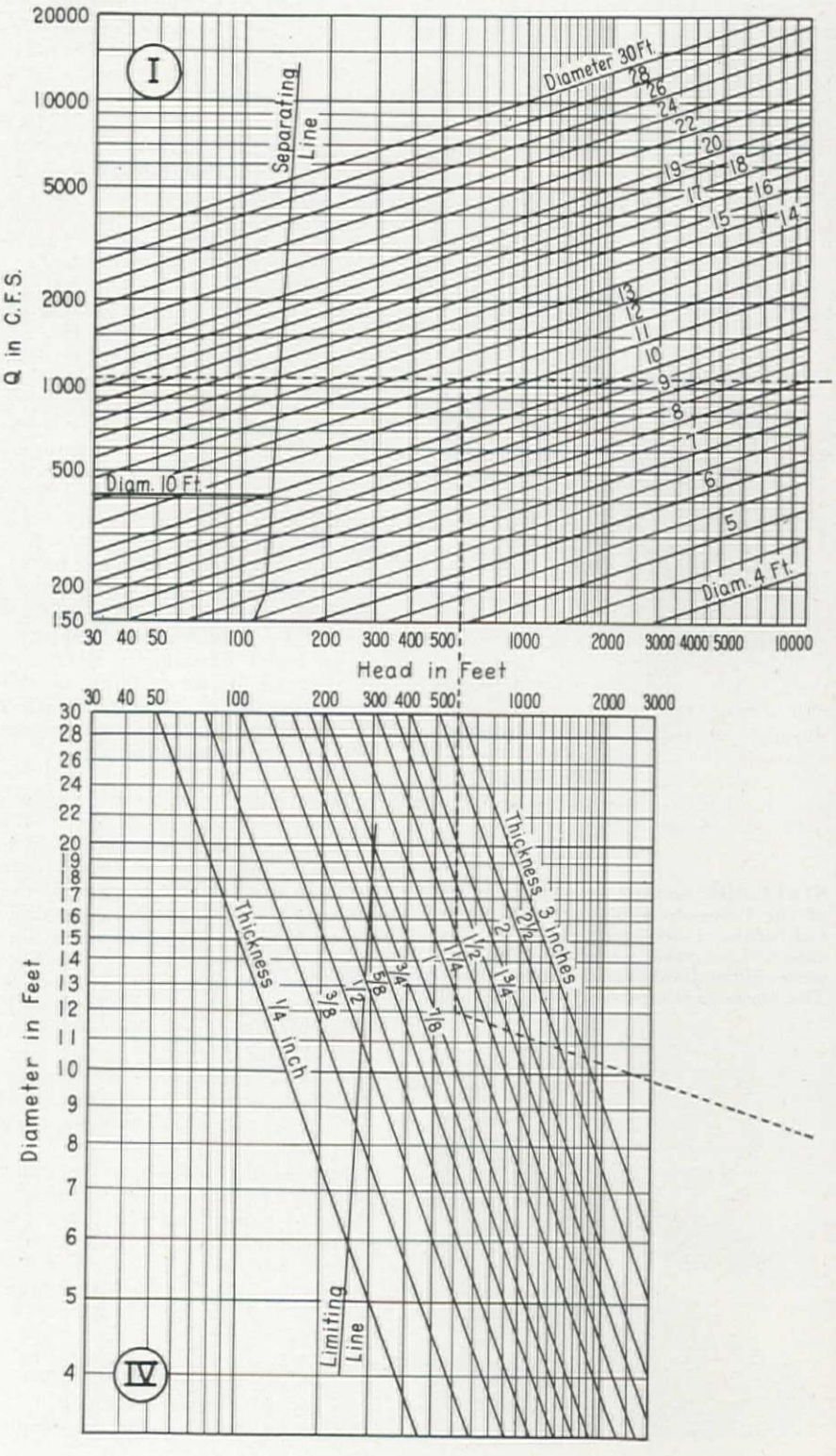
Use of the Diagram

An example will best explain the use of the diagram. Given a maximum discharge of 1,060 c.f.s. to be carried from a high reservoir to a lower powerhouse by a steel penstock, ¾ mi. long, under a total head, of 600 ft. (includes water hammer). It is required to find the economical diameter, the head lost because of friction, the average velocity and the thickness of the steel pipe for several sections depending upon the increasing head as the powerhouse is approached.

Enter the upper portion of the chart at the left at Q = 1,060 c.f.s. and pass horizontally to the right to an intersection with the vertical line for 600-ft. head. Note that this point is to the right of the separating line and the selection of penstock diameter will be on a basis of internal pressure only. The diameter shown by the sloping line is 12 ft.

From this point pass horizontally to the right to the other top quarter of the chart. The middle vertical scale for Q aids in keeping the line horizontal. In this second quarter continue to a point of intersection with the sloping 12-ft. diameter line, then proceed vertically downward reading a friction loss of 1.24 ft. per 1,000 ft. of pipe. If the penstock is ¾ mi. long the head lost due to friction would be 4.91 ft.

Continue vertically downward into



the lower right quarter of the chart to an intersection with the horizontal line for discharge of 1,060 c.f.s. This is indicated by a vertical scale in the center of the lower half of the chart. The intersection is on a sloping line for an average velocity of nearly 10 ft. per sec.

The thickness of pipe is obtained in the fourth quarter of the chart by selecting the point of intersection between the horizontal line for 12-ft. diameter (see vertical scale on lower left) and the vertical line for a head of 600 ft. The point falls between thicknesses of 1 and 1¼ in. and may be called 1⅛ in. This is a maximum thickness near the powerhouse. When the head is 500 ft., the pipe diameter can be increased to 12 ft. 3 in. and the shell can be reduced to 1 in. At 450 ft. of head the diameter is 12 ft. 6 in. and the thickness is 15/16 in. Working with chart quarters I and IV the economical diameter increases and the shell thickness decreases as the head becomes smaller and smaller. The limiting line indicates no further change for a head of 290 ft. where the diameter is 13 ft. 3 in. and the thickness is ⅝ in.

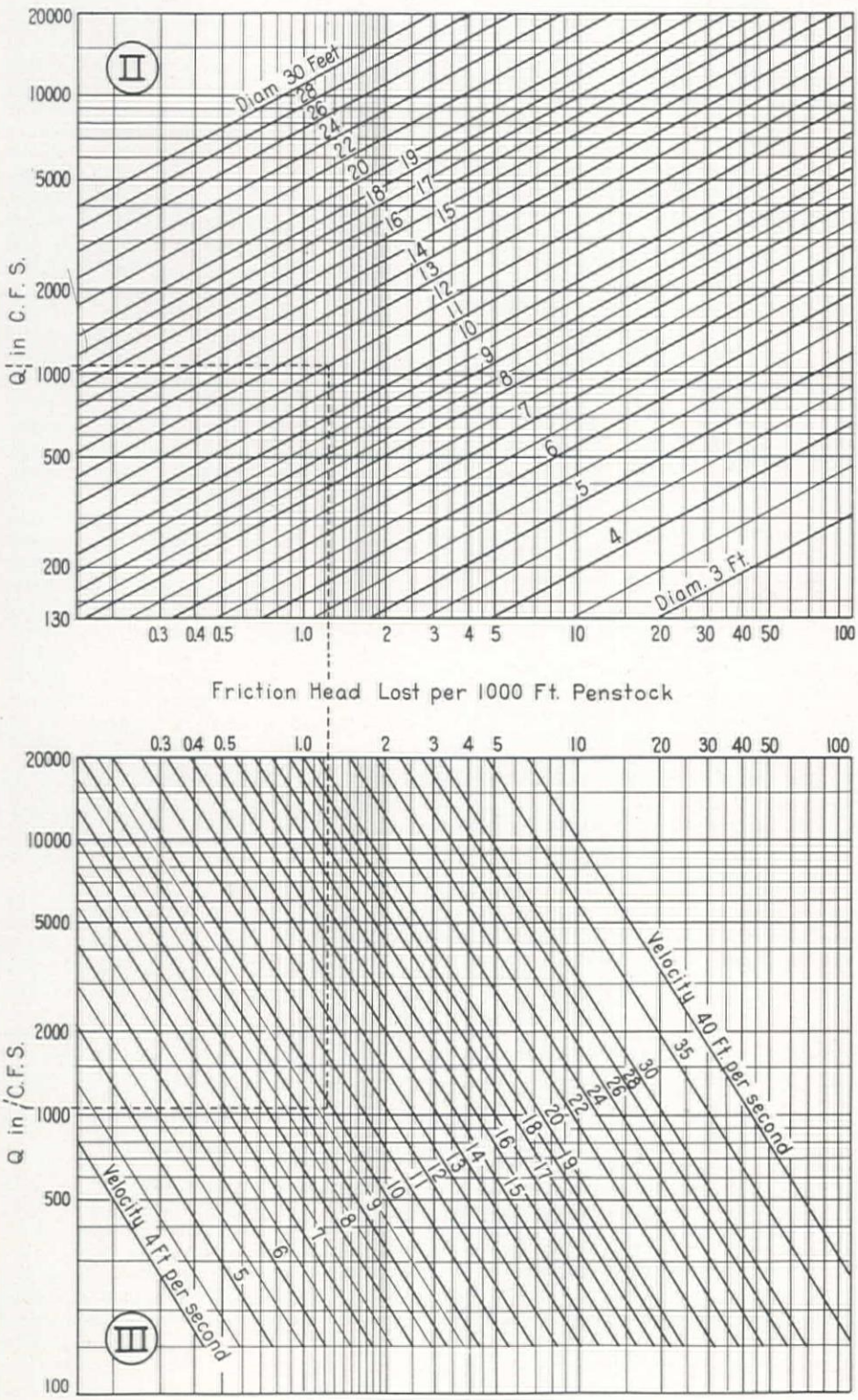
Chart versatility

The use of steel for penstocks at the present time is limited to those projects that have a direct influence on winning the war. It is therefore unlikely that this handy chart will assist in the construction of penstocks in the near future. Post-war planning that is taking place right now can be materially speeded up by the use of this convenient tool. It yields all the required data in a very short time and within limits of accuracy usually associated with more mature and painstaking studies.

Although the basis of the chart has been given for specific conditions there is a little error involved if one or more of the component factors are changed. For instance, power value at 4 mills per kilowatt hour instead of 2 mills would not permit a diameter 100 per cent larger than given by the chart. The actual increase is only 10 per cent from the chart diameter.

By suitable conversion factors this diagram can be used in pumping problems involving water supply for cities and army cantonments or for irrigation water pumped through long conduits. Mining and industrial engineers may find some use for it in the processing of ores and materials where large discharges under a high head are factors entering their problem. Steel, of course, is uneconomical for low head work and is a critical material restricted to essential war use. To take care of this situation the author plans on publishing, in the near future, a similar chart for wood stave pipe. Wood stave pipe is widely used in the Pacific Northwest where timber is plentiful and has always been an economical structural material.

NOTE: This is the seventh of a series of preliminary design charts which have appeared in *Western Construction News* bimonthly since April, 1942. The next chart will appear in the June, 1943, issue.—*Editor*.



University Conducts War Training Courses

WAR TRAINING courses to be offered during the spring and summer of 1943 by Stanford University include such subjects as: cost accounting, management accounting, production control, transportation practice, personnel management, industrial safety engineering, engineering mathematics, several marine and shipbuilding courses, metallurgy, reinforced concrete design, radio and fire prevention. These are 12 and 15-week courses and are given evenings in San Francisco.

In addition to these evening courses, full-time classes are being offered in management practice for industry, industrial accounting, engineering drafting and technical calculations, aircraft drafting, chemical analysis and secondary school mathematics. All of these full-time courses will be held on the campus at Palo Alto.

Information as to meeting times, starting dates and prerequisites may be had from the War Training Office, Rm. 265-A, Engineering Bldg., Stanford University, Palo Alto, Calif.

Auxiliary Flight Strip Plan

Military and civil value shown for emergency landing strips to be built near highways—Site selection, base preparation, and paving are important factors in the design of these unattended fields which have none of the facilities of airports

By FRED E. SCHNEPFE
Director of the Flight Strips Division
Public Roads Administration
Washington, D. C.

THE EARLIEST proposals for Flight Strips date back to an annual convention held by the American Road Builders Association in St. Louis in 1931. There Col. Stedman Shumway Hanks spoke about a plan for providing landing areas for aircraft adjacent to highways, in large numbers, and at low cost.

However, it was not until passage of the Federal Highway Act of 1940 that the Commissioner of Public Roads was authorized, in cooperation with the State Highway Departments, to investigate the location and development of Flight Strips adjacent to public highways or roadside development areas for the landing and take-off of aircraft. Accordingly, the Public Roads Administration undertook this investigation and after presenting its report to Congress, authorization for the construction of Flight Strips was approved in the Defense Highway Act of 1941, which reads:

"Sec. 8. **Flight Strips.**—In order to insure greater safety for traffic on the public highways by providing additional facilities in connection therewith to be available for the landing and take-off of aircraft, the Commissioner of Public Roads is authorized to provide, in cooperation with the Army Air Corps, for studies and for the construction of 'Flight Strips' adjacent to public highways or roadside development areas along such highways. The acquisition of new or additional lands necessary for such projects may, to the extent determined by the Federal Works Administrator, be included as part of the construction thereof and Federal funds shall be available to pay the cost of such acquisition. For carrying out the purposes of this section, there is hereby authorized to be appropriated during the continuance of the emergency declared by the President on May 27, 1941, in addition to any funds that may be available under any other appropriation, the sum of $10,000,000, which shall be available, without regard to apportionment among the several States, for paying all or any part of the cost of such projects."

Subsequently, two appropriations for Flight Strips have been made, each in the amount of $5,000,000.

Definition and purpose

In the Manual of Procedure for the Flight Strip program of the Public Roads Administration, a "Flight Strip" is defined as "an area of land with clear approaches located adjacent to a public highway for use as an auxiliary landing area for aircraft." While the Flight Strip serves the same purpose for take-off and landing as an airport, it does not have the various facilities found at an airport, such as terminal building, hangars, shops, gasoline storage, lighting system, etc. Therefore, the cost of a Flight Strip represents only a part of the cost of an airport. The Flight Strips being built by the Public Roads Administration provide for long runways and approach areas of a greater width and a flatter glide angle than can be found at most airports.

Flight Strips have the two-fold purpose of providing facilities for military and civilian aircraft:

First: The war has taught us that it is folly to concentrate a large number of aircraft on one airport. This practice lays these aircraft open to easy destruction by enemy air action. It is equally foolish to depend upon a few large airports in any defense area as enemy air action could quickly put these few ports out of commission thereby grounding the defending air force in that area.

By means of Flight Strips, landing areas may be provided at many places where the cost of an airport would not be justified in terms of money, materials, transportation and manpower. Although a Flight Strip has only one runway, it is believed that, by a careful study of the winds prevailing at any location, the runway can be so located as to be available for safe operation during the greater part of the time.

Second: Post-war Americans will be in the air in ever increasing numbers and our business and social structure will place an increasing burden on air transportation.

The volume of air mail is increasing at an accelerated rate and many forms of cargo are already transported by plane. There can be no doubt that following the close of the war the air transportation network will have to be enormously increased over the present system, with many new trunk lines and feeder routes.

The part that the Flight Strip program is expected to play in the postwar plan of transportation may be summarized, as follows:

1. Provide landing facilities for the civilian flyer.
2. Provide basic landing facilities for small cities or groups of towns for air feeder service and air cargo.
3. Provide auxiliary landing facilities for all types of aircraft.

Administration of the program

The Defense Highway Act of 1941 authorized the sum of $10,000,000 to be appropriated, without regard to apportionment among the several States, for paying all or any part of the cost of such projects. The acquisition of new or additional lands necessary for such projects may be included as part of the cost of their construction and Federal funds were made available to pay the cost of such acquisition under the terms of this act.

A separate division was set up by the Commissioner of Public Roads for handling all phases of the Flight Strip program. Known as the Flight Strips Division, it is responsible for location, design and construction and maintains liaison with the Headquarters of the Army Air Forces in Washington. Under the direction of the Flight Strips Division, the District Engineers of the Public Roads Administration assume responsibility for the selection of sites (in cooperation with the Army Air Forces), surveys, plans, estimates, bids, award of contracts and supervision of construction, the actual work being done by the various State highway departments.

Upon receipt of the Flight Strips program for his District, the District Engineer of the Public Roads Administration or one of his assistants and an engineer from the State highway department select sites within the areas designated in the program. As soon as tentative selections are made, the Commanding General of the Air Force Area in which the projects are situated, assigns a site board to examine the sites and report on their suitability. Following this examination the District Engineer submits a report to the Commanding General of the Air Force Area, including information about location, soil and drainage, wind condition, cost, time of construction, and other pertinent factors.

If approved, it is forwarded to the Headquarters of the Army Air Forces, where the report is approved or rejected and the Washington office of the Public Roads Administration advised of the action taken.

Once the site is approved, the design and construction of the Flight Strip becomes the responsibility of the Public Roads Administration.

Site selection and layout

In nearly every instance, the projects contained in the program submitted by the Army Air Forces are designated by area rather than by exact location. Usually an area averaging approximately 100 sq. mi. was shown on a map, any suitable location within the area being acceptable to the Army Air Forces. The latitude which this gave PRA engineers in selecting sites has made it possible not

only to select good sites from a military viewpoint, but, everything being equal, to select sites that will have value after the war for use in civil aviation.

In the selection of a Flight Strip site, investigation of suitable construction material on or near the site is made for economy in first cost and subsequent maintenance. The fact that gravel, sand or stone deposits are available at or near a proposed site may well influence the decision in favor of that site provided the soil and aeronautical features are suitable.

Since Flight Strips have only one runway, it is of particular importance that they be located in the direction of the prevailing winds. Sites must be selected where nearby obstructions are not of sufficient height to create hazards, or where provisions may be made for their removal.

GRADING and preparation of sub-base are important factors in construction of a flight strip, since flexible type surfaces must not be allowed to settle or become pitted.

Geometric design

The geometric or dimensional design of the Flight Strip itself is based largely on the operational needs of expected traffic and relates to vertical, horizontal and side clearances, including the length and width of runways, shoulders and end zones as well as approach zone areas.

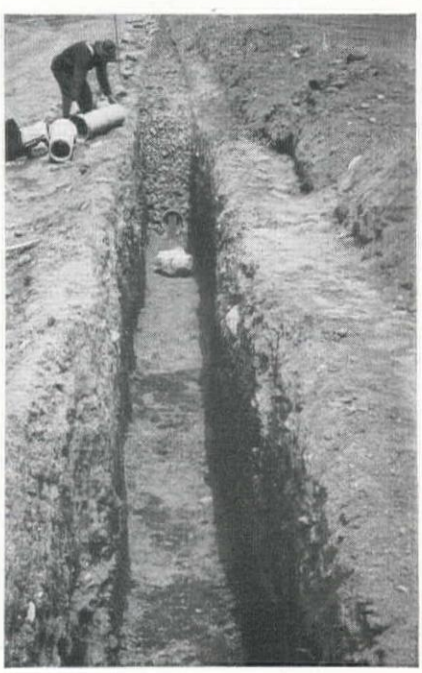
The approach zone to a Flight Strip runway is a trapezoidal area 500 ft. wide at the end of the runway extended, and 4,000 ft. wide at the zone limit 2 mi. distant. Within this trapezoidal area no obstacles, either natural or man-made, may be permitted which are high enough to stand above a 30 to 1 glide angle projected from the end of the runway extension, and wherever feasible a 40 to 1 glide angle is adopted. In addition to the clearances provided at the approach zones, clearance is required along either side of the Flight Strip and extending above a plane projected on a 7 to 1 slope from the edge of the runway and runwav extensions for a zone width of at least 500 ft.

The over-all dimensions of the Flight Strips designed for military use include a normal length of 8,000 ft. However, there may be occasions in which a particularly good site may fall short of this. Such cases, of course, require special consideration. In general, the total width of these Flight Strips is not less than 500 ft. nor more than 1,000 ft. The paved runway has a width of 150 ft. and a length of 4,000 ft. at sea level. This is increased for higher altitudes to a length of 8,000 ft. at an altitude of 8,000 ft. above sea level.

At each end of the paved runway there is a "runway extension" of the same width as the paved runway, usually consisting of some form of soil stabilization. The purpose of these extensions is to provide additional runway length, at low cost, for the planes that may require a runway longer than that which is paved. The shoulders on either side of the paved runway have a width of 175 ft. and extend for the entire length of the paved runway and runway extensions. On certain projects portions of the shoulder areas for a length of 6,000 ft. (at sea level) are stabilized, surface treated with bituminous material, or turfed.

Runway and shoulder grades are relatively flat. The maximum transverse runway grade is 1½ per cent, with a minimum slope of 1 per cent. The one per cent transverse grade is considered the more desirable. Runways may have one-way or two-way transverse slopes. Where a two-way slope is used the surface is made up of two intersecting planes. Parabolic or circular crowns are not used. This is to avoid the possibility of water standing in the central and most used portion of the runway. The maximum transverse slope of shoulders is 1 per cent, with a minimum desirable slope of one-half of 1 per cent. In no case do shoulders slope toward the runway. The maximum longitudinal grade of runways is 1½ per cent. A considerable number of projects have an unbroken longitudinal grade throughout the runway and runway extensions. Where changes in grade are used the maximum rate of change is ½ per cent per 100-ft. station. Vertical curves preferably have a length of 500 ft. with a minimum of 300 ft. Every effort is made to obtain longitudinal tangent intervals between vertical curves of not less than 1,000 ft.

DRAINAGE is taken care of by jointed pipe drains in gravel-filled ditches at the edges of the runways, which drain themselves, being slightly crowned.



Structural design

Structural designs relate largely to the type of surfacing used on runways and shoulders to accommodate expected traffic. An important consideration is to design a subgrade of sufficient and uniform bearing power. At each location soil studies are conducted to determine the bearing values of the natural subgrades, and deficiencies are corrected.

In no case are designs for runway pavements based on a wheel load of less than 12,500 lb.

For a number of years it was standard practice to add an impact factor to the static wheel load. Now it is believed that the critical load may be that imposed by the wheels of the standing plane rather than the sudden forces developed during operating maneuvers. The force exerted against a runway pavement by the wheels of a standing airplane can be determined without difficulty but when a plane is in motion, either in preparing to take off or as the wheels make contact in landing, the force developed by the wheels on the runway is very difficult to determine. It has been observed that surfaces of the flexible type, including the various bituminous treatments which satisfactorily sustain the weight of standing airplanes, do not fail structurally under the forces developed by the same airplanes in motion.

The maximum wheel load of the airplanes of today is several times greater than the maximum wheel load permitted by law on highways and the size of the tire used on the landing wheels of airplanes is correspondingly greater than those used on motor vehicles. The time duration of stress from dynamic loading is probably appreciably less in a runway than it is in a highway, and finally, the frequency of load repetition at a given point in a highway pavement is much greater than on a Flight Strip.

The structural strength of a given type of pavement is dependent on its thickness and support. For flexible type surfaces the thickness of the wearing

PAVING on flight strips is nearly always of the flexible, bituminous type, and may be laid by either plantmix, roadmix, or penetration methods. Minimum thickness is 2 in.

surface, base course, and subbase considered as a unit, are predicated in part on the observed behavior of soils in highway and airport construction, and in part on such results of research as are available. Recently the Public Roads Administration published an article entitled *Classification of Soils and Control Procedures Used in Construction of Embankment,* which may be used as a guide in studying soil characteristics and their classification as related to thickness of flexible type pavements. For a number of years the State Highway Department of California has investigated the design and service of flexible type pavements on highways in that State and they have developed a method of designing the bearing capacity of flexible type pavements. In June of this year the War Department, Office of the Chief of Engineers, published Chapter XX of their engineering manual entitled *Design of Runways, Aprons, and Taxiways at Army Air Force Stations.* The brochure contains curves, illustrations, and data for designing flexible type pavements based on the theory and practice developed in the State of California. For the heavier wheel loads and the soils of low bearing value a total thickness of as much as 24 or 30 in. may be required, whereas for lighter loads, higher type surfaces and soils of high bearing value as little as 6 to 10 in. total thickness may be adequate. Bituminous wearing courses on flexible bases are seldom less than 2 in. thick.

Drainage

Drainage of Flight Strips is a major problem, but a relatively simple one when compared with the drainage of airports having a number of intersecting runways. On many airports subdrainage structures must be provided to intercept and remove storm water, to drain water from seepage planes in the soil and to lower the water table. In such cases drainage becomes an important factor in the cost of airport construction. In the case of Flight Strips the problem is considerably simplified and drainage structures may be entirely eliminated or used only to a minor extent.

Where storm drains or subdrains are needed along the edges of runways, open joint or equally suitable pipe is placed in a trench and backfilled with gravel or crushed stone to a point 12 in. below the top of the trench. The top 12 in. is composed of coarse stone premixed with bituminous material firmly tamped or rolled into place. This prevents displacement by wheels and the blast of propellers and serves also as a transition strip for aircraft passing from the relatively rigid runway to the softer shoulders.

Shoulders adjoining the paved runway of a Flight Strip vary from a normal highway shoulder and must be treated accordingly. While the shoulder in no case should be less than 150 ft. wide, it is not always necessary that mechanical stabilization be carried the entire width; ordinarily, stabilizing is carried from 75 to 100 ft. from the edge of the runway.

Construction methods

The principal construction operations are clearing and grubbing, grading, drainage and paving. Of these items, grading and paving are the most expensive, consume most of the time and are most important to the successful operation of the Flight Strip.

A large portion of the Flight Strip area is composed of embankment. During the emergency, runway pavements are likely to be placed immediately, or shortly after the embankment has been completed. Therefore, every effort is made to secure optimum compaction of fill material and thus avoid subsequent settlement and damage to pavement.

Methods used in the construction of flexible type bases and surfaces follow those developed by the State highway departments in cooperation with the Public Roads Administration, and represent best current practice. A number of types of bituminous surfaces can be satisfactorily constructed with local aggregates. Examples are sand asphalt pavement and several types of open and dense graded bituminous mixtures. One type commonly used on Flight Strips is the plant mixed bituminous surface laid to a minimum compacted thickness of 2 in.

The military program

The United States Government decided in the latter part of 1941 that air power was going to play an increasingly prominent part in our war effort and a call was sent out for 50,000 airplanes in 1942. Since that time the aviation program has again been expanded.

While the production of such large numbers of aircraft presents a tremendous problem, to distribute, store and use these aircraft also presents a problem which can be met only through the construction of all types of landing fields distributed throughout the United States.

The location of one or more Flight Strips somewhere within normal operating range of the major basic training bases permits cross country training flights to take off from the home base, navigate to one or more Flight Strips and return to the base. This enables the student flyer to practice accurate cross country operation to definite objectives and to increase their skill at landing on strange air fields without congesting the air space around one port.

One phase of advanced training is aerial gunnery and bombing. Major air training and operational bases are normally located near some center of population and are not always adaptable to aerial gunnery and bombardment training. By locating the Flight Strips immediately adjacent to isolated wastelands it is possible to send small training groups to these Flight Strips and there carry on concentrated training without hindering or being hindered by normal base flight operations or endangering lives or property.

In addition to their other features of service, Flight Strips are an important adjunct to the national airport system in their function of emergency landing fields.

The far flung military operations of our forces and those of our allies and the role this country is playing as an arsenal for the democracies has placed a tremendous burden upon all forms of transportation. In order to rush vital military supplies to critical zones the Army Air Forces have established an Air Transport Command and through it a worldwide air cargo system.

Most of the routes are either over water or over vast stretches of uninhabited territory in which there are few, if any, landing fields. In one case of overland operation on a route that will no doubt have a vital influence on our war effort in 1943, it was decided to augment the few available airports with a series of Flight Strips, because of the urgent need for additional facilities that could be constructed in a minimum of time.

Future program

The use of Flight Strips in the Air Forces program of landing facilities indicates that they will become increasingly important, particularly in the training of the vast numbers of flight crews that the Air Forces hope to turn out within the next year.

The increased tempo of the training program plus the development of new flight techniques, such as instrument landings, will necessitate the construc-

(Continued on page 179)

Square Bands on Pre-Stressed Tank

Square stressing bands found to be much easier to handle and place, and development of a welded box-type steel beam to replace the turnbuckle results in cheaper, simpler placing and uniformity of tension on all of the rods circling the tank

By ROBERT C. KENNEDY
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TANKS HAVE LONG been constructed of individual units bound tightly together by adjustable hoops. The most common form of tank of this type is constructed of wood staves with steel hoops equipped with threaded ends and turnbuckles.

In recent years it has been discovered that tanks can be built of concrete in a similar manner. Such structures are commonly known as "pre-stressed concrete tanks" or "Hewitt tanks," the latter due to a patent by William S. Hewitt on a detail of their construction and his successful efforts to bring about general appreciation of the advantages of such design in many cases over wood or steel tanks.

The usual method of constructing large pre-stressed concrete tanks, such as are used by the water works industry, is to first pour an annular concrete foundation ring; second, the floor, which locks into the foundation ring. The wall is then poured in units extending from bottom to top, the length of the units being dependent upon the volume of concrete capable of being handled in a day's work. When sufficient units have been poured to complete the entire circumference of the tank, and after the concrete is thoroughly hardened, the steel bands are placed around the structure and tightened to a predetermined stress. The roof is next constructed, either of the dome type or flat, and finally the steel bands are covered with gunite concrete reinforced with wire mesh for preserving the bands and improving the appearance of the tank.

Common standards

The subject of this discussion particularly concerns the steel bands. These must be so spaced and tightened that when the tank is full of liquid, the concrete will still be sufficiently in compression that leakage cannot occur through the vertical joints, and yet the tension of the bands must not be so great as to over-stress the concrete when the tank is empty. Common maximum stresses allowed for concrete are from 500 to 650 lbs. per sq. in. compression, and for steel 16,000 to 40,000 lbs. per sq. in. tension, both depending upon the quality of material. For economy it has been found that a manganese steel of 65,000 lbs. per sq. in. elastic limit and actually stressed to 40,000 lbs. per sq. in. is best suited to this type of work.

In many installations of this kind, the steel rods have been of circular section, generally about ⅞-in. diameter, with upset and threaded ends or with rolled threads, fastened together into hoops by turnbuckles or sleevenuts. Recesses about 2 in. deep in the concrete walls at the turnbuckles create the necessary freedom for turning. This system of bands results in the minimum of material, but on the other hand, is very wasteful of labor. This waste of labor is due to the following causes:

1. The rods must first be assembled on the ground in long enough lines to reach around the structure, and then carried by a large force of men up onto the scaffolding and bent around the tank. The band must then be held until the connecting turnbuckle is started, and all buckles sufficiently tightened to hold the band in place by friction on the concrete wall. The number of men required for this operation may be computed if we assume for instance a 130-ft. diameter tank, a common size. The circumference will be 408 ft., and a ⅞-in. round rod of this length will weigh 832 lb. With ten turnbuckles, the total weight will be approximately 900 lb. It has been found that 18 men are required to handle these long assemblies, and even with this number, placing the upper bands is difficult due to the interference of the necessary scaffolding, and dangerous to the workmen.

2. Because of weight and unwieldiness, only small size bars can be used.

3. In tightening the turnbuckles, three men are required, one on each side of the buckle with pipe wrenches to hold the rod from turning and thus rolling up or down the wall, and a third to turn the buckle.

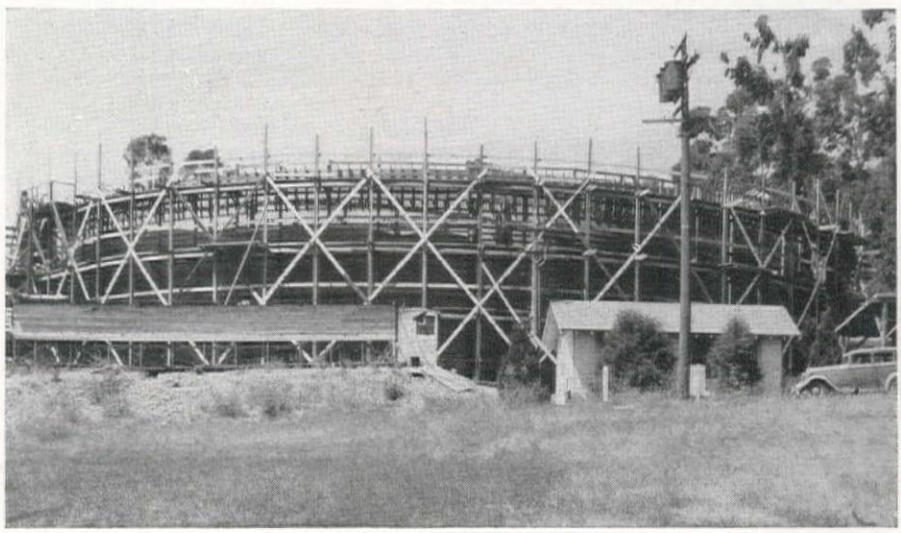
4. A great deal of time is wasted by men waiting for rods to be assembled prior to placing on the tank.

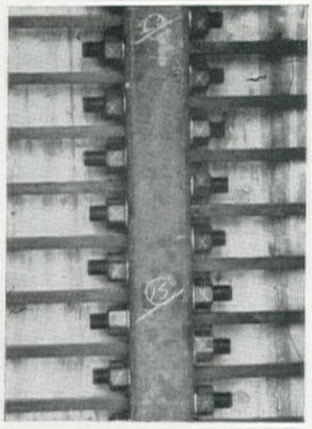
Three-man method of handling

In order to avoid the difficulties inherent in the standard method of applying the bands to pre-stressed concrete tanks, another method has been devised whereby three men can easily handle and tighten the bands. The method has been incorporated in seven tanks of diameters from 93 to 160 ft. In this design the pre-stressing rods are joined together by means of vertical steel beams so as to form a great steel "corset" around the tank. The bars are individually carried to position, their ends inserted into adjoining beams spaced at 35 to 45 ft. apart, following which they are tensed by means of ordinary threaded nuts. Each rod is offset from those in the adjacent panels sufficiently to allow a wrench to be placed over the nut.

The steel beams are of the box type in order to gain the maximum of stiffness with minimum of material. Four plates are welded together with enough space between the side plates to permit the threaded rod to be freely inserted. Holes are then drilled at exact spacing to receive the rods. When the rods are placed through these holes, they cannot roll on the tank during tightening, and by using square bars with upset ends they are

A 3,000,000 gallon pre-stressed concrete water tank under construction by the East-bay Municipal Utilities District, of Oakland, Calif. The stressing bands can be seen before application of gunite covering. Diameter of the tank is 130 ft.





CLOSEUP of the box-type vertical steel beam into which the offset square stressing bands are fastened. The use of square rods prevents rolling when the nuts are being tightened and permits application by a small crew of men.

also prevented from turning without use of a restraining wrench, thus making the task of tightening a one-man job.

The general arrangement of rods and beams, and a close-up of the completed assembly are shown in the accompanying photographs of a three-million gallon capacity, 130-ft. diameter water tank recently completed. In this case the rods were 34 ft. 8 in. long, 12 units being required to complete each band. Two layers of bands were placed over the lower 15 ft. of the tank, a coating of gunite being shot on over the first layer before adding the second. These rods were ⅞-in. square, but it was found that 1⅛-in. rods used on a later structure were easily placed, with greater economy of material.

A special wrench has been designed for tightening all nuts to the same degree. Each nut is gradually taken up by going over the entire assembly several times, until a copper nail is sheared at each nut, thus assuring uniformity of tension on all bars.

Advantages of the new design

Advantages of the new design are as follows:

1. The work of welding the vertical beams is done in the shop where conditions are ideal for economical operation.
2. The work of erecting the rods can be accomplished by only two men, who will work efficiently, with no loss of time while waiting for assembly of bars before placing on the tank.
3. Larger and more economical bars may be used due to ease of placing.
4. Less interference with other work under way during placing of the tank bands.
5. Greater safety of workmen handling the bands.
6. Greater ease in tightening bands due to but one thread being taken up instead of two as with turnbuckles.
7. Lower total cost of material and labor.

Following is a comparison of costs for material and labor involved in the bands for a 130-ft. diameter, three-million gallon tank. The figures are from records except the field labor costs, which are estimates only due to the use of Works Progress Administration labor on these projects. All costs are based on 1940 conditions, in the northern California area.

1. Costs using rods and turnbuckles

1116—⅞-in. sq. manganese steel rods 34 ft. 8 in. long, 55,000 lb. per sq. in. yield point, ends upset and threaded, 50.1 tons at $110	$5,511
1116—1¼-in. turnbuckles, 4580 lb. at 10c	458
Labor for assembling, placing and tightening bands, at $1.75 per rod	1,953
Total Cost	$7,922

2. Costs using rods and steel beams

1116—⅞-in. sq. manganese steel rods, 35 ft. 6 in. long, 55,000 lb. per sq. in. yield point, ends upset and threaded, 51.5 tons at $110	$5,665
2232 nuts and washers, 3340 lb. at 10c	334
24 beams, weight 6840 lb.: Cost Material	260
Labor	500
Labor for placing and tightening bands	400
	$7,159

Conclusions

Thus the saving in cost under the new method is estimated at $763, or 9.6% of the cost of bands and placing the same by the old method for a three-million gallon tank. Since the holes through the beam are produced on a drill press through a template, the cost for additional tanks will be somewhat reduced after the template is made. In normal years one California utility organization constructs about five such tanks per year, so that the annual saving from the new method is about $3,815. The use of pre-stressed concrete tanks is increasing fast, particularly during the present wartime limitations on the use of steel. During the present year, it is estimated that the equivalent of 200 three-million gallon tanks will be constructed, in which case there would be a saving by the new method of about $150,000. It is likely that further refinements in the design may increase this saving to $175,000 per year.

The social value of the improved method lies in the factors of (1) cost saving, (2) safety to workmen, and (3) speed of construction.

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.

Steel Reinforcing Bar Production Is Limited

EXTENSION to three Pacific Coast states of the program for concentration of reinforcing bar production in steel rail re-rolling mills has been announced by H. G. Batcheller, Director of the WPB Steel division.

He also announced that two steel mills whose output has always been largely in reinforcing bars are being permitted to continue in production of the bars. One plant is in California, and the other in Oklahoma.

Earlier it had been announced that no reinforcing bars would be made from new steel except those which could not be supplied by re-rolling mills because of size or specifications requirements. This action was taken because of reduced demand for reinforcing bars, and in order to preserve the manpower and facilities of the re-rolling mills.

At the time of the original announcement, Washington, Oregon, and California were exempted from the terms of the program because rail steel production facilities in those states are relatively small. Because of the continuing downward trend of demand for reinforcing bars, however, it is now felt that the re-rolling mill capacity available in those states will be sufficient to take care of reinforcing bar requirements.

New Commercial Ratings Set for Mineral Wool

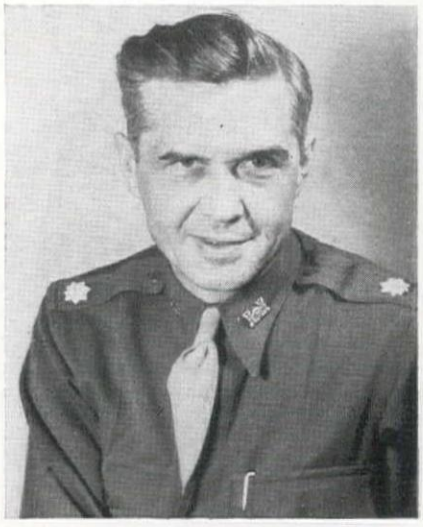
A NEW commercial standard has been adopted for mineral wool in loose, granulated or felted form for low temperature installations. The new standard is designated CS105-43 by the National Bureau of Standards and became effective March 1. It regulates thermal conductivity, installed density, sulphur content and contained substances. Auxiliary material, such as asphalt, building paper, cement, etc., are also regulated. Methods of installation, finishes, fittings, and guarantee labels are all discussed in the new order. Copies may be obtained from J. W. Medley of the Division of Trade Standards, Washington, D. C.

Idaho to Construct New State History Museum

THE NEW historical museum for the State of Idaho will be offered for construction bid in the very near future. The estimated building cost was originally $101,388, of which the state was to supply $40,000 and the WPA the remainder. The project was begun last fall, but was halted after completion of the basement due to WPA suspension. The museum is at present located in the basement of the Statehouse at Boise, and the additional room which will be available when it is moved to the new building is very much needed by other state departments.

Alaska Contractor Wins "E"

Completion of the Alaska Railroad Cut-off in less than contract time, while operating under severe conditions, brings special recognition by the Army and Navy to the West Construction Co.



COL. JAMES TRUITT, now in charge of the Transcanadian Alaska Railroad Survey, who made the early reports and surveys for the Alaska Railroad Cut-off.

Photos by U. S. Army Signal Corps

THE WEST Construction Company of Boston, Mass., received the Army-Navy "E" Production Award on March 10 for outstanding performance in constructing the 16-mi. Alaska Railroad Cut-off from Portage Junction to Whittier. The work was performed under the supervision of the Seattle District of the U. S. Army Engineers.

In ceremonies held at the new salt-water terminus of Whittier, Colonel Benjamin B. Talley, Engineer officer in charge of construction in Alaska, presented the "E" pennant, highest award that can be made to industry by any government agency. Harry Carleton, vice-president of the company, accepted the award for the contractors and men. High ranking officers of the Alaska Defense Command were present to add their praise.

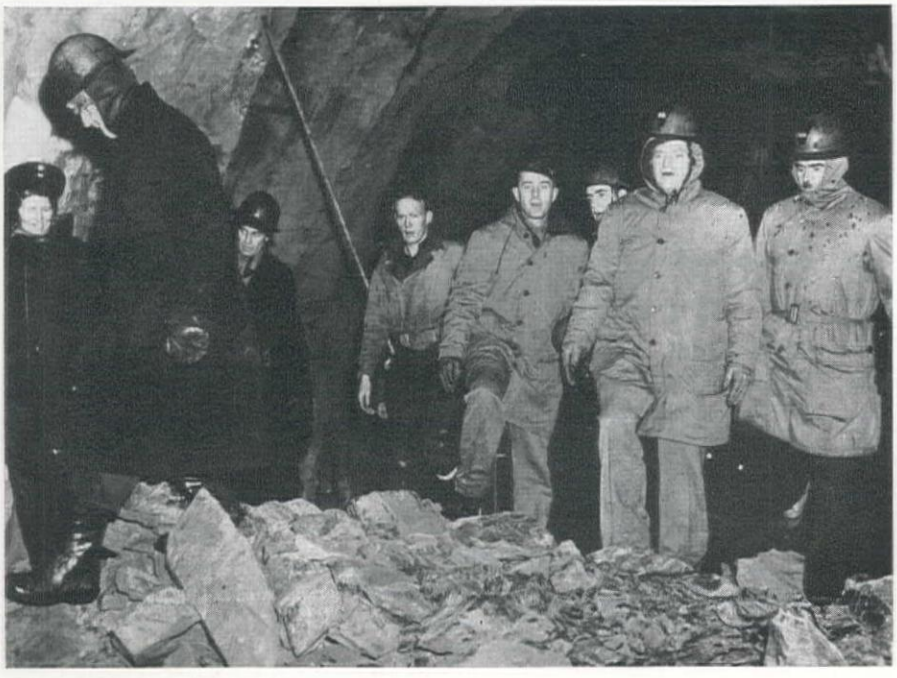
Completion of the project two and a half months ahead of schedule despite war conditions, and performance on the Army Engineer contract won for the West Construction Company the first "E" award to be made in the Seattle Engineer District. Preliminary work at the site was started in the late spring of 1941 and the final shot cleared away the last barrier in the tunnels on November 20, 1942, when Major General Simon B. Buckner, Jr., threw the switch at holing-through ceremonies. Concreting and incidental construction is now complete.

Another step in developing inland Alaska, the Cut-off eliminates steep grades and rail mileage on the original line which reached salt water at Seward, thus saving transportation costs and time between Seattle and interior Alaska and bringing inland Alaska closer to the coast. Nearly 1,000 civilian construction workers were engaged in constructing the Cut-off which consists of approximately 4 mi. of tunnel driving and more than 12 mi. of railroad grading.

Commenced two years ago with surveys and reports by Col. James G. Truitt, now in charge of the survey for the proposed Transcanadian - Alaska railroad and closely identified with the conception of the idea of the project, the Cut-off was first suggested 20 years ago by the Alaska Engineering Commission. First resident engineer on Cut-off construction was F. A. Hanson, Alaska Railroad veteran at present with the Transcanadian survey. Major C. B. Burgoyne has lately served as resident engineer for the Army.

Record time construction of this Cut-off was accomplished in the face of great difficulties. The completion schedule, set before the war, was met ahead of time in spite of shortages of labor, transportation difficulties for materials and personnel, weather extremes, isolated location, hazardous terrain, and difficulties of assembling and transporting specialized equipment. Sometimes supervisory personnel of the two construction camps had to go on foot over glaciers to coordinate work on opposite sides of the mountain. However, speed, quality of work, cooperation between employees and management, and conservation of critical materials were rated by Army officials as of the highest order.

