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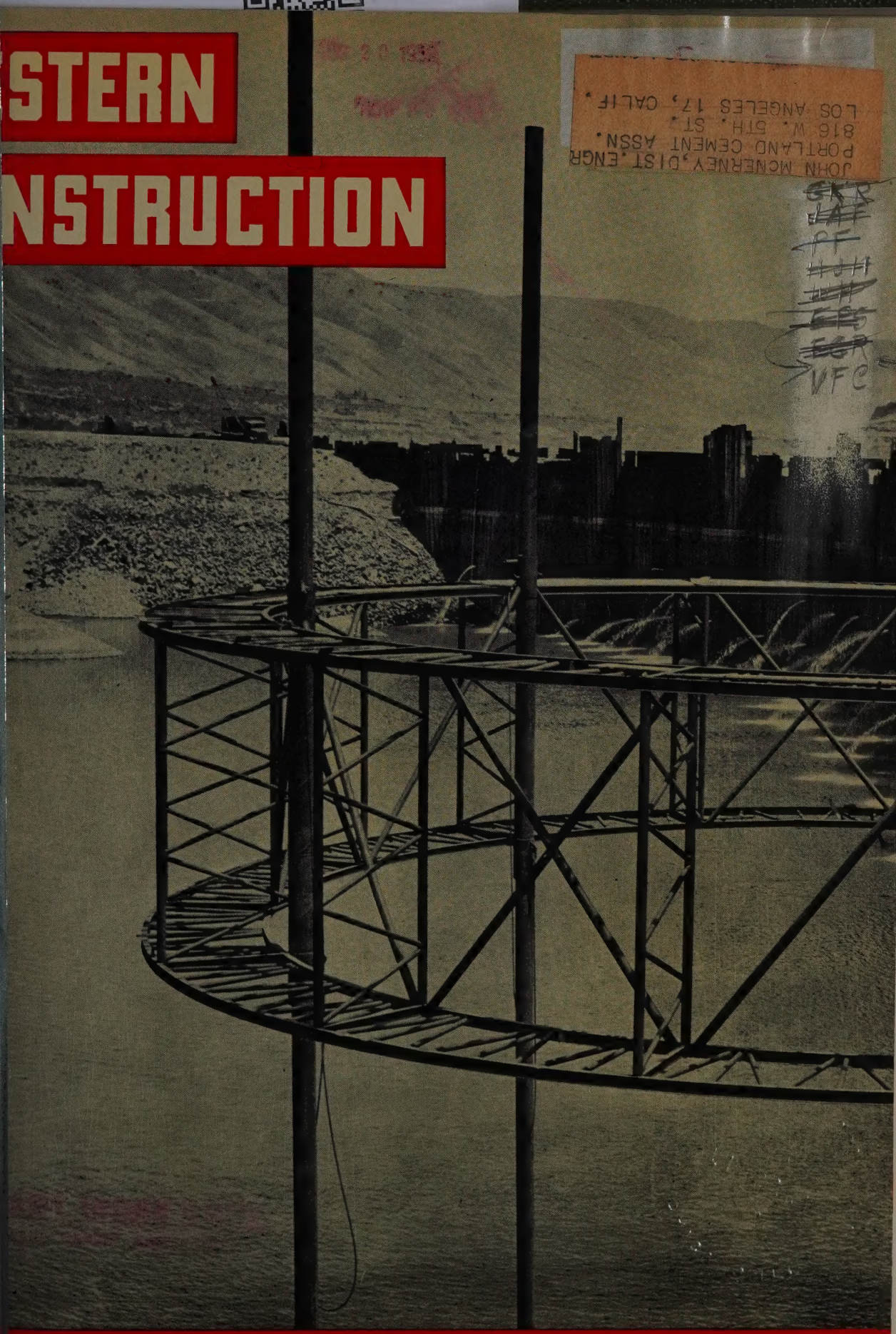