COL. OTTO OHLSON, manager of the Alaska Railroad, left, MAJ. GEN. SIMON B. BUCKNER, JR., and COL. B. B. TALLEY, engineer officer in charge of military construction in Alaska, right, examine new railroad tunnel after final blast in the bore.



Commenting on civilian contributions to the Alaska Railroad Cutoff, one of the officials of the Seattle District of the U. S. Army Engineers said, "The army of civilian construction workers who received the Army-Navy "E" lapel pins for their work on this contract have well earned their award. It was a hard job, this Cut-off, but it's a history-making job and we are proud of the fine record these civilian workers of the West Construction Company have made."

Col. Richard Park is Seattle District Engineer and Lt. Col. James D. Lang serves the District as Executive Officer for matters pertaining to Alaska. Office Engineer on the Cut-off construction was John I. Noble. A. McLeod is Seattle manager for West Construction, and A. M. Coker was general superintendent on the project. Col. Otto Ohlson is manager of the Alaska Railroad.

The West Construction Co. also maintains a headquarters in Seattle, Wash., and direction of the railroad tunnel work described here and other Alaska projects is from the latter office. They have completed several contracts for the Seattle office of the U. S. E. D.

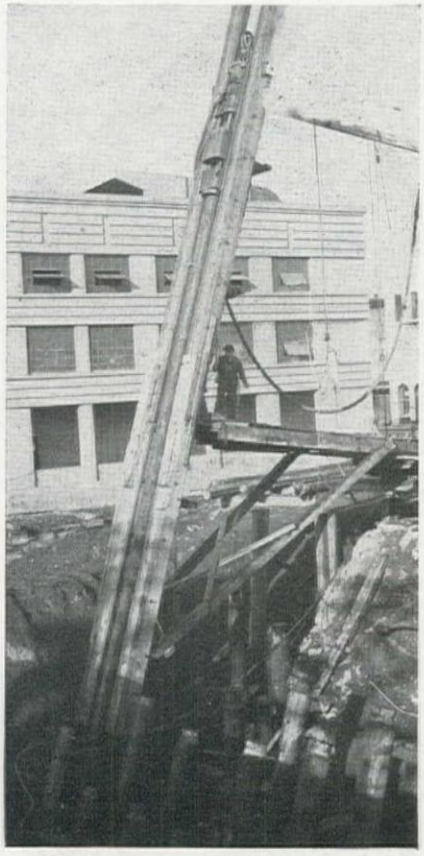
HOW IT WAS DONE

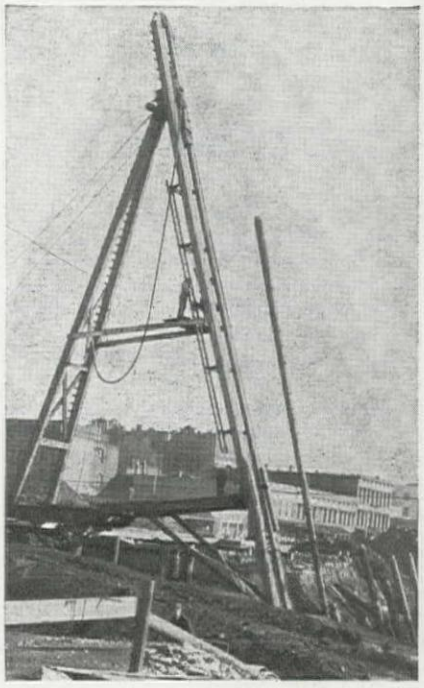
JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

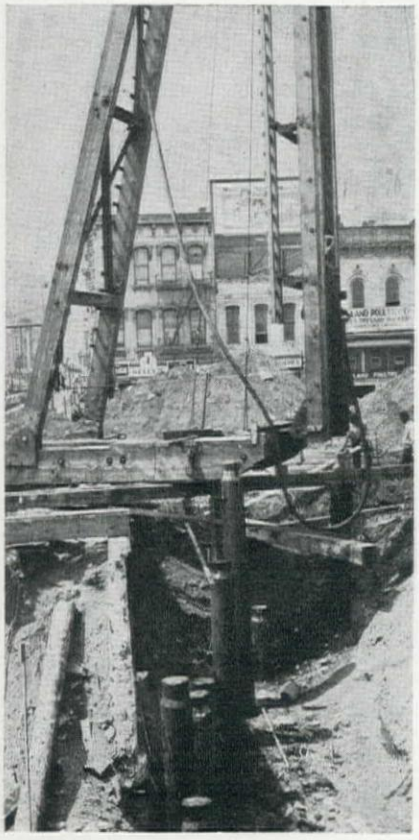
Swinging Leads Device Used On Four-Inch Batter Piling

DRIVING PILES on a four inch per foot batter was handled on the Front Avenue widening project in the city of Portland, Oregon, by a special system of swinging leads. A four-way hinge device was used, allowing the leads to be swung 30 deg. in any direction, and the pin allowed for either a forward or aft batter as required. Portland Tug and Barge Co., sub-contractors for the pile-driving on the project, developed the special features on this hinge.

In order to obtain the required batter, the leads had to be swung 25 ft. out of plumb, and a 20-ft. extension had to be added in order to drive the piles the required depth below the foundation of the driver. A high degree of regularity and evenness of batter was obtained on the driven piling through use of the angled and extended leads. The same rig was used for driving vertical piles by merely removing the lead extensions and closing the hinge. In order to reach satisfactory holding material, it was necessary to drive 75 and 85 ft. pilings, both in the vertical and slanted positions.







TOP, placing a pile in the extended hammer leads used in driving the pier proper. The heavy batter on which these piles are being driven require a 25-ft. extension to hold the leads in position. The tie-back line was used in adjusting the pile with respect to the leads. ABOVE, a close-up view of the extension of the hammer leads in a forward position. Note the accurate position of the batter piling already driven. LEFT, the same rig on the roadway on top of the old abutment, driving vertical 75 to 85-ft. piling in the wing walls. The adaptability of the arrangement made possible a great saving, because in changing position it was only necessary to remove the deck of the driver and swing the leads forward or back as job required.

✦

The Front Avenue project is a part of the Oregon State Highway Department's development of a modern arterial along the Willamette River waterfront. Front Avenue is being made into a 6-lane service street for local traffic while Harbor Drive, one block west and paralleling the Willamette River, provides a limited access route into the city. Sufficient headroom under the several existing bridges across the Willamette gives freedom from cross-traffic, while the river on one side completely limits access in that direction. Limited access only from the other side is provided by the service road program.

The area between Front Ave. and Harbor Drive consists of buildings of depreciated value and the betterment program includes the eventual use of this area for parks and landscaping.

The total cost of the project is approximately $2,000,000 for construction and $2,000,000 for right-of-way.

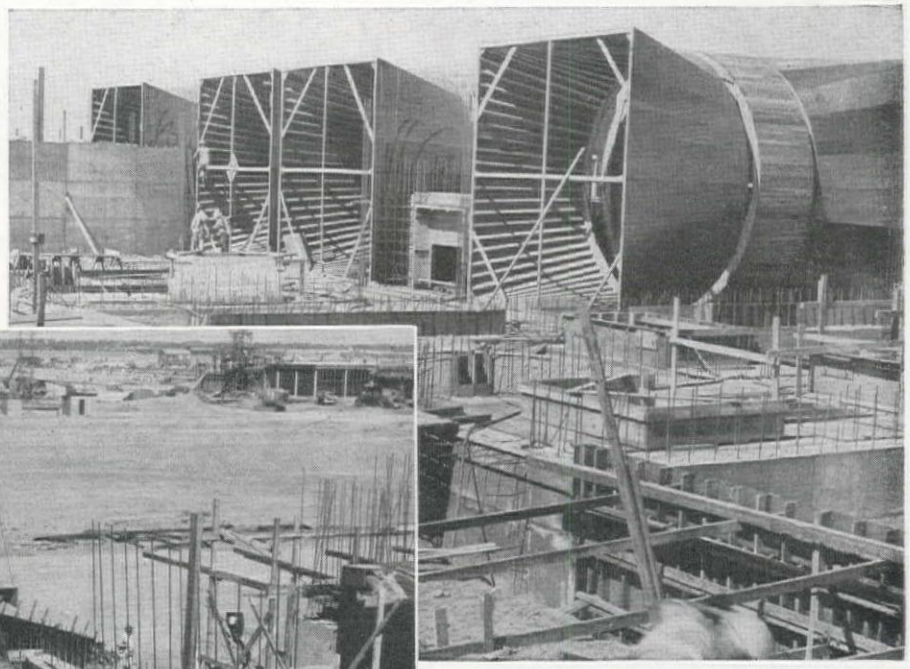
Of the total cost, the City of Portland contributes a bond issue totalling $1,250,000 to take care of the excessive right-of-way costs. The remainder of the money is from funds made available by the Oregon State Highway Commission.

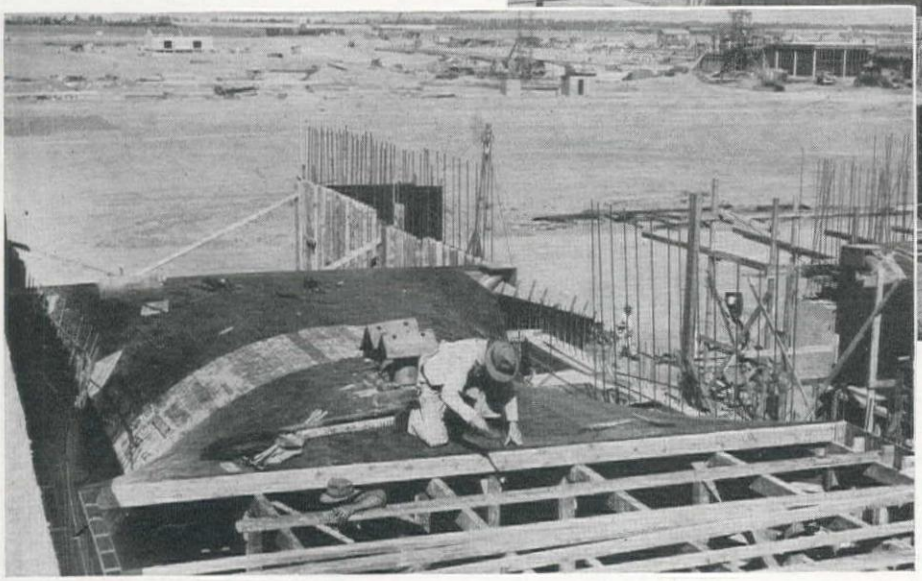
The general contractor was Bierkemeier and Saremal. J. T. Skelton was the resident engineer, and O. R. Kennen, the resident bridge engineer, both representing the State Highway Commission.

Square Opening Made Round

Construction of a wind tunnel in a test hangar at an important air depot in Washington involved a transition section of formwork from a square opening to a round one. While details of size and construction data may not be given, the complications involved are shown in the two photos above. Immediately behind the carpenter in the lower photo may be seen, ready for installation, the two anchor bolts from which planes will be suspended during tests in the wind tunnel. The circular section is used to eliminate drag on the air stream which would occur in the rectangular corners, thus permitting accurate measurement of wind velocity.

The airport and appurtenant buildings are being built under the direction of the U. S. Engineer Department, and Maj. Arthur C. Nauman, Spokane area engineer, is in direct charge. Ford J. Twaits Co. of Los Angeles, Calif., has the contract for this and many other buildings at the airport, M. A. Kitchell being general superintendent for the contractor, and A. B. Standard being superintendent for erection of the engine test building, of which this wind tunnel is a part.

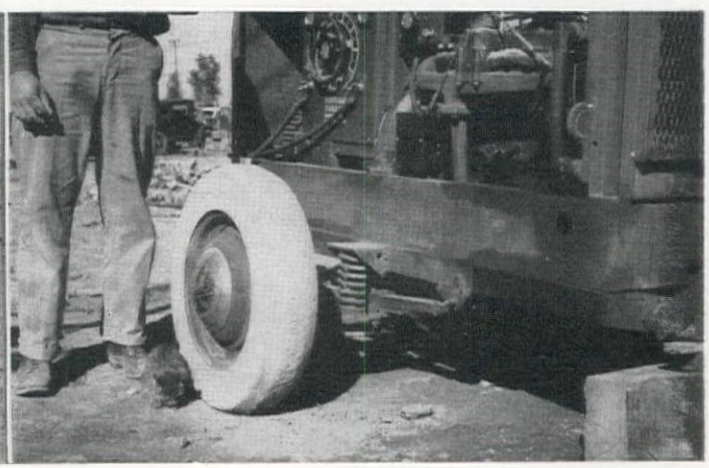


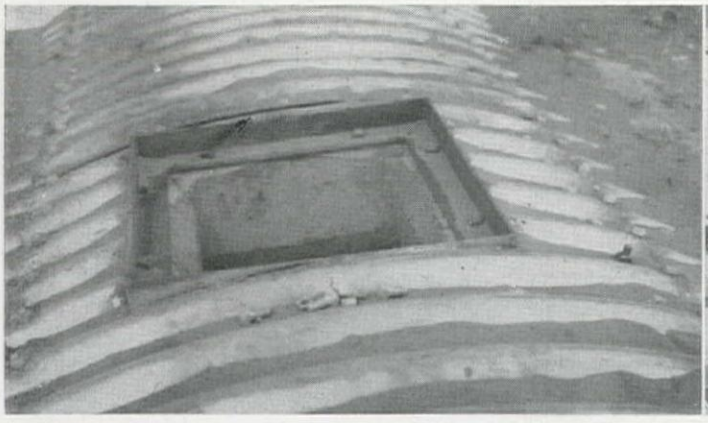


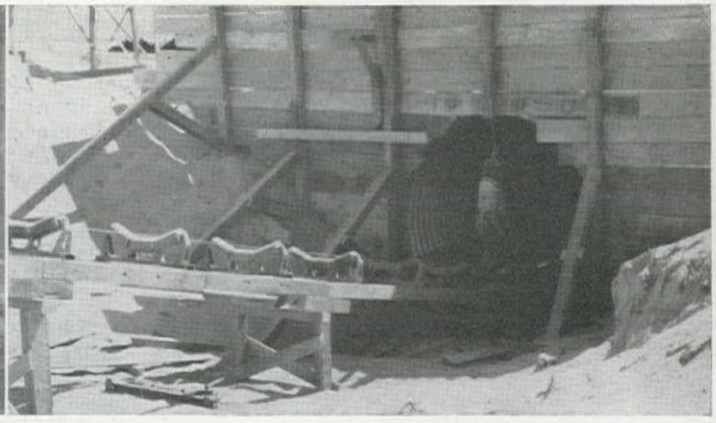
Wood and Concrete Save Vital Rubber

ON A PORTABLE concrete mixer at the Gila Sub-station of the Parker Dam project, tires of wood were substituted for the standard rubber-tire mounting. These tires were made of laminated wood segments using ¾-in. white pine, giving a 4½-in. depth and a 5-in. tread. Twenty-gage sheet iron was nailed to the tire wall to protect the edges of the treads. Four segmental leaves held by 8 through-bolts and spaced to stagger the joints were used to make up the tire width. W. E. Sims was the engineer on the project and Wm. C. Christian was the carpenter foreman.

An ingenious use of concrete was made for the tires on a Hobart welder at the Phoenix Sub-station of the same project. In use for several months, they have proven adequate for the purpose of replacing 6.50x16 pneumatic tires. These tires were built in two parts using circular wooden forms with chamfered edges, plywood being utilized for the circular parts. The rim of the wheel was set inside the form and the concrete placed between the rim and the wooden form. A dry concrete mix was used, with a cement-aggregate ratio of 1:2:2¾. The curing period was two weeks, during which time the concrete was kept continually wet. Reinforcing steel consisted of two ½-in. round bars which were bent to the shape of the tire, with wire mesh between bars. The steel was put 1½ in. below the surface. A number of these tires are being used on the Bagdad line. This information was furnished by G. W. McKay.



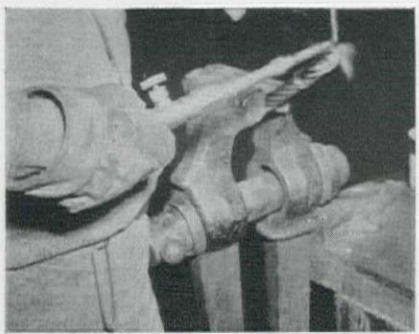




Aggregate Moved Efficiently By Use of Conveyor System

BEFORE steel became quite so scarce as it is now, Fredrickson & Westbrook on an ordnance plant in northern California made an ingenious use of a ten-foot multi-plate pipe for handling concrete aggregate. It was installed underneath the stock pile, fitted with a cast iron gate at the top and a belt conveyor to take the material to the mixing plant. Material can be drawn off the stock pile at their convenience and in the quantities desired.

ABOVE, LEFT—Steel frame and cast iron gate cut into the 120-in. Armco multi-plate pipe used for handling concrete aggregate. RIGHT—The outlet end of the pipe used as a tunnel under stock piles of aggregate. The rollers in the foreground carry the belt conveyor to the mixing plant.

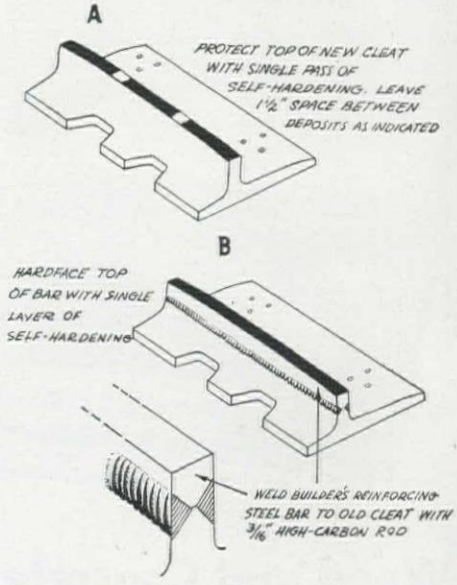


Extends Life of Tractor Cleats

THE BEST way to extend the life of tractor grousers is to protect the wearing surface before the grouser is put into service. It may be done by applying a single layer of coated self-hardening as shown in sketch A. The deposit should be peened while it is still red hot, ¼ to ½ lb. of self-hardening being required for each grouser.

To rebuild worn grousers place a bar of builder's reinforcing steel (see arrow in sketch B) on the worn grouser cleat. Weld the bar to the cleat with high carbon rod. Protect the top of the bar with a ¼-in. layer of self-hardening. The total cost of reclaiming may be estimated at $1.75 per grouser and it adds from 50% to 100% to its life.

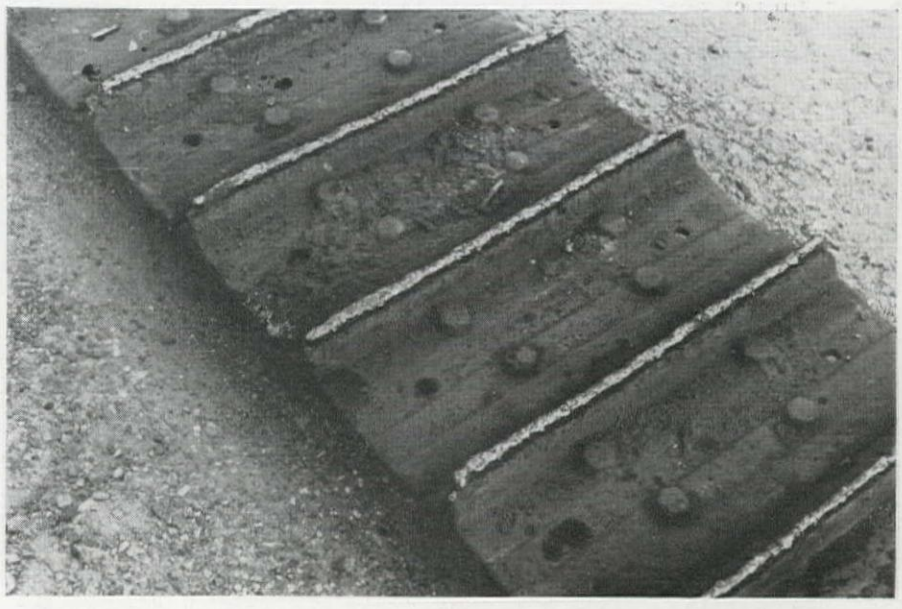
Both the sketch and photo are from the Stoody Co., Whittier, Calif.



Protection From Wire Rope Ends

WHERE clip fastenings or other means of attachment are used that expose the end of a wire rope, there is constant danger that those handling the rope might receive lacerations or puncture wounds from the sharp wires at the rope end.

A simple method of eliminating the hazard is to braze the end of the rope with a bronze welding rod for a distance of an inch or two from the end. When properly done, the bronze covers all the wire ends, and holds the rope end intact so that seizings can be removed.



NEWS OF WESTERN CONSTRUCTION

APRIL, 1943

Second Record Rainfall Tests L. A. Flood Control

WHILE STILL engaged in cleaning up debris from the floods caused by the severe rains of Jan. 22-23, Los Angeles County, Calif., was hit by another heavy rain on March 3-4. The latter storm was more localized in its serious aspect than the former, a strip about 2 mi. wide through South and East Pasadena, Monrovia and Camp LeRoy (Hoegee's Camp) being visited by rains of exceptional short-time intensities.

The all-time national rainfall record established in the January storm has been altered slightly by checking and calibrating the gages used, so that it now stands at 26.12 in. in 24 hr. While no similar record for long-period precipitation was made in March, the gages at several stations recorded short-period accumulations of near-record proportion. Examples were: at Monrovia Falls, 0.95 in. in 26 min.; at Sierra Madre-Carter, 2.30 in. in 39 min.; at Caltech, 1.90 in. in 66 min. and 1.06 in. in 26 min.; at El Sereno, 2.34 in. in 90 min. and 0.52 in. in 10 min.; at Camp LeRoy, 2.16 in. in 80 min.

The debris basin program of the Los Angeles County Flood Control District again prevented any serious flood damage, though silt accumulations in streets caused delay to traffic and were estimated to require about $100,000 to remove. A survey of the basins after the storm indicated that one-third of the total capacity of the basins was filled with silt by the two severe storms. One, the Aliso-Wilbur Ave. debris basin in upper San Fernando Valley, was filled to capacity, 53,000 cu. yd. Excavation of accumulated debris in the various basins is now proceeding.

One life was lost in the March storm, an infant being caught in swirling water in East Los Angeles, where run-off from the belt of heaviest precipitation was particularly severe.

Santa Fe dam on the San Gabriel River, now practically complete, was of little value in protecting property below the structure, since no control gates have yet been installed. A serious break through the levees of the river near the ocean flooded considerable farm land in the East Long Beach section, but little permanent damage ensued. Hansen dam on Tujunga Wash again protected the Los Angeles River valley from damage, although it was necessary to bulkhead the permanent openings through the dam to prevent washing out in the channel below the dam, since it has not yet been concreted and the full outflow would have been more than the natural banks could safely carry.

Value of Construction Continues to Decrease

TOTAL VOLUME of construction in the United States declined 14 per cent from December to January as the downward trend continued for the fifth successive month, the War Production Board has announced. It is estimated that about 80 per cent of this volume was for war purposes, as compared with about 65 per cent for January, 1942.

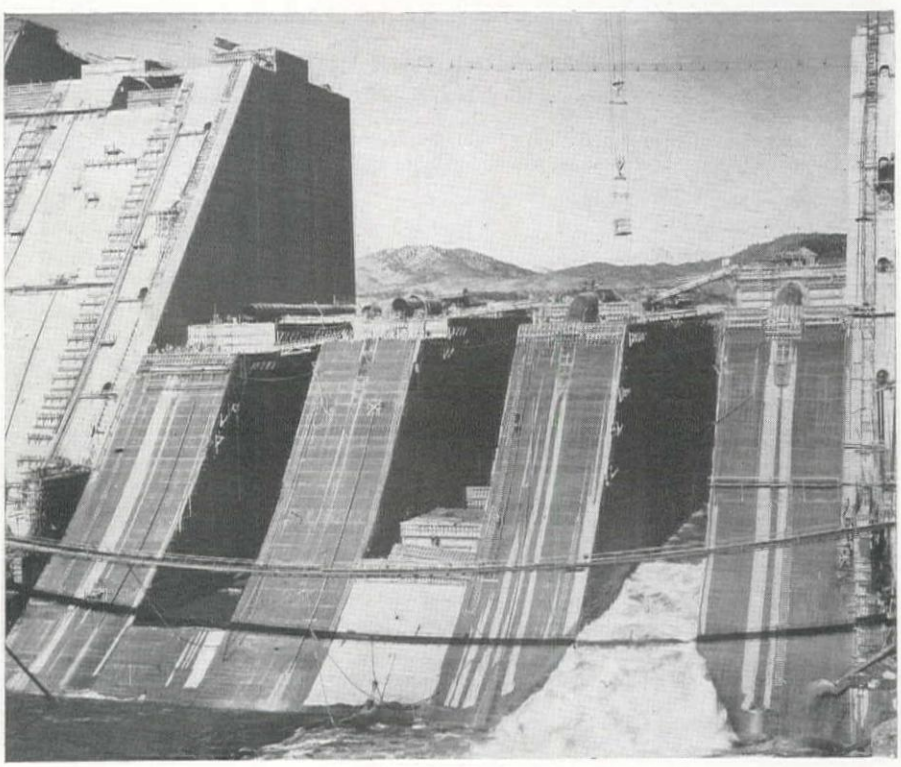
The January volume of $783,500,000 represents a 46 per cent drop from August, 1942, the peak month of last year, when construction reached a total of $1,468,000,000.

War housing and community facilities construction declined 9 per cent from December with the largest decrease occurring in the category of privately-financed housing.

By type of facility, construction decreases occurred in all major categories except machinery and machine tool plants. Construction work and machinery and equipment deliveries for synthetic rubber plants declined following the sharp increases reported for December.

SHASTA DAM FAST APPROACHING CONSTRUCTION COMPLETION

CONSTRUCTION CONTINUES on Shasta dam as its potential power generation capacity assumes added importance as a vital factor in the nation's war program. The structure is now about 80 per cent completed, with over 5,000,000 cu. yd. of concrete in place. River is diverted through Row 40, while concreting proceeds on other blocks.



Generator Added at Grand Coulee Dam

ADDING MORE than 70,000 kw. to the Nation's power facilities for the war industries of the Pacific Northwest, another hydroelectric generator has gone into commercial production at Grand Coulee Dam, Washington. This generator is one of two originally constructed for Shasta Dam of the Central Valley project in California.

Addition of the new generator brings the present capacity at the Grand Coulee power plant to more than 400,000 kw. It increases the combined capacity of the Bureau of Reclamation's 29 power plants in 11 states to more than 1,715,000 kw. Additional installations cleared by the War Production Board will boost this total to nearly 2½ million kilowatts by May, 1944, through doubling the capacity at Grand Coulee, increasing the capacity at Boulder and Parker Dams and through the initial production at Shasta Dam in California. The Grand Coulee plant produced more than 1,898 million kilowatt hours in 1942.

A.W.W.A. Schedules '43 Meeting for Cleveland

THE AMERICAN Waterworks Association will hold its 1943 general meeting at Cleveland, Ohio, June 15-18, with the Carter and Statler Hotels as co-headquarters. The 16th and 17th are scheduled as full sessions on the subject of wartime problems in the industry and post-war planning. The 15th and 18th will be devoted to committee and Division meetings. There will be a limited exhibit of water works materials. The conference was arranged with due regard to the transportation limitations of wartime America, because water supply is an industry especially essential to the war effort, and current problems are so great as to warrant consultation among the leaders in the field.

The nominating committee of the association has presented the following candidates for officers to be elected at the Cleveland meeting: President, Samuel B. Morris, Stanford University, California; Vice-president, Samuel F. Newkirk, Jr., Elizabeth, N. J.; and Treasurer, Wm. W. Brush, New York, N. Y.

A. S. C. E. Convention

The Summer Meeting of the American Society will be held in Los Angeles, Calif., in July. A. M. Rawn, director for southern California, carried the invitation of the Los Angeles section of the society to the Dallas, Texas, meeting of the Board of Direction April 3-7, and it was accepted by the group. Program details and hotel accommodations will be given in succeeding issues of Western Construction News.

Painters Indicted for Anti-Trust Violation

AN INDICTMENT charging violation of the Sherman antitrust act has been returned in the Federal Court in San Francisco against 77 individuals, paint contracting firms and unions.

They are accused of conspiring to restrict the use of paint spraying equipment in the Bay area. This restriction is said to have taken place both on commercial and defense projects, and also on private housing programs.

The Grand Jury which returned the indictment was told that the persons named conspired to restrain interstate commerce by restricting shipments into the state of spraying equipment and special spray paints. Union members did not strike on any project using spray equipment, but were fined $500 a day when this type of work was performed.

The matter was brought to a head by refusal of union painters to spray a 1,000-unit housing project in Alameda, for which the contractors had bid $30,000. The job was finally performed using brushes at a cost of $60,000 and requiring six times as long for completion.

Abandoned Roadbed Is Used for Service Road

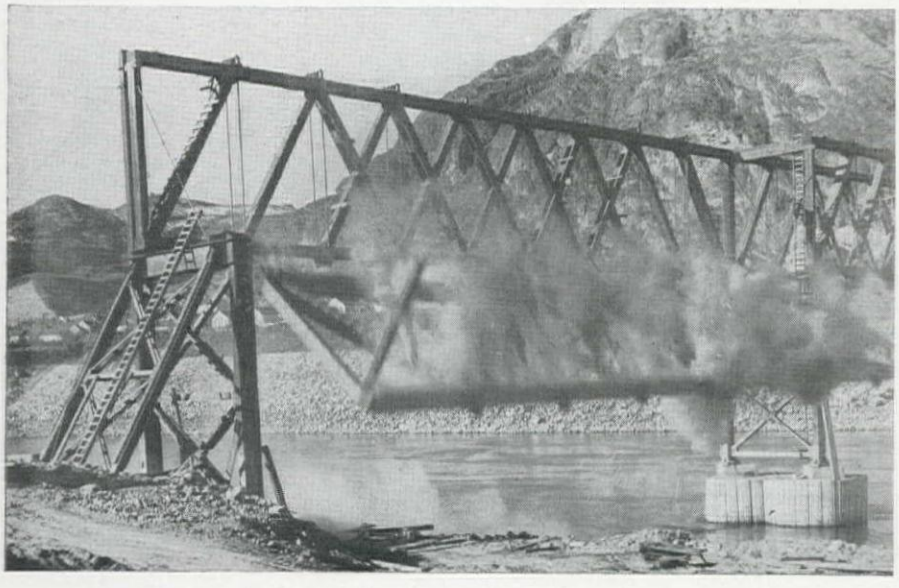
UTILIZING the abandoned roadbed of the pioneer transcontinental railroad, the U. S. Grazing Service is constructing a 115-mi. road for the use of fire fighting crews, range improvement workers and livestock operators in the Promontory Utah grazing district.

It was on this road that the golden spike was driven, symbolizing the meeting of the Southern Pacific construction crews working from the west and Union Pacific crews working from the east to complete the first railroad linking the coasts of the United States.

Construction of the Ogden causeway across the Great Salt Lake shortened the original line by many miles and caused its abandonment some years ago. The rails have now been removed between Lucin and Corinne and have been re-laid at the Clearfield Naval Supply Depot. Drainage structures and roadbed form a ready-made route for the Grazing Service project.

COULEE CONSTRUCTION BRIDGE REMOVED WITH DYNAMITE

A SPAN of the temporary construction bridge below the Grand Coulee dam is shown exploding in mid-air as it falls into the Columbia River. The timber beams were loaded with dynamite and after being felled were salvaged by the Bureau of Reclamation for other uses. The structure was built in 1935 by the contractors on the dam.



Final Concrete Poured at San Vicente Dam

POURING of concrete was completed at San Vicente Dam, the second largest water storage reservoir in the San Diego, Calif., municipal water system, on March 16. The dam was constructed by L. E. Dixon Company of Los Angeles, and the contract cost was $1,743,905. Construction began in November, 1941, and is completed nearly six months ahead of schedule. The capacity of the reservoir formed by the 190-ft. gravity dam is 30,000,000 gal. The dam is located on San Vicente Creek, 4 mi. north of Lakeside and 21 mi. northeast of San Diego.

Because of the critical water shortage existing in San Diego, the Department of Public Works of that city has recently asked residents to abandon Victory gardens and lawns. Rainfall for the 1942 season in the San Diego area has been almost exactly normal, while normals in most other parts of the state have been far exceeded.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

Washington, D. C.—Late in March, National headquarters of the Selective Service System circulated among its 30,000 local boards and officials an amended definition of various activities and occupations. The **essential** activities of the construction industry are enumerated thus: Construction of airports, aqueducts, breakwaters, bridges, channels, coffer-dams, concrete, conduits, culverts, dams, dikes, docks, drainage, electric light and power plants, electric power-lines, gas compressing-stations, grain elevators, harbors, highways, hospitals, industrial buildings, industrial plant appurtenances such as bakers' ovens, silos, tipples, washeries, coke ovens, etc.; hydro-electric plants, irrigation systems, jetties, levees, lightning conductors, marine construction such as dredging, under-water rock removal, pile-driving, land reclamation, harbor and waterways construction; piers, mining appurtenances, natural-gas compressing stations, pipe-lines, pole-lines, residential building for war workers only, retaining walls, roads, railroads, reservoirs, portable buildings, sanitation systems, sewers, tunnels, ventilation systems, viaducts, water-main, water-power projects, water-ways, water-supply systems, wharfs, waterproofing of buildings, maintenance and repair services, trenching and pipe-laying, shoring, road repairs and maintenance, irrigation system operation, installation of machinery and equipment, gas-main construction, excavation and foundation work, elevated-highway construction, drilling water wells, diamond drilling (test borings), damp-proofing of buildings, cement work, camouflaging services.

"Essential" occupations

Persons employed in the construction industry are defined as being engaged in essential occupations when they are classified as cost accountants, barge captains, blacksmiths, blasters, boilermakers, bricklayers, cable squeezers, carpenters, caisson compressor engineers, concrete-paver operators, construction superintendents, gantry crane operators, derrick-boat captains or operators, diamond drillers, dredge captains, levermen or mates, electric elevator installers, electricians, professional and technical engineers, foremen who are employed as supervisors and exercise independent judgment and assume extensive responsibility; furnace and stoker installers and repairmen, hoisting engineers, steel layout men, machinists, man-lock tenders, employment and personnel managers, maintenance mechanics, refrigeration mechanics, millwrights, painters, pipe and steam fitters, plasterers, plumbers, power-shovel and crane operators, construction equipment riggers, sheet metal workers, stonemasons, structural steel erectors, survey party chiefs, tugboat captains, engineers or mates, welders, wharf builders, wire spinners, and yardmasters.

The War Production program is officially defined: "Work of processing or producing, ships, planes, tanks, guns, and other machines, instruments, articles and materials directly used in the prosecution of the war. For an activity to be considered necessary to war production, its facilities must be predominantly devoted to that purpose." The instructions to the draft boards define a **necessary man** as a registrant "in an activity necessary to war production or in any other activity essential to the support of the war." This entitles the man to classification as engaged in an "essential occupation," which by definition "must be such that, unless they are filled by men with the required training, qualification or skill, there will be a serious loss in the effectiveness of the activity." There are no essential occupations in non-war work, no matter how much skill may be required; and there are no deferments for those employed in nonessential occupations in essential activities.

The fact is not mentioned in any printed instruction to draft boards, but it generally is known here that a person whose skill requires less than 6 months to train a substitute or replacement, is not assumed to be considered a skilled worker in the Selective Service sense of the word. This does not mean, however, that those who can be replaced by training a substitute in less than 6 months may not be given the necessary deferment to enable them to train their successor. It depends largely upon the individual case, and the inclination of the local draft board.

Deferment procedure

Selective Service people and WMC people, here, frequently reiterate that in their opinion deferment of a worker often is finally the ability of the employer to do a good piece of selling. If he can convincingly talk to the local board, he will save workers that others lose for lack of a similar ability. Privately we also are urged to pass along the word that it will be wisdom for any employer who wishes to retain the services of an essential employee to file Form 42A even before the worker is called up for reclassification. **Do it now!** The suggestion is that those who employ only small numbers should proceed promptly to file the Form 42A with the local draft board for those they feel they need. If the local board refuses the application it may be successively appealed to the local appeals board, the State Selective Service Director, and Maj.-Gen. Lewis B. Hershey, Director, Selective Service System, Washington, D. C. Here the appeal is given exceedingly careful consideration before final action is taken.

Under the new regulations a worker may transfer his appeal from the place where he is registered to the locality where he is employed. If the local draft board where he is registered declines to permit the transfer, the appellant may address himself directly to Gen. Hershey, in Washington, and if Gen. Hershey is convinced the transfer is reasonable, he will secure the proper ruling from the President.

Power conference

The Brass Hats of hydroelectric power were called together the middle of March by Dr. Paul J. Raver, Bonneville Power Administrator, and adopted a series of resolutions to develop immediately additional power to meet the constantly expanding power demand in the Northwest. Reports of surveys by various Government agencies were submitted. In the group were, besides Dr. Raver, Roger McWhorter, Federal Power Commission; Brig.-Gen. Warren T. Hannum and Col. Donald J. Leehey, U. S. Corps of Engineers; J. A. Krug, power tycoon of the WPB; Ernest H. Wiecking, Department of Agriculture; Arthur Goldschmidt, Power Division of the Department of Interior; Commissioner John C. Page, Bureau of Reclamation; D. L. Marlett and Dr. William A. Dittmer, Bonneville Power Administration; also Ivan Bloch, commercial agent for Bonneville power. Mr. Bloch has since returned to Portland. The resolutions urging prompt development of power resources were sent to Donald Nelson of WPB. Before they may be released for the profane eyes of the public they must be scrutinized by OWI. They have been in the mill of the Government agencies for over two weeks, and will probably still be in process of dehydration for a number of days. The resolutions are obviously of unusual interest to the people of the Pacific slope. If the veil of mystery is lifted in time, the resolutions will be summarized elsewhere in this issue of *Western Construction News*. The Washington power tycoons also held another meeting in which they called upon Fuel Administrator Ickes to turn loose some fuel oil in California and in other states on the Coast to enable Government and other power manufacturers to make steam power to meet the rapidly increasing pressure for industrial power.

As anticipated, the Columbia Basin Law to prevent land speculation swiftly was sent to the White House and signed by the President. Farms may not be smaller than 10 acres, nor larger than 160. Any one landowner who now owns a larger farm will be asked by the Secretary of Interior to sell it to the Government so the Government may resell it in bits to others. Apparently the anti-speculation tenor of the law really covers a definite and broader social aim. The law permits the government to do a number of things, including the establishment of townsites, with all the appurtenances of towns. It is quite probable it may be found the Government may help the settler to build a house and

buy furniture and equip his place with the proper tools and stock and machinery.

Reclamation projects

The drive to secure rapid development of Western irrigation projects is making headway. The Western Senators and the Western Congressmen had their meetings and appointed a Joint Committee, headed by Sen. Hayden of Arizona—he started the activity—and includes Sens. Milligan, Colorado; Bone, Washington; Clark, Idaho; and McNary, Oregon. The members from the House are headed by Rep. Robinson, Utah; the others are Reps. Anderson, New Mexico; Elliott, California; Curtis, Nebraska; and O'Connor, Montana.

Undoubtedly without the personal knowledge of Mr. Wickard the pressure from the Western group has brought into existence in the Department of Agriculture an Intra-Departmental Committee which is devoting full time to the study of the new reclamation projects. This group consists of responsible officials from the Bureau of Agricultural Economics, the Land Utility Bureau and the Agricultural Adjustment Administration.

Negotiations between the Joint Committee of Congress and the Department of the Interior have drawn Commissioner of Reclamation John C. Page actively into the program. He recently reported that resumption of project activities would make possible the following developments (acreage of new land and land already irrigated but to be furnished with supplemental water are shown in the table):

The total acreage on the Pacific slope embraced by this initial program aggregates 2,590,355 acres, consisting of 672,855 acres of new land, and 1,917,500 acres to be developed by production of supplemental water supply. Commissioner Page reported to Sen. Hayden that the full program may be completed in 1945 if he could start promptly, and if he can secure the steel and copper and the labor required for the work. He estimates the cost will be $185,311,000, a limited part of which may be taken from unexpended balances that have been on hand since WPB stopped practically all reclamation work.

Alaska highway

Word here is that Commissioner MacDonald's Public Roads people are driving steadily to get the piers set on the Peace River bridge before the ice goes out in late Spring. They apparently anticipate most of the wooden bridges now in place will go out with the floods along the Alaska Highway. There is some talk about the fact that the permanent road to be built by the Public Roads staff will leave the present road and swing away considerably.

Commissioner MacDonald, incidentally, is one of the most outspoken critics in Washington about the blunders and fumbles of the WPB. All kinds of apocryphal stories are told about his brushes with WPB officials. At St. Louis recently Commissioner MacDonald told his audience with complete frankness that he thinks the WPB is wholly indifferent to road building and to highway repairs and maintenance. At New York he took the button off the foil altogether and went for the WPB with amazing candor. The Commissioner has spent much of his life in building fine sound roads, and he deeply feels the neglect which he thinks gradually is permitting our great highway systems to deteriorate. Apparently so far as the Commissioner himself is concerned he would not mind if his talk at New York were published. But all utterances by people in Government service must first be censored by the Office of War Information. There seems doubt that the Commissioner's talk will ever come out of OWI.

Upwards of 22 States have qualified for some of the $10,000,000 fund which the Public Roads Administration may spend for post-war road surveys and planning. It is expected the plans will entail the expenditure of $170,000,000 out of the $500,000,000 to be provided to build the post-war roads.

Late in March WPB cancelled the authority which enabled State Highway Departments to begin road construction jobs when they used no critical materials. WPB announced fourteen unnamed States had adopted the pooling plan for road machinery and equipment. Most restrictive measures on highway work are designed to save manpower. Regional directors are now authorized to start work on roads which involve no Federal money, no critical materials, and which cost less than $100,000. Apparently Congress thinks more roads should be repaired now. It included $40,000,000 in its recent deficiency bill for maintenance of highways.

STATE	PROJECT	NEW LAND (Acres)	SUPPLEMENTAL SUPPLY (Acres)
Arizona	Gila	63,000	11,000
	Hassayampa	20,000	.....
California	All-American Canal	77,000	18,000
	Central Valley	28,000	383,000
	Kings River	370,000	.....
Colorado	Colorado-Big Thompson	.....	320,000
	La Plata	6,200	3,800
	Mancos	2,000	8,000
	San Luis Valley	100,000	.....
Idaho	Boise-Anderson Ranch	.....	340,000
	Boise-Payette	22,000	.....
	Minidoka	16,658	.....
	Palisades Dam	200,000	.....
	Rathdrum Prairie-Post Falls Unit	.....	3,600
Montana	Bonanza	910	.....
	Buffalo Rapids No. 1	15,000	.....
	Buffalo Rapids No. 2	11,900	.....
	Canyon Ferry	50,000	.....
	Missoula Valley	.....	3,600
	N-Bar-N	7,380	.....
New Mexico	Tucumcari	25,000	.....
Oregon	Bully Creek	5,000	.....
	Deschutes	50,000	.....
Oregon-California	Klamath-Modoc	21,540	9,000
Utah	Gooseberry	.....	40,000
	Newton	565	1,660
	Provo River	.....	40,000
Washington	Columbia Basin	50,000	.....
	Yakima-Roza	63,000	.....
Wyoming	Eden	8,500	11,500
	Kendrick	35,000	.....
	Riverton	58,000	.....
	Shoshone-Heart Mt.	33,400	.....

Contract rulings

OPA recently announced construction contracts and subcontracts based on cost-plus-a-fixed-fee, and contracts performed on the basis of cost with no addition for profit, are exempted from price control. Administrator Brown later announced that most parts of the construction industry not already exempt will soon be freed of price regulation.

WPB announced purchasers of portland cement may require tests, but only tests made in accordance with Federal specifications, or American Society for Testing Materials specifications.

WPB announced recently that firms with Government contracts or subcontracts totalling less than $500,000 a year will not be required to renegotiate prices after delivery. At present all firms with orders totalling $100,000 or more must hold themselves ready to renegotiate. Army, Navy, Maritime Commission, and Treasury Procurement jointly announced war contracts and subcontracts would be exempt if they involved aggregates consisting of washed or screened sand, gravel or crushed stone; cement; and various other products of mines, oil or gas well, timber or other mineral or natural deposit.