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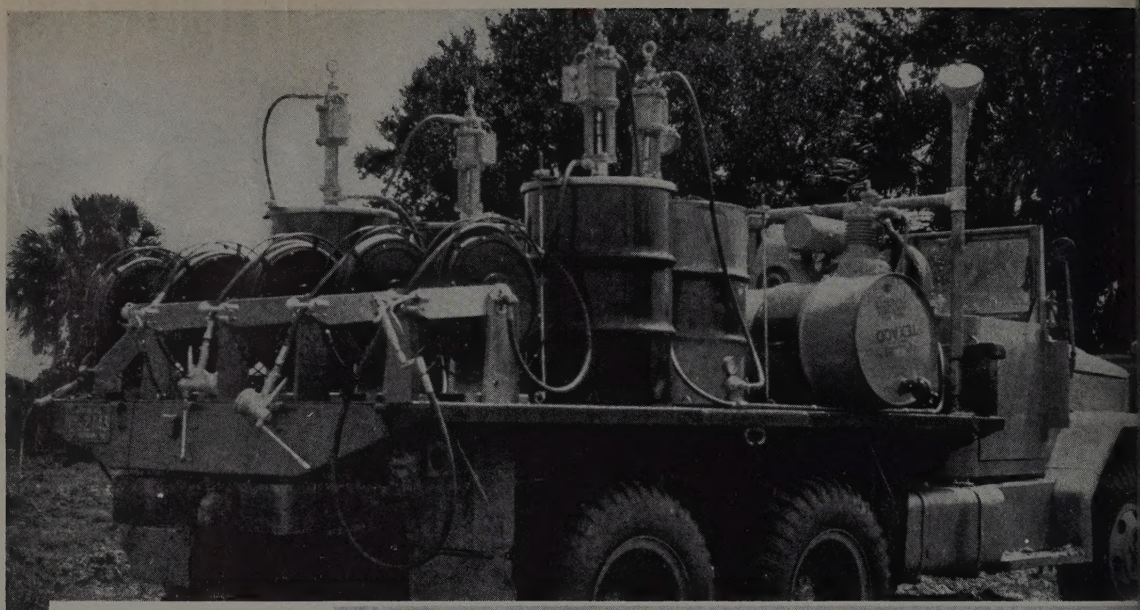

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Harbert Construction Corporation, Birmingham, Alabama, cites fine performance record of Texaco lubricants.

Although their work on the natural gas pipeline for Florida ranges over 1,000 miles of pipeline, Harbert Corporation's equipment is never out of reach of complete lubrication. The reason: mobile lubrication rigs. And with the Texaco Simplified Lube Plan, each rig is completely equipped to service any lube point on any machine, wherever it's working. There's no time lost deadheading equipment back to a fixed service center. As a result, all equipment gets proper lubrication at the right time.

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A Texaco Simplified Lubrication Plan can cut and boost performance on your next project. Just the nearest of the more than 2,000 Texaco Distribu Plants, or write:

Texaco Inc., 135 East 42nd Street, New York New York.

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LUBRICATION IS A MAJOR FACTOR IN COST CONTRO

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

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ET'S TALK ABOUT EASE

of shovel and crane operation

was Northwest that pioneered the movement in the direction of se of Shovel and Crane operation back in the days when operators d to *stand* at the controls on other machines.

To maintain full day operator efficiency, Northwest engineers developed d pioneered the "Feather-Touch" Clutch Control. This device utilizes the wer of the engine to throw the heavy Drum Clutches. Over the years the eather-Touch" Clutch Control has been refined and improved to a high nt of efficiency.

Here, ease of operation is made possible by a simple, understandable, chanical device—just a drum and brake band and the necessary linkage othing more. It is completely free of complicated and delicate mechanisms. ere are no long lines of tubing, no pumps, no compressors or valves—noth- to fill! It is unaffected by weather or temperature and it requires no cial knowledge or outside help for adjustment. The action of the clutch n direct ratio to the movement of the operating lever and the operator s not have to maintain pressure on the operating lever to keep the clutch aged. It is extremely sensitive and the *true feel of the load* is always sent. Release is positive and straight manual control can be introduced ny time.

On a Northwest the operator knows where he is every second of his rating cycle. At once he has smooth, effortless control with freedom m the maintenance problems that come with complicated control ices. This means greater output and greater profit for the con- tor. The "Feather-Touch" Clutch Control is pictured in detail Northwest catalogs. We'll be glad to send you one on the size chine you need.

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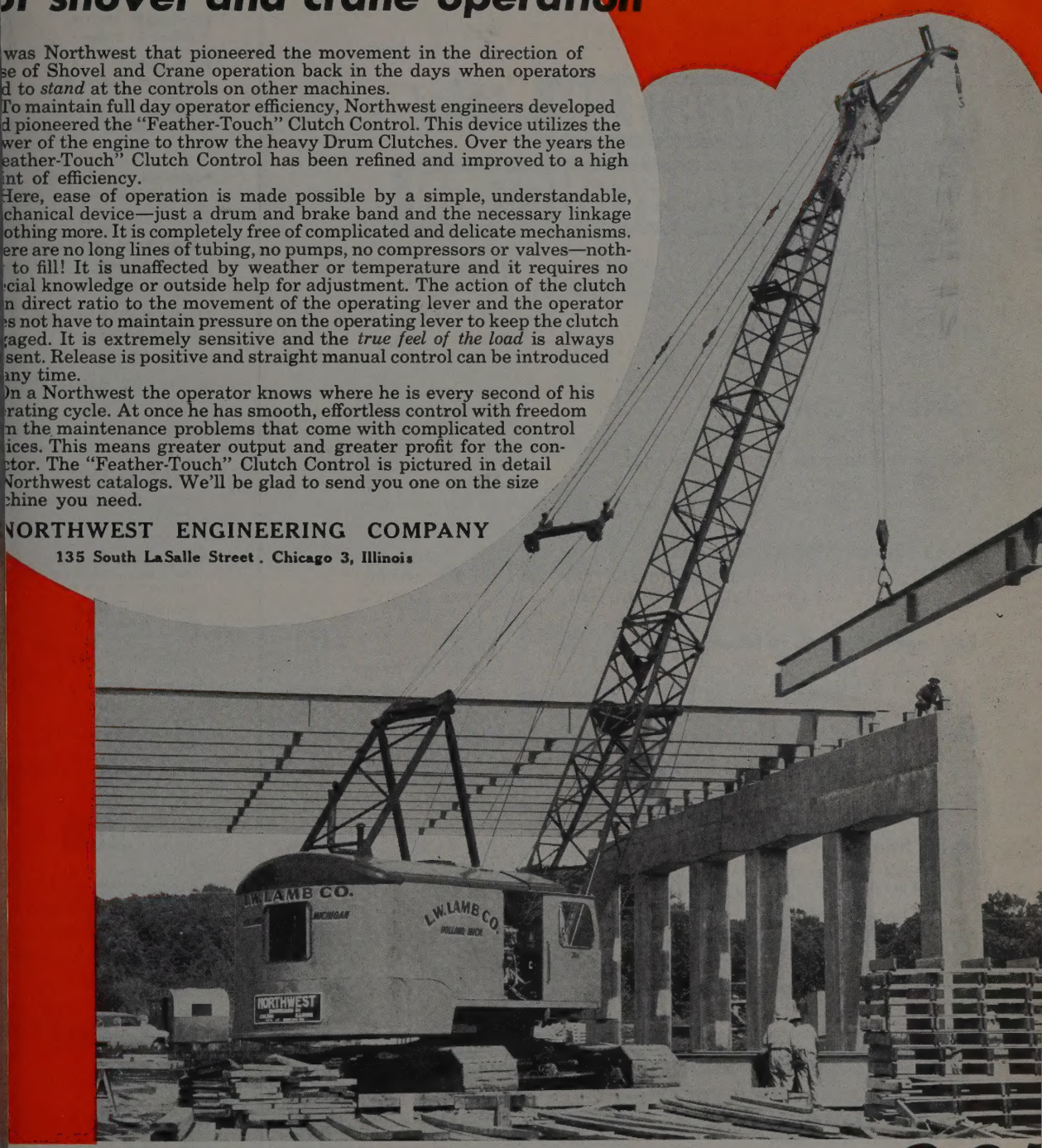

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WESTERN CONSTRUCTION

KING PUBLICATIONS

AUGUST
1959
Vol. 34 No. 8

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COVER—Leaky cofferdam at John Day damsite on the Columbia River was built that way on purpose. Weep holes drilled on the inboard side of the cofferdam cells to drain out cell seepage. A battery of pumps at the top of the cofferdam takes out water.