Post-war planning report

The grand-daddy of all Post-War planning reports is the huge document known as the Findings and Recommendations of the National Resources Planning Board, headed by Dr. Floyd W. Reeves, once of TVA, always of the Uni-

versity of Chicago. It urges that all power resources, private and public, from the Coast to the Atlantic seaboard, be hooked up in one stupendous Government system; it recommends that the regional development program, given its initial pattern in the Tennessee Valley, be applied to all parts of the country, including Alaska and Puerto Rico. The specific relief part of the program is presented in a separate report drafted by the Technical Committee on Long Range Work and Relief Policies of the National Resources Planning Board. The proposed program is much like the Beveridge Plan submitted to the British people, only our plan is more so. They expect here that it will be made into some kind of law before the War is over. The best all around digest of the two reports in briefest form was published by the U. S. Chamber of Commerce, as Section Three of its weekly "Washington Review." The U. S. Chamber will readily send you a copy if you write, addressing the Chamber at Jackson Square and H Street, NW.

Pending legislation

Following legislation pending is of interest to the Pacific slope: SJR 42 extends for year right to do assessment work on mining claims in U. S. and Alaska; S 20 waives interest on Government-owned bonds, notes and similar obligations of drainage, irrigation and reclamation districts; S 29 establishes a fortified military post at the naval depot at Hawthorne, Nev.; S 58 authorizes completion of bridge at Astoria, Oregon; S 649 revives the bill to make a compact between Colorado, Kansas and Nebraska, to build flood control works in the Republican river; HR 802 is the Rankin bill which would create conservation and regional authorities after the pattern of TVA in all parts of the country; HR 804 prohibits aliens from voting in labor organizations or acting as their officers or agents; S 825 orders the Secretary of War to transfer certain lands to Cascade Locks, Oregon; S 833 provides another naval academy to be built on the Pacific Coast; HR 892 provides for construction of a new system of superhighways and airports, to be built at the conclusion of the War; S 870 authorizes the Secretary of Interior to secure food, clothing and other supplies for resale to the people of Alaska; HR 2230 empowers the Federal Government to buy the bridge between Rainier, Oregon, and Longview, Washington; HR 2241 restores the Jackson Hole country to its former status as part of the Teton National Forest; SR 113 expands investigation of labor shortage on the West Coast; S 821 is designed to secure prompt construction of additional rural post roads.

Miscellaneous

Walter C. Mendenhall, director of Geological Survey, retired after 48 years in the Department of Interior, late in February, and is succeeded temporarily by Dr. Julian D. Sears, administrative geologist, as acting chief. Mendenhall served in all but one of the Survey's branches, and headed two of them before becoming chief of the Survey. The President exempted him twice after he reached the retiring age, in order that he might carry on under present extraordinary conditions.

The Navy has announced it will not give the Army-Navy "E" to any plant with a bad absentee record. Incidentally, the National Bureau of Standards has received the "E" the second time within a year. Army and Navy jointly announced the award of the "E" to Potash Company of America, Carlsbad, N. M.

A special course for orientation in Army activities, heavily underlining construction, was given to 83 handpicked civilians by invitation, among whom were Harbor Commissioner Morgan Adams, Los Angeles; T. W. Braun, Braun and Company, Los Angeles; LeRoy M. Edwards, Vice-President, Pacific Lighting Corporation, Los Angeles; Edward C. Lippman, President, The Emporium, San Francisco; M. M. McCallen, McCallen Refining Company, Huntington Beach, California; Marshall Neal, Radio Station KWKW, Pasadena; Leslie W. Nims, Utah Power and Light Company, Salt Lake City.

The Seabees, Navy's Construction Battalion soldiers, were highly praised for their work at Guadalcanal by Marine Corps Commander Maj. Gen. A. A. Vandegrift. He reported to Washington that the Sixth Naval Construction Battalion are a "splendid body of men" and that they not only did a great job of construction but took over voluntarily the handling of stores on the beaches while the fight was going forward.

Four thousand Mexicans applied for jobs in California and in Arizona after the Mexican Government announced it had reached an agreement with the U. S. Government. Over a thousand have been employed.

Government Flight Strip Program

(Continued from page 168)

tion of auxiliary landing areas for every major training and operating base.

Undoubtedly a number of Flight Strips that are now being constructed for the military program will not be so located as to be of the greatest value in the post-war period. However, they are definitely justified as a war measure alone, as the cost of constructing these strips is low when compared to the cost of even secondary airports. Postwar considerations were of course secondary to the present military needs but in a majority of the cases the Flight Strips have been so located as to fit into the planned expansion of air transport and private flying activities.

Just prior to the war the domestic air transport system was composed of four main transcontinental routes and six major north-south routes plus some smaller systems. The air mail, passenger and cargo business was increasing at an over-all rate of about 40 per cent each year. There was a growing demand by off air line cities of all sizes for air service. This demand was in the form of applications to the Civil Aeronautics Administration for certificates of necessity and convenience for numerous so-called feeder routes patterned along the lines of the successful All American Aviation but adding to that mail pick-up service, the carrying of passengers and cargo.

In general, these feeder routes were planned to operate in radiating services from major trunk line airports and to bring air service to cities or groups of cities having populations as low as 4,000 people.

A review of these route applications with respect to the terrain and wind conditions around many of the cities that will receive service, and with respect to the economics of providing air service to small communities, coupled with a consideration of the types of planes that will probably be used in this type of air service, indicates that in many instances the installation of Flight Strips along the main highway adjacent to a small community or equidistant from several small communities will be the wisest course to pursue in providing landing facilities for the settlements.

The scope of this air transport expansion and its effect upon the Flight Strip program can be best illustrated by pointing out that at the start of the war there were less than 500 cities receiving any kind of air service while in the post-war period there is every likelihood of bringing complete air service to as many as 5,000 communities.

There is no desire to abandon the large aircraft plants or completely uproot the thousands of skilled artisans that have been gathered in communities around them. It is likely, therefore, that some of these plants will be turned into light plane factories, to develop the market for private flying.

As a result of this trend, many people who now drive from city to city and to parks, seashore and the country on business and pleasure, will use a small plane in these journeys. To serve and protect the private flyer it will be necessary to provide Flight Strips along the main highways and other Flight Strips at the small centers which cannot justify an airport.

Conclusion

For many years articles had been written and discussions held on Flight Strips; however, other than the passage of preliminary legislation, no action was taken to provide for their construction until the present war emergency. During this emergency they have developed into a reality because they answer both the military and civilian needs for landing fields that can be built quickly and with a minimum of critical materials, manpower, and money.

This article on flight strips is a condensation of a paper presented by Mr. Schnepfe to the 1942 Fall meeting of the American Society of Civil Engineers at Niagara Falls, Canada. Additional details of some western flight strips will be presented in an early issue.

NEW BOOKS...

FUNDAMENTALS OF MACHINES FOR THOSE PREPARING FOR WAR SERVICE—By Glenn M. Hobbs, Ph.D., L. H. Morrison B.S. in M.E., Ray F. Kuns, and a Staff of Technical Experts.

FUNDAMENTAL SHOP TRAINING FOR THOSE PREPARING FOR WAR SERVICE—By John T. Shuman, Captain Bailey Wright, James Ritchey, and a Staff of Technical Experts.

FUNDAMENTALS OF ELECTRICITY FOR THOSE PREPARING FOR WAR SERVICE—By Wynne L. McDougal, Richard R. Ranson, B.S., E.E., Carl H. Dunlap, and a Staff of Electrical Experts.

Published by American Technical Society, Chicago, Ill. Each vol. approx. 300 pages, 5½x8½. Price $2.00 each.

Because out of every hundred men inducted into the armed services, sixty-three are assigned to duties requiring specialized training, this series of text books has been designed to give the potential inductee a working knowledge of the several subjects covered. They follow an outline recommended by the War Department and include information necessary to the mastery of operational skills essential to a mechanized army. The books do not attempt to train men in skills pertaining to specific machines or equipment, but are intended to provide thorough and careful instruction in the principles of physical science and phenomena which explain the operation of mechanical devices.

The book on machines discusses practical physics, automobile design and construction, common engine troubles and the operation of diesel, automobile, and aircraft engines.

The book dealing with shop training describes and illustrates common hand tools and covers techniques of filing and scraping, threading, measurement, wood working, painting, wiring, airplane construction, and related matters. Tables of tapers, threads and common measurements are also given.

The book on electricity describes the principles and laws governing electricity and magnetism. It discusses elementary, series, and parallel circuits, meters, induced currents, generators and motors, and measurements. Also included are common abbreviations and dictionary terms, electrical formulae and useful tables.

* * *

PLUMBING PRACTICE AND DESIGN—Vol. I—By Svend Plum. Published by John Wiley & Sons, Inc., New York, N. Y. 308 pages, 6x9½. Price $4.50.

Intended to consolidate the scattered data available on the subject of plumbing and to present them in a uniform terminology, this volume is the first complete handling of the subject. It contains definitions of various equipment and materials used in plumbing, tables of strength and dimensions of same, many typical problems, and is profusely illustrated with drawings. The volume is useful as a handbook since it contains a number of illustrative examples, but it recognizes that only a small fraction of possible cases can be analyzed. Therefore it is even more useful as a text book. A second volume is in preparation.

* * *

BOOKS ABOUT MIDDLE AMERICA—A Selected Bibliography. Compiled by Charles Morrow Wilson. Distributed by The Middle America Information Bureau conducted by United Fruit Company, 9 Rockefeller Plaza, New York, N. Y.

In view of increasing interest in the countries of Central America, this booklet has been prepared to assist the reading public in selecting the best literature on our sister republics. The publishers, authors, prices, length, and a brief description are given on each of the volumes listed. Countries covered are Mexico, Guatemala, El Salvador, Nicaragua, Honduras, Costa Rica, Panama, Haiti, Cuba and the Dominican Republic.

* * *

CONSERVATION OF CONSTRUCTION EQUIPMENT AND FACILITIES—Prepared by The Associated General Contractors of America, Inc., Munsey Building, Washington, D. C. 75 pages, 5x7½. Prices, 50c per single copy, $5.00 per dozen, $25.00 per hundred.

This volume is a wartime manual of pointers and recommendations for the maintenance of construction equipment and facilities; the conservation of critical materials; and the salvaging of metals, rubber, lumber and other materials now suffering shortages. It is intended to be of help to every organization and agency engaged in construction industries or dealing with critical materials. Fundamentals of economical operation and maximum conservation of the following items are dealt with in separate chapters: plant layout, construction equipment, internal combustion engines, electric equipment, automobiles, small tools, rubber, wire and hemp rope, tarpaulins, scaffolding, steel piling and forms, and a glossary of maintenance hints and a reference listing of manufacturers who have issued literature on maintenance of construction equipment are given in the back of the book.

* * *

MECHANICAL VIBRATIONS—Theory and Applications—By R. K. Bernhard, former Professor and Head, Department of Engineering Mechanics, Pennsylvania State College. Published by Pitman Publishing Corporation, New York and Chicago. 139 pages, 6½x9. Price $3.00.

This book is intended to make possible the recognition of safe and economical methods of design and construction, taking into account the increasingly important study of engineer dynamics and mechanical vibrations. It is designed for use by engineers who have studied little dynamics and utilizes the minimum of higher mathematics. A chapter on instruments for measurement and recording of dynamic quantities is given and the physical phenomena of vibrations are defined and illustrated. Coupled vibrations, harmonic and resonance effects in girders and other structures, and the principles of damping such effects, are covered.

* * *

THE USE OF CURRENT METERS IN MEASURING PIPE DISCHARGES—By Carl Rohwer. Distributed by Colorado Agricultural Experiment Station, Colorado State College, Fort Collins, Colo. (Known as Technical Bulletin No. 29.)

Reporting on experiments conducted at Colorado State College by U. S. Division of Irrigation, Soil Conservation Service, and the Colorado Agricultural Experiment Station, under the direction of W. W. McLaughlin, Chief of the Division of Irrigation, this booklet analyzes the experimental data accumulated on the subject of current meters, checks the accuracy of discharge formulae and summarizes special tests made on numerous types of meters, including tests for the effect of submergence, length of pipe, spiral flow, elbows, sloping outlets, roughness, aeration and other factors.

Aggregate Crusher Types Limited By New WPB Conservation Order

DRASTIC reductions in the number of sizes and types of portable jaw crushers and portable roll crushers have been imposed by Schedule II of Limitation Order L-217, which provides for the application of simplification and conservation measures to construction machinery and equipment through the issuance of schedules for specific equipment.

Under the terms of the new schedule, a producer may manufacture or assemble only one size of either the lever (Blake) type or of the overhead eccentric type portable jaw crusher in each of nine groups, established according to size range. Manufacture or assembly of portable roll crushers is restricted to five specified sizes.

Maintenance and repair parts are exempted and may be manufactured and sold for all sizes to meet the demand for maintenance of existing equipment.

Portable jaw crushers have been manufactured in 63 sizes up to the present time. This number is reduced to 29 within the 9 size-range groups, and the individual producer is limited to a maximum of 9 sizes, one in each group. Only 2 types of portable jaw crushers are permitted instead of 5; sizes of portable roll crushers are reduced from 25 to 5.

Construction Price Controls Soon To Be Relaxed for Most of Industry

MOST parts of the construction industry not already exempt from price control soon will be removed from regulation, OPA has announced. However, repair and maintenance services which are a factor in civilian rents will remain under control.

All general contracting activity and many types of sub-contracting for jobs on new dwellings and factories as well as many of the services connected with the construction of a new building will be formally excluded from price regulation.

It was stated that the removal from price control would be accomplished through revocation of Maximum Price Regulation No. 251 (Construction Services and Sales of Building and Industrial Equipment and Materials on an Installed or Erected Basis).

The necessity for a specific regulation over the entire construction field has been eliminated almost completely by the influence of wartime limitations on civilian construction and the drastic decline of contracting activity, Mr. Brown stated.

It was pointed out that most of the industry is now active in military construction and other government building activities which previously have been exempted from regulation. The remaining construction activities, which were subject to OPA control, will be exempted, except in cases where transfer to other regulations will be announced. Examples of construction work which will remain under control are as follows:

1. Repair services, including plumbing and the repair and maintenance of heating plants.
2. Sheet metal work.
3. The sale of goods—such as roofing, flooring and siding—on an installed basis when such materials are necessary for the maintenance of existing structures.
4. The sale of building materials on an installed basis where the items are sold on a unit basis. Materials such as pipe and fencing, and mechanical equipment such as water-heaters and furnaces, when sold on an installed unit basis, will remain under control.

The prices for materials purchased by the industry will also remain subject to applicable price regulations and wages paid—subject to applicable wage controls of the National War Labor Board and the Wage Adjustment Board.

Maximum Price Regulation No. 251 will be revoked as soon as appropriate amendments to other regulations have been approved so that the specific types of sales and services for repair and maintenance of buildings may remain under control.

At the same time the Administrator announced that since the regulation is to be revoked, there is no longer any necessity for filing reports required under it. Amendment No. 1, to the regulation revokes the reporting provisions.

Except for the reporting provision, all contractors are expected to comply with the regulation until it is revoked and until it is known which sales and services will become subject to other regulations.

Lockheed Professional Men Form E.A.A. Chapter

ENGINEERS of the Lockheed Aircraft Corp., at Burbank, Calif., and other engineering projects in and near that city, have organized a professional group, and have been granted a charter as a chapter of the Engineers and Architects Association of Southern California. Officers will be appointed for the chapter by the parent organization, pending a formal adoption of the constitution and by-laws, and election of chapter officers.

The association is now issuing its monthly periodical, The Info-Gram, in printed form, and carries advertising from several Los Angeles engineering instrument firms. One of the objectives of the organization is effective representation of the engineering profession in wage and hour discussions with employers.

Largest Swimming Pool to Be Built at Colorado Airport

ONE OF THE LARGEST indoor pools ever to be built will be constructed by the U. S. Army Engineers for use at Lowry Field, near Denver, Colo. The pool, which will be 330 ft. by 100 ft., will be built by contract and bids probably will be asked for some time in the spring. Plans call for concrete and wood construction with bow-string truss type of roof. Maximum height of the roof crown will be 44 ft. Final approval of the plans, which are now complete, is virtually assured. The cost is estimated at $400,000.

The pool will be used to train army air force men in water safety methods. The pool is planned to serve 1,000 men an hour.

Equipment Pool Plan in Use in Fourteen States

FOURTEEN STATES thus far have adopted road machinery and equipment pooling plans in a move to reduce requirements for such materials, the War Production Board announced recently.

Thirty other states are studying the plan, which is expected to insure maintenance of the nation's streets and roads under wartime conditions.

The necessity for such a program results from conversion of road machinery and equipment plants into more direct war production. Under the pooling program, the shifting of equipment to meet pressing needs in various sections of each state rests entirely with state-appointed officials. WPB participation is limited to initiating the program and assisting in its operation.

Tabulations of surplus motorized equipment owned by all cities and counties of the state are made, and are matched against equipment needs of the various agencies, and surpluses and deficiencies are balanced.

New Gaging Standards Proposed for Industry

AS A MEANS of making uniform the gaging practices employed in inspection of precision parts of war equipment, the Automotive Council for War Production has proposed that the American Standards Association undertake an intensified standardization program for all American industry.

The proposal is intended to accelerate the development of a new standard for specifying fits and tolerances and methods of gaging inspection and gage control because of the high degree of precision and maximum interchangeability of close-fitting parts required in modern machinery.

The actual development work would be conducted by the American Standards Association, under the direction of a special wartime committee, embracing all American industry. The program would be undertaken with close cooperation of the War Production Board.

Revoke Priorities for Tin Recovery Plants

PREFERENCE RATINGS of ten detinning and recovery plant projects having a total contract cost of $12,059,507 have been revoked by the WPB.

The H. K. Ferguson Company of Cleveland, Ohio, held contracts for nine of the plants, including installations at Los Angeles, Calif., and Dallas, Texas. The Facility Review Committee which ordered the projects stopped announced that the deferment of detinning plant construction does not indicate an easing of either tin or scrap metal shortages, but rather that the motors, boilers and other equipment designed for use in these plants are urgently needed in other phases of the war effort.

The status of the contractors' commitments as a result of this deferment has not yet been adjudicated. When construction can be resumed is unknown.

California Flood Work Reduced by Engineers

FLOOD CONTROL work proposed by the Corps of Engineers for California during the fiscal year beginning July 1, 1943, is considerably reduced in value from the programs of preceding years. The largest new project proposed is for work on the Sacramento River at a cost of $2,300,000. The only other new proj-

ects are: Los Angeles Co. drainage area, $115,000; Prado Dam, $34,000; Brea Dam, $25,000; Fullerton Dam, $20,000.

River and harbor maintenance proposals include the following: Santa Barbara Harbor, $60,000; Humboldt Harbor & Bay, $20,000; San Joaquin River, $75,000; Old River, $12,000; Oakland Harbor, $54,000; Richmond Harbor, $47,000; San Pablo Bay & Mare Island Strait, $220,000; examination, surveys, and contingencies in San Francisco, $20,000; Suisun Bay Channel, $11,000; Sacramento River, $125,000; examination, surveys, and contingencies in Sacramento, $20,000.

Highway Petition Puzzles Utah State Road Commission

THE ROAD COMMISSION of the State of Utah was baffled recently by a request from citizens of Box Elder Co. that they improve a road which runs for twenty miles in Idaho, but parallel with Utah's northern boundary. The delegates presenting the claim stated the road was used almost exclusively by Utahans. Before making a decision on the unusual request, the Road Commission referred the matter to the State's Attorney General.

The Editor's Mail...

Dear Sir:

Your attention is called to an error in the charts shown in the article on cross sections of draft tubes by Mr. A. E. Niederhoff and Lt. F. L. B. Miller, in the February 1943 issue of *Western Construction News*.

Please turn to page 63, whereupon you will observe that ordinates designations 40, 60, and 80, under "Rated Head —Feet," should be 30, 50, and 70, respectively. As they now stand, the curves indicate appreciable errors in the discharge sections of draft tubes.

In the chart on page 62, the diagonal which should have been marked 100,000 horsepower is actually marked 10,000 horsepower. This error should also be corrected.

We suggest that errata sheets should be published in the next issue.

Yours very truly,
D. W. Proebstel
Electrical Engineer

Dear Sir:

In the story beginning on page 119 of the March (1943) *Western Construction News* there is an error in the last paragraph of the first column on page 120. The error is in stating that a bituminous joint compound was used between the tiles. This is in error—the joint compound used had a sulphur base and is a sulphur silica combination far more acid resistant than ordinary bituminous filler. It is requested that you make appropriate correction for this.

Yours very truly,
A. M. Rawn
Chief Engineer and
General Manager

OBITUARIES...

George A. Atherton, widely known retired civil engineer, died March 11 in Stockton, Calif. at the age of 82. He played a major part in the preliminary phases of the Central Valleys Project, and also for the Yolo by-pass and the widening of the Sacramento River channel at Rio Vista. Atherton was born in Novato, Calif., and devoted a great part of his life to reclamation work and large-scale agricultural production in the San Joaquin Delta.

* * *

John D. Galloway, prominent west coast engineer for forty years, died March 11 in Berkeley, Calif. He was on the board of three engineers who submitted sites for the Bay bridge, and served on such projects as the San Mateo Bridge, Shasta Dam, Coyote Dam and Stanislaus, Las Plumas and Moccasin hydro-electric plants. He was 73 years of age at the time of his death.

* * *

O. O. Haga, chairman of the highway committee of the Boise Chamber of Commerce, died at a Boise, Idaho, hospital following a brief illness. He devoted much of his time and energy to the building of the Idaho-Oregon-Nevada cut-off highway, as well as pioneering water litigation in connection with the Carey Act projects in Idaho. He was 70 years of age.

* * *

Fred H. McConnel, prominent Idaho engineer, died on March 9 at Caldwell, Idaho, following a brief illness. He had supervised the construction of several sewer and water systems in Idaho, and made preliminary surveys of the Idaho-Oregon-Nevada cut-off highway, in addition to many other projects before his death at the age of 66.

* * *

C. T. Keigley, general superintendent of Utah operations for the Columbia Steel Co., died suddenly in his home in Provo, Utah, on March 11. He had been associated with Columbia Steel since 1923 and assisted in supervising the Ironton, Utah, plant and was later superintendent of coke ovens. He was 50 years of age.

* * *

Albert W. Potts died in San Francisco recently at the age of 57. He was secretary and a director of the engineering and contracting firm of C. C. Moore & Co., San Francisco, and had served with the company since 1901.

* * *

George E. Maxfield, prominent Idaho contractor for more than fifty years, died at his home in Cascade, Idaho, on March 8. As owner and manager of Maxfield Building Contractors, Mr. Maxfield supervised building of several prominent lumber mills in Idaho as well as many private residences and store buildings. He was 77 years of age.

* * *

Arthur L. Richardson, retired civil engineer, died March 11, at his farm near Yamhill, Ore. He had been in the engineering profession for 44 years on the west coast, and for the past 18 years had been a construction engineer with the California Division of Highways, bridge department. He was 64 years of age.

* * *

Emile N. Vidal, 42, engineer in charge of the U. S. Bureau of Reclamation's concrete and metals laboratories, died in Denver, Colo., on March 14. He served with the Bureau of Reclamation for eighteen years and made many contributions to engineering literature in the field of concrete technology.

* * *

Edward J. Hancock, Jr., 71-year-old retired excavating contractor of Ogden, Utah, died in that city on March 22. He was one of the principal excavating contractors during construction of the Union Pacific railroad through Utah many years ago.

* * *

Thomas M. Morgan, one of the pioneer highway contractors of the Pacific Coast, died recently at the age of 68. He was president of the T. M. Morgan Paving Co. and the Globe Bearing Company, Los Angeles, Calif.

* * *

William Lester Athey, foreman for the construction firm of J. A. Terteling Co., Boise, Idaho, died February 17 at his home in Boise.

* * *

Edward Henderson Smith, 79, Mendocino County Surveyor for 24 years, died March 11th at Ukiah, Calif.

* * *

Jesse B. Holly, former city engineer of Hayward, Calif., and a practicing civil engineer, died at his home on March 17.

* * *

Albert C. O'Neel, construction engineer in Alaska and Portland, Ore., died in the latter city on March 12, at the age of 78. He built 196 miles of railroad in Alaska, and was an engineer on Bonneville dam and the Portland airport.

* * *

Wilbur C. Cone, building contractor, died in Oakland, Calif., on March 5.

Maximum Price Ceiling For Asphalt Products

A NEW MAXIMUM price regulation covering asphalt and asphalt products has been issued by the Office of Price Administration. It does not change substantially the general level of prices at which asphalt products were marketed during the past year. In general, the prices are those prevailing from August 1 to November 1, 1941.

Twenty-seven refinery areas have been designated and each refinery in a given area will have the same f.o.b. refinery price ceiling.

The reference points for Western refinery areas are: Oklahoma City, Okla.; Ft. Worth, Texas; Houston, Texas; Great Falls, Mont.; Cody, Wyo.; Dodge City, Kans.; Salt Lake City, Utah; Santa Fe, N. Mex.; San Francisco, Bakersfield, Los Angeles, and Santa Maria, Calif. Copies of the new order, MPR 323, may be obtained from the Office of Price Administration, Washington, D. C.

Average Mileage Reduced by Gasoline Rationing

MILEAGE rationing has reduced the national average of American passenger cars to 5,400 miles annually without eliminating essential transportation, according to an OPA announcement based on a study of rationing board records of 80 representative counties. The figure reflects a mileage reduction achieved previous to the non-essential driving ban applied to the East Coast on Jan. 7.

A study of these reports indicates that the 5,000-mile average set as a goal by the Baruch committee for passenger cars this year can be reached.

The study of rationing board records in the 80 representative counties indicates that gasoline rations have been issued to 25,000,000 private passenger cars, excluding fleet and official cars. Of these automobiles, 15,000,000 or 60 per cent, are operating on "A" books alone. Approximately 26 per cent have "B" coupon books in addition to the basic ration, and 14 per cent have been issued "C" books in addition to the "A" books.

California to Reduce 1943 Unemployment Fund Rates

UNEMPLOYMENT insurance rates for 12,000 California employers will be reduced in 1943 according to R. G. Wagenet, Director of the Department of Employment, because of experience rating provisions in the Unemployment Insurance Act. The unemployment fund showed about 85 per cent drop during 1942 in the number of benefit claims. This, combined with the fact that California payrolls are on the upswing, caused an increase in the fund. It is anticipated that even with the reduced rates the fund's income will approximate $160,000,000 for 1943, compared with approximately $120,000,000 in 1942. The 12,000 employers who have earned this reduction in rates compose 23 per cent of the total employers in the state.

PERSONALLY SPEAKING

Paul Grafe, formerly vice-president of W. E. Callahan Construction Co., Los Angeles, Calif., and Dallas, Texas, has been made president of the company, and **W. E. Callahan,** formerly president, has been named chairman of the board. **W. K. McIlyar** has been named vice-president and treasurer, and **Vincent M. Flynn** as secretary. **J. A. Worsham** was also selected to be a vice-president. Callahan heads the Dallas office of the firm, while Grafe is in charge of the Los Angeles office.

* * *

W. B. Wolfendale has been made project engineer in charge of construction and design of the second step of Ross dam for the City Light Department, Seattle, Wash. **E. R. Hoffman** is superintendent of the department. A $7,144,922 contract was recently awarded to General Construction Co., Morrison-Knudsen Co., Inc., and J. F. Shea Co., for erection of the concrete arch structure on the Skagit River.

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William W. Aultman, water purification engineer of the Metropolitan Water District of Southern California, has been commissioned a lieutenant in the Navy's Construction Battalion. He has been with the district since 1930, in water softening and filtration studies, and was in charge of both construction and operation of the softening and filtration plant.

* * *

George W. Howson has been appointed field co-ordinator of the Central Valley Project studies by the Bureau of Reclamation. The studies were launched in December, 1942, to determine how the Central Valley project can contribute most to the war and post-war adjustments, and how its operation may be fitted into established economies. Howson's work is to facilitate cooperation and exchange of data between the more than 40 bodies and agencies participating in the studies.

PAUL GRAFE

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Mrs. Minnie Lucas, clerk in the office of the Los Angeles County Surveyor, has been editing since last June a monthly newsletter to the 57 employees of that office who are now in the armed services all over the world. She sends news of the men still at home, and exchanges news of those in far places, besides adding words of cheer. So well has her material been received that her idea is spreading to many other engineering and other offices.

* * *

U. S. Marshall, city engineer of South San Francisco, Calif., and formerly county engineer of San Mateo County, Calif., has concluded an eleven-month leave of absence from the city, during which time he has been in charge of road

construction at an army base in Arizona, for Atkinson-Kier Co., contractors.

* * *

Southern California men recently granted certificates of registration as civil engineer are: **William O. Langenbach,** Burbank; **Francis Noel,** Eagle Rock; **Vinton W. Bacon, Samuel W. Berliner, Morris Brown, Dan E. Bundy, Fred A. Camp, Stephen M. Dunn, Edwin W. Fehsenfeld, Homer W. Jorgensen, Noel L. Woen, Jr., Alan U. Palo, Lawrence F. Pratt, Mervin A. Schuhart,** and **Eugene E. Wekall,** Los Angeles; **Bob Neal Hoffmaster,** Long Beach; **Byron L. Green,** Monrovia; **L. D. Wanee,** San Bernardino; **L. E. Crayne,** San Diego; **Joseph C. Moxcey,** Santa Barbara; **S. S. Ball** and **Richard E. Hemberg,** Van Nuys.

The following men were granted licenses to practice as land surveyors: **Elmer W. Lane,** Bakersfield; **L. R. Myers,** Mentone; **J. Richard Odle,** Los Angeles; **G. S. Powell,** Santa Ana; and **Harold Turner,** Santa Maria.

* * *

Elton J. Lewis, field engineer for the Siems Drake Puget Sound Co., on contracts at Dutch Harbor, Alaska, has accepted a similar position with the British Columbia Bridge and Dredging Co., at Port Edwards, B. C., on yard and dock work for the U. S. Engineer Department.

* * *

Lt. Col. H. G. Gerdes, area engineer on several important army construction projects in the southeastern part of the United States, and most recently at the Bell aircraft assembly plant in Marietta, Ga., is now on a confidential mission to South America for the Pan-American Division office of the U. S. E. D. in Miami, Fla.

* * *

Vern R. Huck has been re-elected president of the Los Angeles chapter of the Building Contractors' Association of California. Other officers of the group are **R. E. Payne** and **Cliff May,** vice-presidents, **Cedric Roberts,** secretary, and **P. A. Weeger,** treasurer.

* * *

Ora L. Hyer, superintendent for W. W. Clyde & Co., Springville, Utah, is directing the work on the project in Davis Co., Utah, consisting of 3.49 mi. of roadmix bitum. surf. for $100,384 and $31,300 for two timber overhead structures.

* * *

William L. Johnson, for ten years a member of the firm of Tanner Construction Co., Phoenix, Ariz., and more recently general superintendent for Arizona Constructors, of the same city, on several Arizona war contracts, has been sworn in as a lieutenant commander in the Seabees, and is presently assigned to duty at Norfolk, Va.

MAJ. CLINE L. MANSUR is post engineer at Luke Field, 20 mi. west of Phoenix, Arizona, in charge of maintenance, repair, and operation of all utilities and structures. He was formerly resident engineer on Pensacola dam, Okla., and on construction at Camp Gruber in Oklahoma.

John Bankus has been promoted from assistant chief engineer of the Portland, Ore., General Electric Co., to the post of chief, succeeding **Walter E. Brenton,** who has accepted a commission in the U. S. Navy. He has been with the firm for 20 years.

* * *

The following men are stationed temporarily at Camp Callan, Calif., for training in the Coast Artillery Corps (Anti-aircraft): **Stanley C. McCulloch,** materials engineer for the California Division of Highways, Los Angeles, recently commissioned as first lieutenant; **Henry F. Cabell,** chairman of the Oregon State Highway Commission, Portland, who is ranked a captain; and **Felix A. Plastino,** highway contractor of Jerome, Ida., also a first lieutenant.

* * *

E. F. Sullivan, civil engineer for the public works division of the Puget Sound Navy Yard, Bremerton, Wash., for the past two and one-half years, has been transferred to Moffatt Field, Calif., where he will be resident engineer in charge of contract Noy 5604.

* * *

R. A. Nelson and **T. Lappi,** engineers with the Bureau of Reclamation at Denver, Colo., have been commissioned ensigns in the Navy. Nelson, a junior engineer, and Lappi, assistant engineer, were both in the Bureau's design section.

* * *

C. E. Webb, district engineer for British Columbia of the Dominion water power and hydraulic bureau, has been elected to the council of the Engineering Institute of Canada, representing the Vancouver, B. C. branch. In 1940, he was chairman of the Vancouver branch.

* * *

L. J. (Larry) Dolan, formerly supervisor of construction at Redriver Ordnance Depot, Lowry Field, and Scottsbluff airfield, is now construction engineer at Camp Luna, near Las Vegas, N. Mex., where he is supervising construction under the post engineer.

* * *

J. H. Warner, resident engineer for the past 3½ years at Friant Dam for the Bureau of Reclamation, has been appointed chief navy engineer at the U. S. Naval Advance base depot, located at Port Hueneme, Calif.

* * *

T. W. Switzer, of Tulare County, has been elected president of the County Engineers' Association of California. **Albert F. Parrott,** of Siskiyou County, is the new vice-president, and **Howard L. Way,** San Bernardino County, was elected secretary.

* * *

C. A. Burdette has been elected president of the Associated Engineers of Spokane, Wash. Vice-presidents of the group are **H. C. Whitehouse, P. E. Oscarson, H. J. Reeves,** and **J. G. McGivern.** The secretary-treasurer is **H. C. Bender.**

* * *

C. F. Seifried has been appointed acting state highway superintendent of Wyoming, to fill the position left vacant by the resignation of **Frank Kelso.** Seifried has been chief highway engineer

ARNOLD CLAUSEN, noted for his work on the Pan-American and Trans-Isthmian Highways, and a former structural engineer with the Oregon State Highway Department, is now a lieutenant commander in the Seabees, Navy construction battalion.

for the past four years, and will now hold both positions.

* * *

Verne C. Cooperrider, senior structural engineering student at University of California, and editor of the student engineering publication, *California Engineer,* is now on the editorial staff of *Western Construction News.*

* * *

Douglas Dacre Stone, San Francisco architect, was recently elected president of the City Planning Commission, succeeding **Clarence H. King. Carlton H. Wall** was elected vice-president by the Commission at its annual meeting.

* * *

Vaud E. Larson, formerly in charge of investigations on the Bridge Canyon project in Arizona for the Bureau of Reclamation, is now in the Denver office of the Bureau, preparing a report on the studies.

* * *

James C. Linton, formerly project engineer on the Casper, Wyo., airbase, is now at Albany, Ky., where he is assistant superintendent for Morrison-Knudsen Co., Inc., of Boise, Ida., on the job of clearing a 10,000-acre reservoir site.

* * *

J. Henry Baird, formerly superintendent of the construction division of Summerbell Roof Structures at Oakland, Calif., is now engineer for the William P. Neil Co., Ltd., in their San Francisco office.

* * *

Capt. R. V. Miller, engineer in charge of construction of the Naval depot at Clearfield, Utah, since June, 1942, has been transferred to work in the Bureau of Yards and Docks, Washington, D. C. He is succeeded at Clearfield by **Lt. J. L. Babcock.**

* * *

R. F. Covell, formerly resident engineer for the Pacific Gas & Electric Co., Oakland, Calif., on construction of the Yuba Narrows powerhouse, is now in the armed forces.

* * *

John Steel has accepted a position as assistant office engineer with the Guy F. Atkinson Co., on army construction work near Juneau, Alaska, working particularly on concrete and progress reports.

* * *

First Lieutenant William J. NePage, chief of the protective security division of Seattle district office of the U. S. E. D., has been promoted to the rank of captain.

* * *

Winston L. Somerville, formerly a civil engineer with the Bureau of Reclamation, is now an ensign in the Seabees, construction battalion of the Navy.

* * *

Paul Rothi, an engineer with the Bureau of Reclamation, has been transferred from the Eden project at Rock Springs, Wyo., to the Gila project at Yuma, Ariz.

* * *

Charles H. Williams, city engineer of Olympia, Wash., has been elected president of the Tacoma, Wash., chapter of the American Society of Civil Engineers.

* * *

Carl E. Schmidt, field engineer with McNeil Construction Co., Los Angeles, Calif., and Basic Magnesium, Inc., Las Vegas, Nev., is now assistant cost and progress engineer with J. Gordon Turnbull, at Edmonton, Alberta.

CAPT. JOHN S. DETLIE, assistant camouflage officer in the Seattle, Wash., district office of the U. S. E. D., has been promoted to the rank of major.

BOB LEIGHTON, engineer with the Nevada State Highway Dept., and formerly with the Bureau of Reclamation, has accepted a commission as lieutenant (jg) in the Navy's Seabee battalions.

* * *

W. A. Dexheimer, field engineer for the U. S. army at Shasta dam, is now a captain in the Corps of Engineers, stationed at Camp Claiborne, La.

* * *

H. K. Brainerd is now assistant engineer at Marinship Corp., Sausalito, Calif., working on construction and maintenance of facilities at the shipyard.

* * *

Paul Vanderlippe is on furlough from the Bureau of Reclamation to work with the city of Tacoma, Wash., on design of the Second Nisqually powerhouse and dam development.

* * *

Milburn H. Davison of the Bureau of Reclamation is now at Norfolk, Va., with the commission of lieutenant (j.g.) in the Navy's Seabees.

* * *

Samuel D. Clinton, recently in the engineering department of Utah Construction Co., at Davis dam on the Colorado River, is now with Basic Magnesium, Inc., at Las Vegas, Nev.

* * *

Capt. Sydney C. Dean, assistant to the chief of the control section of the Seattle District office of the U. S. E. D., has been transferred to the Post Utilities Engineer headquarters at Gowen Field, Boise, Idaho.

* * *

Reuben E. Cole, of the U. S. Engineer office in Albuquerque, N. Mex., has

HERBERT HART, formerly assistant engineer with the California Division of Highways, has been designated a warrant carpenter in the Seabees. He is from Mountain View, California.

been promoted to the rank of lieutenant colonel, and **Paul Wilson,** also in the Albuquerque office, has been made a major.

* * *

New officers of the San Diego, Calif., section of the American Society of Civil Engineers are president, **I. C. Hess;** vice-president, **L. W. Deewall;** secretary-treasurer, **W. C. Brown.**

* * *

Maj. Carl A. Anderson, formerly chief of the control section of the Seattle, Wash., district office of U. S. E. D., is now serving as area engineer for the same office at Wenatchee, Wash.

* * *

A. E. Ferguson has been appointed by the Idaho State Highway department to the post of resident engineer in Lemhi county.

* * *

Walter P. Koetitz has been named chief of the division of Immigration and Housing in the California state government by Gov. Earl Warren.

* * *

S. J. Glaser has recently been appointed senior engineer for Bechtel-Price-Callahan, San Francisco, Calif., on their canal project near Edmonton, Alberta.

* * *

H. H. Holley, consulting engineer of Visalia, Calif., is conducting a survey of the domestic water supply for the city of Coalinga, Calif., including wells, distribution and storage system.

* * *

E. K. Nesbitt, formerly with the Bureau of Reclamation on Anderson dam in Idaho, is now assistant engineer at the Alaska Barge Terminal, Juneau, Alaska, for the U. S. E. D.

* * *

Andrew Burns, secretary of the A. F. Mowat Construction Co., Seattle, Wash., has retired from active work after 15 years with the company.

* * *

Joseph Symons, formerly with the Bureau of Reclamation at Shasta dam, and **Bob Jennings,** with the same organization at Provo, Utah, are now officers in the Seabees, Navy construction men's battalion.

Maj. Fred G. Erie, administrative officer of the Seattle office of the U. S. E. D., has been promoted to the rank of Lt. Colonel. He has been with the Engineers since 1922, and in Seattle since Dec., 1939.

* * *

T. H. Banfield, Portland manufacturer, has been named to the Oregon State Highway Commission, succeeding **Henry Cabell,** now in the U. S. Army.

* * *

Newton F. Hicks is now in the engineering staff of Douglas Aircraft Co., El Segundo, Calif. He was formerly assistant office engineer of the WPA at Lincoln, Nebr.

SUPERVISING THE JOBS

Mack Agnew has been named superintendent by the Morrison-Knudsen de Mexico, Mexico City, on the project to realign and widen approximately 500 mi. of railroad south of Mexico City, Mexico. **Walter M. Parsons** is the manager and **Maurice Brown** is chief engineer on this project. The division superintendents are **M. A. Dawdy, Glenn S. Ostrander,** and **Glen A. Reese.** Bridge superintendents are **Orbie (Bill) Slater** and **S. J. Stewart,** and master mechanic is **Al Wisnewshy.** M-K has set up offices in Mexico City, with **J. B. Bonny,** vice-president, in charge.

* * *

Axel Osberg, Seattle, Wash., is personally directing the Arlington airport job in Snohomish Co., Wash., as project manager on his own contract. **W. J. Pierce** is his general superintendent and **John Anderson** is foreman. The gravelling and filling sub-contract went to the Bay Construction Co., Seattle, and **H. E. Wasson** is project manager and **Al Jorgensen** is foreman for the firm. Washington Asphalt Co. were the sub-contractors for the runway paving. **Eugene Cyr** is the resident engineer on the job.

* * *

Thomas Myall is the project manager for the Howard H. Wright and L. H. Hoffman firms from Seattle, Wash., and Portland, Ore., respectively, who are the contractors on the Federal Housing Authority project in East Port Orchard, Wash. **C. Glenn Smith** is the resident engineer and **Howard Williams** is the general superintendent on the job. Other key men are foremen **Chris. Frike, Jack McLeod, Glenn Adams, William MacDonald, Jack Riordan, George Sparling, Ed. Campbell; Don Ludwig,** arch. draftsman; **Wayne J. Warren,** shop-foreman; **L. O. Franklin,** office engineer; **Jas. P. Smith,** chief of party; **Katherine Roden,** secretary to the superintendent; **E. P. Erwen,** assist. proj. manager; **Miller,** chief inspector; and **L. G. Stough,** FHA project manager.

* * *

F. W. Case is the project manager on the $7,570,500 contract awarded to the Macco Construction Co. of Clearwater, Calif., for additional facilities at the Destroyer Base in San Diego. **W. A. King** is general superintendent; **G. C. Parker,** marine superintendent; **Z. N. Nelson,** chief engineer; **Bennett Murray,** excavation superintendent; **L. E. McGinners,** carpenter superintendent; **Ed Fisher,** reinforcing superintendent; **George W. Harris,** concrete and asphalt paving superintendent; **Lester Croft,** master mechanic; **L. E. Browder,** office manager; and **K. C. Grisham,** purchasing agent, for the project.

* * *

E. Selene is personally supervising the sewerage disposal system project in Kirkland, Washington, for the firm of C. V. Wilder and E. Selene, Bellingham, Wash. **H. W. Poling** is the resident engineer for the Federal Works Authority. **Harry H. Sisler,** consultant engineer of Seattle, designed the system and is supervising the work for the city of Kirkland.

* * *

On two housing projects in the San Francisco bay area, contracts for which are held by Stolte, Inc., Alameda, Calif., the following is the supervising personnel: On one job, **Barney Hedberg** is

project manager, and **Claude Elsea** is general superintendent. On the other, **Bob Harbison** is project manager, **L. H. Calkins** is general superintendent, **M. W. Overhulse** is labor superintendent, **E. K. Ferguson** is utilities superintendent, and **Mr. McElderry** is chief engineer. Working on both projects are: **George C. Loorz,** vice-president of the firm, **George Steffy,** office manager, **Len Coffee,** materials expediter, and **W. L. Mooers,** personnel chief.

* * *

Charles VanderPloeg has been named superintendent on erection of school buildings in Las Vegas, Nev., a $74,558 contract secured by G. Panicari, contractor of Reno, Nev. His assistant on the job is **John Pagni.**

* * *

Carl F. Herziger is the project manager for Swinerton & Walberg—United Concrete Pipe Corp.—A. S. Vinnell Co., joint contractors on a $5,000,000 naval fuel depot being built at San Pedro, Calif. Other key men on the job are: **M. C. Burns,** structural superintendent, **Cecil Alberts,** excavation superintendent, **Barney Dickson,** pipe line superintendent, **B. Skinner,** master mechanic, **Chas. R. Stinson,** purchasing agent, and **Carl Brady,** auditor. The contract is known as NOy 5596.

* * *

William A. Hearst, formerly superintendent on the grading and foundations contract for the aluminum plant near Hillyard, Wash., has been appointed superintendent on a modified hangar project in Spokane Co., Wash. This job of over $100,000 was also awarded to the Clifton & Applegate and Henry Georg firms from Spokane, Wash.

JAMES ROSE is superintendent for R. J. Daum, Inglewood, Calif., who was awarded $198,446 contract to construct a housing project in Maricopa Co., Ariz.

CHARLES VANDERPLOEG

C. H. Merrill is job superintendent at Bakersfield, Calif., for W. F. (Wes) Waldon, who holds a $65,528 contract to remove 92,400 ft. of abandoned street-car rail from that city's streets. Waldon himself is in direct supervision of the job and has built all the special equipment being used. The inspector on the job representing War Materials, Inc., is **E. H. Heald, Jr.,** and the inspector for the City of Bakersfield is **Jack Carnahan.**

* * *

C. E. Talbott will serve as job superintendent on a contract of over $100,000 for construction of water storage and pumping facilities and a sewage treatment plant in Collins Co., Tex., for Creech Construction Co., University City, Mo., to whom the contract was awarded. **Dan A. Klinglesmith** is operations manager on the project.

* * *

Bert Iler is superintendent for Cameron & Tarnutzer, Beverly Hills, Calif., on construction of additional buildings at an air corps Ferrying command headquarters in Los Angeles County, the contract being in the "over $100,000" bracket. **George Anders** is general foreman, and L. E. Carlin is foreman of construction.

* * *

C. C. De Armond, well-known superintendent on the west coast, is now in charge of construction for George A. Fuller Co., New York City, on construction of the Goodyear synthetic rubber plant at Houston, Tex. He was formerly in charge of construction for the Fuller Co. at the Los Angeles and San Francisco, Calif., postoffices, the Fresno, Calif., airbase, and Camp Cooke, Lompoc, Calif. On the Houston job, **Leo W. Cook** is assistant superintendent, and **Albert Nichoson** is general labor foreman.

H. J. Schmiedeskamp is the general superintendent on two guayule rubber labor camp projects of the Midstate Construction Co., San Francisco, Calif. **Shelby Allen** is the assistant superintendent on the camp located at Lamont, Kern Co., and **L. Neilson** is the assistant at the Los Banos camp. The two contracts were both over $100,000.

* * *

L. W. Farrell is superintendent of construction for Kuney-Johnson Co., Bremerton, Wash., on erection of a junior high school building in that city. His assistants on the $406,231 job are **John F. Cope,** assistant superintendent, **C. F. Magnuson,** carpenter foreman, and **M. I. Atchison,** labor foreman.

* * *

C. S. Guy is building superintendent, **V. O. Crockett** is utilities superintendent, and **C. F. Sponenburgh** is office manager on the 400-unit housing project in Kern Co., Calif. R. A. Wattson Co. and Kemp Bros., Los Angeles, Calif., received the award of $411,384 for the job.

* * *

M. J. Ruddy, Jr., is general superintendent and **Glenn Francis** is job superintendent for M. J. Ruddy Co., Modesto, Calif., on the $77,972 contract to grade and surface 3.9 mi. of road between the west entrance to the Redding Airdrome and Route 20 in Shasta County.

* * *

W. W. Sutherland is the superintendent for the Austin Co., Los Angeles, Calif., who have a $250,000 contract to build a potato dehydrating plant near Bakersfield, Calif. **R. E. Ward** is the dis-

C. C. DE ARMOND

trict manager and **E. C. Weaver** the district superintendent for the area.

* * *

Sam Macri, Jr., is general superintendent and **R. Cook** is foreman for the Macri, Mullen, Strand & Tait Co. of Seattle, Wash., who are building the FHA Sheridan housing units in Manette, Wash. Mr. Macri's own contract is on the water distribution system for the project.

* * *

On three building contracts recently awarded to Dudley Anderson Co., of Great Falls, Mont., the following men have been named superintendents: **J. B. Wideen** at Glasgow, Mont., **J. D. Cave** at Cut Bank, Mont., and **Elmer Ackerman** at Lewiston, Mont.

* * *

Ralph Osterode, superintendent, and **Nelson E. Frost,** expeditor, have been appointed by the E. A. Kaiser Co., Beverly Hills, Calif., to direct the project in San Bernardino Co., Calif., of service command troop facilities at an army camp. The contract was for a sum over $100,000.

* * *

Ray O'Connor is the superintendent for the Ford J. Twaits Co., Salt Lake City, Utah, who have a contract at more than $200,000 to build an extension to a plane anchorage in Wendover, Utah. **H. D. Carlson** is the district manager and **J. D. LaRock** is his assistant for this area.

* * *

W. R. Masters and **James K. Walker** have been appointed superintendents on a 100-target and 40-target rifle range project, respectively, in Comanche Co., Okla. A. C. Shelton & Son of Lawton, Okla., received the contracts at over $50,000.

* * *

Tom Brennan, superintendent, and **Fred N. McCandless,** project manager, are directing the work on the additional hospitalization contract at an army camp in Riverside Co., Calif. Allison Honer, Santa Ana, Calif., was awarded the job totalling more than $100,000.

* * *

Lewis R. Parker is project manager and **Eddie Holmesdale,** superintendent, on a contract of $327,000 for a 200-unit housing project in San Luis Obispo Co., Calif., which was awarded to the W. C. Crowell Co. of Pasadena, Calif.

* * *

W. B. Howe has been named job superintendent for the Charles R. Schmeideskamp Co., Oswego, Ore., which has a $139,453 contract to build five emergency school buildings at Portland, Ore.

* * *

N. W. Axline is the superintendent for Tiffany Construction Co., Phoenix, Ariz., on their landing field project at a ground gunnery range in Yuma County, Ariz. **J. S. Parker** is his assistant, and **Phillip Stephens** is the chief engineer on this more than $100,000 job.

WALTER PANTLE, contractor and construction superintendent of Auburn, Calif., is serving as a Seabee lieutenant.

* * *

James F. Rabbitt, superintendent, and **Ernest L. Shockley,** general foreman, are directing the work for Heyman Bros., San Francisco, California, on the $85,894 project in Contra Costa Co., Calif., to build two dormitories and an admin. building.

* * *

L. H. Gordon is superintendent for the Kuckenberg Construction Co., Portland, Ore., who have a $117,826 contract for clearing, grading, drainage, and paving of 1.15 mi. of an access road to the Kaiser Shipyards in Vancouver, Wash.

* * *

Eric Ohlund has been named job superintendent for DeLuca & Sons, San Francisco, Calif., on their more than $100,000 contract to erect 195 dormitory units at Camp Roberts, Calif. **Vincent Maffie** is foreman on the job.

* * *

M. R. Newell is superintendent on two "more than $100,000" building and utilities contracts at a gunnery school in Mohave Co., Ariz. The Del E. Webb Construction Co., Phoenix, Ariz., is the contractor.

* * *

George Morris is the superintendent on the contract at more than $100,000 awarded to the Parks-Marshall-McCleskey Construction Co., Dallas, Tex., for addtl. housing and facilities at an airfield in Chaves Co., N. Mex.

* * *

In addition to personnel already mentioned at the McNeil Construction Co. job at Pleasanton, Calif., where a several million dollar navy replacement center is under construction, **John Mamer** is maintenance superintendent, **Bob Box** is master mechanic, **Bob Snodgrass** is general foreman, **Mark Jenkins** is shovel foreman, **LeRoy Little** is welding superintendent, and **Gerald Straight** is heavy duty partsman. **Ray Heinze** is equipment representative on the job for Guy F. Atkinson Co.

* * *

G. F. Hyatt is the superintendent and **George Dyson,** the captain on the dredging project in southern California for which Case Construction Co., San Pedro, Calif., obtained the contract.

* * *

Cleve Lee is the superintendent for the E. W. Duhame Construction Co., Phoenix, Ariz., who were awarded a $248,698 contract to build 134 dwelling units at Avondale, Ariz.

* * *

Harold E. Paul has been appointed superintendent by the Harris Construction Co., Fresno, Calif., who have a contract of over $100,000 to construct additional buildings in Fresno Co., Calif.

* * *

Lewis R. Jones is superintendent for the Dolph Jones Co., Tacoma, Wash., who have a $62,200 contract to build a nurses' home at St. Peter's Hospital in Olympia, Wash.

* * *

Tom Davis is superintendent for the W. T. Davis Co., Inc., Albuquerque, N. Mex., on their contract for more than $50,000 to build additional airfield housing and technical facilities in Reeves Co., Texas.

* * *

A. A. Cole, until recently on the Suisun, Calif., airport contract of Fredrickson & Watson Construction Co., and Fredrickson Bros., has been transferred to Santa Maria, Calif., for the same company.

* * *

Blain P. Clyde is superintendent for the firm of W. W. Clyde & Co., Springville, Utah, on the $54,052 award to build 11.7 mi. of road between Delta and the Japanese Relocation Center.

* * *

Harold Stenson is the superintendent on the 450-unit housing project in West Seattle for which Lease & Leighland, Seattle, Wash., received the contract at $843,000.

* * *

Robert Fleming is superintendent on the contract obtained by the Del E. Webb Construction Co., Phoenix, Ariz., for a 200-unit housing project in Flagstaff, Ariz.

* * *

R. S. Stone is employed as a bulldozer operator on airport construction at Concord. Calif., by Larson Bros. and Harms Bros., who hold the contract.

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SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

UNIT BID SUMMARY

Bridge and Grade Separation . . .

Washington—Pierce County—State—Bridge

Industrial Engineers & Contractors, Inc., Tacoma, submitted the low bid to the Department of Highways, Olympia, of $66,372 and were awarded the contract for a bridge and surfacing on an access road to the Seattle-Tacoma Shipyards in Tacoma, for a length of 0.19 miles. Completion date was set for 150 days. The contract includes removing portions of the existing structure and bulkheads. Unit bids were as follows:

(1) Industrial Engineers & Contractors.....$66,373 (2) Hart Construction Co.....$86,575

		(1)	(2)
480	cu. yds. unclassified excavation, including haul	.75	.80
1,290	cu. yds. selected roadway borrow in place, including haul	.75	.80
750	tons Type I-1 asph. conc. pav't. Cl. "C" wearing course, in place	8.00	8.50
310	tons Type I-1 asph. conc. pav't Cl. "E" base course, in place	8.00	8.50
160	cu. yds. loose riprap Class "A", in place	5.00	5.50
Lump sum	Removing existing bulkheads (2)	75.00	275.00
2	only reflector units complete, in place	5.00	7.50
	BRIDGE		
14,000	lin. ft. furnishing timber piling (creosote treated) at site	.82	.93
250	only driving timber piles (creosote treated) in place	12.00	24.00
35	M.B.M. timber and lumber (creosote treated) in place	202.00	215.00
284	M.B.M. timber and lumber (untreated) in place	95.00	111.00
Lump sum	removing portions of existing structure	$5,000	$10,650
Lump sum	raising existing structure	$1,100	$1,010
Lump sum	removing existing surfacing	150.00	$150.00
50	cu. yds. structure excavation	3.00	3.00
2	only furnishing and driving timber test piles in place	100.00	300.00

Utah—Tooele County—State—Grading & Surf. and Underpass

J. W. Whiting Construction Co., Springville, Utah, bid low to the Utah State Road Commission at $62,058 for 0.73 mi. of 2½-in. road-mix bit. surf. and an underpass structure consisting of a steel girder on mass concrete abutments. The project will have a 24-ft. width of surfacing, and is located at the main entrance of the Tooele Ordnance Depot. The low bid was somewhat lower than the engineer's estimate. The following bids were submitted:

(1) W. W. Clyde & Co.....$ 76,740
(2) A. C. Thorn & Sons Const. Co..... 101,005
(3) LeGrand Johnson..... 63,217
(4) J. W. Whiting Const. Co..... 62,058
(5) Young & Smith Const. Co.....$62,859
(6) J. B. & R. E. Walker..... 63,449
(7) Engineer's Estimate..... 73,239

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
18,000	gal. bituminous material, Type MC-2	.11	.20	.125	.10	.12	.125	.12
3,300	gal. bituminous material, Type RC-3	.13	.20	.14	.15	.15	.135	.13
140	ton cover material	4.00	5.00	5.00	3.00	5.00	4.00	4.00
0.725	mi. scarifying and mixing (24-ft. wide)	$1,000	$1,500	$1,400	$1,000	$1,000	12.00	800.00
0.142	mi. scarifying and mix. (gutter 4-ft. wide)	$1,000	900.00	$1,500	600.00	$1,000	$1,600	500.00
0.673	mi. scarifying and mixing (sidewalk)	600.00	900.00	$1,500	500.00	500.00	650.00	500.00
6,200	ton cr. rock or cr. gravel surface course	.75	1.25	1.00	.80	1.00	1.35	1.25
2,800	ton gravel or crushed rock base	.75	1.25	1.00	.70	1.00	1.35	1.20
35,000	cu. yd. unclassified excavation	.35	.50	.25	.35	.35	.40	.40
175,000	st. yd. overhaul, Class "A"	.02	.02	.01	.015	.015	.0175	.02
5,000	yd. mi. overhaul, Class "B"	.20	.20	.20	.20	.20	.15	.20
300	1,000 gal. watering	2.00	3.00	2.00	2.00	2.00	2.00	2.00
500	hr. rolling	3.50	5.00	5.00	4.00	5.00	4.00	6.00
2	ea. F.A.P. Markers	20.00	25.00	20.00	15.00	15.00	12.00	15.00
18	ea. Right-of-Way Markers	5.00	8.00	5.00	3.00	3.00	4.75	2.50
	UNDERPASS STRUCTURE							
2,300	cu. yd. excavation for structures	3.00	4.00	2.00	1.00	1.00	1.15	1.50
960	cu. yd. concrete, Class "B"	35.00	40.00	25.00	26.00	24.00	19.50	30.00
39,500	lb. structural steel	.10	.20	.085	.10	.085	.09	.055
6	M.F.B.M. lumber treated	250.00	250.00	250.00	180.00	200.00	274.00	185.00
190	lin. ft. concrete gutter	3.00	2.00	2.00	2.25	2.00	1.50	1.50

California—Los Angeles County—State—Bridge Superstructure

United Concrete Pipe Corp., Los Angeles, was the low bidder to the California Division of Highways at $16,370 for a portion of the superstructure of a bridge across the Los Angeles River and the tracks of the Southern Pacific R.R. and the Los Angeles Railway at Figueroa St. in the city of Los Angeles. The state is to furnish bar reinf. steel, elect. equipment and misc. constr. equipment. The following bids were submitted:

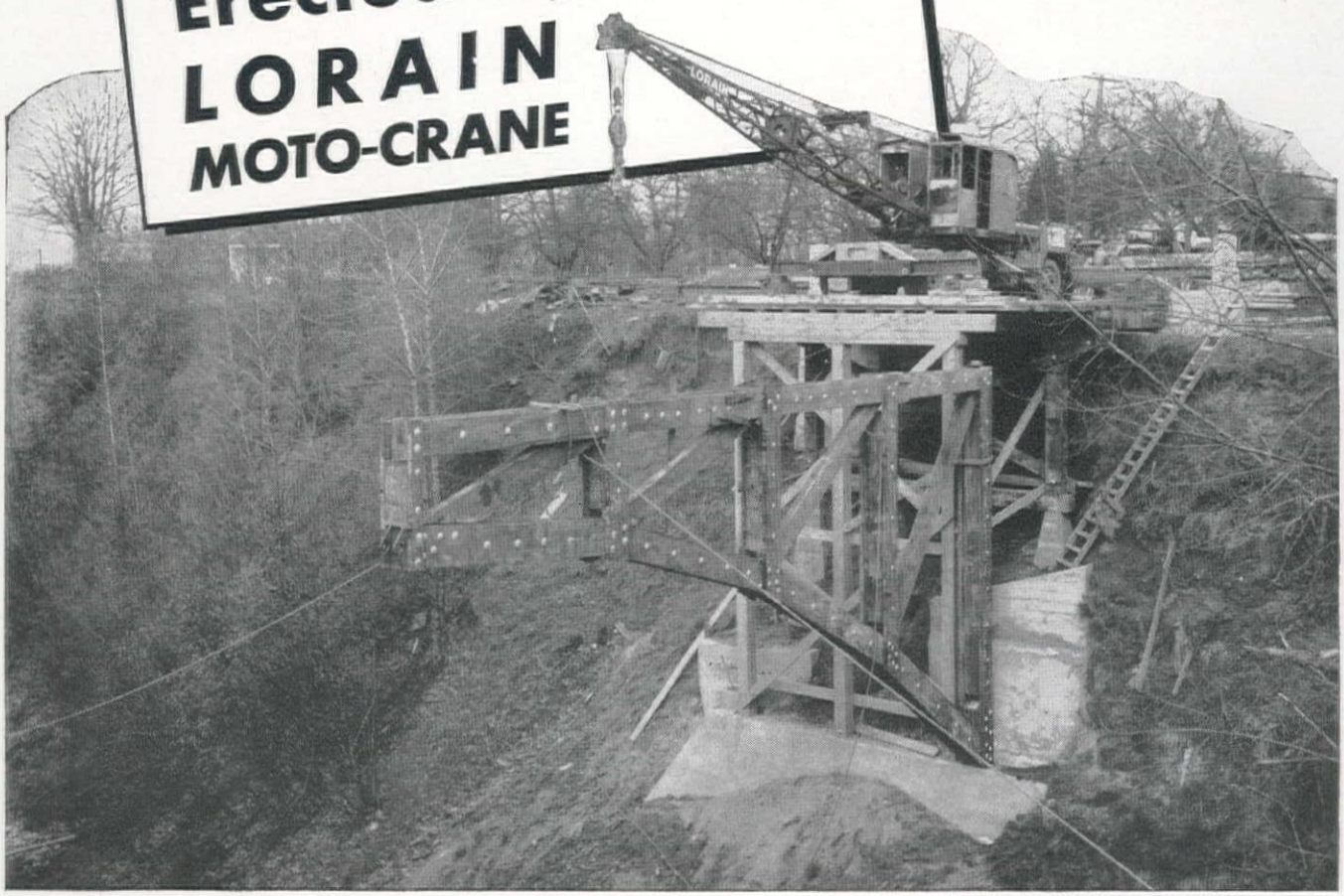
(A) United Concrete Pipe Corporation.....$16,370
(B) Robert R. Hensler..... 17,610
(C) E. G. Perham..... 18,610
(D) Contracting Engineers Co..... 19,280
(E) Oberg Brothers.....$20,270
(F) Bonadiman-McCain Inc..... 21,736
(G) Carlo Bongiovanni..... 27,634
(H) Fred E. Potts Co..... 29,388

Item	Units	Description
(1)	120 cu. yd.	Class "A" P.C.C. (structure)
(2)	75 cu. yd.	Class "A" P.C.C. (railing)
(3)	13,000 lbs.	placing bar reinf. steel
(4)	Lump sum	Placing electrical equipment
(5)	Lump sum	Removing existing forms and falsework
(6)	Lump sum	Finishing existing concrete surfaces
(7)	Lump sum	Misc. items of work

Item	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	34.00	35.00	48.00	40.00	60.00	38.09	58.00	58.00
(2)	60.00	80.00	50.00	80.00	60.00	75.00	70.00	79.00

(Continued on next page)

PORTLAND TIMBER BRIDGE Erected by Single LORAIN MOTO-CRANE



Timber Engineering Company photo.

WHEN Timber Structures, Inc., Portland, Ore., undertook the erection of the new 132-ft. all-timber bridge in Portland, they called in a Lorain Moto-Crane*. The picture shows the truck crane erecting a half-truss for the 88-ft. arch span weighing 7 tons.

After one end was skillfully placed the mobility of the Moto-Crane was used to travel to the other end of the bridge and there performed a similar operation.

More and more Lorain Moto-Cranes are being used in difficult construction and material handling jobs like this one. Their patented turntable (designed to yield maximum counterbalancing effect and to eliminate dead weight), the extra power and capacity derived from Thew Center Drive construction, and the advantages of complete mobility are reasons why Moto-Cranes will save you time and money in your projects.

*Trade Mark

Universal Crane Division
THE THEW SHOVEL COMPANY
LORAIN, OHIO

THEW CENTER DRIVE

THEW-LORAIN CRANES • SHOVELS DRAGLINES • MOTO-CRANES

LeROI-RIX MACHINERY CO., Los Angeles; CATE EQUIPMENT CO., Salt Lake City; LIBERTY TRUCK & PARTS CO., Denver; COAST EQUIPMENT CO., San Francisco; WILSON EQUIPMENT & SUPPLY Co., Cheyenne, Wyo.; A. H. COX & CO., INC., Seattle; COLUMBIA EQUIPMENT CO., Portland, Spokane; McCHESNEY-RAND EQUIPMENT CO., Albuquerque; BUNTING TRACTOR CO., La Grande, Ore.; Boise and Twin Falls, Idaho; STATE TRACTOR & EQUIPMENT CO., Phoenix, Arizona; CONNELLY MACHINERY COMPANY, Billings and Great Falls Montana.

(3)	.03	.02	.05	.06	.04	.017	.03	.04
(4)	300.00	350.00	300.00	500.00	600.00	200.00	911.00	750.00
(5)	$5,200	$6,000	$7,200	$4,200	$4,800	9,269.56	$10.212	$13,490
(6)	$1,200	300.00	450.00	800.00	$1,900	$1,750	$3,211	$1,120
(7)	700.00	500.00	500.00	$2,200	750.00	100.00	700.00	623.00

Idaho—Elmore County—State—Surf. and Drainage Struct.

J. A. Terteling & Sons, Boise, Idaho, submitted the low bid of $284,733 to the Idaho Bureau of Highways and were awarded the contract for 10.20 miles of plant-mix bitum. surf. and roadbed drainage structures on the Mountain Home Airport Road. The following bids were submitted:

(1) J. A. Terteling & Sons $284,733
(2) Hoops Construction Co. 301,122
(3) Triangle Construction Co. 323,518
(4) Morrison-Knudsen Co. $351,375
(5) Engineer's Estimate 341,493

		(1)	(2)	(3)	(4)	(5)
16	units sel. removal of trees and stumps	5.00	10.00	20.00	25.00	10.00
2	ea. removal of culvert	50.00	100.00	100.00	50.00	25.00
58,000	cu. yd. unclassified excavation	.26	.35	.65	.33	.48
400	cu. yd. excavation for structures	1.50	1.50	3.00	1.50	5.00
33,000	cu. yd. borrow	.26	.36	.40	.33	.50
23,000	sta. yd. overhaul	.01	.05	.02	.02	.05
32,000	yd. mi. haul	.10	.12	.15	.18	.20
11,100	tons cr. gr. surf. for shldrs. ¾-in. max.	1.08	1.25	1.30	2.00	1.60
57,000	cu. yd. selected borrow subbase	1.10	1.25	1.50	1.50	1.40
3,000	lin. ft. small ditch	.15	.10	.10	.10	.15
25	days rolling, power roller	30.00	30.00	24.00	20.00	30.00
110	days rolling, tamping roller	25.00	30.00	24.00	35.00	35.00
2,500	M. gal. watering embankments	2.00	2.00	1.50	2.00	2.25
3,000	M. gal. watering base and surf. courses	2.00	2.00	1.50	2.00	2.25
49,000	tons cr. gr. surf. course ¾-in. max.	1.25	1.25	1.15	2.00	1.50
960	bbls. MC-1 liquid asphalt prime	4.65	5.00	6.50	6.00	6.00
710	tons 200-300 Pen Asph. plantmix	27.00	30.00	32.00	27.50	32.00
17,000	tons plantmix bituminous surfacing	3.75	3.25	2.75	2.75	2.95
1,050	bbls. MC-5 liquid asphalt seal	5.00	5.00	6.50	6.50	6.00
2,200	tons cover coat matl. Type "B"	3.00	3.00	3.00	3.50	3.50
63.0	cu. yd. concrete Class "A"	40.00	35.00	50.00	35.00	35.00
2,500	lbs. place metal reinforcement	.05	.05	.05	.03	.05
34	lin. ft. salvage 30-in. CM pipe	2.00	2.00	1.00	1.50	1.00
238	lin. ft. relay 12-in. CM pipe	1.00	1.50	1.50	1.00	.50
34	lin. ft. relay 15-in. CM pipe	1.00	1.50	1.50	1.25	.75
90	lin. ft. 36-in. reinf. concrete pipe	8.50	9.00	10.00	7.25	6.50
0.130	M.F.B.M. No. 1 common timber untreated	150.00	200.00	200.00	100.00	150.00
2	ea. project markers	10.00	15.00	25.00	10.00	10.00
64	ea. right-of-way markers	5.00	5.00	5.00	5.00	5.00
150	lin. ft. 12-in. plain concrete pipe	1.60	1.50	2.00	1.40	1.50
1,040	lin. ft. 18-in. plain concrete pipe	2.30	2.50	3.00	2.20	2.50

Sewerage . . .

California—Los Angeles County—Fed. Works Agency—Sewer

Baruch Corp., Los Angeles, bid low at $55,345 to the Federal Works Agency, Los Angeles, for the sixth section of the Lockheed storm drain in Burbank. The unit bids were as follows:

(A) Baruch Corp. $55,345
(B) J. S. Barrett 55,678
(C) Artukovich Bros. 70,211
(D) V. C. K. Const. Co. 72,588
(E) Oberg Bros. 73,326
(F) United Conc. Pipe Corp. 74,292
(G) Burch & Bebek $74,662
(H) Geo. J. Bock and Byerts & Dunn ..... $ 76,568
(I) Werner & Webb 82,191
(J) P. & J. Artukovich 83,684
(K) R. J. Blanco 93,700
(L) Martin Const. Co. 109,139
(M) R. A. Wattson Co. 120,605

Item	Units	Description
(1)	Lum sum	Remove existing structures
(2)	Lump sum	Barricades and detours
(3)	25	cu. yd. compacted roadway fill
(4)	180	cu. yd. conc.—structure
(5)	1,630	sq. ft. conc.—local depression
(6)	176	lin. ft. conc.—curb
(7)	135	sq. ft. conc.—sidewalk
(8)	12	cu. yd. conc.—driveway
(9)	440	cu. yd. conc.—pipe cradle
(10)	4,500	lbs. steel reinf. bars
(11)	280	tons asph. conc. base
(12)	300	tons asph. conc. wearing surf.
(13)	49	lin. ft. furn. and install 18-in. conc. pipe
(14)	17	lin. ft. furn. and install 21-in. conc. pipe
(15)	50	lin. ft. furn. and install 24-in. conc. pipe
(16)	185	lin. ft. furn. and install 27-in. conc. pipe
(17)	5,158	lin. ft. install 60-in. conc. pipe
(18)	105	lin. ft. prec. conc. M.H. shaft
(19)	4	ea. prec. conc. M.H. ring and cover, traff.
(20)	4	ea. prec. conc. M.H. ring and cover, "B"
(21)	9	ea. prec. conc. M.H. cover, Type "B"
(22)	6,200	lbs. miscellaneous metal
(23)	73	lin. ft. timber guardrail
(24)	100	lin. ft. rem. and rep. chain link fence
(25)	2	ea. furn. and erect project signs

Item	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
(1)	$2,858	$2,500	$1,500	$4,000	$4,000	$4,500	$1,000	$4,000	$9,000	900.00	$11,816.68	$3,000	$2,545
(2)	$1,566	300.00	$1,500	$1,500	$2,000	$4,500	500.00	$4,500	$5,000	$1,500	4,626.00	300.00	$3,750
(3)	1.56	5.00	1.00	5.00	1.00	1.00	4.00	1.00	1.00	1.50	2.00	3.00	1.50
(4)	40.00	35.50	45.00	45.00	50.00	40.00	50.00	60.00	50.00	50.00	40.00	28.00	38.00

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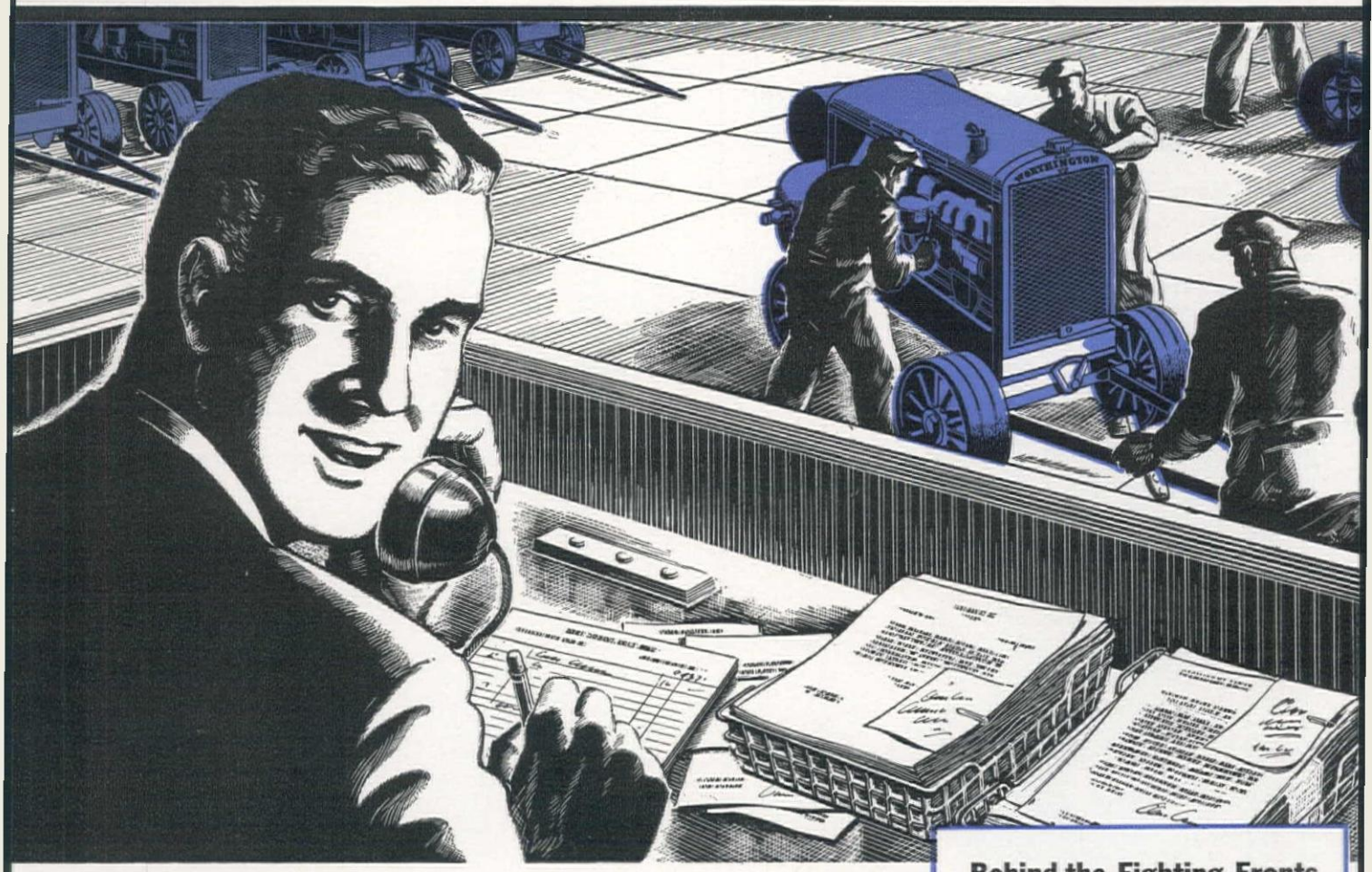
A Good Man With Brutes



Buy 'em, rent 'em, get 'em fixed... he's a good man to depend on when you're *in* a jam or want to ***keep out*** of one.

He's the Worthington distributor, the man who handles Blue Brutes — compressors, rock drills, air tools.

If you need a Blue Brute — or several — *fast* . . . he'll do his darndest to get it to you as soon as possible after you hang up your phone. If your Blue Brutes are facing a stiff schedule, he's the man to send them to for a "physical" — a wise precaution these days when replacements are hard to get. If rough treatment has turned up bruises or breaks, he's got a "first aid kit" of supply parts and repair "know-how" that will restore their pep and vigor.

They make quite a team. Rugged, easy-breathing Blue Brute Air Compressors with the improved and famous "Feather* Valve" . . . easy-handling Blue Brute Rock Drills and Air Tools for a wide range of work . . . and capable, cooperative Blue Brute Distributors whose job is helping you get *your* job done.

Behind the Fighting Fronts with

Blue Brutes

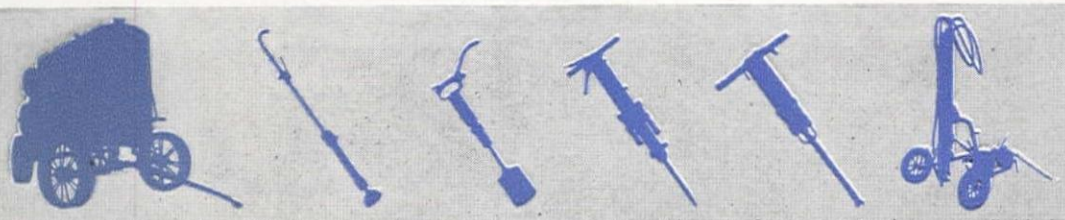
Blue Brutes on the Alaskan highway help punch through the vital life line that will help the U. S. Army smash the Japs! In addition, Blue Brutes are at work today on hundreds of Army, Navy and Air Force projects all over the country — in "uniforms" of olive drab and battleship gray, instead of customary blue.‡

Your nearest distributor is listed on page 192.

*Reg. U. S. Pat.
‡Blue Brute Compressors and Air Tools are painted olive drab for the Army and battleship gray for the Navy.

Get more WORTH from air with WORTHINGTON

Buy Blue Brutes



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Harrison, N. J. Holyoke Compressor and Air Tool Department Holyoke, Massachusetts

(5)	.59	.50	.50	.80	.60	.30	.40	.40	.50	.60	.38	.30	.38
(6)	1.25	1.60	1.50	1.50	2.00	1.00	1.00	1.50	1.50	2.00	1.50	1.00	1.50
(7)	2.12	1.75	3.00	4.50	3.00	1.50	2.00	2.00	2.00	3.25	1.75	4.00	1.60
(8)	24.60	20.00	20.00	15.00	25.00	14.00	20.00	19.00	20.00	35.00	21.50	28.00	22.00
(9)	10.11	12.00	12.00	12.00	16.00	12.00	15.00	14.00	15.00	14.00	12.00	14.00	18.00
(10)	.094	.12	.10	.10	.10	.10	.20	.10	.10	.10	.10	.06	.08
(11)	7.80	4.06	10.00	8.00	4.00	4.00	5.00	5.00	7.00	10.00	5.00	5.00	8.25
(12)	7.80	4.06	10.00	8.00	4.00	4.00	6.00	5.00	7.00	10.00	5.00	6.00	8.25
(13)	6.30	9.25	7.00	5.50	6.00	4.00	5.00	5.50	6.00	7.00	6.00	4.00	5.50
(14)	9.20	11.00	8.00	6.50	7.00	4.00	6.00	6.50	6.50	8.00	6.80	5.00	6.00
(15)	8.90	11.50	9.00	7.00	7.00	5.00	7.00	7.50	7.00	10.00	7.50	6.00	6.10
(16)	9.80	12.00	9.50	8.35	8.00	6.00	7.50	8.50	7.50	12.00	8.00	7.00	7.20
(17)	5.16	5.80	7.70	7.75	8.00	8.50	9.00	8.00	8.00	10.00	10.70	16.40	17.00
(18)	11.70	14.50	11.00	14.00	8.00	10.00	7.50	11.00	8.00	10.00	8.50	12.00	12.00
(19)	26.00	27.50	25.00	25.00	20.00	30.00	50.00	30.00	30.00	25.00	25.00	35.00	30.00
(20)	12.00	16.00	15.00	15.00	20.00	25.00	25.00	12.50	15.00	20.00	10.00	30.00	15.00
(21)	5.00	12.00	5.00	10.00	10.00	30.00	25.00	6.00	8.00	10.00	4.50	30.00	15.00
(22)	.206	.20	.25	.25	.25	.20	.20	.15	.25	.20	.15	.15	.22
(23)	3.14	1.50	3.00	3.00	1.50	5.00	5.00	3.00	3.00	1.50	4.00	2.00	2.00
(24)	.94	1.50	2.00	3.00	1.00	1.00	5.00	1.00	1.00	1.00	1.50	2.00	1.75
(25)	80.00	30.00	50.00	50.00	50.00	100.00	50.00	50.00	50.00	50.00	50.00	25.00	25.00

Highway and Street . . .

Washington—Clark County—State—Grading, Surf. and Paving

Kuckenberg Construction Co., Portland, Oregon, was the low bidder and was awarded the contract at $117,826 by the Washington Director of Highways, Olympia, for 1.15 mi. of grading, crushed stone surfacing, and asphaltic concrete pavement. The project is an access road to the Kaiser Shipyards at Vancouver from Blandford Drive to Jct. P.S.H. No. 8. 60 days has been alloted for time of completion. The unit bids were as follows:

(1) Kuckenberg Construction Co.....$117,826 (2) Porter W. Yett.....$120,180

		(1)	(2)
Lump sum	Clearing and Grubbing	$1,000	$1,500
53,790	cu. yds. common excavation including haul of 600 ft.	.48	.50
80	cu. yds. common trench excavation including haul of 600 ft.	2.00	2.00
50,890	cu. yd. stas. overhaul on above materials	.01	.03
319.38	cu. yd. stas. overhaul on above materials	10.00	10.00
610	cu. yds. structure excavation	2.00	3.50
60.6	stas. (100 ft.) finishing roadway	20.00	17.00
5,310	lin. ft. slope treatment	.20	.20
12,660	cu. yds. selected roadway borrow in place including haul	1.45	1.40
1,020	cu. yds. crushed stone surfacing top course in place	3.60	3.50
3,180	cu. yds. crushed stone surfacing base course in place	3.50	3.40
444	M. gals water	2.00	2.50
5,982	sq. yds. cem. conc. pav't. std. 14 day 5 sack mix in place	3.45	3.35
	TYPE I-1 ASPHALTIC CONCRETE PAVEMENT		
569.0	tons Class "C" wearing course in place	8.25	8.00
1992.4	tons Class "E" leveling course in place	8.00	8.10
	MISCELLANEOUS ITEMS		
110.0	cu. yds. concrete Class "F" in place	40.00	40.00
312	lin. ft. special concrete curb in place	1.20	1.10
26	only reflector units Type No. 1 complete in place	12.00	10.00
19	only reflector units Type No. 2 complete in place	14.00	12.00
58	only asphaltic concrete traffic buttons complete in place	6.00	6.00
480	lin. ft. asphaltic concrete traffic bars complete in place	1.50	3.00
1	only std. conc. catch basin with wood grate complete in place	60.00	60.00
160	sq. yds. removing existing concrete pavement	2.00	1.00
2	only removing existing concrete headers	25.00	25.00
243	lin. ft. pl. conc. or V.C. culvert pipe 12-in. diam. in place	1.50	1.50
204	lin. ft. pl. conc. or V.C. culvert pipe 18-in. diam. in place	2.75	2.75
159	lin. ft. pl. conc. or V.C. culvert pipe 24-in. diam. in place	3.50	3.25

California—Shasta County—State—Grading and Surf.

M. J. Ruddy & Son, Modesto, was the low bidder at $77,972 and was awarded the contract by the California Division of Highways for approx. 3.9 mi. of grading and surfacing with plant-mixed surfacing between the west entrance to the Redding Airdrome and Route 20. Unit bids were submitted as follows:

(1) M. J. Ruddy & Son.....$77,972
(2) A. R. McEwen.....78,659
(3) Hemstreet & Bell.....78,884
(4) M. W. Stanfield Co.....82,850
(5) Brown, Doko & Baun.....$ 87,269
(6) A. Teichert & Son.....89,915
(7) J. P. Brennan.....126,976

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
23	acres clearing and grubbing	150.00	205.00	150.00	100.00	225.00	200.00	200.00
22,000	cu. yd. roadway excavation	.31	.60	.30	.35	.45	.48	.80
500	cu. yd. structure excavation	1.50	2.00	2.00	1.90	1.80	2.25	3.50
12,000	sta. yd. overhaul	.01	.02	.01	.01	.01	.02	.02
25,500	cu. yd. imported borrow	1.05	.92	1.00	1.15	1.00	1.15	2.00
Lump sum	Dev. water supply and furn. watering equipment	500.00	$1,500	300.00	360.00	500.00	500.00	714.00
1,200	M. gals. applying water	1.75	1.00	2.00	1.70	3.00	1.50	2.50
205	sta. finishing roadway	6.00	5.00	9.00	10.00	10.00	10.00	11.50
155	tons liq. asph. MC-2 (pentr., pr. ct. & chkr.)	21.00	20.00	25.00	25.00	26.00	25.00	35.00
5,200	tons mineral aggr. (P.M.S. primary course)	3.80	3.25	4.00	3.75	4.40	4.10	4.45
185	tons asph. cement (P.M.S. primary course)	19.50	20.00	20.00	22.00	15.00	22.00	36.50
400	tons choker aggregate (P.M.S.)	4.80	4.00	5.00	6.70	5.00	5.00	4.30
45	tons liq. asph. RC-5 (seal coat)	22.00	20.00	25.00	25.00	25.00	25.00	35.00
380	tons screenings (seal coat)	6.00	3.50	4.50	5.80	5.30	6.00	6.25
20	cu. yd. Class "A" P.C.C. (structures)	35.00	40.00	35.00	36.00	50.00	50.00	35.00
10	ea. monuments	4.00	4.00	4.00	4.25	4.00	3.50	6.00
26	ea. culvert markers	4.00	4.00	4.00	4.00	4.00	3.50	5.00

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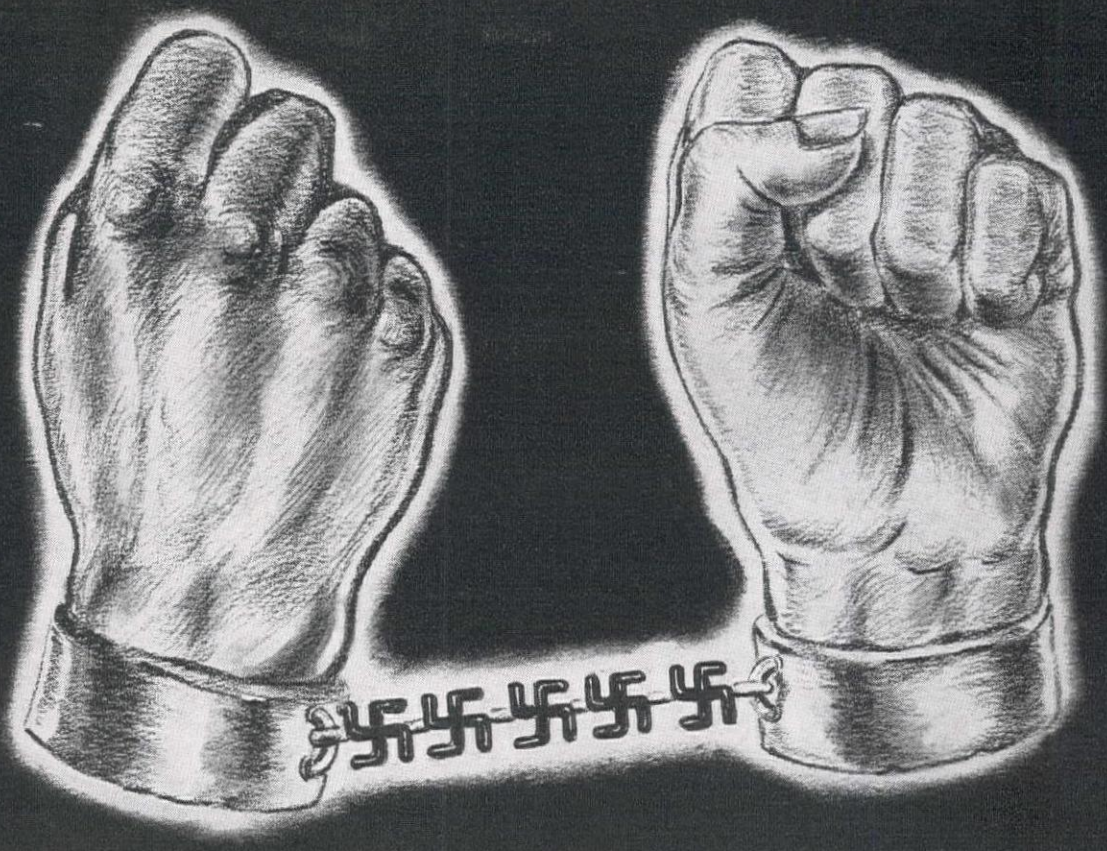
"For what avail the Plow or Sail,
or Land, or Life, if Freedom fail?"
(RALPH WALDO EMERSON)



. . If Freedom Fail!

HYDRAULICS Rodgers KEEP THE WORLD MOVING

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

TODAY, Americans are uniting their energies to build for the future a world-wide faith in neighborliness and good-will. A practical faith born in the hearts of people who believe in the Four Freedoms, who have built this great Nation with simple courage through the strength of common effort.