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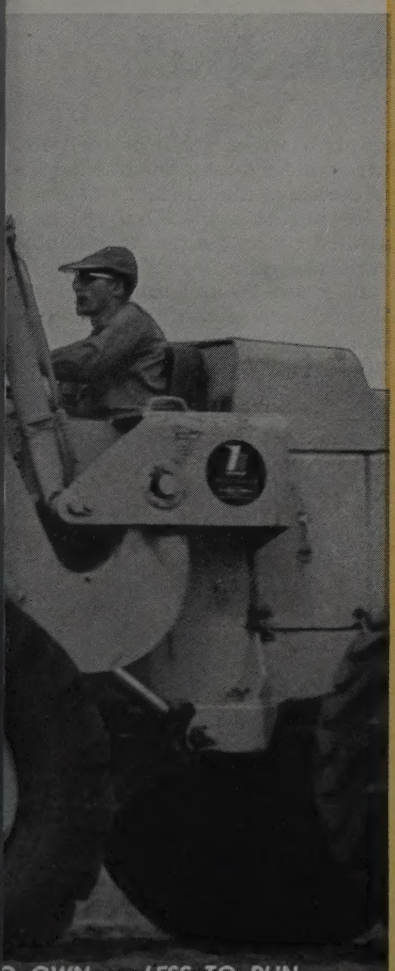

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LAST LONGER, TOO!

'59 FORD PICKUPS GIVE 25.2% MORE MPG!

25.2% advantage delivered in Economy Showdown Tests means five days' driving on four days' gas

The nation's leading automotive research organization* proved and certifies that a '59 Ford Six Pickup will run five days on the same amount of gas the average competitive '59 pickup burns in four days.

The tests were made on 1959 six-cylinder ½-ton pickups of the six leading makes purchased from dealers – just as you would. The trucks were tested in every kind of driving–high and low speeds, open highway and city streets, even simulated door-to-door delivery. And in every test '59 Ford Sixes delivered more miles per gallon than any other make.

Here are the actual percentages:

HOW NEW '59 SIXES RATE IN GAS MILEAGE

'59 FORD SIXES GIVE	25.2% more miles per gallon than Make "C"	31.1% more miles per gallon than Make "I"	9.6% more miles per gallon than Make "G"	42.6% more miles per gallon than Make "D"	22.0% more miles per gallon than Make "S"	25.2% more miles per gallon than the average of all makes

What's the secret of Ford's economy? First, of all pickup sixes, only the Ford Six has modern Short Stroke design which reduces engine friction and thus requires less fuel. Second, to this modern engine, Ford has added a new economy carburetor to meter fuel more precisely in both high- and low-speed ranges.

Your Ford Dealer has the complete report of Economy Showdown U.S.A. See him and get the whole story firsthand.

Go Ford-ward for savings!

**Name available on request.*

NEW EQUIPMENT

Obtain more information on these new developments in construction equipment by circling the corresponding numbers on reply postcard.

L-W introduces the C Speedpull

A fast, high-production six-wheel self-propelled scraper has been introduced by **LeTourneau-Westinghouse Co.** Named the Model C Speedpull, the machine teams a 20-yd. heaped-capacity Fullpak scraper with a 276-hp. 4-wheel prime mover. The Speedpull was designed specifically for top production on long haul earthmoving jobs. The machine is expected to gain acceptance as a companion unit to the L-W 4-wheel Tournapulls.

Unveiling of the Speedpull follows, by only a few weeks, the introduction of the firm's Haulpak trucks.

Operating advantages result from the Speedpull's horsepower-to-weight ratio of only 336 lb. of total loaded weight per horsepower. L-W engineers also report that the Speedpull's low-friction drive train, specially-designed transmission, and ducted fan will permit an exceptionally high percentage of engine horsepower to be delivered to the drive-wheels.