On any street in the United States, if you watch the faces of the people as they pass, you will see the secret weapon of the free nations — the tremendous power of ordinary people working together. It is the simple weapon that has turned the American Nation into a gigantic arsenal, and sent American fighting men into every theatre of war around the world.

Rodgers Hydraulic Inc. have dedicated their entire resources to smashing the Axis chain of cruel brutality and arrogant domination of free people — everywhere. Rodgers Hydraulic Inc., St. Louis Park, Minneapolis, Minnesota.

Rodgers HYDRAULIC Inc.

2 miles new property fence	$1,100	800.00	$1,000	$1,000	$1,000	$1,000	800.00
3 ea. drive gates	35.00	30.00	35.00	26.00	25.00	35.00	40.00
30 lin. ft. salvaging existing conc. pipe culverts	1.50	2.00	1.00	1.25	.50	.75	1.50
30 lin. ft. relaying salvaged conc. pipe culverts	1.00	2.00	1.00	1.25	.50	.75	1.50
24 lin. ft. 12-in. unreinf. conc. pipe (2000 D)	1.45	3.00	2.00	1.80	2.00	2.00	2.50
411 lin. ft. 18-in. unreinf. conc. pipe (2000 D)	2.00	3.50	2.50	2.60	2.50	3.00	3.60
75 lin. ft. 30-in. unreinf. conc. pipe (2000 D)	4.45	7.00	5.00	5.60	5.00	6.50	6.50

Utah—Salt Lake County—State—Grading and Surfacing

W. W. Clyde, Springville, was low bidder at $206,572 to the Utah State Road Commission for 9.82 miles of 2½-in. roadmix bitum. surfacing and drainage structures on the Copperton-Magna highway. This was somewhat below the engineer's estimate. The following contractors submitted bids:

(1) Reynolds-Ely Construction Co. $287,796
(2) The Utah Construction Co. 245,982
(3) W. W. Clyde & Co. 206,572
(4) A. O. Thorn & Sons Constr. Co. 220,518
(5) V. C. Mendenhall Co. 287,141
(6) J. B. & R. E. Walker $225,869
(7) Floyd S. Whiting 273,546
(8) Leach Brothers 251,486
(9) Olaf Nelson Construction Co. 298,643
(10) Engineer's Estimate 239,829

Item	Units	Description
(1)	213,000	gal. bituminous material, Type MC-2
(2)	38,000	gal. bituminous material, Type RC-3
(3)	10.1	mile scarifying and mixing
(4)	1,900	ton cover material
(5)	55,000	ton crusher rock or cr. grav. surface course
(6)	3,800	ton gravel or crusher rock base course
(7)	225,000	cu. yd. unclassified excavation
(8)	740,000	sta. yd. overhaul, Class "A"
(9)	12,000	yd. mi. overhaul, "Class "B"
(10)	3,450	1,000 gal. watering
(11)	3,400	hour rolling
(12)	5,800	cu. yd. channel excavation
(13)	5,500	lin. ft. surface ditches
(14)	18	lin. ft. 12-in. concrete pipe
(15)	282	lin. ft. 15-in. concrete pipe
(16)	399	lin. ft. 18-in. concrete pipe
(17)	1,071	lin. ft. 24-in. concrete pipe
(18)	21	lin. ft. 24-in. concrete pipe (extra strength)
(19)	87	lin. ft. 30-in. concrete pipe
(20)	822	lin. ft. 36-in. concrete pipe
(21)	60	lin. ft. 42-in. concrete pipe
(22)	156	lin. ft. 48-in. concrete pipe
(23)	63	lin. ft. 60-in. concrete pipe
(24)	18	lin. ft. relaying 24-in. C.G.M. pipe
(25)	84,000	lb. reinforcing steel
(26)	1,800	cu. yd. excavation for structures
(27)	450	cu. yd. concrete, Class "A"

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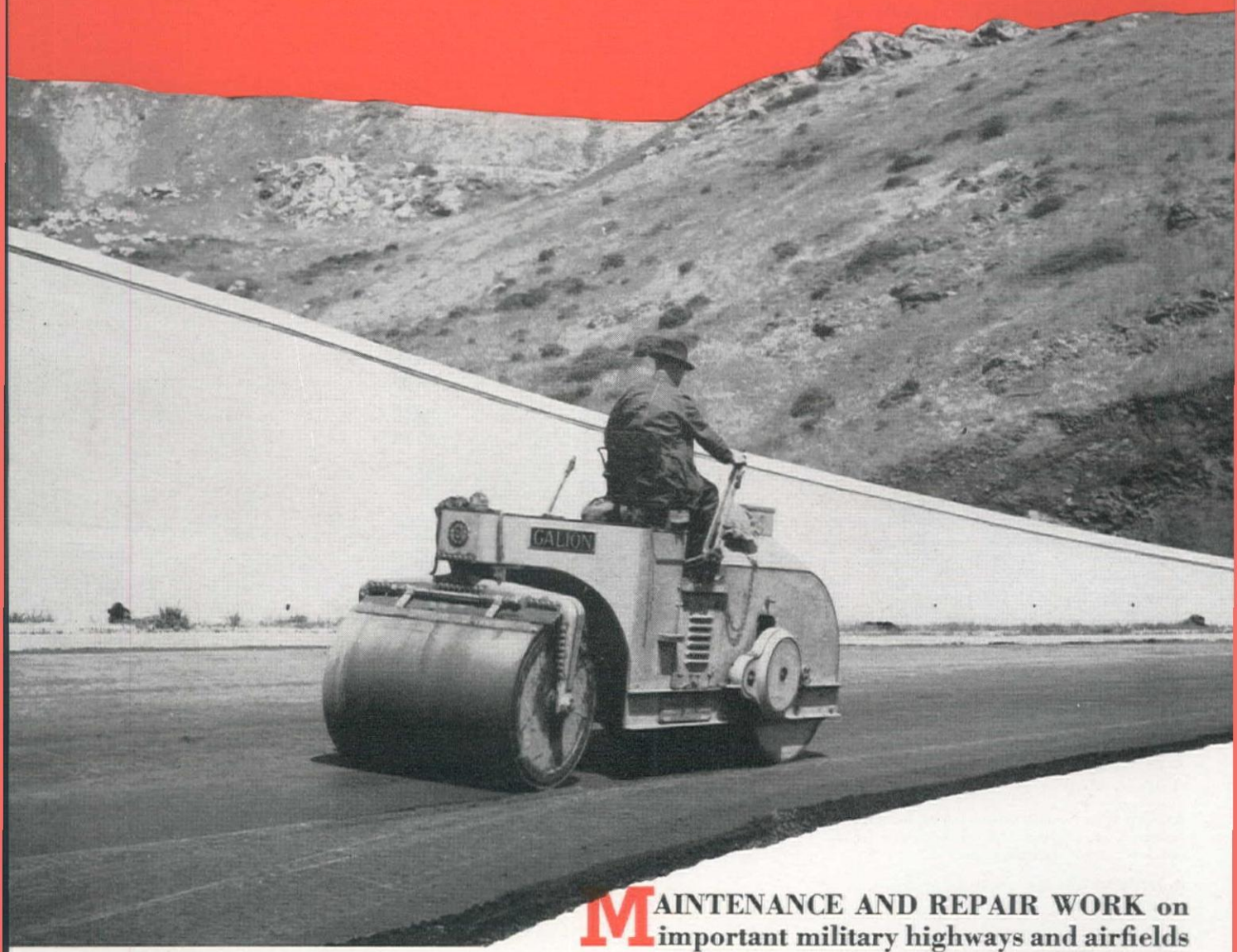
ROAD MAINTENANCE—

Save Manpower—Machines—Time!



SEE YOUR GALION DEALER WHEN REPAIRS ARE NEEDED

BROWN-BEVIS EQUIPMENT CO., Los Angeles, California and Phoenix, Arizona; F. RONSTADT HARDWARE CO., Tucson, Arizona; H. W. MOORE EQUIPMENT CO., Denver, Colorado; HALL PERRY MACHINERY CO., Butte, Montana; MORROW & CO., Albuquerque, New Mexico; ARNOLD MACHINERY CO., Salt Lake City, Utah; NELSON EQUIPMENT CO., Portland, Oregon, Seattle, Washington, and Twin Falls, Idaho; WESTERN TRACTION CO., San Francisco, California; ORMANDE C. BELL, Reno, Nevada.

MAINTENANCE AND REPAIR WORK on important military highways and airfields must be done with the greatest possible speed. That is where the Galion Tandem Roller has found its place of importance in the war effort.

This versatile roller has been designed so that in one compact, efficient unit you have the equivalent of a series of conventional tandem rollers . . . simply by filling rolls with water to desired weight. Built in three sizes with a weight range from 5 to 14 tons. Diesel or gasoline engine.

For *top* performance . . . specify Galion tandem rollers.

The GALION IRON WORKS & MFG. CO.
GALION . . . . . OHIO

(28) 85 cu. yd. concrete, Class "B"
(29) 2 ea. F.A.P. markers
(30) 158 ea. right-of-way markers
(31) 10,600 lin. ft. moving fence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	.12	.11	.10	.105	.12	.11	.12	.11	.11	.11
(2)	.12	.12	.12	.125	.13	.12	.15	.12	.11	.11
(3)	$1,000	800.00	700.00	700.00	900.00	525.00	$1,000	890.00	600.00	700.00
(4)	4.00	3.50	3.00	3.00	3.50	2.50	4.00	3.40	3.00	3.50
(5)	1.25	.80	.62	.80	.80	.75	1.00	.735	.80	.65
(6)	1.00	.70	.62	.80	.80	.75	1.00	.615	.80	.60
(7)	.40	.33	.28	.25	.53	.32	.40	.395	.56	.35
(8)	.02	.01	.012	.01	.015	.015	.01	.015	.015	.015
(9)	.15	.10	.15	.20	.20	.12	.20	.20	.15	.15
(10)	2.00	2.30	2.00	2.00	2.00	1.75	2.50	2.00	2.00	2.00
(11)	5.00	4.50	3.50	4.00	3.50	3.25	3.00	5.00	4.00	4.00
(12)	1.00	.60	.35	.50	.60	.45	.40	.50	1.00	.35
(13)	.10	.07	.06	.10	.07	.06	.10	.10	.20	.10
(14)	1.50	1.50	1.10	2.00	1.12	1.03	1.00	1.00	1.30	1.75
(15)	2.00	2.00	1.50	2.20	1.50	1.40	1.50	1.50	1.70	2.20
(16)	2.50	2.50	1.90	2.50	2.00	1.80	2.00	2.00	2.20	2.90
(17)	3.00	3.00	2.60	3.00	2.75	2.55	3.00	2.50	3.00	3.65
(18)	4.00	3.30	2.70	3.10	2.80	2.60	3.50	3.00	3.20	4.75
(19)	5.00	4.20	3.50	3.50	3.75	3.40	4.00	3.50	4.00	5.10
(20)	7.00	6.30	5.50	5.50	5.60	5.30	8.00	5.00	6.30	7.25
(21)	8.00	7.50	6.50	6.20	6.50	6.20	9.00	6.50	7.20	8.75
(22)	9.00	9.70	8.50	8.50	8.75	8.15	10.00	8.00	10.00	10.60
(23)	14.60	15.00	16.00	15.00	14.60	13.60	15.00	13.00	17.00	16.00
(24)	2.00	1.50	1.00	2.00	.75	2.55	1.00	1.00	1.00	.75
(25)	.09	.08	.07	.08	.07	.064	.07	.075	.09	.08
(26)	2.00	2.50	1.50	2.00	1.50	2.00	2.00	1.50	2.50	1.50
(27)	.40	38.00	28.00	35.00	30.00	33.00	35.00	27.00	35.00	35.00
(28)	30.00	34.00	25.00	35.00	30.00	28.50	35.00	27.00	35.00	35.00
(29)	10.00	15.00	20.00	25.00	25.00	12.00	20.00	15.00	15.00	15.00
(30)	4.00	5.00	4.00	5.00	4.00	4.50	3.00	3.00	5.00	3.50
(31)	.20	.12	.10	.12	.12	.10	.10	.07	.10	.15

Washington—Pierce County—State—Pave

Paine & Gallucci and Harrison Bros., Inc., Tacoma, were the only bidders at $20,310 to the Director of Highways, Olympia, for 0.26 miles of grading, asphaltic surfacing and concrete paving at the Fife intersection on State Highway No. 1. They were awarded the contract and given 90 days for completion time.

Lump sum	Clearing and grubbing	300.00
2,150	cu. yds. unclassified excavation incl. haul	1.30
10	cu. yds. structure excavation	4.50
145	cu. yds. temporary earth crossings in place	3.00
2,430	cu. yds. selected roadway borrow incl. haul	1.60
19.0	stas. (100 ft.) finishing roadway	15.00
81	tons asph. conc. pav't Type I-1 Class "C" wearing course in place	14.00
5	tons asph. conc. pav't Type I-1 Class "G" leveling course in place	14.00
2,545	sq. yds. cement conc. pav't H.E.S. 5 sack mix in place	3.50
2.2	cu. yds. cement conc. pav't H.E.S. 5 sack mix in place	16.00
153	lin. ft. int. conc. curb and gutter H.E.S. in place	1.35
10	cu. yds. concrete Class "C" in place	35.00
650	lin. ft. asph. conc. traffic bars in place	1.00
42	only asph. conc. traffic buttons in place	2.50
5	only install magnetic detectors complete in place	50.00
75	lin. ft. install beam guard rails and posts complete in place	1.10
473	lin. ft. install underground conduit 1-in. dia. and wire complete in place	.80
260	lin. ft. install underground conduit 2-in. dia. and wire complete in place	.80
71	sq. yds. remove existing conc. pavement	2.60

California—Orange County—State—Grading and Surf.

Griffith Co., Los Angeles, submitted a bid of $108,053 to the California Division of Highways which was low for the Baker Street project between Harbor Blvd. and Newport Blvd. It includes approv. 2.3 miles of grading, drainage, and surfacing with plant-mixed material. The following bids were submitted:

(1) Griffith Co. $108,053
(2) Vido Kovacevich 108,683
(3) United Concrete Pipe Corp. 118,500
(4) Oswald Bros. $121,127
(5) George Herz & Co. 140,925

		(1)	(2)	(3)	(4)	(5)
80	cu. yd. removing concrete	3.00	6.50	6.00	4.00	10.00
120	sta. clearing and grubbing	16.00	25.00	15.00	40.00	77.00
17,000	cu. yd. roadway excavation	.57	.50	.65	.55	1.00
150	cu. yd. ditch and channel excavation	1.80	2.00	2.00	.80	1.80
675	cu. yd. structure excavation	1.80	2.25	2.50	2.00	2.50
180,000	sta. yds. overhaul	.006	.0075	.01	.01	.01
6,500	cu. yd. imported borrow	.90	.80	1.10	1.15	1.20
23,000	tons imported subgrade material	1.45	1.40	1.50	1.60	1.90
Lump sum	Developing water supply and furn. watering equip.	$2,000	$1,000	$1,000	$3,000	800.00
1,000	M. gals. applying water	1.50	1.50	2.00	2.00	2.50
120	sta. finishing roadway	7.50	10.00	10.00	10.00	12.00
16	tons asphaltic emulsion (seal coat)	30.00	40.00	30.00	55.00	29.00
22,000	sq. yds. preparing, mixing and shaping surface	.10	.09	.12	.15	.12
270	tons liquid asphalt MC-3 (bit. surf. tr.)	14.00	14.00	15.00	12.70	15.00
28	tons liquid asphalt MC-3 (prime coat)	18.00	17.00	25.00	12.70	50.00
7,550	tons plant-mixed surfacing	4.10	4.25	4.30	4.00	4.00
9	cu. yd. Class "C" P.C.C. (structures)	30.00	35.00	40.00	35.00	60.00
115	cu. yd. Class "A" P.C.C. (structures)	28.00	36.00	35.00	35.00	50.00
90	lin. ft. timber bridge railing	1.60	1.50	5.00	1.50	3.00
68	lin. ft. low timber guard railing	2.40	2.50	3.00	2.40	3.00
720	lin. ft. furnishing treated timber piles	1.30	1.25	1.40	2.00	1.30
24	each driving piles	39.00	50.00	60.00	56.00	36.00
21,000	lbs. bar reinforcing steel	.06	.06	.10	.06	.07
500	lin. ft. 18-in. unreinforced concrete pipe (2000-D)	2.90	3.75	4.00	3.20	4.10
200	lin. ft. 24-in. unreinforced concrete pipe (2000-D)	4.50	4.50	5.00	4.75	5.10
130	lin. ft. salvaging existing pipe culverts	.90	1.25	1.00	1.00	1.00
130	lin. ft. relaying salvaged corr. metal pipe	.90	1.25	1.00	.75	1.00

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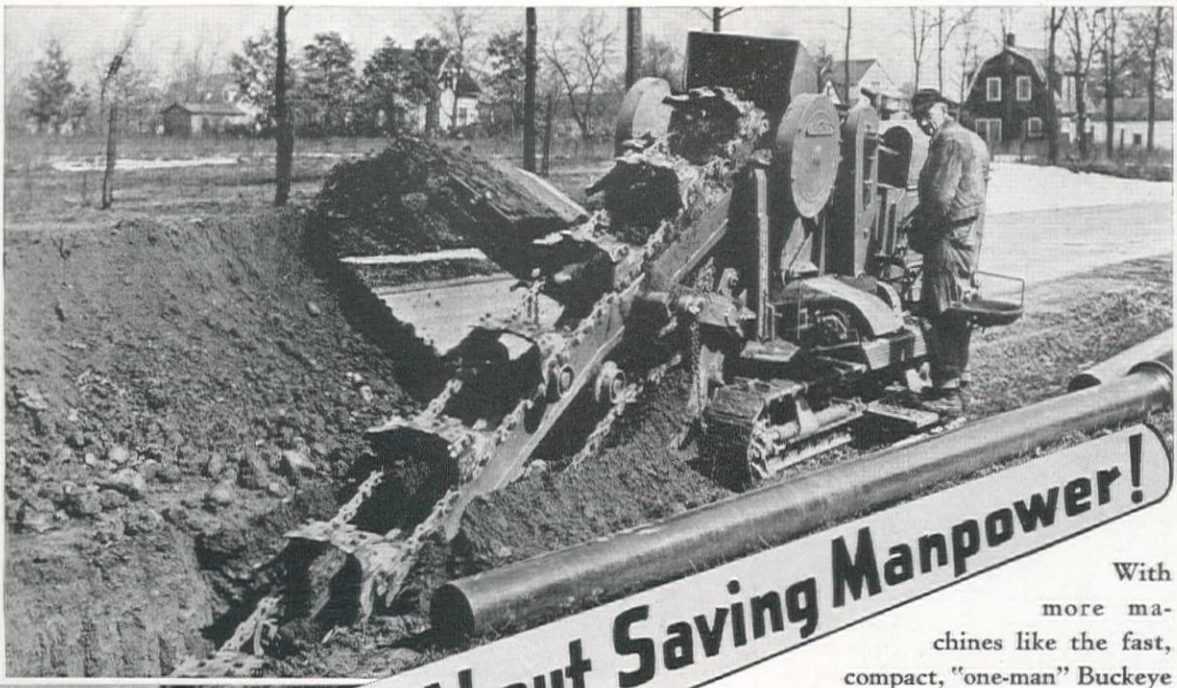
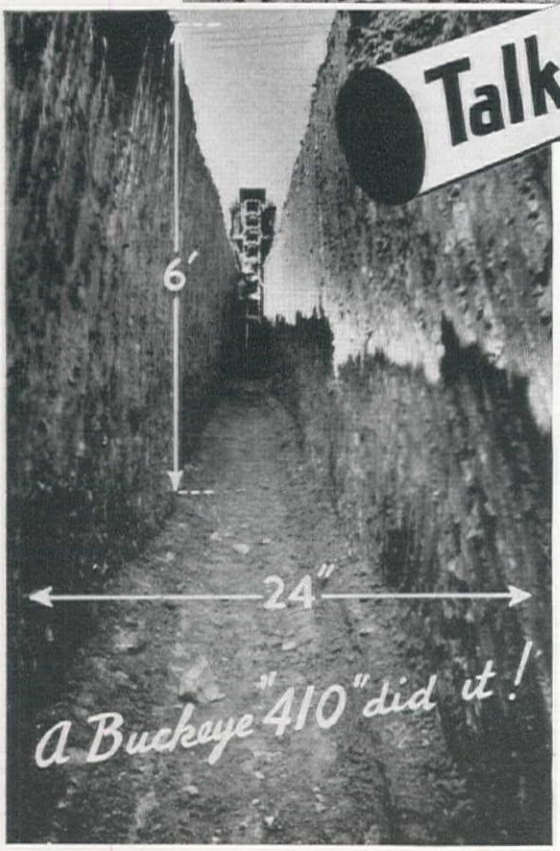


Talk About Saving Manpower!

With more machines like the fast, compact, "one-man" Buckeye "410" boom type trencher in use, Paul McNutt's War Manpower Commission won't have so many sleepless nights trying to figure how to fill three jobs with two men.



The "410" is the result of over 50 years of trencher engineering experience. Only 80″ high, 57″ wide (7′10″ including power-shifting conveyor). Handles like a truck, yet rugged enough to stand up under continuous cat-skinning. Single lever steering; both crawlers driven; wide range of cutting feeds—6″ to 38′ per minute; bucket line speeds 31′ to 189′ per minute; road speeds up to 2.67 miles per hour. Hydraulically controlled boom, forged bucket chain with patented splined bushings and reversible pins. Easy to transport. *Man, what a trencher!*

Comparatively new, yet dozens of them are in there pitching for Uncle Sam—digging clean, round bottom trench for drainage, sewer, water, gas and steam pipe and underground cable at airports, army camps, war plants, housing projects—at home and abroad—doing the work of a whole gang of men day after day!

BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

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

50 YEARS OF PROGRESS BUCKEYE 1892 ✓ 1942

Buckeye✓

CONVERTIBLE SHOVELS, TRENCHERS AND BACKFILLERS, TRACTOR EQUIPMENT, R-B FINEGRADERS, ROAD WIDENERS AND SPREADERS

36 each culvert markers	3.50	3.50	5.00	3.00	3.60
1.2 miles moving and resetting property fences	800.00	400.00	700.00	500.00	500.00
8 each manholes adjusted to grade	15.00	10.00	10.00	10.00	30.00
Lump sum Removing existing bridge	200.00	925.00	500.00	500.00	360.00
Lump sum Misc. bridge items of work	$1,200	600.00	750.00	$2,000	440.00

Oregon—Klamath County—State—Stockpiling

M. C. Lininger & Sons, Medford, submitted the only bid to the Oregon State Highway Department at $33,300 for furnishing 11,500 cu. yds. of crushed rock in stockpiles on the Chemult Section of The Dalles-California and Willamette highway. The single bid was accepted on this project.

5,900 cu. yds. ¾-in. - ½-in. crushed rock in stockpile	2.70
3,900 cu. yds. ½-in. - ¼-in. crushed rock in stockpile	2.70
1,700 cu. yds. ¼-in. - 0-in. crushed rock in stockpile	2.70
9,000 yd. mi. hauling crushed rock, pile measure	.25

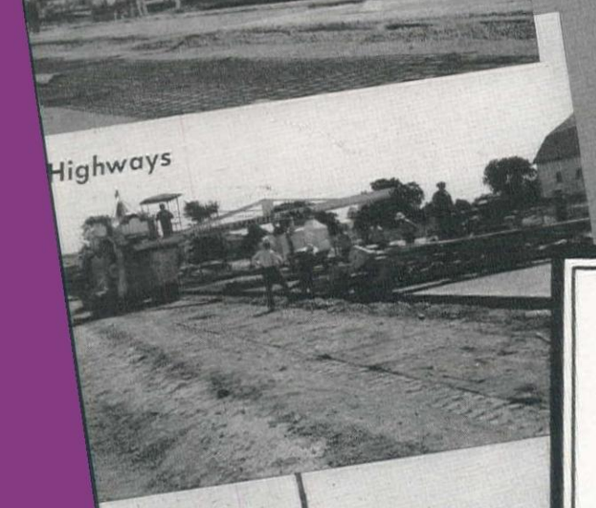
California—Sacramento County—State—Grade and Surf.

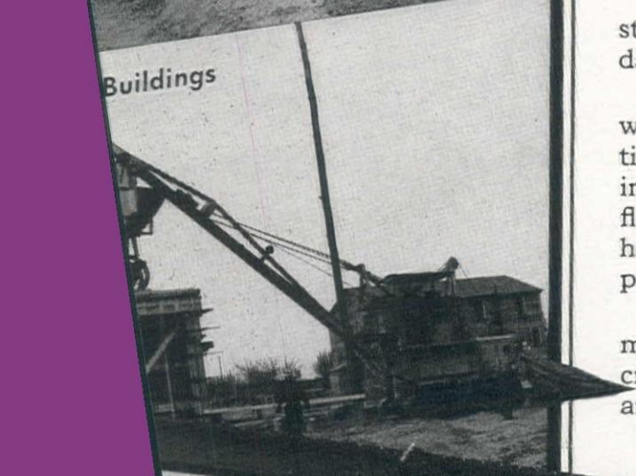
A. Teichert & Son, Inc., Sacramento, bid low to the California Division of Highways, Sacramento, at $21,396, and was awarded the contract for approx. 0.6 mi. of grading and surfacing with plant-mixed surfacing between State Highway Route 3 and Camp Kohler. The following bids were submitted:

(1) A. Teichert & Son	$21,396	(4) M. E. Whitney	$23,576
(2) McGillivray Const. Co.	22,822	(5) Hemstreet & Bell	25,494
(3) J. R. Reeves	23,544		

	(1)	(2)	(3)	(4)	(5)
Lump sum Clearing and grubbing	150.00	200.00	100.00	250.00	400.00
5,700 cu. yd. roadway excavation	.35	.30	.30	.30	.50
210 cu. yd. structure excavation	1.50	1.50	1.50	1.00	2.00
2,500 sta. yds. overhaul	.02	.01	.01	.01	.02
L. S. Developing water supply and furn. watering equipment	100.00	150.00	200.00	250.00	300.00
290 M. gals. applying water	1.50	1.50	1.00	2.00	2.00
Lump sum Finishing roadway	200.00	300.00	300.00	400.00	300.00
5,900 tons imported borrow	1.17	1.10	1.10	.75	1.08
1,750 tons crusher run base	2.06	2.80	2.60	3.05	2.90
65 tons screenings (seal coat)	4.00	4.00	4.00	4.00	4.00
7 tons asphaltic emulsion (seal coat)	25.00	25.00	20.00	30.00	32.00
7 tons liquid asphalt, MC-1 or MC-2 (prime coat)	22.00	18.00	16.00	30.00	25.00
12 tons sand (prime coat)	3.00	4.00	3.00	3.00	4.00
1,650 tons plant-mixed surfacing	3.74	4.25	4.90	5.00	4.50
3 cu. yd. Class "A" P.C.C. (structures)	35.00	25.00	25.00	50.00	35.00
12 ea. monuments	3.50	4.50	3.00	7.00	4.00
8 ea. culvert markers	3.50	5.00	3.00	3.50	4.00
20 ea. guide posts	3.50	5.00	3.00	3.25	4.00
114 lin. ft. 12-in. unreinforced conc. pipe (2000-D)	1.30	1.00	1.60	2.40	1.80
170 lin. ft. 18-in. unreinforced conc pipe (2000-D)	2.20	1.25	2.20	3.85	2.50
80 lin. ft. salvaging and relaying pipe culv.	1.00	1.00	1.00	2.10	1.50

New PAVER VERSATILITY for tomorrow's Jobs!





THE old Third Avenue elevated becomes a highway of tomorrow—a modern four-lane elevated express highway that will speed motor traffic from New York City to South Brooklyn.

Now other municipalities with elevated structures are studying the costs of redesign and reconstruction for the day when steel is available again.

Ideas like this are only indications of the great mass of work that peace time needs are going to generate. For that time, there will be an improved MultiFoote, a paver proved in the "highball" service of war effort—a paver with new flexibility — a paver with an elevated boom capable of handling high output to elevated structures—and fast—a paver capable of more than roadwork only.

In the MultiFoote, you will have a machine that will make post-war contracts more successful in spite of the increased post-war competitive angle—and remember, there are more MultiFoote Pavers in service than any other make.

THE FOOTE COMPANY, INC., Nunda, New York

MultiFoote Paver placing concrete for the old Third Avenue Elevated, New York City.

ADNUN BLACK TOP PAVER

MULTIFOOTE
CONCRETE PAVERS

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

Fredrickson & Watson Construction Co., Oakland, and **Fredrickson Bros.,** Emeryville, were awarded a $119,148 contract to grade and surf. 6 mi. of road in Solano Co., Calif., by Public Roads Administration, San Francisco, Calif.

J. A. Terteling & Sons, Boise, Ida., received a $248,733 award for 10.2 mi. of roadbed, drainage struc. and a plant-mix bitum. surf. from Mountain Home to the army airport in Elmore Co., by Commissioner of Public Works, Boise, Ida.

Kuckenberg Construction Co., Portland, Ore., at $117,826 will build approx. 1.15 mi. of access road to the Kaiser Shipyards, Vancouver, Wash., by Director of Highways, Olympia.

Industrial Engineering & Construction Co., Tacoma, Wash., was awarded the contract at $66,372 for raising and widening a timber trestle over the Wapato Waterway on East 11th St. in Tacoma and grade and pave the approaches, by Director of Highways, Olympia.

Pearson & Dickerson, Oswald Brothers, and **J. A. Casson,** Phoenix, Ariz., were successful bidders at $500,000 for runway extensions and addtl. taxiways at an airfield in Pima Co., Ariz., by U. S. Engineer Office, Phoenix, Ariz.

Radich & Brown, Burbank, Calif., at $750,000 were awarded the contract for paving extensions at an airbase in northern Calif., by Bureau of Yards & Docks, Washington, D. C.

Brown-Bellows-Columbia, Corpus Christi, Tex., received an award of $3,500,000 for a Navy auxiliary air station at Beeville, Tex., by Bureau of Yards and Docks, Washington, D. C.

Peter Kiewit Sons' Co., Omaha, Neb., and **Big Horn Construction Co.,** Sheridan, Wyo., at over $500,000 were awarded the contract for relocation or runways & taxiways, in Laramie Co., Wyo. by U. S. Engineer Office, Omaha, Neb.

Carlson Construction Co., Denver, Colo., at $87,536 will build a sewage treatment plant serving a portion of Denver and Lowry Field, by Man. of Improvements & Parks, Denver, Colo.

Barrett & Hilp, San Francisco, Calif., were granted $3,875,300 for addtl. facil. at Hunters Point, by Bureau of Yards & Docks, Washington, D. C.

Utah Construction Co., San Francisco, Calif., at $655,209 was awarded a contract for 200 dorm. units and 150 demountable units in Kingman, Ariz., by Federal Public Housing Authority, San Francisco, Calif.

Eaton and Smith, San Francisco, Calif., were awarded a $550,000 contract for bldgs. & facil. at St. Marys College at Moraga, Calif., by Bureau of Yards & Docks, Washington, D. C.

P. J. Walker Co., Los Angeles, Calif., received an award of $2,182,500 for addtns. to the Navy hospital in Long Beach, Calif., by Bureau of Yards & Docks, Washington, D. C.

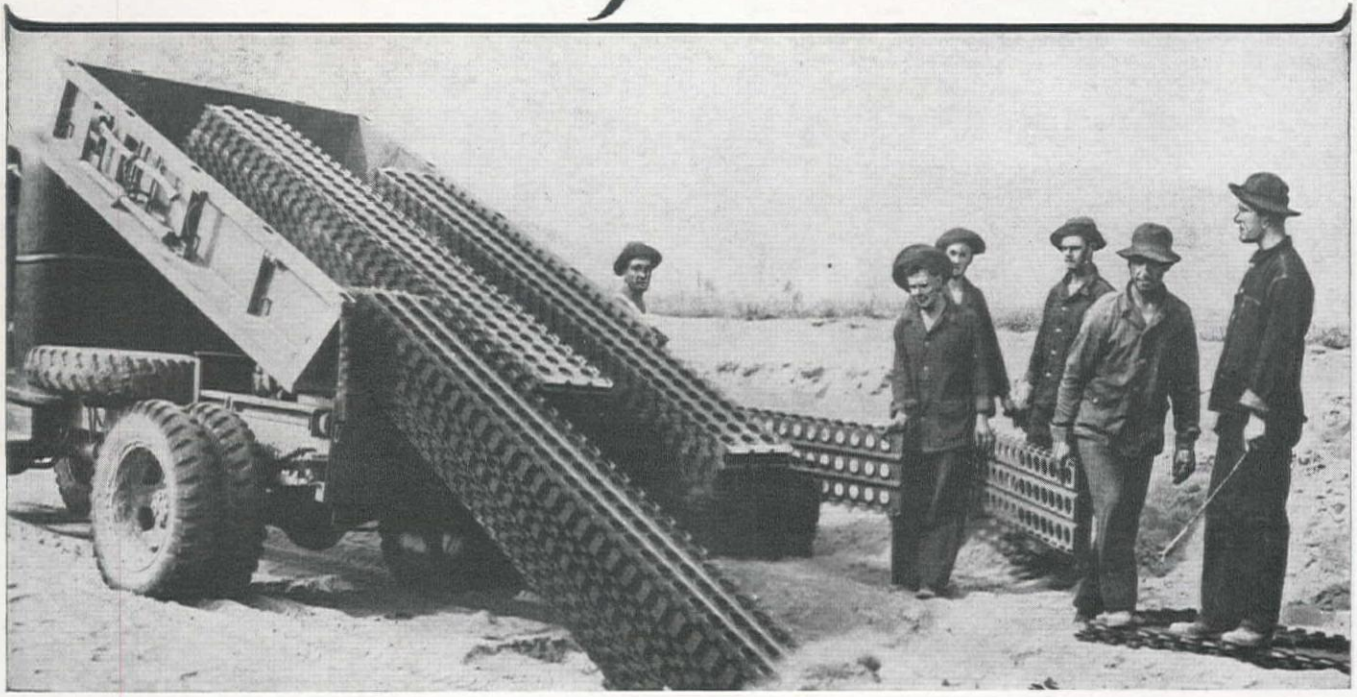
Standard Oil Co. of California was authorized to build a synthetic rubber plant costing $6,200,000 by the Defense Plant Corporation, Washington, D. C.

Nordin Construction Co., Los Angeles, Calif., was awarded a

Bases for BOMBERS

★ Made by HERCULES.

★ Delivered by HERCULES



Besides HERCULES Speedraulic Hoists and Dump Bodies for civilian use and the huge Cargo Bodies produced for the U. S. Army, thousands of Airplane Landing Mats for emergency "Bomber Bases" have been turned out by the big Hercules plant the past year. HERCULES Dump Cargo Bodies, like the one shown above, mounted on a Chevrolet chassis, are used for transporting such materials on many fronts.

Heavy production for war will continue in all lines until victory is won, but if your need is essential, your Hercules distributor can take care of you.

REMEMBER THESE "HERCULES" FEATURES!

- Exclusive Center-Lift Hoist Action
- Double Bridge-type Lift Arms
- Balanced Piston Valve, with finger-tip control
- 6", 7", 8" and 10" Hoists

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

housing contract of $750,000 in Las Vegas, Nev., by Vegas Village, Inc.

Hommes and Eudemiller, Los Angeles, Calif., received a $619,995 award for a housing project in Las Vegas, Nev., by Federal Public Housing Authority, San Francisco, Calif.

Nettleton & Baldwin, Seattle, Wash., at $1,215,000 were awarded the contract for 700 temp. housing units near the Duwamish River in King Co., Wash., by Housing Authority, Seattle.

Reimers & Jolivette, Portland, Ore., were awarded the contract at $6,583,196 for 2,160 housing units at Swan Island, Portland, Ore., and 7,000 units at Vancouver, Wash., by U. S. Maritime Commission, Portland, Ore.

Mullen & Strand, Seattle, Wash., received a $748,000 award for 250 perm. housing units in Everett, Wash., by Housing Authority, Everett.

Myers Bros., Los Angeles, Calif., will build 1,035 public housing units in Spokane Co., Wash., at a contract price of $1,741,300. **D. W. Nicholson Corp.,** San Leandro, Calif., was awarded an army cargo vessel contract at over $1,000,000 for their Stockton plant, by U. S. Engineer Office, Sacramento.

William P. Neil Co., Ltd., Los Angeles, Calif., was awarded a $3,302,300 contract for addtl. facil. at the Naval ammunition depot in Hawthorne, Nev., by Bureau of Yards & Docks, Washington, D. C.

Northwestern Shipbuilding Co., Bellingham, Wash., received an award at over $500,000 for two addtl. 127-ft. army tugs, by Bureau of Yards & Docks, Washington, D. C.

Highway and Street . . .

CONTRACTS AWARDED

Arizona

MARICOPA CO. — **Shumaker & Evans Construction Co.,** and **C. L. Maddox,** 3000 N. Central Ave., Phoenix—less than $50,000 for addtl. paving for streets & aprons and drainage control at an airfield—by U. S. Engineer Office, Phoenix. 3-17

MOHAVE CO.—**Brown, Doko & Baun,** Pismo Beach, Calif.—over $100,000 for street improvements at a reception center—by U. S. Engineer Office. 3-9

PIMA CO.—**Pearson & Dickerson, Oswald Brothers, and J. A. Casson,** 409 Luhrs Bldg., Phoenix—less than $50,000 for relocation of access roads at an airfield—by U. S. Engineer Office, Phoenix. 3-17

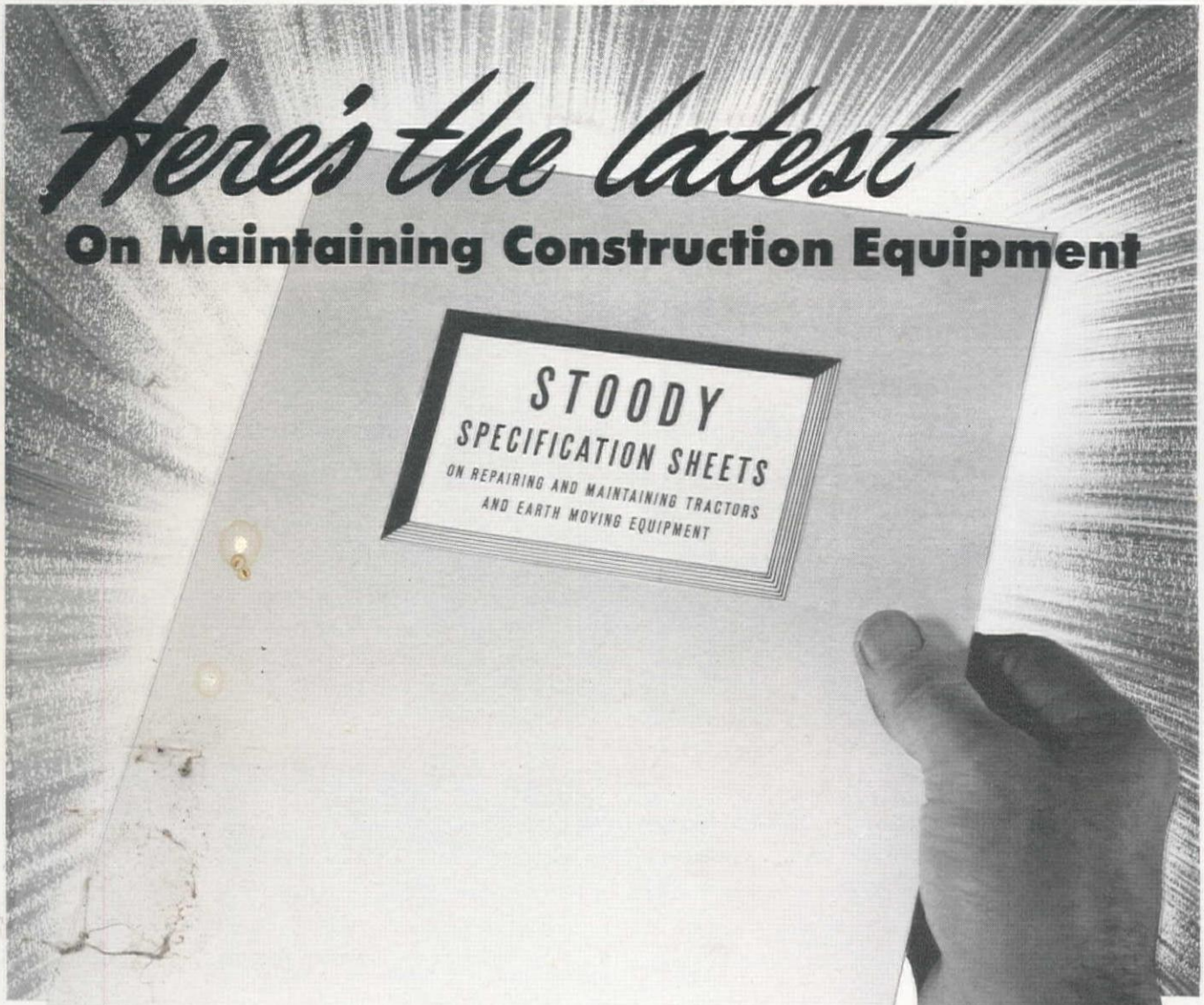
California

KERN CO.—**Basich Bros.,** 20530 Normandie Ave., Torrance—less than $50,000 for road const. at an army air base—by U. S. Engineer Office, San Bernardino. 3-15

LOS ANGELES CO.—**Basich Brothers,** 20530 Normandie Ave., Torrance — less than $50,000 for clear. & grad. at subport of embarkation hospital—by U. S. Engineer Office, Los Angeles. 3-11

Here's the latest

On Maintaining Construction Equipment



STOODY'S new engineering style specification sheets were compiled from information furnished by operators of construction equipment. They contain more and later information on methods of applying Stoody Hard-Facing Metals to wearing parts. Concise paragraphs give material requirements, rebuilding and hard-facing procedures and estimated service life of twenty wearing parts ordinarily requiring frequent replacement or repair. Large photographs illustrate appearance of properly hard-faced parts and sketches show extent and area of deposits.

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, fill in and return the coupon, your copy will be mailed immediately.

STOODY COMPANY

1136 WEST SLAUSON AVENUE • WHITTIER, CALIFORNIA

Please send the Specification Sheets on maintaining construction equipment.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

STOODY HARD-FACING ALLOYS

Stop wear . . . Eliminate Repair

LOS ANGELES CO.—**Calowell Construction Co.,** 1835 E. Wardlow Rd., Long Beach—less than $50,000 for a truck road from A. G. gasoline fueling system, at an airport—by U. S. Engineer Office, Los Angeles. 3-8

LOS ANGELES CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—$29,411, for improving Alcoa Ave., betw. Slauson & Fruitland Avenues, Vernon—by City Council, Vernon. 3-4

LOS ANGELES CO.—**R. R. Hensler,** 228 Vallejo Dr., Glendale—less than $50,000 for access roads—by U. S. Engineer Office, Los Angeles. 3-8

LOS ANGELES CO.—**Vido Kovacevich,** 5400 Imperial Highway, South Gate—less than $50,000 for access roads—by U. S. Engineer Office, Los Angeles. 3-8

LOS ANGELES CO.—**Arthur Malcolm,** 10820 Collins, No. Hollywood—under $50,000, for roads—by U. S. Engineer Office, Los Angeles. 3-18

LOS ANGELES CO.—**Claude L. Murphy,** 1046 S. Olive St., Los Angeles—less than $50,000, for access roads—by U. S. Engineer Office, Los Angeles. 3-1

MARIN CO.—**N. M. Ball & Sons,** Box 430, Berkeley—$82,912 for .4 mi. grade & surf. with plant mixed surf. on imported rock base & const. reinf. conc. grade separation struc. near Waldo Point—by California Division of Highways, Sacramento. 3-25

MARIN CO.—**Fredrickson & Watson Construction Co.** and **Fredrickson Bros.,** 873 81st Ave., Oakland—roads and walks in the San Rafael area—by U. S. Engineer Office San Francisco. 3-23

ORANGE CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—$108,053 for 2.3 mi. grade & surf. with plant-mix surf. on Baker St., betw. Harbor Blvd. & Newport Blvd.—by California Division of Highways, Los Angeles. 3-1

ORANGE CO.—**Matich Bros. & E. L. Yeager,** Box 87, Riverside—under $50,000 for pav. motor pool area at an army air base—by U. S. Engineer Office.