Probably the most unusual design feature is Hydrair suspension of its front wheels. In this system, originally perfected by L-W for its new Haulpak trucks, each front wheel is mounted to a piston which operates inside a frame-mounted cylinder. Surrounding the piston is a circular chamber of oil, connected by tube to an oil reservoir inside the piston. As the wheel rolls along surface irregularities, the up-and-down motion of the piston forces oil in and out of the piston's reservoir. This, in turn, compresses and decompresses nitrogen gas contained above the oil reservoir, snubbing the overall movement of the piston and wheel, thus absorbing shocks and leveling the ride.

In addition, Hydrair makes possible several design advantages on the Speedpull. It eliminates the need for a front axle, thereby, providing a higher ground clearance at the front of the machine. The "no axle" feature also permits a wider angle of turn for t wheels, and a correspondingly sharper turning abili With full-power steering, the 41-ft., 2-in. long u can turn a full 180 deg. in a space only 34 ft. wi Steering is controlled by a "feather touch" steeri wheel, which actuates a hydraulic ram system for tu ing the wheels under any ground condition, yet st retains the ability to steer in case of steering pow failure. Uniform steering reaction is assured becau the hydraulic pump is given only the steering assi ment.

The Speedpull also offers "Spot-Turn" brakes standard equipment. This system permits braking either drive wheel for fast skid steer action to supp ment the normal front-wheel steering in difficult t rain. The brakes are regulated by a hand-lever cated on the steering shaft immediately beneath t steering wheel. Total braking surface of 3,764 sq. is the largest in the industry for this size of machi In addition, the Speedpull offers a parking brake standard equipment, and, as an optional item, t L-W Electrotarder. This later device creates a resi ance "drag" on the big engine-mounted electric gen ator, thus slowing the engine, and saving wear on t machine's service brakes.

Other features include electric control of scra functions, the Fullpak scraper design, and a pow transfer differential that automatically transfers up 80% of engine power from a slipping drive wheel the one on better footing.

Electric motors control the unit's apron lift, tailga motion, and bowl lift. Fingertip switches to activa these point-of-action motors are located to the rig of the operator on control panel. For natural, rig hand reach to these controls, the operator seat is angl

GALION® 12-Ton Pneumatic-Tire Roller

NEW NEW NEW NEW NEW

2239

Only Galion offers EQUA-MATIC front end construction

19 IMPORTANT FEATURES

- Galion's exclusive EQUA-MATIC front end construction assures safe roller support when working over uneven or sloping ground.
- ROLL-O-MATIC or standard gear shift drive.
- SYNCHRO-MESH transmission.
- UNITIZED assembly provides easy access and servicing.
- AUTOMOTIVE-type hydraulic steering.
- LARGEST ballastable capacity in relation to overall size—in excess of 24,000 lbs. total weight with wet sand ballast.
- EIGHTY horsepower gasoline engine.
- HEAVIEST construction—8,400 lbs. metal weight.
- LOW center of gravity.
- 100% COVERAGE—treads of the nine tires overlap.
- WIDE RANGE of speeds—same range forward and reverse.
- SHORT drive shaft.
- DOUBLE drive chains to each pair of drive wheels.
- FOUR-WHEEL hydraulic service brake and independent parking brake.
- EXCELLENT visibility for operator.
- SHORT turning radius.
- FOUR large doors for ballast removal.
- SWIVEL seat, fully adjustable.

GREATER STABILITY

Maximum stability and support across the entire front end of the roller is achieved by GALION'S three-point king pin suspension of the five steering wheels. PATENT PENDING.

SYNCHRONIZED 5-WHEEL STEERING

Each of the five steering wheels is adjusted to always steer in its own true arc. This design eliminates the pushing and gouging of material which results when no provision is made to compensate for arcing variations in multiple-wheel steering.

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Unitized assembly permits each wheel and wheel brake to be serviced individually, as well as the oil-tight double drive chains. The entire power train can be removed as a unit.