RIVERSIDE CO.—**Calowell Construction Co.,** 1835 E. Wardlow Rd., Long Beach—less than $50,000 for grading for a camp hospital expansion—by U. S. Engineer Office, Riverside. 3-9

RIVERSIDE CO.—**Calowell Construction Co.,** 1835 E. Wardlow Rd., Long Beach—over $100,000, for roads for warehouse & magazine areas at a camp—by U. S. Engin eer Office, Riverside. 3-2

SACRAMENTO CO.—**A. Teichert & Son,** 1846 - 37th St., Sacramento—$21,396 for 0.6 mi. grad. and plant-mix surf. betw. State Highway, Route 3 & Camp Kohler—by California Division of Highways, Sacramento. 3-11

SAN BERNARDINO CO.—**Bonadiman-McCain, Inc.,** Los Angeles—less than $50,000, for roads—by U. S. Engineer Office, Los Angeles. 3-12

SAN BERNARDINO CO.—**Caylen B. Finch,** 1055½ "F" St., San Bernardino—less than $50,000, for paving at two locations—by U. S. Engineer Office, San Bernardino. 3-16

SAN BERNARDINO CO.—**J. E. Haddock,** Ltd., Box "E", East Pasadena—less than $50,000 for paving aprons in front of hangars at an air force school—by U. S. Engineer Office, San Bernardino. 3-24

SAN BERNARDINO CO.—**Johnson, Inc., Minnis & Moody,** and **Vista Construction Co.,** P. O. Box 781, San Bernardino—less than $50,000, for paving parking area at an air depot—by U. S. Engineer Office, San Bernardino. 3-16

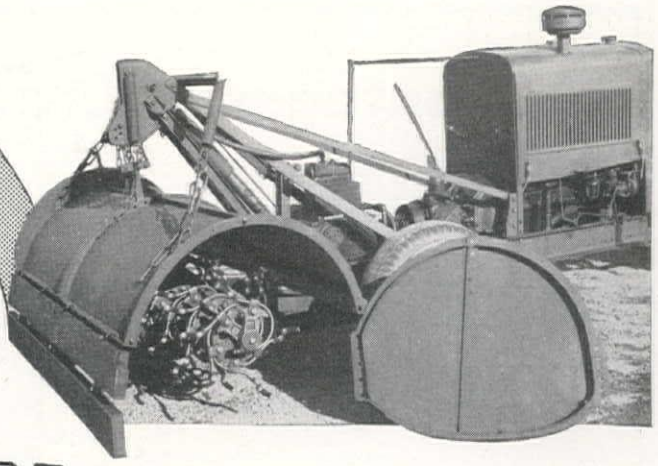
SHASTA CO.—**M. J. Ruddy,** Box 1122, Modesto—$77,972, for 3.9 mi. grad. & plantmix surf. betw. west entrance Redding Airdrome & Route 20—by California Division of Highways, Sacramento. 3-4

SOLANO CO.—**Fredrickson & Watson Construction Co.,** 873 - 81st Ave., Oakland, and **Fredrickson Bros.,** 1259 - 65th St., Emeryville—$119,148. for 6 mi. grad. & surf.—by Public Roads Administration, San Francisco. 3-15

Idaho

ELMORE CO.—**J. A. Terteling & Sons,** Box 1406, Boise—$284,733 for 10.2 mi. roadbed, drainage struct. and a plant-mix bitum. surf. from Mountain Home to the army airport—by Commissioner of Public Works, Boise. 3-8

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.

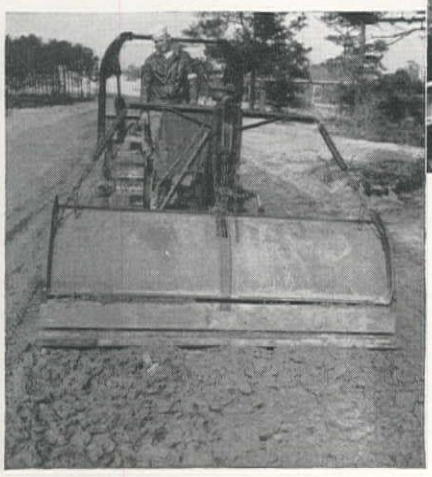
7 STAR FEATURES

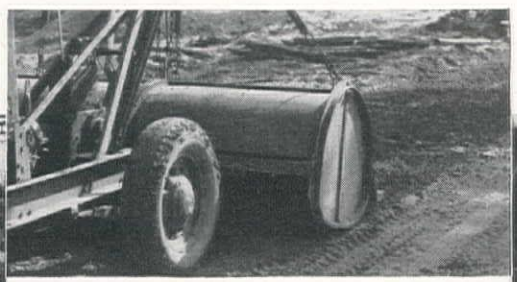
1. Improved, self-sharpening, single unit spring-tines.
2. 4-speed transmission permits use for scarifying as well as mixing.
3. Flexible tilling unit gives fast, easy operation; sharp turns with safety.
4. Weight of tilling unit variable to suit conditions; lessens wear.
5. Depth of operation regulated 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.

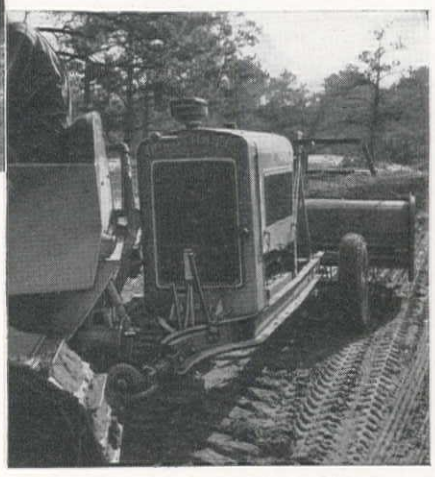




ABOVE: Mixing clay and sand to depth of 12 to 14 inches on experimental project for U. S. Naval Construction Battalions (Seabees). Note fine pulverization and uniformity of mix.

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

New Mexico

CHAVES CO.—**Allison, Armstrong, and Thygesen,** Roswell—over $50,000, for addtl. grading & paving at an airfield—by U. S. Engineer Office, Albuquerque. 3-25

SAN MIGUEL CO.—**A. O. Peabody,** Santa Fe—less than $50,000, for addtl. roads & addtn. to sewage disposal plant—by U. S. Engineer Office, Albuquerque. 3-16

Oklahoma

TILLMAN CO.—**Bell and Braden,** Herring Hotel Bldg., Amarillo, Texas—over $100,000 for paving—by U. S. Engineer Office, Denison, Texas. 3-9

Utah

IRON CO.—**W. W. Clyde & Co.,** Bowers Bldg., Springville—$15,057 for 5.4 mi. of 1½-in. road-mix bitum. surf. road—by State Road Commission of Utah, Salt Lake City. 3-8

TOOELE CO.—**L. A. Young Construction Co.,** and **Victor Newman,** First National Bank Bldg., Salt Lake City—less than $40,000, for road const.—by U. S. Engineer Office, Salt Lake City. 3-22

TOOELE CO.—**J. W. Whiting Construction Co.,** Springville—$62,058 for 0.72 mi. of 2½-in. roadmix bitum. surf. road and a steel girder bridge—by State Road Commission, Salt Lake City. 3-4

Washington

CLARK CO.—**Kuckenberg Construction Co.,** 11104 N.E. Holman Ave., Portland, Ore.—$117,826, for clearing, grading, draining & paving with portland cement conc. & asph. conc. on approx. 1.15 mi. access road to the Kaiser Shipyards, Vancouver—by Director of Highways, Olympia. 3-4

LEWIS CO.—**Fiorito Brothers,** 1100 Leary Way, Seattle—over $100,000, for grading & paving—by U. S. Engineer Office, Seattle. 3-17

PIERCE CO.—**J. D. Shotwell,** 1920 N. Union St., Tacoma—over $100,000, for grading & paving—by U. S. Engineer Office, Seattle. 3-18

PIERCE CO.—**Harrison Bros.** and **Paine-Gallucci,** 1521 S. Grant Ave., Tacoma—$20,509 for grading, paving and traffic islands on Primary State Highway No. 1 at Fife intersection—by Director of Highways, Olympia. 2-26

Wyoming

SWEETWATER CO.—**Wyoming Construction Co.,** 162-A North 3rd St., Laramie—$99,417 for 3.68 mi. grad., drain., base course surf., oil treatment, stone chip seal coat, 1 treated timber bridge & misc. work on Rock Springs Airport—by State Highway Commission, Cheyenne. 3-22

PROPOSED PROJECTS

California

LOS ANGELES CO.—$17,127 in gas tax funds have been allotted to the city of Huntington Park for street improvements—by County Board of Supervisors, Los Angeles.

LOS ANGELES CO.—Gas tax funds amounting to $48,860 have been appropriated to Pasadena for street improvements by County Board of Supervisors, Los Angeles.

Montana

The Montana State Highway Commission, Public Roads Administration, Helena, has approved expenditure of $202,000 for plans, surveys and studies of Montana's primary roads for post-war construction. 3-9

Nevada

PERSHING CO.—The Bureau of Mines, WPB and the Public Roads Administration have authorized the improvement of 17 mi. of access road to the Majuba Hill copper property, to cost $20,700.

Mexico

The Ministry of Communications, Mexico City, has authorized $700,000 for completion of a highway betw. Piedras Negras, on the Texas border, and Saltillo, south of Monterrey. 3-30

WAR begins with AGGREGATE!

655,000 TONS
roll out of this
ONE IOWA MOROK PLANT
for
M. O. WEAVER, Inc., Des Moines, Iowa
— all for the War Effort!

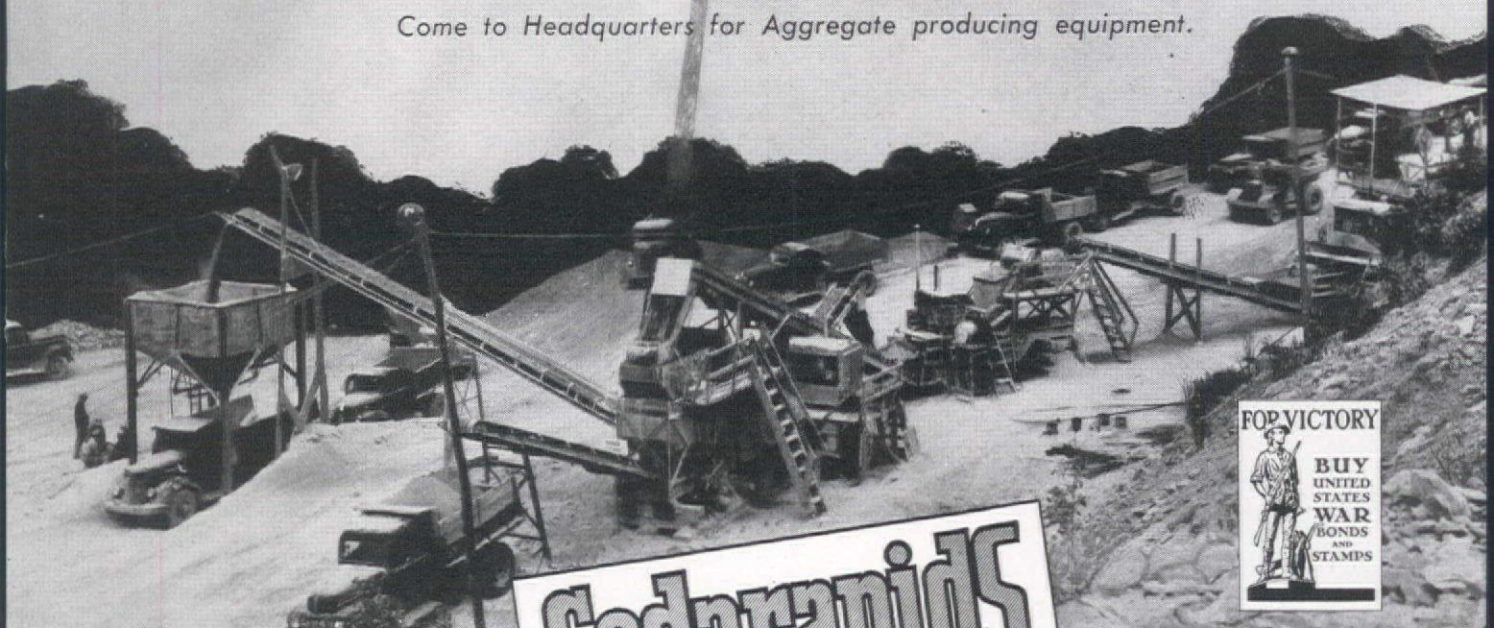
WAR begins with aggregate! It is the basis of every foundation — for plant expansion, for flying field, for cantonment, for arsenal and hospital.

M. O. Weavers Morok plant is one of the many Iowa Cedarapids portable crushing plants that is producing for Victory. 655,300 tons of material rolled out of this plant in 1942 in spite of the fact that it was moved four times from widely divergent points. The monthly average output for the periods when the plant was actually on the job location, was 73,000 tons. That is enough material to provide 25 runways 200 ft. wide, a mile long and 6 inches thick.

Output like this gives you some idea what it means to have an Iowa Cedarapids plant — it means a smooth running job, free from hitches and giving easy portability when you are faced with a move — Iowa Cedarapids plants keep-a-runnin'.

These are things that are going to be mighty important after the "Duration". They are going to play a real part in the success of post war contracts. The Iowa line is complete and can be engineered to meet any aggregate production problem either from the standpoint of output or character of materials for either an entire plant or any part of a plant.

Come to Headquarters for Aggregate producing equipment.



FOR VICTORY
BUY UNITED STATES WAR BONDS AND STAMPS

Cedarapids

Built by IOWA

IOWA MANUFACTURING CO.
Cedar Rapids, Ia.

DISTRIBUTORS: Howard-Cooper Corp., Seattle, Spokane, Washington and Portland, Oregon; Hall-Perry Machy. Co., 801 E. Iron St., Butte, Montana; Intermountain Equipment Co., Broadway and Myrtle, Boise, Idaho; Wortham Machy. Co., 517 W. 17th St., Cheyenne, Wyoming; Spears-Wells Machy. Co., 1832 W. 9th St., Oakland, Cal.; Lund Machy. Co., 49 No. 2nd W., Salt Lake City, Utah; Brown-Bevis Machy. Co., 4900 Santa Fe Ave., Los Angeles, Cal.; H. W. Moore Equipment Co., 5th and Acoma Sts., Denver, Colo.

Bridge . . .

CONTRACTS AWARDED

California

LOS ANGELES CO.—**United Concrete Pipe Corp.,** Box 1 Sta. H, Los Angeles—$16,370 for portion of bridge superstructure across the Los Angeles River and tracks of the S. P. Railroad and the L. A. Railway at Figueroa St. in Los Angeles—by California Division of Highways, Los Angeles. 3-11

Washington

PIERCE CO.—**Industrial Engineering & Construction Co.,** 711 Middle Waterway, Tacoma—$66,372 for raising and widening timber trestle over Wapato Waterway on East 11th St. in Tacoma and grading and paving approaches—by Director of Highways, Olympia. 2-26

Airport . . .

CONTRACTS AWARDED

Arizona

COHISE CO.—**A. Teichert & Son** and **John C. Gist,** 1846 - 37th St., Sacramento, Calif.—over $100,000, for addtl. taxiway at an army air force advanced flying school—by U. S. Engineer Office, Phoenix. 3-23

MARICOPA CO.—**Donaldson & Nekritz,** Heard Bldg., Phoenix—less than $50,000 for concrete aprons at an airfield—by U. S. Engineer Office, Phoenix. 3-10

PIMA CO.—**Pearson & Dickerson, Oswald Brothers,** and **J. A. Casson,** Homebuilders Bldg., Phoenix—over $500,000 for runway extensions and addtl. taxiways at an airfield—by U. S. Engineer Office, Phoenix. 3-11

PIMA CO.—**J. S. Sundt,** Box 2592, Tucson—less than $50,000 for bombing range facil. at an airfield—by U. S. Engineer Office, Phoenix. 3-12

PINAL CO.—**Arizona Sand & Rock Co.** and **United Concrete Pipe Corp.,** Box 1522, Phoenix—over $100,000, parking apron for auxiliary operating base at an airfield—by U. S. Engineer Office, Los Angeles, Calif. 3-4

YUMA CO.—**Tanner Construction Co.,** Box 1832, Phoenix—over $100,000 for ground gunnery range landing fields—by U. S. Engineer Office, Los Angeles. 3-2

YUMA CO.—**Tiffany Construction Co.,** Box 846, Phoenix—over $100,000 for ground gunnery range landing field—by U. S. Engineer Office, Los Angeles, Calif. 3-2

YUMA CO.—**United Concrete Pipe Corp.,** and **Arizona Sand & Rock Co.,** Box 1, Sta. "H", Los Angeles, Calif.—over $100,000 for ground gunnery range landing field—by U. S. Engineer Office, Los Angeles. 3-2

California

ALAMEDA CO.—**Dinwiddie Construction Co., Inc.,** Crocker Bldg., San Francisco—$548,500 for aviation facilities at the Naval Air station outlying field, Alameda—by Bureau of Yards & Docks, Washington, D. C. 3-8

LOS ANGELES CO.—**J. & B. Construction Co.,** 5572 Valley Blvd., Los Angeles — less than $50,000 for adds. to hangar apron at a factory training school—by U. S. Engineer Office, Los Angeles. 3-18

RIVERSIDE CO.—**Calowell Construction Co.,** 1835 E. Wardlow Rd., Long Beach—less than $50,000 for parking apron at an air transport command base—by U. S. Engineer Office, Los Angeles. 3-11

SAN FRANCISCO CO.—**Peter Sorensen,** 926 Arguello St., Redwood City—for runway extensions in the San Francisco Bay area—by U. S. Engineer Office, San Francisco. 3-23

SISKIYOU CO.—**Jones & King,** Yreka—over $50,000 for extension to runway—by U. S. Engineer Office, San Francisco. 3-17

For SPRING Road Jobs Like These . . . Make Full Use of Your FWD's!

★ Pulls scarifier for raising buried binding material—mixing soil constituents—loosening irregular hard pan—displacing oversize material.

★ Pulls leaning-wheel grader for cutting down backslopes—widening of traveled roadway—removal of slides—deepening gutters.

★ Removes ice with underbody scraper.

★ With underbody blade—removes washboard surfaces, ruts and sinkholes.

★ Hauls markers, signs, etc. for replacement.

★ Reclaims valuable surfacing material from the shoulder.

★ Hauls gravel, sand, asphalt heaters in pavement patching.

★ Hauls snow fence to storage.

★ Hauls materials for patching hardened road surfaces.

★ Hauls materials for replacement on wearing course.

★ Compacts surface materials with flat blade.

★ Hauls men and materials to remote locations.

FWD Model H G ALL-SEASON Maintainer—the most advanced four-wheel-drive truck built in America. A solid year of proving-ground tests has shown it to be a real truck engineering achievement—outstanding in pulling power, flexibility, and load-carrying ability.

Listed above are just a few of more than 60 road conditioning and maintaining jobs that can be done faster—better—at far less cost with your FWD Model HG All-Season Maintainer. We print them here so you do not overlook the wide range of jobs which your FWD trucks will take in stride.

Now—when existing truck equipment must deliver more than the expected in service and long life—highway men who operate FWD trucks appreciate their extra stamina—ruggedness—endurance—and the high quality of steels that go into their construction. . . . More than ever before, highway departments depend on their FWD trucks for their sustained and superior performance—their four-season usefulness—their recognized capacity to conserve gas—oil—tires—replacements—to hold all operating and maintenance costs to the very minimum.

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory: Kitchener, Ont.

IN EVERY FIELD WHERE TRUCK QUALITY IS PUT TO THE TEST — FWD's STAND UP!


COMMERCIAL


CONSTRUCTION


UTILITIES


OIL FIELDS

FWD TRUCKS


MILITARY

SISKIYOU CO.—**Jones & King,** Yreka— over $100,000 for pav. runways & taxiways—by U. S. Engineer Office, San Francisco. 3-17

SAN BERNARDINO CO.—**Doudell Construction Co.,** Box 488, San Jose—over $100,000 for runway and taxiway extensions at an airport—by U. S. Engineer Office, Los Angeles. 2-26

SAN BERNARDINO CO.—**George Herz & Co.,** Box 191, San Bernardino—less than $50,000 for parking apron & taxiway No. 5, at an air depot—by U. S. Engineer Office, San Bernardino. 3-19

UNANNOUNCED CO.—**Radich & Brown,** 3000 Empire Ave., Burbank—$750,000 for paving extension at an airbase in northern Calif.—by Bureau of Yards & Docks, Washington, D. C. 2-26

UNANNOUNCED CO.—**Harold W. Seimer** and **B. Wright,** Santa Rosa—for approach zones at an air support command base in northern Calif.—by U. S. Engineer Office, San Francisco. 3-23

UNANNOUNCED CO.—**A. Teichert & Son, Inc.,** Box 1113, Sacramento—for field grading for bldgs. and subdepot paving at a field in northern Calif.—by U. S. Engineer Office, Sacramento. 3-8

Nevada

PERSHING CO.—**Axman & Miller,** Box 29, McMinnville, Ore. —$302,755 for clearing, grading, paving & drainage for Lovelock Airport—by Civil Aeronautics Administration, Santa Monica, Calif. 3-25

New Mexico

CURRY CO.—**Nolan Bros.** & **C. A. Wagner,** 20 North 2nd St., Minneapolis, Minn.—over $100,000 for runways—by U. S. Engineer Office, Albuquerque. 3-16

LUNA CO.—**Brown Brothers,** Box 1479, Albuquerque—over $50,000 for taxiways expansion, clearing, grading, drainage and paving—by U. S. Engineer Office, Albuquerque. 3-9

Oregon

DESCHUTES CO.—**Babler Bros.,** 4617 S. E. Milwaukee, Portland—over $100,000 for widening taxiways—by U. S. Engineer Office, Portland. 3-9

Now CAST IRON PIPE BECOMES EVEN *more* ECONOMICAL

Yes, cast iron pipe, by far the lowest in cost per service year of all pipe materials used for underground mains, is now more economical than ever.

* * *

In January we announced that our members were making pipe in accordance with the recently adopted A. S. A. LAW OF DESIGN for cast iron pipe in underground service. And that this new Law of Design was the result of our cooperative study with consulting engineers and pipe users under the auspices of the American Standards Association.

* * *

This new A. S. A. Law of Design means that the weights and thicknesses of cast iron pipe are *scientifically designed for specific laying conditions.* No more risk of under-guessing. No more over-guessing to be safe. You get the proper thickness for the service required.

Our members will of course continue to manufacture cast iron pipe in accordance with previously established specifications — A. W. W. A. — A. G. A. — Federal Government W W—P—421. But it will be obvious that the new factors in cast iron pipe design can save thousands of tons of metal with resultant large economies to pipe users.

* * *

Thus, cast iron pipe keeps in step with American Industry's swift wartime progress in design and production. Known for *longest life* by official records — proved to be *lowest in maintenance cost* by a nation-wide survey — *salvaged or re-used* by hundreds of cities — it is now scientifically designed for specific laying conditions. And it is more economical than ever. Cast Iron Pipe Research Association, Thomas F. Wolfe, Engineer, Peoples Gas Bldg., Chicago.

CAST IRON PIPE
RESEARCH ASSOCIATION, CHICAGO

Texas

BASTROP CO.—**J. D. Scarborough,** San Antonio—less than $50,000 for landing strips—by U. S. Engineer Office, San Antonio. 3-12

BEE CO.—**Brown-Bellows-Columbia,** Corpus Christi—approx. $3,5000,000 for a Navy auxiliary air station at Beeville—by Bureau of Yards and Docks, Washington, D. C. 3-9

BEXAR CO.—**R. W. Briggs & Co.,** and **M. B. Killian,** Box 1981, San Antonio—over $100,000 for extension of airport apron—by U. S. Engineer Office, San Antonio. 3-12

DALLAM CO.—**Uvalde Construction Co.,** 920 Santa Fe Bldg., Dallas, Texas—over $50,000 for addtl. apron—by U. S. Engineer Office, Tulsa, Okla. 3-19

WARD CO.—**Uvalde Construction Co.,** 920 Santa Fe Bldg., Dallas, Texas—over $50,000 for widening of taxiways & parking apron expansion—by U. S. Engineer Office, Albuquerque, N. M. 2-26

Washington

SPOKANE CO.—**J. H. Collins,** Box 187, Colville—less than $50,000 for turnouts for a runway—by U. S. Engineer Office, Seattle. 3-10

SPOKANE CO.—**Northwest Pavers,** Box 135, Spokane—two contracts each over $100,000 for runways, aprons and taxiways—by U. S. Engineer Office, Spokane. 3-12

Wyoming

LARAMIE CO.—**Peter Kiewit Sons' Co.,** 1024 Omaha Nat'l Bank Bldg., Omaha, Neb., and **Big Horn Construction Co.,** Sheridan, Wyo.—over $500,000 for relocation of runways & taxiways—by U. S. Engineer Office, Omaha, Neb. 3-9

PROPOSED PROJECTS

California

MENDOCINO CO.—The Civil Aeronautics Authority, Washington, D. C., has announced approval of a $650,000 airport in Mendocino.

Idaho

NEZ PERCE CO.—An allocation of $241,000 has been made to the CAA for completion of the airport at Lewiston—by U. S. Engineer Office. 3-16

Kansas

PRATT CO.—An expansion is planned for the existing facilities at an Army Air Forces installation, to cost approx. $2,000,000—by U. S. Engineer Office, Kansas City, Mo. 2-26

Nebraska

HALL CO.—Authorization was granted for the expansion of existing facilities at an army air force installation, to cost approx. $2,000,000—by U. S. Engineer Office, Omaha. 2-26

RED WILLOW CO.—Authorization was granted for the expansion of existing facilities at an Army air force installation, to cost approx. $2,000,000—by U. S. Engineer Office, Omaha. 2-26

Oregon

CURRY CO.—$865,000 has been allocated for a class 4 airport at Port Orford by the airport approval board, Washington, D. C. 3-10

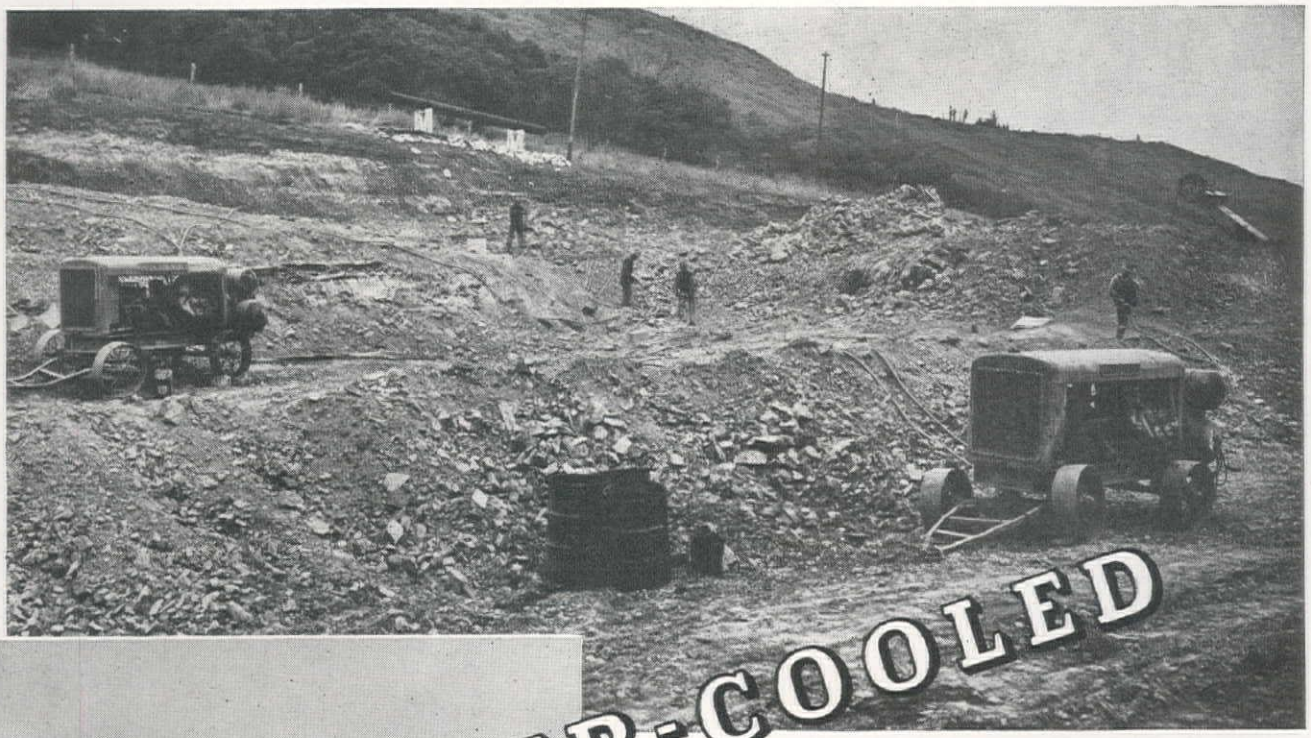
Washington

BENTON CO.—The Bureau of Yards & Docks, Washington, D. C., has authorized development work at the Kennewick Air Base to cost $3,976,000.

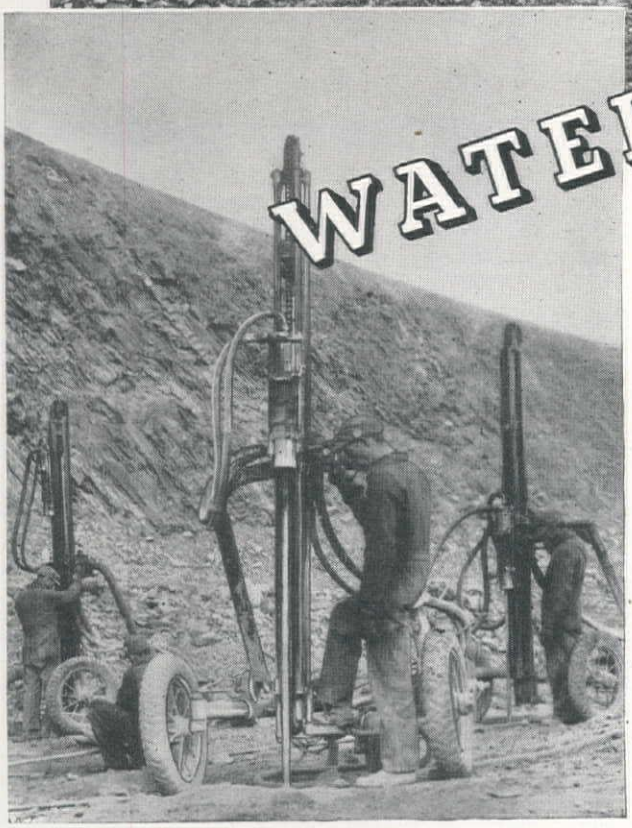
FRANKLIN CO.—$3,465,220 has been authorized for development work at the Pasco Air Stadium, by Bureau of Yards & Docks, Washington, D. C. 3-10

ISLAND CO.—Authorization has been granted for runways at Coupeville, to cost approx. $360,000—by Bureau of Yards & Docks, Washington, D. C. 3-10

SNOHOMISH AND SKAGIT CO.—Authorization has been granted for airport facilities at Arlington and Mount Vernon, to cost approx. $3,430,000—by Bureau of Yards & Docks, Washington, D. C. 3-10



WATER-COOLED FOR WAR



For greater speed and maneuverability, choose Gardner-Denver UM-99 Wagon Drills. Equipped to handle 6-foot steel changes, they are quickly adjustable for drilling in any desired position.

ON BIG jobs—on rush jobs—they've found it out: "Water-cooled" means *superior portable compressor performance*. Because Gardner-Denver Portable Compressors are water-cooled, with completely water-jacketed cylinders and heads, they give you these advantages:

1. Sustained high air output in any kind of weather regardless of altitude or temperature extremes.
2. Cooler discharge temperatures that protect your valuable air hose and reduce air tool upkeep.
3. A cooler running machine that's a miser with lubricating oil.
4. Dependable air output every day in the year—without fuss or pampering.

Gardner-Denver Water-Cooled Portable Compressors—either Diesel or gasoline engine driven—are built in a full range of capacities. For a descriptive bulletin, write Gardner-Denver Company, Quincy, Illinois.

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

GARDNER-DENVER *Since 1859*

Water Supply . . .

CONTRACTS AWARDED

Arizona

MOHAVE CO.—**Del E. Webb Construction Co.,** 302 S. 23rd Ave., Phoenix—over $100,000 for deep-well pumps, water supply lines and reservoirs, at a flexible gunnery school—by U. S. Engineer Office, Phoenix. 3-2

California

KERN CO.—**E. W. Brockman,** 918 W. Sixth St., Corona—less than $50,000, for drilling a water well at a material center flight test base—by U. S. Engineer Office, San Bernardino. 3-18

VENTURA CO.—**Roscoe Moss Co.,** 4360 Worth Ave., Los Angeles—less than $50,000 for drilling a water well at an army air base—by U. S. Engineer Office, Santa Maria. 3-18

UNANNOUNCED CO.—**Pacific Builders,** 312 East Alisal St., Salinas—additions to water system at a location in central California—by U. S. Engineer Office, San Francisco. 3-8

Montana

CASCADE CO.—**Utility Builders,** Great Falls—less than $50,000 for a water distribution system—by U. S. Engineer Office, Seattle, Wash. 3-10

Texas

POTTER CO.—**Amarillo Bridge Co.,** Amarillo—$216,807 for a 30-in. water supply line—by City of Amarillo. 3-16

Washington

CLALLAM CO.—**The Standard Plumbing & Heating Co.,** Bremerton—less than $50,000, for a water supply system—by U. S. Engineer Office, Seatle. 3-8

KING CO.—**Atherton Construction Co.,** 1101 Terminal Sales Bldg., Seattle—$10,853 for a 500,000-gal. stor. res. on Rose Hill—by Federal Works Authority, Seattle. 3-17

KING CO.—**Matt Malaspina,** Seattle—$10,000 for installing water mains in Eighth Ave. S., Seattle—by Seattle Board of Public Works, Seattle. 3-8

ISLAND CO.—**International Water Supply Co.,** Alaska Bldg., Seattle—$15,770 for well-drilling and pipe-line installation in Oak Harbor—by Federal Works Authority, Seattle. 3-8

SPOKANE CO.—**Clifton, Applegate and Henry Georg,** Box 1473, Spokane—less than $50,000 for a reinf. conc. well—by U. S. Engineer Office, Seattle. 3-26

Canada

BRITISH COLUMBIA—**Keith Mercer,** Montreal—$15,800 for equipment at Seymour Intakes—by Greater Vancouver Water Board, Vancouver.

BRITISH COLUMBIA—**Shanahan's Limited,** foot of Campbell Ave., Vancouver—$28,500 for chlorinating equipment at Capilano Intake—by Greater Vancouver Water Board, Vancouver.

PROPOSED PROJECTS

Arizona

MARICOPA CO.—**The Aluminum Co. of America,** Phoenix, is planning a 13,000-ft. 12-in. pipe line to connect with the city water supply. Estimated cost is $55,000. 3-10

Sewerage . . .

CONTRACTS AWARDED

California

KERN CO.—**Midstate Construction Co.,** 251 Kearny St., San Francisco—$37,719 for a sewage treatment plant at Lamont—by U. S. Dept. of Agr., Emergency Rubber Project, Los Angeles. 3-29

LOS ANGELES CO.—**Baruch Corp.,** 625 S. Olive St., Lo Angeles—$55,345 for the sixth section of Lockheed storm drai Burbank—by Federal Works Agency, Los Angeles. 3-

LOS ANGELES CO.—**Basich Bros.,** 20530 S. Normandie Ave Torrance—less than $50,000, for sewers, water, electric distribu tion, roads, and utilities at a flight strip—by U. S. Engineer Of fice, Los Angeles. 3-1

SAN BERNARDINO CO.—**A. R. Milosevich,** 303 North Alm Ave., Los Angeles—less than $50,000 for sewer line for effluen from existing sewage disposal plant at a holding & reconsign ment point—by U. S. Engineer Office, San Bernardino. 3-1

SAN DIEGO CO.—**J. S. Barrett,** 412 First National Bank Bldg Santa Ana—over $50,000 for sewage disposal plant extension a a camp—by U. S. Engineer Office, San Diego. 3-

SAN FRANCISCO CO.—**Fay Improvement Co.,** 760 Marke St., San Francisco—$2,479, for replacement of sewer in Lucern St. from Brannan St. southerly — by Department of Publi Works, San Francisco. 3-

SAN FRANCISCO CO.—**R. Flatland,** 1115 Clement St., Sa Francisco—$18,350 for drainage system in Burnham St. at 24t St.—by Department of Public Works, San Francisco. 3-

SAN JOAQUIN CO.—**Louis Biasotti,** 40 W. Clay St., Stockto —$21,785 for street work, sewage & water systems for a 100-uni trailer camp on Monte Diablo Ave. near Pollock shipyard, Stock ton—by San Joaquin Housing Authority, Stockton. 3-

SANTA BARBARA CO.—**Midland Construction Co.,** 8677 Oti St., South Gate—over $50,000 for sewage treatment plant at camp—by U. S. Engineer Office, Santa Maria. 3-1

UNANNOUNCED CO.—**Fred J. Early, Jr.,** 369 Pine St., Sa Francisco—for auxiliary sewage pumping station for stockade i central Calif.—by U. S. Engineer Office, San Francisco. 3-2

Colorado

DENVER CO.—**Carlson Construction Co.,** 4482 Newton St. Denver—$87,536 for sewage treatment plant serving a portion o Denver & the Lowry Field air corps—by Manager of Improve ments & Parks, Denver. 3-2

EL PASO CO.—**J. T. McDowell,** First National Bank Bldg. Denver—for a sewage disp. plant & 1,000,000-gal. cap. reinf conc. storage tanks—by U. S. Engineer Office, Denver. 3-1

Idaho

ELMORE CO.—**J. A. Tertelling & Sons,** Boise—over $50,00 for a sewage treatment plant, etc., at a military site—by U. S Engineer Office, Portland. 3-1

Montana

CASCADE CO.—**Utility Builders,** Great Falls—less than $50, 000 for a sanitary sewer system—by U. S. Engineer Office Seattle, Wash. 3-2

Nebraska

BOX BUTTE CO.—**Owen Mann,** Rapid City, S. Dakota—less than $50,000 for exc. of channel, instal. of sewer lines & man holes, etc.—by U. S. Engineer Office, Omaha. 3-1

Nevada

CLARK CO.—**H. F. Hendrickson Co.,** 2811 Clearwater St., Los Angeles, Calif.—$42,170, for a sewage treatment plant in Las Vegas—by Federal Works Agency, Los Angeles, Calif. 3-

New Mexico

BERNALILLO CO.—**Cooper-Staehlin-Whisler,** Albuquerqu —less than $50,000 for a sewer at an airfield—by U. S. Enginee Office, Albuquerque. 3-

CHAVES CO.—**Walter L. Denison,** Albuquerque—less tha $50,000 for addtl. sewage facilities at an airfield—by U. S. Engi neer Office, Albuquerque.

Texas

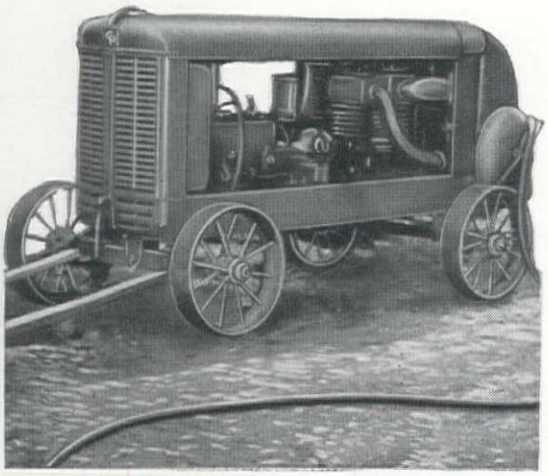
BEXAR CO.—**Gayle Brothers,** Houston—less than $50,000 fo addtn. to sewage system—by U. S. Engineer Office, San Antonio 3-1

Washington

KING CO.—**C. V. Wilder,** 2006 State St., Bellingham—$27,84

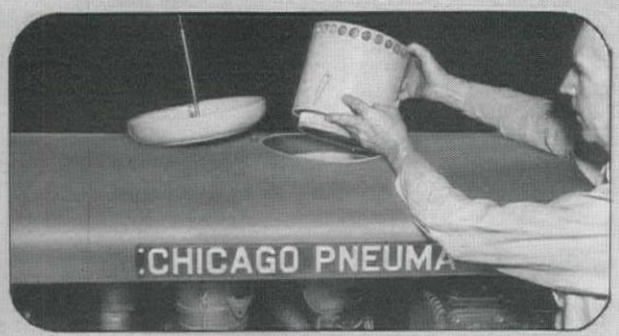
Even CP Compressors

MUST BE LUBRICATED

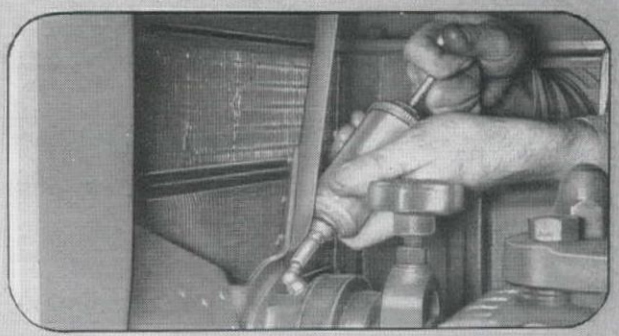


CP Portable Compressors are equipped with a force feed system of lubrication which is automatic, positive, economical – and which also keeps the air relatively oil-free. Nevertheless, for the dependable, uninterrupted service so essential under war conditions, there are a few manual operations which should be performed regularly. Four of these are illustrated below; others will be presented in future advertisements.

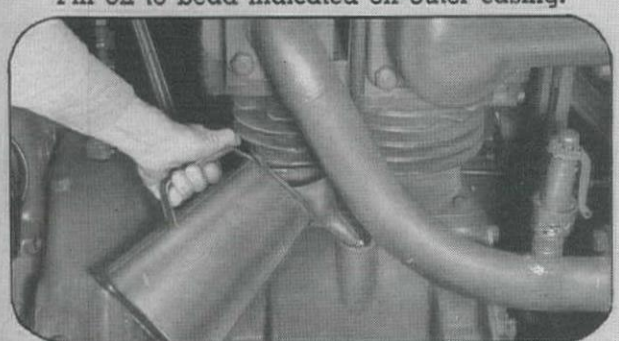
HOW TO GET MAXIMUM SERVICE FROM YOUR CP PORTABLE COMPRESSORS



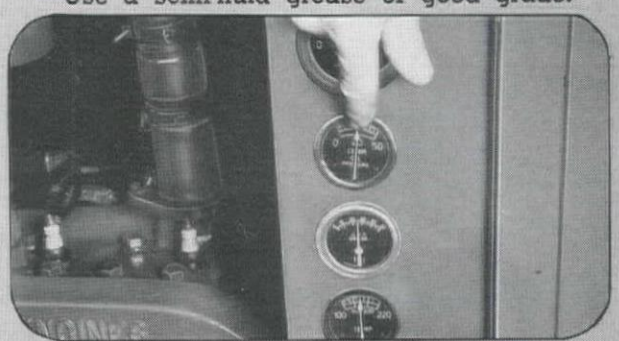
1 Remove air intake filter, clean with kerosene weekly. Dry all parts before replacing. Fill oil to bead indicated on outer casing.



2 Lubricate the fan bearings with a grease gun every three hundred operating hours. Use a semi-fluid grease of good grade.



3 Keep crank case filled to indicated level. Drain every 100 operating hours. Refill with grade of oil specified in instruction book.



4 Get the habit of checking compressor and engine oil pressure gauges frequently on each shift. Pressure should be about 25 lbs.

★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
(Hicycle...Universal)
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL CP COMPANY
General Offices: 8 East 44th Street, New York, N. Y.

★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

for Kirkland sewer system—by City Clerk, Kirkland. 3-12

KITSAP CO.—**M. Marchetto,** 550 - 13th Avenue S., Seattle—$49,849 for storm and sanitary sewers from 7th Street to Port Washington Narrows—by City Council, Bremerton. 2-26

WHATCOM CO.—**C. V. Wilder,** 2006 State St., Bellingham—less than $50,000 for a sewer system—by U. S. Engineer Office, Seattle. 3-18

PROPOSED PROJECTS

California

LOS ANGELES CO.—Approval has been granted for new sewers and water lines for the city of Lynwood by the Federal Works Administration, Washington, D. C. $17,187 has been appropriated thus far.

Waterway Improvement . . .

CONTRACTS AWARDED

California

LOS ANGELES CO.—**Case Construction Co.,** Berth 109, San Pedro—over $100,000, for dredging in southern Calif.—by U. S. Engineer Office, San Pedro. 3-1

SAN FRANCISCO CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$3,875,300 for addtl. facil. at Hunter's Point—by Bureau of Yards & Docks, Washington, D. C. 3-3

SAN DIEGO CO.—**Standard Dredging Co.,** Central Bldg., Los Angeles—for dredging approx. 4,000,000 cu. yds. of material between the Dest. Base and the National City waterfront—by Bureau of Yards and Docks, Washington, D. C.