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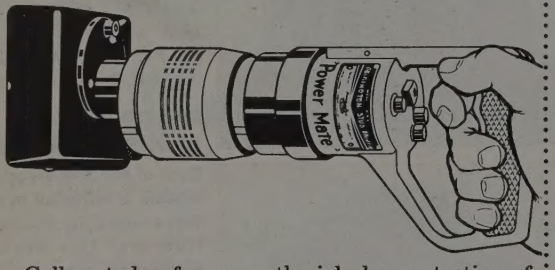

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A-200A

. . . for more details, circle No. 13 on Reader Service Postcard

slightly in the cockpit. Thus during loading ar spreading, the operator controls the steering whe with his left hand, the controls with his right, ar need look only slightly to the right and back to s the blade and load in the scraper bowl behind hi

Connecting the Fullpak scraper to the Speedpu prime-mover is a newly-designed hitch that perm exceptional oscillation in all directions. The scrap can tilt 30 deg. from the prime mover plane eith right or left with no difficulty. Positive heavy-du stops prevent jack-knifing damage.

Power plant is a Cummins NHS-6-BI diesel engir rated at 276 hp. at 2,100 rpm. at sea level. The uni step-gear transmission offers 10 forward speeds to 37 mph., and 2 reverse speeds to 3.7 mph. The tra mission provides pressure filtration and pressure lub cation.

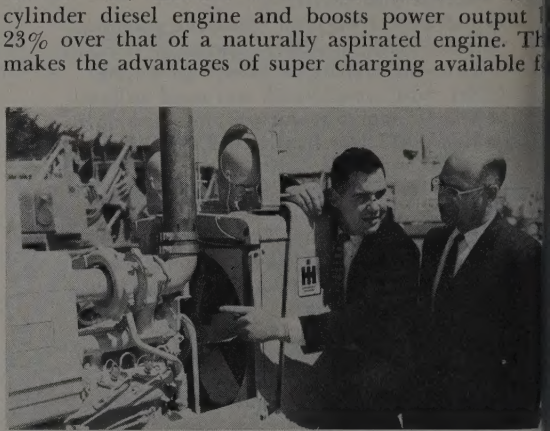
Grease fittings have been kept to a minimum. On one, on the generator, needs daily service.

Greatest use of the Speedpull is expected to be o jobs where one-way haul routes are over 2,000 ft. lon and where haul conditions are good.

Price of the complete Speedpull with 20-yd. Fullp scraper is $43,505 f.o.b., Peoria. . . . *Circle No. 1*

Smallest turbocharger for IH tractor

Weighing only 24 lb. (see picture for size) the sma est turbocharger now in production has been dev oped for use on the new International TD-9 crawl tractor. The unit fits on the International D-283 cylinder diesel engine and boosts power output 23% over that of a naturally aspirated engine. Th makes the advantages of super charging available f