Irrigation . . .

CONTRACTS AWARDED

California

STANISLAUS CO.—**Ed Erickson,** Rt. 4, Box 1516, Modesto—$2,941 for conc. lining the Herzog ditch—by Turlock Irrigatio District. 3-

STANISLAUS CO.—**Lloyd W. Terrell,** 221 - 9th Ave., Turloc —$7,647 for conc. lining the Olson branch of the Smyrna Par Ditch—by Turlock Irrig. District. 3-

Building . . .

CONTRACTS AWARDED

Arizona

COHISE CO.—**Paul E. Griffin,** 7219 Sepulveda Blvd., Van Nuys Calif.—over $50,000 for addtl. temporary bldgs. at a trainin school—by U. S. Engineer Office, Phoenix. 3-

MARICOPA CO.—**E. W. Duhame Construction Co.,** 371 North Central Ave., Phoenix—$248,698 for 134 temp. dwellin units at Avondale—by Federal Public Housing Authority, Sa Francisco. 3-1

MARICOPA CO.—**R. J. Daum,** 6803 West Blvd., Inglewoo Calif.—$198,446 for a housing project in Phoenix—by Federa Public Housing Authority, San Francisco, Calif. 3-

MARICOPA CO.—**George C. Gammill,** Prescott—$110,097 fo

The Alcan Highway

This is another tough job taken in stride by Fruehaufs. Heavy machinery rolled many miles on Fruehauf Low-bed Trailers. Dirt and aggregates were moved in a hurry with Fruehauf Dump Trailers.

1000 miles from any Complete Service Shop

that's where 'Engineered Transportation' counts

The Alcan Highway was a tough, fast operation, where equipment had to keep going, for even the crude repair stations were few and far between north of 54° 40'.

That's the sort of job on which experienced operators like to have Fruehaufs. They know Fruehauf Trailers are designed and built, first, to do more work...tougher work...without needing service; second, so that when servicing is necessary, it can be done quickly, easily.

FILE YOUR PD-310

Perhaps you now qualify for the Trailers now available to operators having a Certificate of Transfer (PD-321). Fruehauf Branches will be glad to advise you and to help you file the application form PD-310.

FRUEHAUF TRAILERS

ENGINEERED TRANSPORTATION

Reg. U. S. Pat. Off.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant—Los Angeles

Sales and Service Branches
Los Angeles • Fresno • Phoenix • Seattle • San Diego
San Francisco • Portland • Denver • Salt Lake City

Truck-Trailer Transport Is Doing An Essential Job for All America

64 temporary dwelling units at Luke Field—by Federal Public Housing Authority, San Francisco, Calif. 3-12

MARICOPA CO.—**Shumaker, Evans & C. L. Mattox,** 3000 N. Central Ave., Phoenix—$67,000 for a housing project—by Federal Public Housing Authority, San Francisco, Calif. 3-3

MARICOPA CO—**Del E. Webb Construction Co.,** 302 South 23rd Ave., Phoenix—$60,000 for a health center at 12th Ave. and Madison St. in Phoenix—by Board of Supervisors, Maricopa Co., Phoenix. 2-26

MOHAVE CO.—**Utah Construction Co.,** 1 Montgomery St., San Francisco—$655,209 for a housing project of 200 dorm. units and 150 demountable units in Kingman—by Federal Public Housing Authority, San Francisco. 3-10

NAVAJO CO.—**L. H. Hansen & Sons,** 313 Palm Ave., Fresno—$194,888 for a housing project in Winslow—by Federal Housing Authority, San Francisco. 3-12

PIMA CO.—**Joynt Construction Co.,** 2533 E. Helen St., Tucson—$163,000 for 100 temp. dwelling units at Tucson—by Federal Public Housing Authority, San Francisco. 3-11

PIMA CO.—**M. M. Sundt Construction Co.,** 440 S. Park Ave., Tucson—over $100,000 for a P. A. hangar at an airfield—by U. S. Engineer Office, Phoenix. 3-22

PIMA CO.—**Murphey-Keith Building Co.,** 411 East Third St., Tucson—$87,000 for 50 temporary dwelling units at Marana—by Federal Public Housing Authority, Tucson. 3-18

PINAL CO.—**Murphey-Keith Bldg. Co.,** 411 E. 3rd St., Tucson—$95,665 for 30 temp. dwelling units at Florence—by Federal Public Housing Authority, San Francisco. 3-3

California

ALAMEDA CO.—**John E. Branagh,** 105 Sheridan St., Piedmont $70,000 for bldgs. for cyclotron project—by Regents of the Univ. of Calif., Berkeley. 3-3

ALAMEDA CO.—**B. Liebman,** 3319 Fillmore St., San Francisco—over $50,000 for addtl. housing—by U. S. Engineer Office, San Francisco. 3-4

AMADOR CO.—**Knapp California, Inc.,** 103 W. Verdugo Ave., Burbank—$50,885, for 28 housing units at Silver Lake, Calif., and at Boulder City, Nevada—by Department of Water & Power, Los Angeles. 3-15

CONTRA COSTA CO.—**Eaton and Smith,** 715 Ocean Ave., San Francisco—$550,000 for bldg. & facil. at St. Marys College, at Moraga—By Bureau of Yards & Docks, Washington, D. C. 3-24

CONTRA COSTA CO.—**Robert McCarthy,** 1050 Kirkham St., San Francisco—4,000 family apartments in Richmond—by U. S. Maritime Commission, Washington, D. C.

KERN CO.—**Alco Construction Co.,** 5423 Flemish Village, Los Angeles—over $100,000 for hospital at an army air base—by U. S. Engineer Office, Los Angeles. 3-10

KERN CO.—**Austin Company,** 777 E. Washington Blvd., Los Angeles—$250,000 for a potato dehydrating plant near Bakersfield—by Kern County Dehydrating Company, Bakersfield. 3-11

KERN CO.—**Eric Flodine,** 2021 Wellington Rd., Los Angeles—$116,259 for a labor camp at Shafter—by U. S. Department of Agriculture, Emergency Rubber Proj., Los Angeles. 3-1

KERN CO.—**R. A. Wattson Co.,** and **Kemp Bros.,** 1026 N. McCadden Place, Los Angeles—$411,384, for 250 dormitory units, and 150 dwelling units—by Housing Authority, Bakersfield. 3-4

LOS ANGELES CO.—**R. J. Daum,** 6803 West Blvd., Inglewood—over $100,000 for converting a hotel into a hospital—by U. S. Engineer Office, Los Angeles. 3-4

LOS ANGELES CO.—**W. J. Hunter,** 660 Heliotrope Dr., Los Angeles—over $50,000 for demolition and rebuilding an elevator shaft at a hospital—by U. S. Engineer Office, Los Angeles. 3-17

LOS ANGELES CO.—**O'Neal and Hedberg,** 852 S. Robertson Blvd., Los Angeles—less than $50,000, for bomb storage facil., bldgs. and roads at a municipal airport—by U. S. Engineer Office, Los Angeles. 3-29

LOS ANGELES CO.—**Stout Houses,** 1501 S. Ogden Drive, Los Angeles—over $50,000 for demountable bldgs. (prefabricated) at an airport—by U. S. Engineer Office, Los Angeles. 3-16

LOS ANGELES—**P. J. Walker Co.,** 3900 Whiteside Ave., Los Angeles—$2,182,500 for addtns. to the Navy Hospital in Long Beach—by Bureau of Yards & Docks, Washington, D. C. 3-29

McWANE - PACIFIC
CAST IRON PIPE

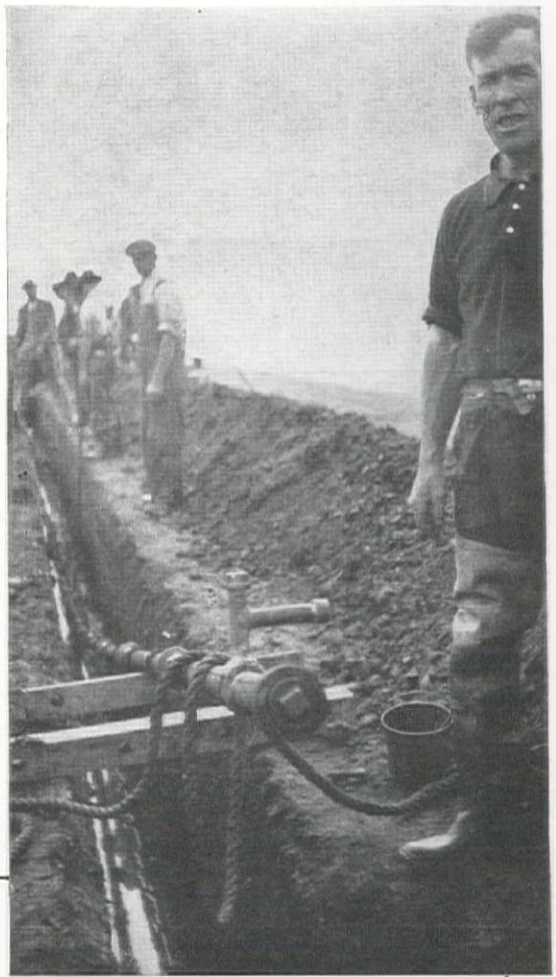
AGAIN AVAILABLE!

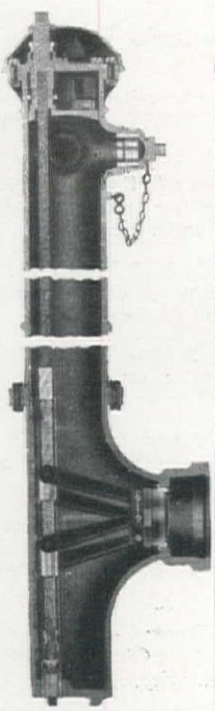
This Easy-to-Lay, Corrosion-Resisting Pipe Can Now Be Supplied on Any Rating of A-10 or Better. Prompt Deliveries!

America's war needs come first . . . but we are now in a position to take care of many industrial and municipal requirements in addition to government orders.

McWane-Pacific Cast Iron Pipe is noted for its corrosion-resisting permanence, excellent machinability, strength, flexibility, ease of laying. By every standard, it's the *economical* pipe to use underground.

Available in all sizes, 2″ through 12″, with famous self-tightening McWane Precalked Joint, Open Bell, Oversize Threaded (on 2″ and 3″ sizes) and Gland Type Joints. Fittings, too.





Pacific States
FIRE HYDRANTS

—preferred for their easy, positive operation, rugged construction and other superior features, including: Frost proof; flood proof; easy to repair; minimize the possibility of water hammer. Conform to Federal specification WW-V-76 and the new AWWA specification. Available on AA-5 rating or better.

WE ALSO MANUFACTURE

Service and Valve Boxes
Meter Box Covers
Manhole Frames and Covers
Flanged Fittings

Write or call for new catalog or other detailed information

Pacific States
GATE VALVES

Iron Body — Bronze Mounted
Parallel Seats — Double Gates

Characterized by exceptional ease of operation, as the special design eliminates all binding action. These valves meet all standard specifications including Federal Specification WW-V-76 and the new AWWA specification. Available on AA-5 rating or better.

PACIFIC STATES CAST IRON PIPE COMPANY

GENERAL OFFICES: PROVO, UTAH

LOS ANGELES	SAN FRANCISCO	DENVER	PORTLAND	SALT LAKE CITY	NEW YORK CITY, N. Y.	CHICAGO, ILL.
437 So. Hill St.	116 New Montgomery St.	1921 Blake St.	319 S. W. Washington St.	149 West 2nd So. St.	80 Broad St.	333 No. Michigan Ave.

LOS ANGELES CO.—**P. A. Weeger,** 4565 Santa Monica Blvd., Los Angeles—over $50,000 for housing—by U. S. Engineer Office, Los Angeles. 3-4

MARIN CO.—**W. C. Akard,** 225 Cervantes Blvd., San Francisco—housing project in the San Francisco Bay Area—by U. S. Army Engineer Office, San Francisco. 3-9

MARIN CO.—**Daley Bros.,** 426 Bryant St., San Francisco—over $50,000 for temporary frame bldgs.—by U. S. Engineer Office, San Francisco. 3-17

MARIN CO.—**Heyman Bros.,** 564 Market St., San Francisco—$101,178 for bldgs. and util. for a 250-unit public trailer camp at Alto—by Marin County Housing Authority. 3-29

MONTEREY CO.—**J. Paul Campbell,** 5601 W. Manchester Ave., Inglewood—$87,805, for a labor camp at Soledad—by U. S. Department of Agriculture, Emergency Rubber Proj., Los Angeles. 3-1

MONTEREY CO.—**Howson Bros.,** Gilroy—over $50,000 for const. hospital facil.—by U. S. Engineer Office, San Francisco. 3-31

ORANGE CO.—**John C. Blystone,** Box 7, Garden Grove—over $50,000 for combination school & admin. bldg. at an army air base—by U. S. Engineer Office, Riverside. 3-24

ORANGE CO.—**W. J. Hunter,** 660 Heliotrope Dr., Los Angeles—over $100,000 for housing at an airport—by U. S. Engineer Office, Riverside. 3-2

ORANGE CO.—**Nordin Construction Co.,** 3030 Exposition Blvd., Los Angeles—over $200,000 for bldgs., grading and paving at an army air base—by U. S. Engineer Office, Riverside.

RIVERSIDE CO.—**Gordon Donald** and **Lewis McKee,** 50 E. Vine St., Redlands—over $100,000 for two contracts for 50 temp. dwelling units and 50 trailer units at Blythe—by Federal Public Housing Authority, San Francisco. 3-9

RIVERSIDE CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—over $100,000 for hangar bldg. & utils. at an army air base—by U. S. Engineer Office, Los Angeles. 3-9

RIVERSIDE CO.—**Allison Honer,** 103 E. 3rd St., Santa Ana—over $100,000 for addtl. hospitalization at a camp—by U. S. Engineer Office, Riverside. 3-2

SACRAMENTO CO.—**C. C. Moore & Co., Engineers,** 460 Mission St., San Francisco—over $100,000 for an extension to a central steam plant at a military location—by U. S. Engineer Office, Sacramento. 3-9

SACRAMENTO CO.—**Lawrence Construction Co.,** 3511 E. Curtis Park Drive, Sacramento—over $75,000 for bldgs.—by U. S. Engineer Office, Sacramento. 3-2

SAN BERNARDINO CO.—**George Herz & Co.,** Box 191, San Bernardino—$178,719 for 100 temp. dwelling units at Needles—by Federal Public Housing Authority, San Francisco. 3-11

SAN BERNARDINO CO.—**John Keith,** 8517 W. 3rd St., Los Angeles—$322,474 for a 100-unit housing project and community buildings in Upland—by Upland Housing Authority. 3-10

SAN BERNARDINO CO.—**Robert E. Millsap,** 210 W. 7th St., Los Angeles—over $100,000 for bldgs. at an army air base—by U. S. Engineer Office, Riverside. 3-10

SAN BERNARDINO CO.—**J. O. Oltmans,** 810 E. 18th St., Los Angeles—over $50,000, for an armament repair bldg. at an air depot—by U. S. Engineer Office, Los Angeles. 3-3

SAN BERNARDINO CO.—**Ivan M. Wells Construction Co.,** 201 S. Linden Drive, Beverly Hills—over $50,000 for engineer maintenance shop at an air depot—by U. S. Engineer Office, San Bernardino. 3-17

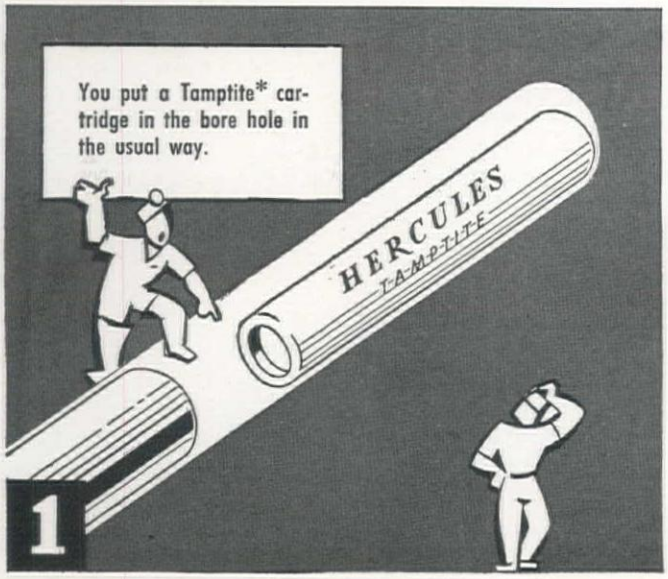
SAN DIEGO CO.—**J. K. Thomas** and **Beyer Construction Co.,** 1151 S. Broadway, Los Angeles—$454,184 for Old Town housing project—by Federal Public Housing Authority, San Diego. 3-2

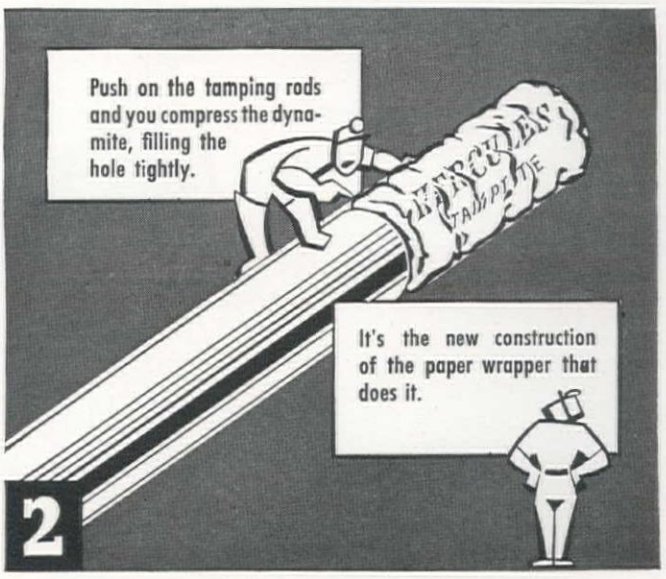
SAN JOAQUIN CO.—**Shepherd & Green,** 309 First National Bank Bldg., Stockton—$325,000 for 50 dormitory units and 200 family dwelling units near Pollock-Stockton Shipbuilding Co.—by San Joaquin Co. Housing Authority, Stockton. 3-15

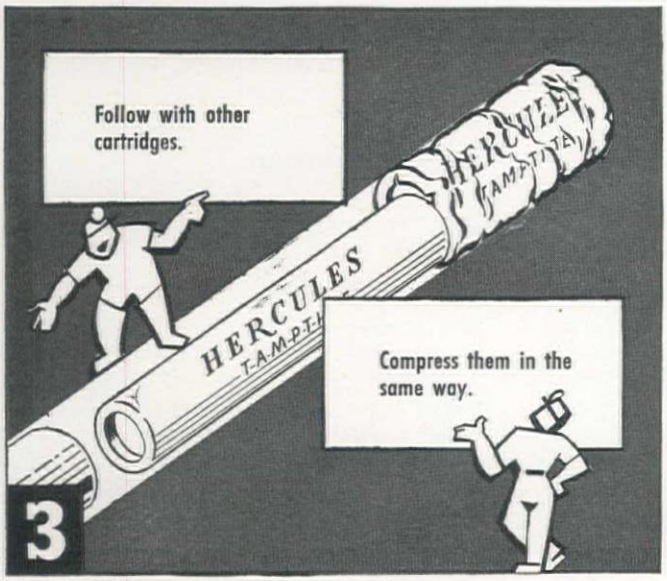
SAN MATEO CO.—**Louis C. Dunn, Inc.,** 799 Monadnock Bldg., San Francisco—$53,479 for 128 dormitory units and a community bldg. at San Bruno—by Federal Housing Authority. 3-2

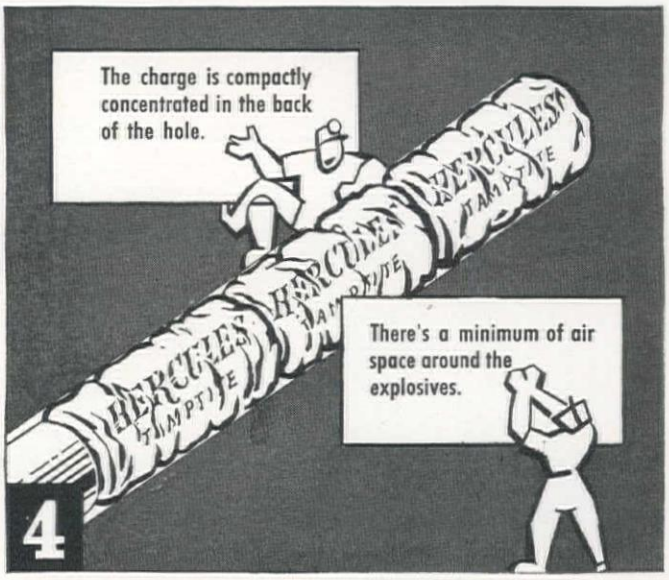
NEW TAMPTITE CARTRIDGE

speeds work · saves labor · gives better breakage









RESULTS: You save valuable man hours formerly used in slitting cartridges to make them pack tightly. There's no spilled powder, even when loading uppers. You get better breakage for faster mucking.

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EXPLOSIVES

HERCULES POWDER COMPANY
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A-92

SAN MATEO CO.—**B. Liebman,** 3319 Fillmore St., San Francisco—over $50,000 for addtl. housing—by U. S. Engineer Office, San Francisco. 3-4

SISKIYOU CO.—**T. C. Buck,** 315 East Weber St., Stockton—$127,855 for 60 temp. dwelling units at Happy Camp—by Federal Public Housing Authority, San Francisco. 3-11

SOLANO CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$1,027,300, for a 250-bed Vallejo City Hospital on Napa Road in Vallejo—by U. S. Public Buildings Administration, Washington, D. C. 3-29

STANISLAUS CO.—**Trewitt-Shields & Fisher,** Pacific Southwest Bldg., Fresno—over $100,000 for bldgs.—by U. S. Engineer Office, Sacramento. 3-20

VENTURA CO.—**Davies & Keusder,** 118½ N. Larchmont Blvd., Los Angeles—over $50,000 for demountable bldgs. (prefabricated) at a flight strip—by U. S. Engineer Office, Los Angeles. 3-16

UNANNOUNCED CO.—**Standard Oil Co. of California,** San Francisco—$6,200,000 for a synthetic rubber plant—by Defense Plant Corporation.

Colorado

DENVER CO.—**Peter Serrie,** Interstate Trust Bldg., Denver—over $100,000 for bldgs., utilities, and misc. improv.—by U. S. Engineer Office, Denver. 3-11

DENVER CO.—**S. C. Cook,** 3020 Newton St., Denver—over $50,000 for cinder block and heating plant bldgs.—by U. S. Engineer Office, Denver. 3-2

Idaho

ADA CO.—**J. O. Jordan & Son,** 1840 N. 8th St., Boise—$65,000 for misc. bldgs. at a military site—by U. S. Engineer Office, Portland, Ore. 3-9

ELMORE CO.—**Mountain Home Builders,** Portland, Ore.—over $50,000, for temporary frame bldg.—by U. S. Engineer Office, Portland, Ore. 3-25

Montana

VARIOUS COUNTIES—**Dudley Anderson Co.,** Great Falls—over $100,000 for buildings—by U. S. Engineer Office, Great Falls. 3-12

Nevada

CLARK CO.—**E. A. Kaiser Co.,** 8825 Olympic Blvd., Beverly Hills—$307,862 for 100 temp. dwelling units in Las Vegas—by Federal Public Housing Authority, San Francisco, Calif. 3-25

CLARK CO.—**Nordin Construction Co.,** 3030 Exposition Blvd., Los Angeles, Calif.—over $750,000 for dwellings on Hwy. No. 91, Las Vegas—by Vegas Village, Inc., Las Vegas. 3-16

CLARK CO.—**General Construction Co.,** and **J. Walter Johnson,** 5205 Hollywood Blvd., Los Angeles, Calif.—over $50,000 for a line maintenance shed at an army air force flexible gunnery school—by U. S. Engineer Office, Kingman, Arizona. 3-23

CLARK CO.—**Knapp California, Inc.,** 103 W. Verdugo Ave., Burbank, Calif.—$50,885, for 28 housing units at Silver Lake, Calif., and at Boulder City—by Department of Water & Power, Los Angeles, Calif. 3-15

CLARK CO.—**Hommes and Eudemiller,** 6521 Wilshire Blvd., Los Angeles—$619,995 for a housing project of 324 living units and 175 dormitory units in Las Vegas—by Federal Public Housing Authority. 3-10

CLARK CO.—**G. Panicari,** 1040 Lander St., Reno—$74,558 for school bldg. in Las Vegas—by Federal Works Agency, Washington, D. C. 3-12

New Mexico

CHAVES CO.—**Parks-Marshall-McCleskey Construction Co.,** Dallas, Texas—over $100,000 for addtl. housing & facil. at an airfield—by U. S. Engineer Office, Albuquerque. 3-10

CURRY CO.—**McMilland & Glover,** Lubbock, Texas—over $100,000 for addtl. bldgs. at an airfield—by U. S. Engineer Office, Albuquerque. 3-4

DE BACA CO.—**Maxey & Leftwich,** Lubbock, Texas—over $100,000 for addtl. bldg. at an airfield—by U. S. Engineer Office, Albuquerque. 3-8

You Bet-I'm Busy!

but not too busy to keep my equipment in A-1 shape!

With new machines and replacement parts hard to get, it's practical patriotism, as well as good business, to adopt a regular schedule of inspection, lubrication and maintenance of your present equipment. . . . Keep your MICHIGAN Mobile CRANES in shape to carry on under war-time pressure.

CHECK THESE VITAL POINTS REGULARLY:

- **Power Take-Off:** Inspect housing weekly for proper oil level. Use SAE No. 250 in summer; SAE No. 140 in winter.
- **Hoist, Crowd, Intermediate and Swing Shafts:** Remove and repack bearing retainers every six months. When machine is worked longer than normal hours, repack retainers more frequently.
- **Boom Point Sheave Bushings:** Grease daily through high-pressure fittings. Inspect sheave flanges for wear. Sheaves in good condition will contribute to longer cable life.
- **Cables:** Inspect regularly for wear. Apply lubricant by brush as required.
- **Main Drive Chain:** To eliminate chain slap, add shinns under hoist shaft support brackets.
- **Clutches (Hoist, Crowd, Swing):** To adjust, remove cotter keys and tighten the three nuts located on extreme diameters of clutches to an even, snug pressure. Back nuts off five notches and replace cotter keys.

Our engineering staff is ready to offer its services in helping you solve your lubrication and maintenance problems. Write today . . . Ask for Bulletin W-43.

★ ★ ★ ★ ★ ★

Model T6-K Michigan Mobile Shovel-Crane, 3/8 yard capacity. Convertible to standard front-end attachments.

★ ★ ★ ★

AIR CONTROLLED

MICHIGAN

POWER SHOVEL CO.

BENTON HARBOR, MICHIGAN

OTERO CO.—**J. E. Morgan & Sons,** 210 Campbell St., El Paso, Tex.—over $50,000 for addtl. airfield bldgs.—by U. S. Engineer Office, Albuquerque. 3-24

OTERO CO.—**Ponsford Bros.,** 914 E. Missouri St., El Paso, Tex.—over $200,000 for addtl. housing and technical facilities at an airfield—by U. S. Engineer Office, Albuquerque. 3-1

Oregon

MULTNOMAH CO.—**Charles R. Schmiedeskamp,** Oswego—$139,453 for five new school bldg. addtns.—Federal Works Authority, Seattle, Wash. 3-3

WASCO CO.—**Mid-States Construction Co.,** The Dalles—over $100,000 for office and storage facil. on city-owned land betw. the Columbia River Highway and the Oregon shore of the river—by River Terminals Inc., The Dalles. 3-29

Texas

BEXAR CO.—**Ed. W. Oeffinger,** Box 1208, San Antonio—over $100,000 for addtl. temporary const.—by U. S. Engineer Office, San Antonio. 3-16

BEXAR CO.—**C. L. Browning, Jr.,** 812 Insurance Bldg., San Antonio—over $100,000 for a temporary frame bldg.—by U. S. Engineer Office, San Antonio. 3-9

BEXAR CO.—**Timber Fabricating Corp.,** Houston—over $500,000, for columns and trusses for storage facil.—by U. S. Engineer Office, San Antonio. 3-31

BROWN CO.—**P. O'B. Montgomery,** Box 923, Dallas—over $100,000 for housing—by U. S. Engineer Office, San Antonio. 3-12

EL PASO CO.—**Robert E. McKee,** Box 217, El Paso—over $100,000 for addtl. structures and facil. at an airfield—by U. S. Engineer Office, Albuquerque. 3-8

PRESIDIO CO.—**Investment Service Corp.,** Dallas—over $100,000 for addtl. housing and facilities at an airfield—by U. S. Engineer Office, Albuquerque, N. Mex. 3-1

WARD CO.—**Suggs Construction Co.,** Big Springs—over $200,000 for addtl. housing & technical facilites at an airfield—by U. S. Engineer Office, Albuquerque, N. Mex. 3-1

Utah

SALT LAKE CO.—**Jacobsen Construction Co.,** 724 South 3 East, Salt Lake City—over $50,000 for a WAAC building at a camp—by U. S. Engineer Office, Salt Lake City. 3-29

TOOELE CO.—**Harrison-Dorman Inc.,** 13 So. St. and 4 West St., Salt Lake City—over $100,000 for addtl. work and misc. bldgs.—by U. S. Engineer Office, Salt Lake City. 2-25

TOOELE CO.—**Horman Construction Co.,** 1514 Millcreek Way, Salt Lake City—$468,045 for a housing project of 224 units at Wendover—by Federal Public Housing Authority, Kansas City, Mo. 3-10

TOOELE CO.—**Olsen Construction Co.,** Hill Field—over $200,000 for civilian war housing—by U. S. Engineer Office, Salt Lake City. 3-11

WEBER CO.—**Paul Paulsen Co.,** 55½ W. 1 South St., Salt Lake City—over $50,000 for a repair bldg., at an air depot—by U. S. Engineer Office, Salt Lake City. 3-11

Washington

CLARK CO.—**Geo. H. Buckler Co.,** Lewis Bldg., Portland, Ore.—$76,700 for an addition to the Northern Permanente Hospital at Vancouver—by Kaiser Co., Vancouver. 3-11

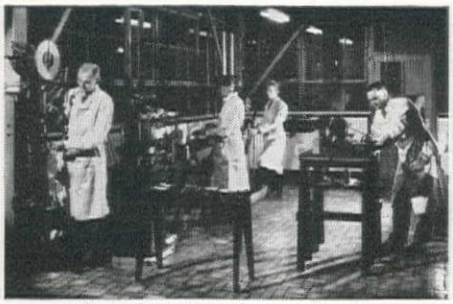
CLARK CO.—**Reimers & Jollivette,** Railway Exchange Bldg., Portland—$6,583,196 for 2,160 units at St. Johns, 2,160 units at Swan Island, Portland, and 7,000 units at Vancouver, Wash.—by U. S. Maritime Commission, Portland. 3-15

FRANKLIN CO.—**Halvorson Construction Co.,** 4559 N. E. 39th Ave., Portland, Ore.—$196,709, for 100 public housing units—by Pasco Housing Authority. 3-19

KING CO.—**Nelse Mortensen & Co.,** 1021 Westlake Ave. N., Seattle—over $50,000 for transient housing in the Denny regrade area—by U. S. Engineer Office, Seattle. 3-17

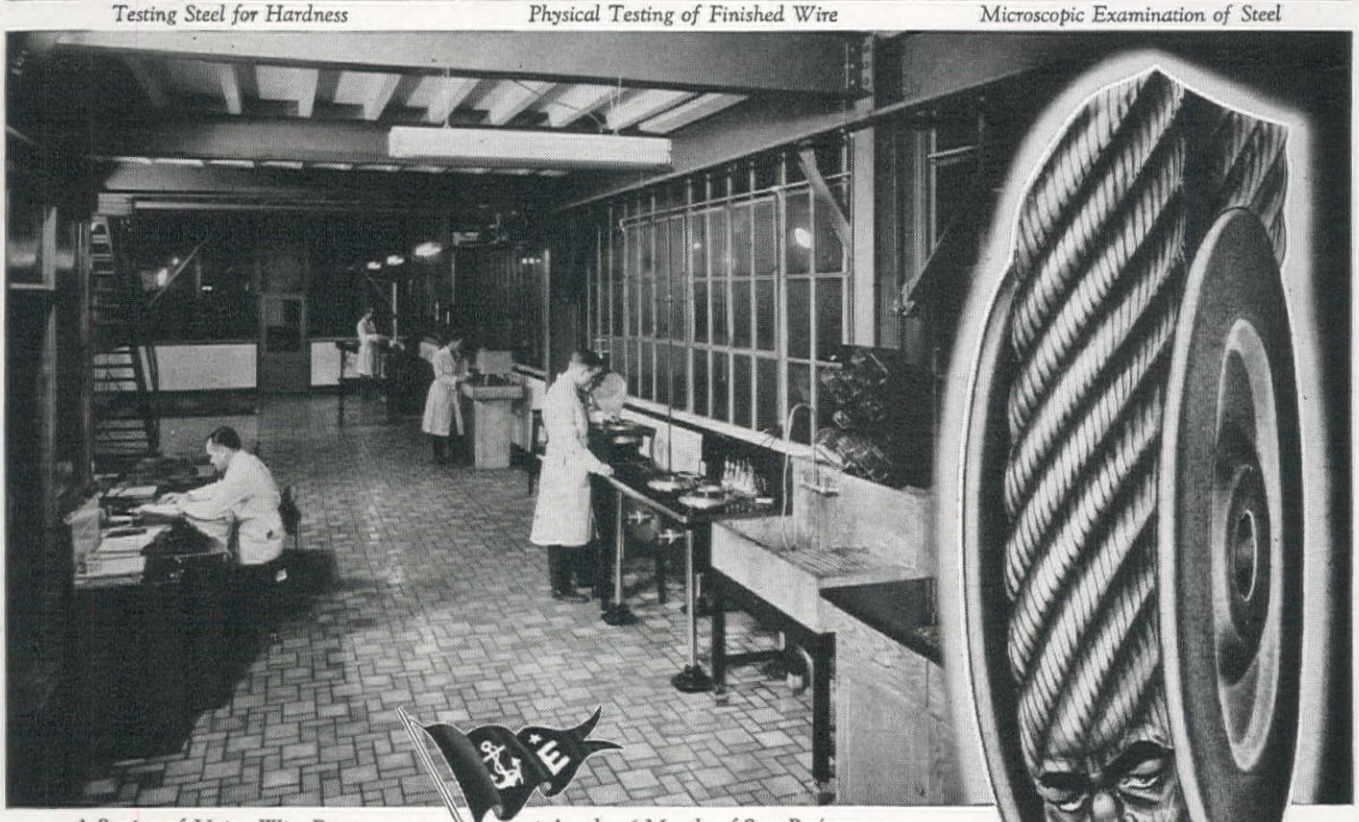
KING CO.—**Nettleton & Baldwin,** 6803 Fox St., Seattle—$1,215,000 for 700 temporary housing units near the Duwamish River—by Housing Authority, Seattle. 3-1

Testing Steel for Hardness



Physical Testing of Finished Wire

Microscopic Examination of Steel



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★Another 6 Months of Star Performance In War Production

BIRTHPLACE OF TOUGHNESS

Out of some 4000 steel formulas, relatively few are suited to wire rope making. From long years of experience, Union Wire Rope engineers and metallurgists have determined upon a steel formula for each type of Union Wire Rope.

To be certain each heat meets specified analysis, steel is examined under a powerful microscopic photo and scanning machine (see photo at top right). In minute detail its micro structure and inherent grain size are analyzed. From this analysis is determined the controlled heat-treatment and the subsequent processing operations it is to be given in the mill to secure wire meeting the exact specifications desired.

Samples of the wire then are brought back into the elaborate Union Wire Rope laboratory. First it is subjected to hardness tests under a delicate pendulum machine (see left photo above) and its Brinell hardness determined. Then in a group of six physical testing machines (see photo at top center) the actual tenisle strength, torsional values, fatigue life, ductility and hardness of wires of all grades and sizes are checked. Here, before the wire is stranded, the ultimate tensile strength, toughness and durability of Union Wire Rope is pre-determined.

Many other research activities are constantly carried on in Union Wire Rope's laboratory. Although not pictured here, there are scientific research machines for testing wire coatings by the salt spray, Preece, strip test and wrap test methods.

Here tough wire is born and on long lines of stranding machines (many of them designed by our own engineers) it grows into Union Wire Rope of maximum strength and greater toughness to withstand harder use and longer service.

UNION WIRE ROPE CORPORATION
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B-43

SEND FOR ROPE DOPE•Tells how to make wire rope last longer—how to handle and install it—how to socket or splice—and a wealth of other helpful information.

WHEN YOU NEED PREFORMED WIRE ROPE
SPECIFY **union-formed**

union Wire Rope
"THE ULTIMATE LOW COST WIRE ROPE"

KING CO.—**Sound Construction & Engineering Co.,** Northern Life Tower, Seattle—over $50,000 for remodeling a bldg.—by U. S. Engineer Office, Seatle. 3-26

KING CO.—**Stone & Webster Corp.,** Lloyd Bldg., Seattle—contract for addtl. bldgs. and facilities at the Canal Station—by Puget Sound Light & Power Co., Seattle. 3-9

KITSAP CO.—**Herbert F. Miller,** Wallace Bldg., Bremerton—$299,000 for three community bldgs. to serve a housing project—by Bremerton Housing Authoriy, Bremerton. 3-1

PIERCE CO.—**O. F. Larson & Son,** Tacoma—over $50,000 for temp. frame bldg. and facilities—by U. S. Engineer Office, Seattle. 3-4

SKAGIT CO.—**Daniels & Turnquist,** Orpheum Bldg., Seattle—$157,265, for 75 public housing units at Anacortes—by Federal Public Housing Authority, Seattle. 3-15

SNOHOMISH CO.—**Mullen & Strand,** 1222 - 8th Ave., West, Seattle—$748,000 for 250 permanent housing units in Everett—by Housing Authority, Everett. 3-19

SPOKANE CO.—**Hawkins and Armstrong,** 5265 - 16th N. E., Seattle—over $100,000 for addtl. hospital facilities—by U. S. Engineer Office, Spokane. 3-12

SPOKANE CO.—**Myers Bros.,** 3407 San Fernando Road, Los Angeles, Calif.—$1,741,300, for 1,035 public housing units—by Federal Public Housing Authority, Spokane. 3-16

WALLA WALLA CO.—**W. C. Smith Co. L. H. Hoffman** and **Howard S. Wright & Co.,** Portland, Ore.—over $100,000 for bldgs. & appurt.—by U. S. Engineer Office, Portland, Oreg. 3-16

Canada

BRITISH COLUMBIA—**Bennett & White Construction Co. Ltd.,** 510 W. Hastings St., Vancouver—$80,000 for addtl. bldgs. at a district depot camp—by Department of Munitions & Supply, Ottawa. 3-5

BRITISH COLUMBIA—**Dawson, Wade & Co. Ltd.,** 775 Clark Drive, Vancouver—$70,000 for bldgs. at a Fraser Valley centre—by Department of Munitions & Supply, Ottawa.

PROPOSED PROJECTS

California

CONTRA COSTA CO.—**H. J. Kaiser Co.,** Oakland, is preparing plans for const of a 100-bed addtn. to Richmond Shipyards Field Hospital. 3-16

CONTRA COSTA CO.—Approval has been obtained for a 4,000-unit dormitory project in Richmond—by National Housing Agency.

LOS ANGELES CO.—Plans are being prepared for rebuilding the South Coast Fisheries cannery at Terminal Island which was recently destroyed by fire. Cost will be approx. $75,000.

LOS ANGELES CO.—Plans are being made for addtl. hospital bldgs. and facils. at Camp Pendleton, near Oceanside—Cost to be approx. $4,000,000—by U. S. Navy Dept., Washington, D. C.

RIVERSIDE CO.—Plans are being prepared for a 150-unit housing project for Palm Springs—by Federal Public Housing Authority, San Francisco. 3-8

SAN BERNARDINO CO.—A housing project to cost approx. $500,000 is being planned for the Larkman Park dist., Colton, by the Home Builders Supply Co., Los Angeles.

SAN FRANCISCO CO.—The National Housing Agency has approved 4,500 new housing units for the Hunters Point area.

SANTA BARBARA CO.—A housing project of 160 units is planned for Lompoc—by Federal Public Housing Authority, Los Angeles.

VENTURA CO.—Authorization for development of 74 family trailer units at Oxnard has been granted the Federal Public Housing Authority, San Francisco. 3-26

VENTURA CO.—A project including classrooms, barracks and mess halls at the Port Hueneme naval base has been approved for $400,000—by the Bureau of Yards & Docks, Washington, D. C.

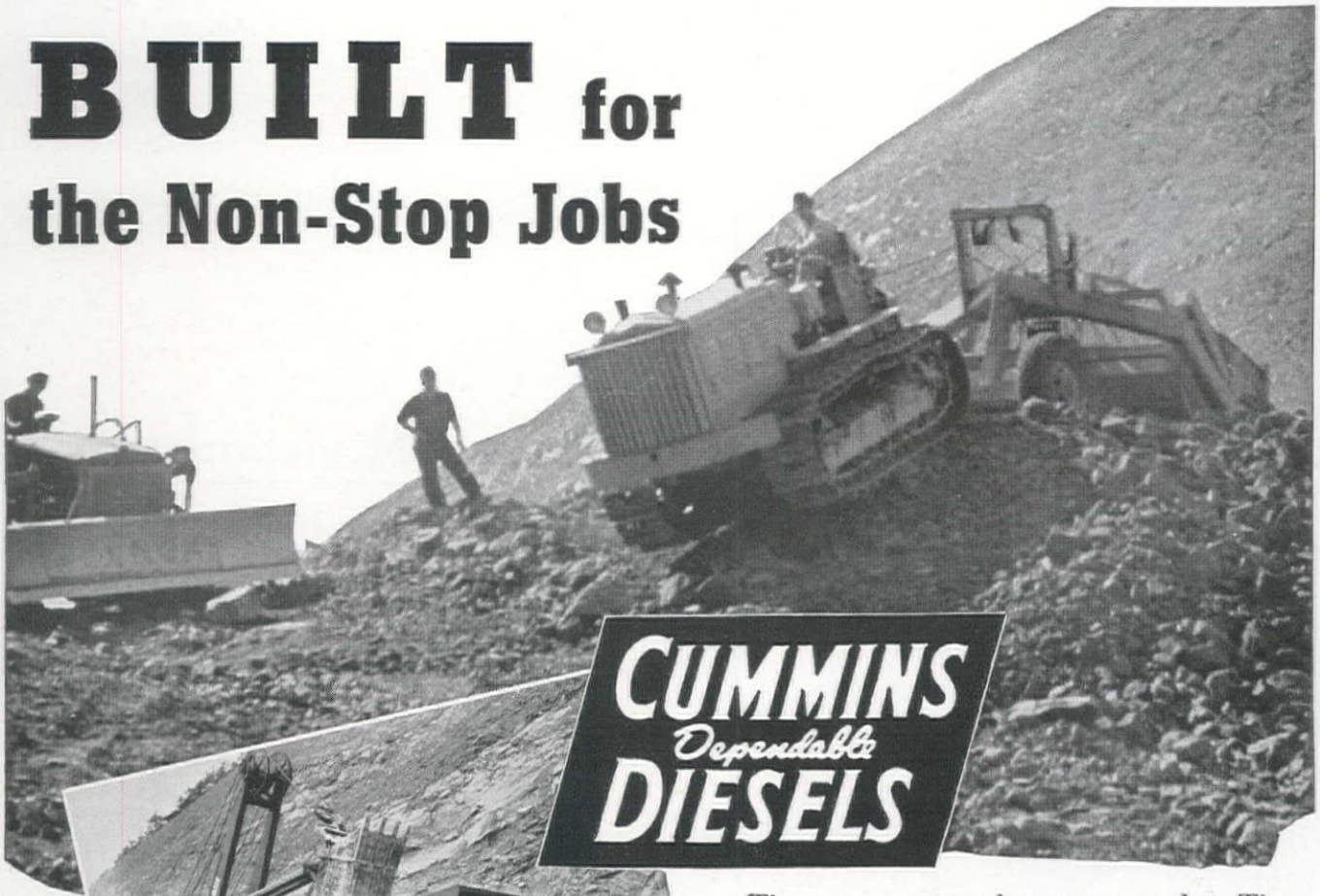
YOLO CO.—Plans are being prepared for a shop building in Woodland to cost approx. $50,000—by Weaver Tractor Co., Sacramento.