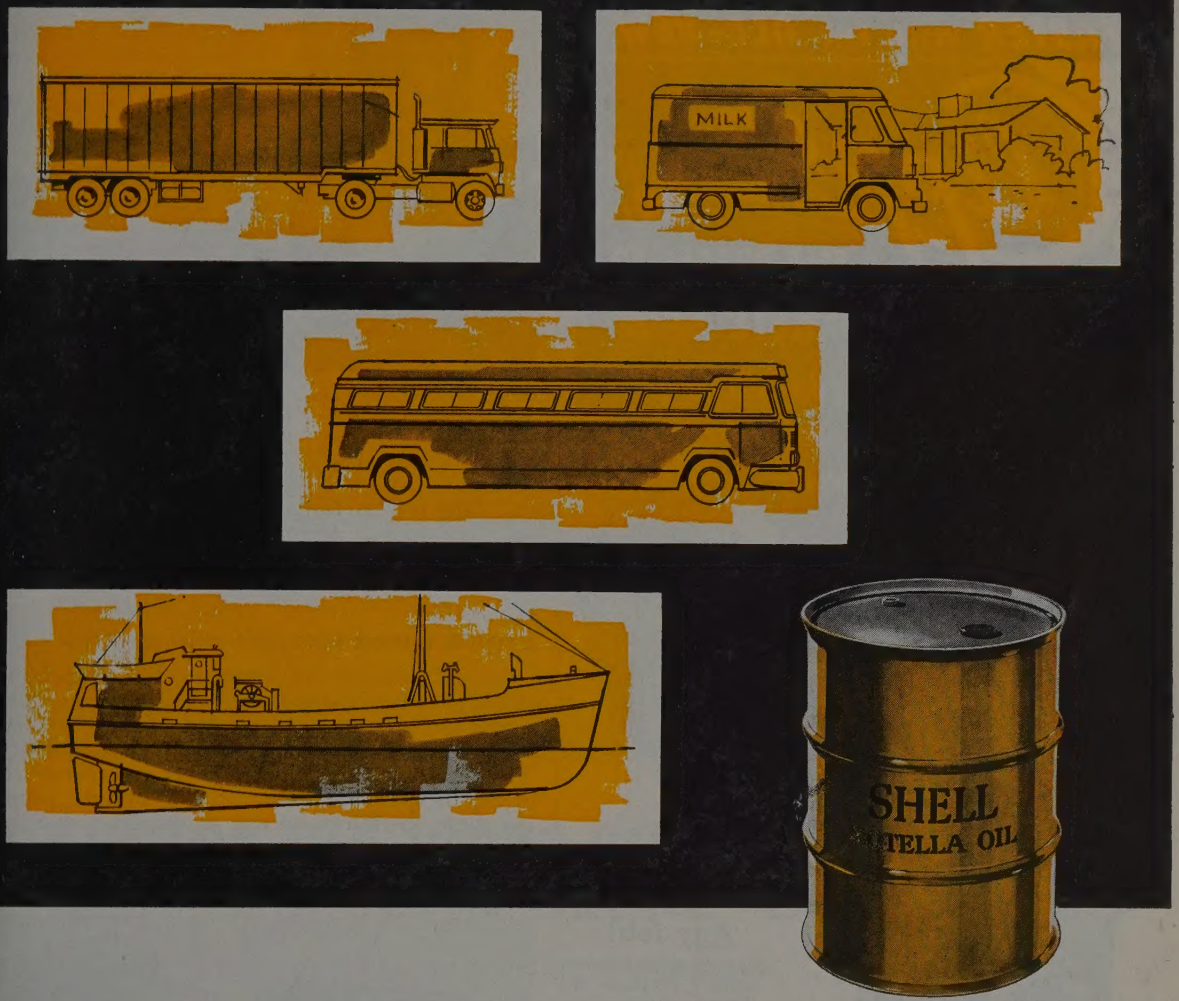


the first time in a small crawler tractor. Exhaust gas are harnessed to increase the volume of air fed in the engine resulting in fuel being burned more ef ciently.

The turbocharger was developed by **AiResear Industrial Division of The Garrett Corp.** and **Int national Harvester Co.** The picture shows Wolfga G. Schlegel of the former company explaining deta to Homer F. Griffith, manager of the IH Chica Tractor Works. . . . *Circle No.*

Trench drill with higher capacity

A new series of trench drills has been introduc by **The Salem Tool Co.** capable of drilling up to 4 ft. and pushing pipe as far as 250 ft. The new mo 24-TD is especially designed for contractors and ut ties in installing water, gas, electric and other li under streets, highways and railroads without cutti pavements. The unit is also being used in all typ of dewatering and drainage jobs. Powered by a 52-



The finest protection for fleet engines ...both gasoline and diesel

KEEPING commercial fleets on the move—and out of the repair shop—calls for these special qualities in a crankcase lubricant:

- Effective dispersant action to cut wear and keep engine parts clean.
- Protection against high-temperature oil breakdown caused by oxidation.
- Anti-scuffing properties to cut wear of highly loaded cam and valve lifter surfaces.
- Protection against hydraulic valve lifter troubles.

If you operate a commercial fleet, a Shell Representative can show you the many benefits of using Rotella® Oil. Write or call: Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California. In Canada: Shell Oil Company of Canada, Limited, 505 University Avenue, Toronto 2, Ontario.