YUBA CO.—Revised plans have been prepared for the Marysville Community hospital, the estimated cost of which is $325,000.

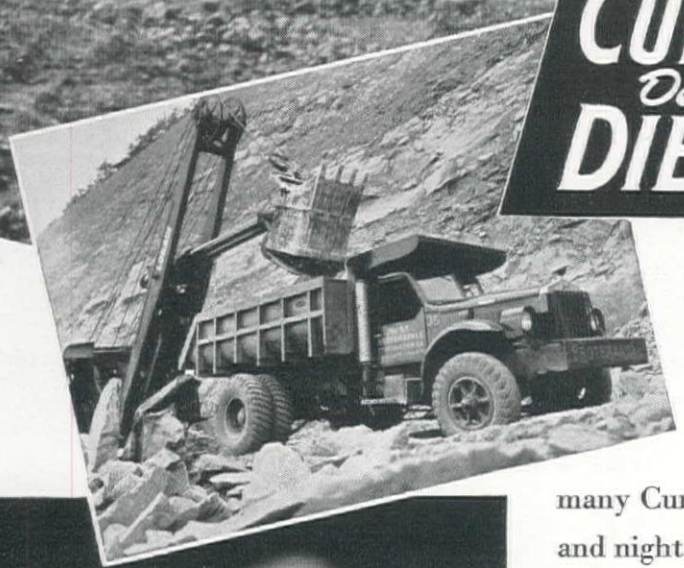
Oregon

CLATSOP CO.—Plans are being prepared for a housing project of 300 family dwelling units in Astoria—by Federal Public Housing Authority. 3-10

BUILT for the Non-Stop Jobs

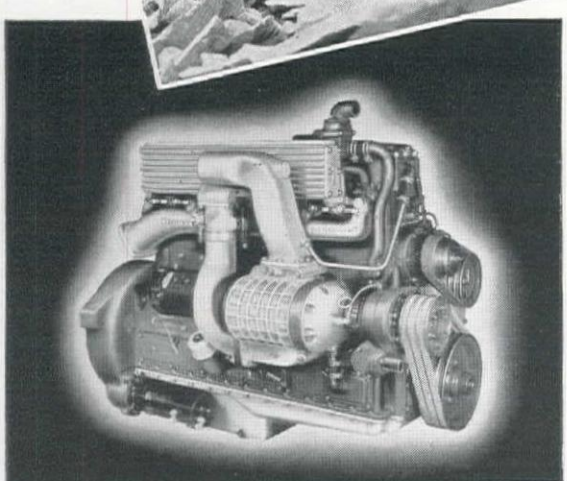


CUMMINS *Dependable* **DIESELS**



Time means more than money today. Time means victory. That's why every hour is a working hour on the nation's construction front. And that's why—on almost every important defense project in the country—so many Cummins Dependable Diesels are on the job, day and night, seven days a week. . . . Because the "job-test evidence" has proved to leading contractors everywhere that there's no end to the Cummins Diesel's endurance . . . no limit to its ability to deliver full-rated power on a round-the-clock schedule in every heavy-duty service.

Assure uninterrupted operation on your job during the emergency by providing adequate maintenance and service for your Cummins Diesels. Take advantage of the complete parts and service facilities offered by authorized Cummins Dealers in all parts of the country.



Above: Model HBIS-600 (supercharged) Cummins Dependable Diesel. 200 hp. at 1800 rpm. There's no need to sacrifice more weight and space for extra power . . . supercharging gives you the additional horsepower needed in the same dimensions and with very few changes in your service parts requirements.

ILLUSTRATED AT TOP: *A supercharged Cummins Dependable Diesel powers this Cletrac FDLC tractor with 23-yard Wooldridge Scraper.*

LEFT, ABOVE: *One of the fleet of Cummins Diesel-powered trucks owned by the S. T. Brotemarkle Construction Co.*

CUMMINS ENGINE COMPANY • • • COLUMBUS, INDIANA

Fresno, California, Watson & Meehan; **Los Angeles, California,** Diesel Motor Sales & Service Corporation; **Nanaimo, B. C.,** Cummins Diesel Sales of B. C., Ltd.; **Phoenix, Arizona,** Watson and Meehan; **Portland, Oregon,** Cummins Diesel Sales of Oregon, Inc.; **Salt Lake City, Utah,** Cummins Intermountain Diesel Sales Corporation; **San Francisco, California,** Watson & Meehan; **Seattle, Washington,** Cummins Northwest Diesel Sales; **Spokane, Washington,** Cummins Diesel Sales of Spokane; **Vancouver, B. C.,** Cummins Diesel Sales of B. C., Ltd.

MULTNOMAH CO.—Plans are being prepared for 400 units of war housing in Portland—by Portland Housing Authority, Portland. 3-13

TILLAMOOK CO.—The National Housing Agency, Washington, D. C., has approved a 100-unit housing project to be built in the Tillamook area.

Texas

SMITH CO.—Authorization was granted for a station hospital in connection with an army installation, to cost approx. $1,000,000—by U. S. Engineer Office, Denison. 2-26

Utah

SALT LAKE CO.—The Defense Plant Corp., Washington, D. C., has authorized $990,000 in addtl. funds to the Kalunite Co., Inc., Salt Lake City, for addtl. bldgs. and equipment. 3-11

Washington

KING CO.—Addtl. funds totalling $2,035,000 have been allotted for expansion of the naval hospital at Seattle—by Bureau of Yards & Docks, Washington, D. C. 3-27

KING CO.—The Bureau of Yards and Docks, Washington, D. C., has authorized building totalling $1,279,000 for bachelor officers' quarters and for barracks and mess hall at the Sand Point naval air station, Lake Washington. 3-9

KING CO.—A housing project of 100 family dwelling units and 155 dorm. units at McChord field has been approved by the National Housing Agency, Washington, D. C. 3-25

KITSAP CO.—The Federal Public Housing Authority has been authorized to build 4,400 addtl. family dwelling units in Bremerton and Port Orchard. 3-24

SPOKANE CO.—Plans have been made for a housing project of 52 units in Spokane, to cost approx. $250,000—by John A. Pring Corp., Spokane.

SPOKANE CO.—Plans are made for a housing project of 20 homes in Spokane to cost approx. $96,000—by J. L. Siegmund Co., Spokane.

Miscellaneous . . .

CONTRACTS AWARDED

Arizona

MARICOPA CO.—**Wonderly Construction Co.,** 269 Lime Ave., Long Beach, Calif.—over $50,000 for a gascoline fueling system at an airfield—by U. S. Engineer Office, Phoenix. 3-4

California

ALAMEDA CO.—**McNeil Construction Co.,** 5860 Avalon Blvd., Los Angeles, and 409 Main St., Pleasanton—approx. $150,000 for a rifle range north of Seabees base in Camp Parks—by Bureau of Yards & Docks, Washington, D. C. 3-23

ALAMEDA CO.—**Doelger & Stizek,** 320 Judah St., San Francisco—a levee in the Oakland area—by U. S. Engineer Office, San Francisco. 3-9

ALAMEDA CO.—**Ben C. Gerwick, Inc.,** 112 Market St., San Francisco—over $50,000 for an extension to a railroad hold yard—by U. S. Engineer Office, San Francisco. 3-4

CONTRA COSTA CO.—**Cahill Bros.,** 206 Sansome St., San Francisco—$92,810 for widening of concrete fitting-out dock at Richmond Shipyard No. 3—by H. J. Kaiser Co., Oakland. 3-4

FRESNO CO.—**MacDonald & Kahn, Inc.,** 200 Financial Center Bldg., San Francisco, $225,000 for utilities—by U. S. Engineer Office, Sacramento. 3-3

LOS ANGELES CO.—**H. B. Nicholson,** 572 Chamber of Commerce Bldg., Los Angeles—over $100,000 for grading & railroad trackage at an army air force supply depot—by U. S. Engineer Office, Los Angeles. 3-16

LOS ANGELES CO.—**Swinerton & Walberg, United Concrete Pipe Corp.** and **A. S. Vinnell Co.,** Box 511, San Pedro—over $5,000,000 for a naval fuel oil depot at San Pedro—by Bureau of Yards & Docks, Washington, D. C.

LOS ANGELES CO.—**United Concrete Pipe Corp.,** Box 1, Sta. H, Los Angeles—over $100,000 for buildings & roads at an ordnance training center—by U. S. Engineer Office, Los Angeles. 3-1

ORANGE CO.—**Nordin Construction Co.,** 3030 Exposition Blvd., Los Angeles—over $100,000 for addtl. temporary const. at an army air base—by U. S. Engineer Office, Riverside. 3-23

SAN BERNARDINO CO.—**Gaylen B. Finch,** 189 S. Sycamore, San Bernardino—over $50,000 for dust control at a modification center—by U. S. Engineer Office, San Bernardino. 3-9

Victor Cutting Torches

No SINGLE TOOL contributes so mightily to the conservation of ferrous metals and the construction of ships and tanks and aircraft or other vitally needed metal structures as do cutting torches.

Whether ferrous metals are gas or electric welded, cutting torches are usually essential to prepare plates or metal structures for subsequent welding.

A tool so important to our War Production merits thoughtful selection.

Respectfully we call attention to the fine gas welding and flame cutting apparatus produced by our company for over 30 years.

VICTOR EQUIPMENT COMPANY

844 FOLSOM STREET ★ ★ SAN FRANCISCO

SAN BERNARDINO CO.—**J. M. Roth Construction Co.**, 6028 Whittier Blvd., Los Angeles—over $50,000 for misc. work at an air depot—by U. S. Engineer Office, Los Angeles. 3-16

SAN BERNARDINO CO.—**Shannahan Bros.**, 6193 Maywood Ave., Huntington Park—over $100,000 for site grading & a railroad for an army air force supply depot—by U. S. Engineer Office, San Bernardino. 3-23

SAN FRANCISCO CO.—**Carl N. Swenson**, 355 Stockton Ave., San Jose—$375,000 for repairing facil. at San Francisco—by Bureau of Yards & Docks, Washington, D. C. 3-24

SAN JOAQUIN CO.—**D. W. Nicholson Corp.**, 1701 San Leandro Blvd., San Leandro—over $1,000,000 for army cargo vessels at Stockton—by U. S. Engineer Office, San Francisco. 3-9

Nevada

MINERAL CO.—**William P. Neil Co., Ltd.**, 4814 Loma Vista Ave., Los Angeles, Calif.—$3,302,300, for addtl. facil. at Naval Ammunition depot, Hawthorne—by Bureau of Yards & Docks, Washington, D. C. 3-16

New Mexico

DE BACA CO.—**Walter L. Denison**, 207 S. Hermosa, Albuquerque—over $50,000 for dust palliative treatment—by U. S. Engineer Office, Albuquerque. 3-9

OTERO CO.—**Skousen Bros.**, Springer Bldg., Albuquerque—over $200,000 for dust palliative treatment at an airfield—by U. S. Engineer Office, Albuquerque. 3-3

OTERO CO.—**Henry Thygesen & Co.**, Albuquerque—over $100,000 for base motor pool facil. at an airfield—by U. S. Engineer Office, Albuquerque. 3-15

Texas

EL PASO CO.—**Robert E. Ziebarth**, 815 W. 17th St., Long Beach, Calif.—$63,488 for overhead sprinkler system and utils. at the Misilla Nursery—by U. S. Dept. of Agr., Emergency Rubber Proj., Los Angeles. 3-3

Washington

KING CO.—**Northwest Construction Co.**, 3950 6th N. W., Seattle—$61,148 for removal of car tracks on Dexter Ave. and other streets in various areas of Seattle, and the repair of the street area torn up—by Seattle Board of Public Works. 3-10

KING CO.—**Thorburn & Logozo**, 4608 - 36th Ave., S.W., Seattle—over $50,000 for fire protection facils. & water treatment room—by U. S. Engineer Office, Seattle. 3-15

KITSAP CO. — **Northwestern Shipbuilding Co.**, Bellingham—over $500,000 for two addtl. 127-ft. army tugs — by Bureau of Yards and Docks, Washington, D. C. 3-2

KITTITAS CO.—**J. A. Terteling & Sons**, Box 1406, Boise, Idaho—for straightening "Dead Man's Curve" and moving approx. 720,000 cu. yd. dirt, west of Cle Elum—by Northern Pacific Railroad Co., Seattle. 3-25

SNOHOMISH CO. — **Everett - Pacific Co.**, Everett—for major part of a floating drydock—by Bureau of Yards and Docks, Washington, D. C. 3-3

THURSTON CO. — **Haddock Construction Co.**, 3578 E. Foothill Blvd., Pasadena, Calif.—$250,000 for 400-ton floating drydock at Olympia—by Bureau of Yards & Docks, Washington, D. C. 3-23

SPOKANE CO.—**Hansen & Weidner**, E. 3806 - 30th St., Spokane—over $50,000 for addtl. facilities—by U. S. Engineer Office, Seattle. 3-9

SPOKANE CO.—**Northwest Pavers**, Box 135, Spokane—over $50,000 for training facilities—by U. S. Engineer Office, Seattle. 3-15

Canada

BRITISH COLUMBIA—**Northern Construction Co. & J. W. Stewart**, 736 Granville St., Vancouver—$360,000 for work in an unannounced location—by Dept. of Munitions & Supply, Ottawa.

PROPOSED PROJECTS

California

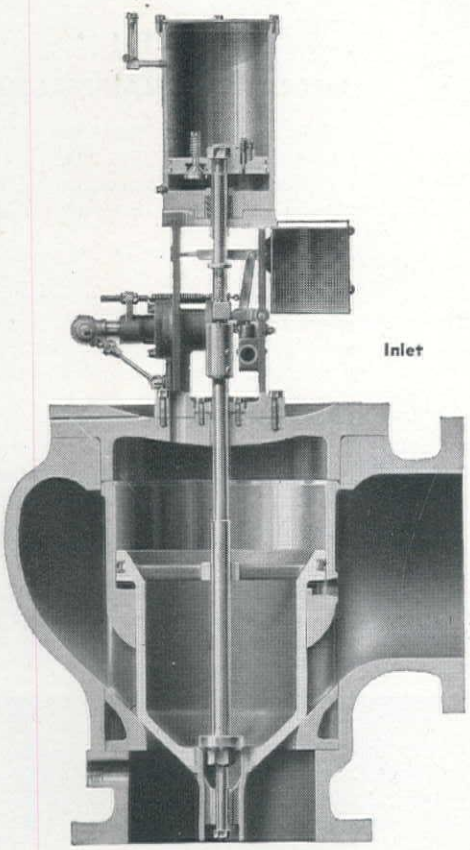
An allotment of $3,000,000 has been made to improve the railroad lines between Los Angeles and San Diego, doubletracking 30 per cent of the route—by Santa Fe Railway Co.

Utah

UTAH CO.—The Denver & Rio Grande Western Railway Co. has completed plans for the expansion of the railroad yards in Provo, estimated cost to be $150,000. 3-11

Why is the

PELTON SURGE SUPPRESSOR Called America's Most Dependable Protection for *Water Pumping Lines?*



When the pumping power goes off or back surges develop from other causes, the Pelton Surge Suppressor, located near the pump, opens automatically, releases the water and protects the line from rupture.

Thus the dangerous back surge of water, which causes line ruptures, is discharged and the line protected. Then the Pelton Surge Suppressor slowly and automatically closes.

THE PELTON WATER WHEEL COMPANY

Hydraulic Engineers

2929 NINETEENTH ST., SAN FRANCISCO

EXCLUSIVE WESTERN REPRESENTATIVES for Baldwin-Southwark Division of Baldwin Locomotive Works, Baldwin-De La Vergne Sales Corp., Woodward Governor Co. and Cone Valve Division, Chapman Valve Mfg. Co.

120 BROADWAY
NEW YORK

PASCHALL STATION
PHILADELPHIA

BLW THE BALDWIN GROUP

PELTON

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

TRADE WINDS

News of Men Who Sell to the Construction West

A WAR PRODUCTION factory building was the site of the presentation of the Army-Navy "E" to R. G. LeTourneau, Inc., Peoria, Ill., for "accomplishing more than seemed reasonable or possible a year ago." About 4,000 were in attendance.

CALIFORNIA

Charles G. Cox, vice president, has been appointed general manager of the Diesel Engine & Manufacturing Divisions of the *Enterprise Engine & Foundry Co.,* San Francisco, and **Serge P. Kovaleff** has been placed in charge of plant production. Both are old-timers with the organization, Cox in the Engineering and Manufacturing Division, and Kovaleff as plant engineer and plant manager.

* * * *

H. M. Harper Co., Chicago, Illinois, has opened a factory branch in the I. N. Van Nuys Building, Los Angeles, with **Clarence A. Gauger** in charge. For the past 7 years Gauger has been associated with the Los Angeles office of Pacific Metals Company.

* * * *

Adel Precision Products Corp., Burbank, has been named one of the prize winners in the annual All America packaging competition, as a result of a set of special cellophane bags used to package the company's replacement and extra parts for aircraft anti-icing and hydraulic systems.

* * * *

The Techkote Co. is the new firm name of *Lyons & Rood,* manufacturers of concrete curing compounds and specialized coatings in Los Angeles. **Ashton Rood** continues as manager of the company and **S. P. Lyons** has relinquished his interest in the firm.

* * * *

Employees of *Caterpillar Tractor Co.,* San Leandro, Calif. have authorized deductions from salaries of 11 per cent of the total payroll, and for their achievement have for the second time in six months been given special recognition by the U. S. Treasury Department. Sam Hume, representing the Treasury, at a recent ceremony made the presentation of a white "T" to be added to the Minute-man flag already flying over the plant. **Joe Kloss,** Victory Committee chairman, accepted the flag on behalf of the employees, and **Gail Spain,** vice-president, spoke in behalf of the company.

PACIFIC NORTHWEST

Jesse R. Henshaw, sales engineer for *Oregon Culvert & Pipe Co.,* Portland, Oregon, has been commissioned an ensign in the Sea Bees and has reported for duty at Camp Peary near Williamsburg, Va., for training.

* * * *

The Pacific Coast Yard of the *Chicago Bridge & Iron Co.* at Eureka, California, has received the Army-Navy production award for outstanding performance in war time construction. Com. Harry A. Shawk, Commandant of the Eureka Section Base, represented the Navy in making the formal presentation and Lt. Col. Donn Austin, U. S. Cavalry, representing the Army, presented token pins to employees. The award was accepted by **Charles S. Pillsbury,** vice president. **L. A. Elsener** served as chairman of the presentation program. **Donald E. Larson** is general manager of the Eureka yard. The award also included employees of the *Mercer Fraser Co.,* sub-contractors at the yard.

* * * *

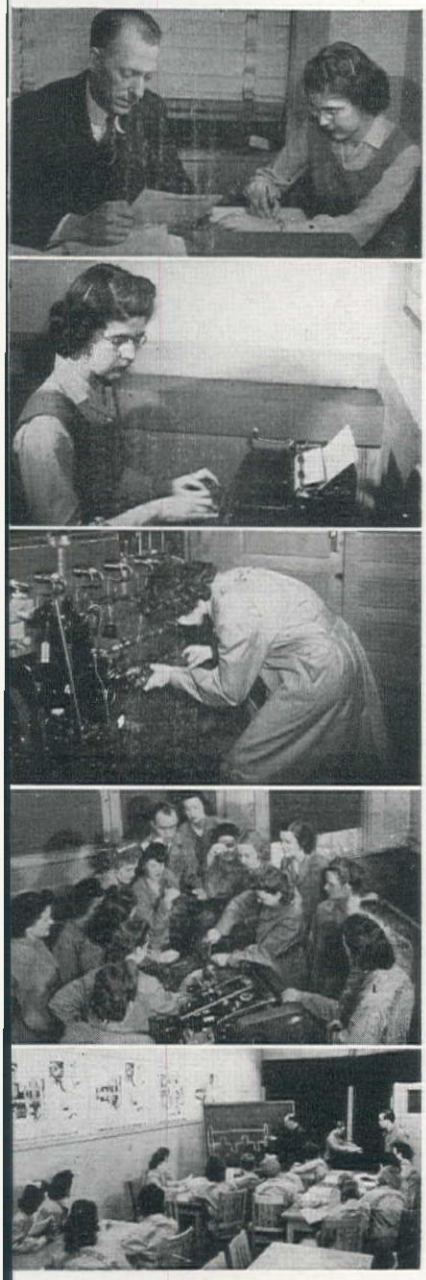
AMONG THE MANUFACTURERS

John L. Collyer, president of the *B. F. Goodrich Company,* has been appointed a member of the National Industrial Information Committee Governors Board.

* * * *

At a streamlined, between-shifts ceremony, the Army-Navy "E" award was made recently to the *Cummins Engine Co.,* Columbus, Ind., for outstanding production of war materials. The banner was presented by Rear Admiral W. C. Watts, U. S. N., and accepted on behalf of the company by **C. L. Cummins,** president, in one of the plants from which high speed diesel engines are rolling to the fighting fronts.

PARTICIPANTS in the award of the Army-Navy "E" banner to Cummins Engine Co., Columbus, Ind., were, left to right, REAR ADMIRAL W. C. WATTS, U.S.N. (Ret.); C. L. CUMMINS, president of the company; and COL. WALTER S. DRYSDALE, of Fort Benjamin Harrison.



ALL EMPLOYEES of the Cummins Engine Co., Columbus, Ind., has instituted the plan of instructing all their employees, office as well as shop in the complexities of their engines. In this series of photos, a pretty stenographer is shown at her regular office duties, and also attending class and actually working on repair problems of an engine.

Col. Walter S. Drysdale, commanding officer of Fort Benjamin Harrison, awarded the "E" lapel insignia to the two employees longest in the company's employ.

* * * *

The annual report of the *United States Steel Corp.*, New York City, reported a 1942 steel ingot tonnage production 28% greater than for the peak year in World War One, the 1942 total being more than thirty million net tons. Total sales of the corporation were $1,865,951,692 and net income amounted to $72,000,000 but wage, tax, and operating cost increases made this figure about $23,000,000 less than 1941.

Standard Oil Co. of California has been awarded the Army-Navy "E" pennant for outstanding production work at its Richmond, Calif., refinery. The refinery has been much expanded from its peacetime size and practically its entire production is going into war work.

* * * *

The annual report of the *Pittsburgh Plate Glass Company*, Pittsburgh, Pa., was issued on March 19 and shows a net income for 1942 amounting to $11,237,132, equivalent to $5.09 per share. This was smaller than the preceding year when the earnings amounted to $6.82 per share. While the report shows narrowed markets for the civilian production of the company, these losses were largely offset by requirements of the armed forces.

* * * *

Nathaniel Dyke, Jr., partner in *Dyke Bros.*, Little Rock, Ark., who has served during the past twelve months as consultant on lumber and lumber products production in the WPB, has been given an important assignment in the smaller war plants division of the same board. Dyke is also president of *Cole Manufacturing Co.*, Memphis, Tenn.

* * * *

Merrill N. Davis, executive vice president of *Dresser Mfg. Co.*, Bradford, Pa., died suddenly on March 7th in that city, at the age of 56. He had been with the Dresser Company since 1919.

V. E. McMullen, formerly works manager for *Cummins Engine Co.,* Columbus, Ind., has been promoted to the position of vice president and general manager, succeeding **J. I. Miller,** who resigned to accept a commission as lieutenant in the U. S. Naval Reserve. **Carl R. Fox,** formerly McMullen's assistant, advances to the works manager post. Other changes in the organization include **J. D. Allen,** credit manager, elevated to the post of assistant sales manager, and **K. M. Leech,** sales engineer, made assistant service manager.

* * * *

U. S. Rubber Co. has leased four buildings and the power house of the Hupp Motor Co. in Detroit, Mich., to accommodate the tremendous increases in the rubber firm's war production program. The additional space will be used in the manufacture of two types of tank treads for the U. S. Army.

* * * *

Homer C. Simmons, New England manager of sales for the Cellulose Products department of *Hercules Powder Co.,* will head the company's new sales offices in Boston. **Howard C. Bates** will be in charge of the synthetic department sales for the territory and **W. M. Williams** will head the industrial chemical division sales group. **G. J. Rising** is being transferred to the Hercules office in Pittsburgh, Pa., to represent the industrial chemical division.

W. A. Steele has been named general superintendent of the Buffalo Works, of the *Wickwire Spencer Steel Co.,* succeeding **Fred Johnson,** who is retiring after more than twenty years' active duty with the company.

* * * *

Donald C. Barrick, associated with the *Union Metal Manufacturing Co.,* Canton, Ohio, ever since the company was formed by his father and himself in 1906, died March 9 at Cleveland, Ohio. He was 59 years old. He was for many years secretary and treasurer of the company, also a member of its sales staff.

* * * *

The Maritime "M" pennant was presented to the Bridgeport, Conn., plant of *Jenkins Bros.,* manufacturers of valves, on March 2, by Charles E. Walsh, director of procurement for the Maritime Commission. Governor Baldwin of Connecticut was the principal speakers at the ceremonies and the pennant was accepted by **Bernard J. Lee,** vice president in charge of manufacturing, who immediately turned it over to four of the company's oldest employees. On March 9 a star was added to the Army-Navy "E" pennant already in possession of the company and ceremonies at which Admiral Wat T. Cluverius made the presentation speech. This added award symbolizes six months of additional service satisfactory to the United States Navy.

* * * *

Ben F. Lease, formerly manager of service and research for *Athey Truss Wheel Co.* of Chicago, Ill., has been made domestic sales manager for the company. He has been with Athey since 1931 when he became a district representative.

* * * *

JOHN P. CALUWAERT, manager of welding sales for J. E. Haseltine, Portland, Oregon, recently resigned that position to become welding engineer for the Stoody Company, Whittier, California, manufacturers of hard facing alloys. He will serve the eastern Oregon and Washington territory, working with all types of industrial concerns on problems involving abrasive wear.

CHARLES G. COX, left, general manager of the Deisel Engine & Manufacturing divisions of Enterprise Engine & Foundry Co., San Francisco, and SERGE P. KOUALEFF, in charge of plant production.

William S. Newell, president of *Todd-Bath Iron Shipbuilding Corp.* and the *Bath Iron Works,* has been appointed to the board of directors of *Mack Trucks, Inc.* He is vice president of the American Society of Naval Architects and Marine Engineers.

* * * *

A. N. Morton, formerly factory manager of the Plainfield, N. J. plant of *Mack Trucks, Inc.,* has been appointed production manager of all three of the company's plants, each of which has at one time or another, received the Army-Navy "E" for excellence in war production.

As a result of an intensive employee scrap campaign launched in the summer of 1942, at the *General Motors Truck & Coach* factories of Pontiac, Mich., a total of 362 freight cars and 539 trucks, loaded to the top with scrap metal, were shipped from that plant during 1942.

* * * *

Hercules Powder Co., Wilmington, Delaware, has received an award for the best all-around use of business paper advertising in 1942. The award was made by the Chicago Business Papers Assn. at a joint meeting with the Chicago Federated Advertising Club. The award was accepted by **Theodore Marvin,** Hercules advertising manager.

* * * *

The plant of the *Masonite Corp.* at Laurel, Miss., recently received the Army-Navy "E" production award. The entire executive staff of the company attended the celebration in which Rear Admiral William C. Watts and Brigadier General Sumter L. Lowry, Jr., Commander of the 31st Field Artillery, represented the pennant and lapel insignia. **Ben Alexander,** president of the corporation, accepted the pennant for the directors and workers.

* * * *

Fisher Body Division of General Motors at Detroit, Michigan, is now in volume production of a powerful new tank destroyer, a land cruiser capable of coping with anything thrown into battle by Germany. The entire Fisher plant is devoted to the production of these monsters.

R. W. (DICK) COCHRAN has been appointed Los Angeles Branch Manager for White Motor Co. succeeding W. E. WILKINSON. He has been with the firm for 22 years having started in the Accounting Department at Denver. In 1933 he became wholesale manager in the sales department and in 1940 was appointed manager of the St. Louis branch.

Roberts B. Thomas has been elected secretary of the *American Institute of Steel Construction*, New York City, succeeding **V. G. Iden**, who is now a member of the Bureau of National Affairs at Washington, D. C. Thomas will continue his duties as general counsel of the Institute.

* * * *

The annual report of *Caterpillar Tractor Company* for 1942 shows total sales of $142,168,850, an increase of more than $40,000,000 from the preceding year. Net profit per share was $3.72, a decrease of 42 cents from the preceding year. Products included the company's regular items now going to war uses, and several special war products, sales for which will terminate with the War. An insert in the report calls attention to the award of the Army-Navy "E" to the Peoria plant of the company.

* * * *

Wilfred C. Shattuck has been appointed wire sales manager for *Wickwire Spencer Steel Co.*, with offices in New York City. For the past two years he has been manager of sales at Trenton, N. J. for John A. Roebling's Sons Co.

* * * *

At an impressive "between shift" ceremony at the plant of *Ilg Electric Ventilating Co.* in Chilcago, Ill., Army-Navy "E" award emblems were conferred upon several hundred employees. The presentation of the flag to fly over the factory was made by Lt. Com. T. H. Urdahl of the Bureau of Ships, and Major Lauris Eek of the U. S. Army Air Force made the presentation of pins to the employees. Ilg blowers are being used on aircraft, warships and trucks used in the war effort.

* * * *

The Anthony Co., Inc., Streator, Ill., has received the Army-Navy "E" at its No. 1 plant at Streator. The presentation was made by Capt. Robert Henderson, U. S. N. (Ret.). In response, the navy was presented with a bomb trailer by employees of the company, as being symbolic of the work they are doing in the war effort. Col. J. F. Butler, U. S. A., presented "E" pins to the employees. Over 3,000 employees and friends attended the ceremonies, held in the factory.

* * * *

Virgil L. Snow, assistant chief engineer in the industrial department of *Euclid Road Machinery Co.*, Cleveland, Ohio, has been named industrial engineer for the company to work with mining companies, quarries and other industrial concerns in the design, application and maintenance of Euclid equipment.

* * * *

A production conference for the *National Metal Trades Association* will be held at the Palmer House, Chicago, Ill., on May 26 and 27.

* * * *

Koroseal plants of the *B. F. Goodrich Company* at Louisville, Ky. and Niagara Falls, N. Y., have been awarded Army-Navy "E's" for high achievement in the production of war materials. Recent per-

J. W. GARDNER, who was associated with the Gardner-Denver Co., Quincy, Ill., from 1881, until his retirement a few years ago, died on Feb. 1, with a 60-year record of directing the company.

A. W. VAN HERCKE

sonnel changes in the Goodrich organization include **Grover D. Motherwell,** who has been appointed manager of the Minneapolis district to succeed **Arthur J. Martin,** who died recently. **Chester F. Conner** appointed Merchandise Manager; **Jay E. Miller** appointed Sales Promotion Manager; and **Harold F. Mosher** appointed Manager of Special Industrial Merchandise, all in the Industrial Products Sales Division. **E. D. Nathan** is appointed to head sales promotion for the National Sales and Service Division.

* * * *

A. W. Van Hercke, sales manager of the Tractor Division of *Allis-Chalmers Manufacturing Co.,* Milwaukee, Wisconsin, has been promoted to assistant manager of the division. He will coordinate all engineering and development work. **A. F. McGraw** was promoted at the same time from sales promotion manager to general sales manager, heading all industrial and agricultural sales of the division. **R. A. Crosby,** temporarily with the Salvage Section of WPB, will be advertising manager.

* * * *

A. F. McGRAW

NEW EQUIPMENT

MORE COMPLETE information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, Western Construction News, 503 Market St., San Francisco, Calif.

All-Plastic Badge

Manufacturer: Royal Emblem Co., New York, N. Y.

Equipment: All-plastic identification badge.

Features claimed: In the interests of metal preservation, this badge has been developed which is made entirely of plastic. Its two parts are cast by the injection method and together form a lightweight badge only 1/8 of an inch thick. It is claimed to be tamperproof.

Coil Lifter

Manufacturer: Never-Slip Safety Clamp Co., Mamaroneck, N. Y.

Equipment: Lifting device for coils of strip.

Features claimed: Lifter is readily adjustable for a wide range of coil sizes, and especially designed for handling coils in a horizontal position without first raising the coil. Brass, copper, aluminum or steel may be handled by this non-magnetic lifter, and can be used on any crane or hoist without special equipment.

Portable Electric Drill

Manufacturer: Independent Pneumatic Tool Co., Chicago, Ill.

Equipment: Portable electric drill with plastic housing.

Features claimed: Plastic construction provides not only greater strength and protection from shock but more power per pound. The plastic housing does not support any of the operating parts but serves simply as a protective shell, an inner metal frame being designed to house the moving parts. The new drill is available in three speeds from 2,500 r.p.m. to 5,000 r.p.m., and weight is three pounds and three ounces.

New Synthetic Rubber Use

Manufacturer: Goodyear Tire & Rubber Co., Akron, Ohio.

Equipment: Synthetic rubber hose connections for airplane engines.

Features claimed: Now used in at least one major type of airplane engine, this especially-compounded synthetic rubber is superior to natural rubber in resisting leaks and seepages of the special anti-freeze fluids used in planes flying at high altitudes. A greater resistance to distortion and to deterioration from oils and greases is also claimed.

Plastic Mechanical Pencils

Manufacturer: E. I. DuPont De Nemours and Co., Wilmington, Del.

Equipment: Plastic mechanical pencils.

Features claimed: A redesign and substitution of a new cellulose nitrate plastic composition is making great savings in the metal formerly used. Practically all the parts are being made from plastic, and the resulting pencils are much lighter than with the former metal construction, with no sacrifice in strength.

Floor Cleaning Compound

Manufacturer: Lacey-Webber Co., Kalamazoo, Mich.

Equipment: Floor cleaning compound.

Features claimed: This new cleaning compound will not burn when directly exposed to fire, and is highly absorbent of oils and grease. It has an active cleaning effect upon floors which makes it applicable to industrial plants in general or wherever machinery is serviced or oil or grease may collect. Fibre-Tex is packaged in 50 lb. cartons.

Decking Material

Manufacturer: Goodyear Tire & Rubber Co., Akron, Ohio.

Equipment: Decking material.

Features claimed: Adapted to war and cargo ships, this decking material can be applied on metal, wood, or concrete surfaces to provide a long-wearing covering. Unimpaired by cold, resistant to oils and greases, it can be applied by spraying or with a steel trowel to a light-weight thickness of one thirty-second of an inch. Protects metal from corrosion and wood from moisture, and is a quick-drying non-skid substance.

Work Shift Schedule

Manufacturer: George S. May Co., New York, N. Y.

Equipment: Perpetual work shift schedule.

Features claimed: The Shiftograph provides a quick solution to the problem of proper work shift rotation. By turning a dial the user can tell what shifts certain crews will work, the days they work, and their days off. Several different plans of rotation are covered, so that all employees share equally in desirable and undesirable work shifts.

Airplane Landing Mats

Manufacturer: Hercules Steel Products Co., Galion, Ohio.

Equipment: Steel landing mats.

Features claimed: Now under contract to the government, the company is building millions of square feet of these portable runways

which may be used as emergency or semi-permanent landing fields. They are laid in sections, and can be put down almost anywhere with only a little preliminary grading. The mats are fastened together with clips, making a solid continuous sheet of metal strong enough to support the heaviest bombers.

Corrosion Data Work Sheet

Manufacturer: The International Nickel Co., New York, N. Y.

Equipment: Corrosion data work sheets.

Features claimed: These work sheets have been designed to assist in the study of corrosion problems, and act as a check list to insure consideration and evaluation of all factors concerned. It permits ready comparison of a problem with similar ones which may be used as a guide for selecting the proper materials. The data sheets on file cover a wide range of construction materials, and furnish guidance of actual experience.

Eye-protection Glass

Manufacturer: American Optical Co., Southbridge, Mass.

Equipment: Eye-protection glass for gas welders.

Features claimed: The new safety goggle lenses cut down the high intensity sodium rays of the fluxes, and absorb the harsh, tiring invisible ultra-violet and infra-red rays generated during welding. The glare piercing glass is available in three shades.

Electronic Level Controls

Manufacturer: Photoswitch Inc., Cambridge, Mass.

Equipment: Electronic level controls.

Features claimed: Designed particularly for mountings in a hazardous location, as for conductive liquids of an explosive nature. Available for high and low-level control, each is furnished as a complete unit in a vapor-proof cast-iron housing for direct tank installation. Both models have safety feature providing for operation of relay in case of current or tube failure. Relay connections are single-pole double-throw switch, and relay contacts are rated at 1000 watts A.C.

Safety Hat Eyeshield

Manufacturer: Mine Safety Appliances Co., Pittsburgh, Pa.

Equipment: Eyeshield for a safety hat.

Features claimed: Designed to deflect hazardous flying particles, it is easily and quickly attached to any M.S.A. safety hat. The transparent plastic shield is hinged so that it can be placed flat against the brim when not in use, and remains firmly in place in either position.

Sponge Rubber Gasket

Manufacturer: B. F. Goodrich Co., Akron, Ohio.

Equipment: Sponge rubber gasket.

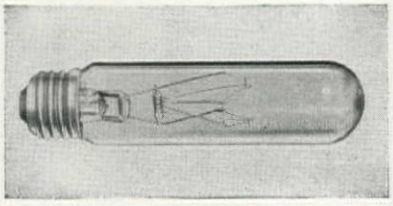
Features claimed: The Ameripol synthetic rubber coating applied by the extrusion process makes the gasket capable of withstanding the destructive action of oils and greases, and also of very low temperatures. This type of gasket has a lower permanent set than the tubular type, and is available in round, square and rectangular shapes. At present the most practical dimensions are between ¼ and 1½-in.

Spatterproof Lamp

Manufacturer: Radiant Lamp Corp., Newark, N. J.

Equipment: Welders' lamp.

Features claimed: Made of a special glass that resists penetration of hot metal particles, this new type spatterproof lamp is built to



withstand severe handling received in welding and other rough industrial services. The lamps are equipped with a T10 bulb with medium screw base, and are available in sizes of 50, 75, 100, and 150 watts.

Solder-Saving Connections

Manufacturer: Ideal Commutator Dresser Co., Sycamore, Ill.

Equipment: Solderless wire connectors.

Features claimed: No critical metals used for solder in connecting wires of electric installations. The connectors consist of a cone-shaped spiral spring insert, imbedded in a molded insulation. This device is screwed onto stripped ends of wires. The connector is practically indestructible. The insulation will not melt and is puncture-proof at 10,000 volts. "Wire-Nuts" are fully approved by Underwriters' Laboratories, Inc. and other leading electrical authorities.

Gypsum Building Board

Manufacturer: Certain-teed Products Corp., Chicago, Ill.

Equipment: Gypsum exterior board and roof decking.

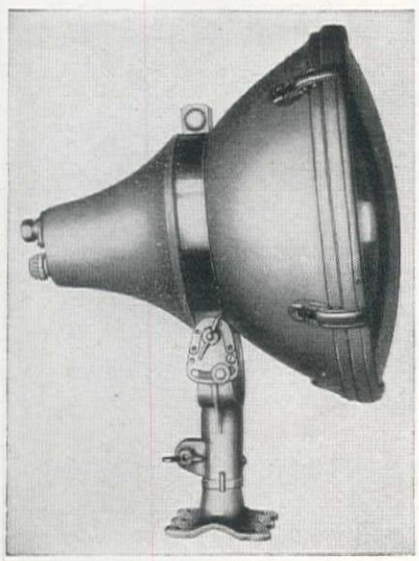
Features claimed: Exterior board sheathes, sides and insulates, being a combination of gypsum board and asphalt roofing. It is termite resistant, will not buckle, warp or open at joints. A single panel covers up to 20 sq. ft. and goes on in two minutes. It can be sawed and nailed just like lumber. Smooth and mineral surfaces are available, as are all standard colors. The gypsum laminated roof decking comes in two types, 1½ in. thick with tongue-and-groove edges, and 2 in. thick with ship-lap edges. It is strong, fireproof, and quickly and easily applied.

Floodlighting Projectors

Manufacturer: Benjamin Electric Mfg. Co., De Plaines, Ill.

Equipment: Floodlighting projectors.

Features claimed: Seamless steel housing units are completely formed from ferrous metals specially treated with porcelain enameling and other rust-proofing processes. Features are adjustability of the beam over a wide range, a special focusing mechanism, easy installation, and safety type cover clamps. Units are furnished in two models for lamps from 300-1000 watts, each with plain, stippled or ribbed, heat resisting glass covers.



LITERATURE . . .

Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the Advertising Manager, Western Construction News, 503 Market St., San Francisco, Calif.

Pioneer Rubber Mills, San Francisco, Calif.—A booklet entitled "How to Lengthen the Life of Mechanical Rubber Goods" contains field-practical pictures and explanations of proven ways to increase service from belting and hose. Foreword tells of leadership of Pioneer in industrial rubber production, and conclusion suggests conservation idea of marking industrial rubber in daily use by attractively designed tags.

Colorthru Chemical Co., New York, N. Y.—Leaflet explaining the action of Colorthru masonry paint, which is said to waterproof, beautify and preserve all types of masonry. A color chart is attached.

B. F. Goodrich Co., Akron, O.—Catalog section 7020 deals with industrial molded rubber goods, explaining process of molding rubber to metal, and cost factors in making molds. After a discussion of the subject, a series of questions and answers make up the most of the publication.

General Electric Co., Schenectady, N. Y.—Catalog 2704B shows the company's line of arc-welding accessories, including head protectors, welding lenses, goggles, chrome-leather protective clothing, asbestos cloth-

ing, metal electrode holders, cable connectors, brushes, gages, and other necessary accessories. Prices f.o.b. Schenectady are shown for all items described, and order blanks are attached to back cover.

The Lincoln Electric Co., Cleveland, Ohio—Booklet on arc welding procedure, with an emphasis on more efficient methods to increase production. There are fifteen sections dealing with specific phases of arc welding such as factors affecting speed and cost, justification of the amount of equipment for fit-up, and where, when and how to weave. Many charts and tables are included that will aid in applying the most suitable welding technique, in choosing the correct electrode, and other cost-reducing methods.

R. G. Le Tourneau Inc., Peoria, Ill.—Booklet A-35 describing equipment servicing units and shops that are of vital importance in keeping existing equipment moving. Illustrations are shown describing equipment used in war zones; and special parts such as welding rods for repair work, wire rope, and blades, are shown.

Seaman Motors, Milwaukee, Wis.—Bulletin 22 on soil stabilization methods gives a review of the subject of soil cement as a finished surface and as a sub-base treatment, with practical suggestions as to proper application for the most economy. A chapter is included on bituminous road construction and repair, and one on calcium chloride soil stabilization.

Baldwin Southwark Division, Baldwin Locomotive Works, Philadelphia, Penn.—Bulletin 171 describes the many uses and applications of strain gages for static, impact, repeated stress tests on structural members. The great advantage of strain gages is that the member need not be loaded to the breaking point and stress-strain relationships may be measured over the working range of hitherto inaccessible parts.

Littleford Bros., Inc., Cincinnati, Ohio—Pamphlet describing four black top road construction units; supply tanks, tanker heaters, and two types of pressure distributors.

Aberdeen Wood Products Co., Inc., Aberdeen, Wash.—Folder describes plywood garbage receptacles which have been developed in the interest of steel conservation. They are watertight, nonrustable obviously, and the phenolic resin bond with which these receptacles are made renders them impervious to rodents and termites.

Air Reduction Co., New York, N. Y.—A 16-page illustrated booklet on the welding of piping, covering various types of ferrous and non-ferrous piping, their dimensions, fabrication, and estimates of welding and labor costs.

J. D. Adams Co., Indianapolis, Ind.—Units of earthwork-rolling, scarifying, and moving equipment are illustrated at work on important war contracts throughout the nation and abroad in their new booklet describing progress in 1942. A list of distributors is given to aid in keeping equipment serviceable for the duration.

Reliance Devices Co., Inc., New York, N. Y.—Catalog No. 101 lists the various types of swivel sockets and directive lighting units which allow any horizontal adjustment and a 90° vertical adjustment. It is claimed that the units are unaffected by vibration, and the nipple construction permits direct attachment to fixtures.

Strauss Co., Pittsburg, Penn.—Bulletin 143 describes with illustrations the various types of protective headgear designed for shipyard, structural steel, and construction workers. Rain and storm capes, and a new line of safety hats and breast protectors for factory women is included.

Fritz Ziebarth Construction Co., Long Beach, Calif.—A 24-page booklet in colors depicts the various projects which have been successfully completed by the company. Included are high-tension wire line across Lake Chelan, pumping plants, water supply and sewage plants built for Army camps, the creation of airport facilities, the installation of telegraph, telephone and railroad signal lines, and many other phases of heavy construction.

Opportunity Section

This widely-read column can help you to sell your used machinery and other used equipment. For rates, write to the Opportunity Section, Western Construction News, 503 Market Street, San Francisco, Calif.

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