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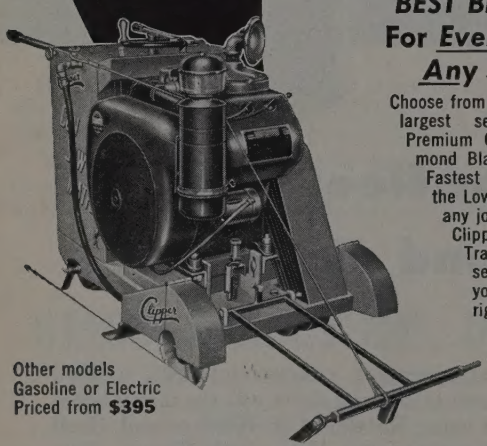

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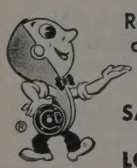

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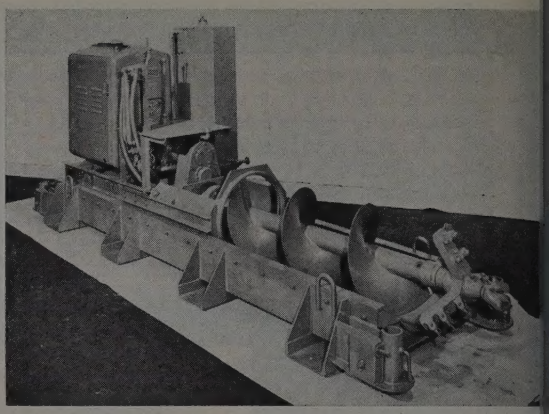
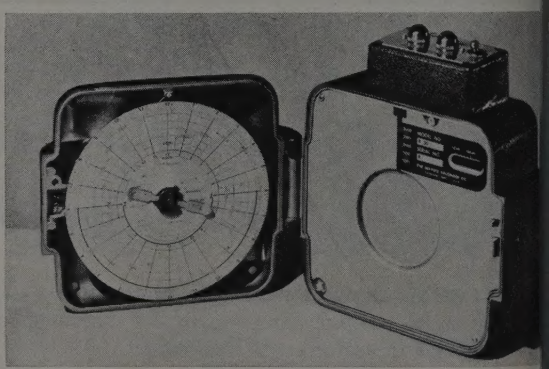


gasoline engine and with a 4-speed transmission, t drill has electric starting and is equipped with variab hydraulic feed in a rigid frame for accuracy. Forwa thrust is rated at 30,000 lb. and maximum torque the auger is 6,500 ft. lb. A pipe pusher and one gui are standard equipment.

. . . *Circle No.* 1

Engine speed recorder and control

To aid operators of off-the-road equipment in effort to reduce maintenance expense a new time r corder has been developed to help these cost-conscio owners and their drivers. The unit is announced **The Servis Recorder Co.** It makes an accurate reco of engine speed in revolutions per minute, pinpoi ing these operations on one or three-day charts. T instrument is designed specially for heavy constru tion and diesel powered equipment.



Representing a new concept in speed recorde these units provide a visible control. An accompanyi indicater flashes warning lights if the engine reach too high or too low a speed. The driver is able to ke his engine speed within specified limits. The unit factory adjusted to have the red light flash when t diesel engine reaches 1,600 rpm., and an amber lig flashes when the engine increases to 2,000 rpm. Th settings can be adjusted to other limits. The usu speed and time records are kept automatically on t chart and only the warning lights are the conce of the operator.

. . . *Circle No.* 1

(Turn to page 138 for more New Equipment. New Literature can be found on page 132.)

Changing old ideas on earth moving...

The JOHN DEERE "840" with Hancock "Piggyback" Scraper

"It takes heavy investment to get an efficient scraper of effective size."

"You need a stand-by pusher to get those heaped payloads."

"You have to sacrifice high maneuverability if you're going to get a scraper that really produces for you."

These old ideas are fading fast in the face of the performance of this John Deere-Hancock outfit.

First, compare the initial cost with other scrapers. See for yourself what you save in dollar outlay, keeping in mind you don't need a pusher tractor to give you a *fully loaded (7-1/2-yard) bowl every time.*

Then, consider the added working efficiency you get with the John Deere-Hancock unit which makes a complete, *continuous turn within a 30-foot diameter.*

Finally, you get that outstanding feature you are sure to want—*positive, hydraulic ejection*—which means a fast, easy dump in all soils.

For a demonstration, see your John Deere Industrial Dealer.

For detailed specifications, write today.

Immediate ownership through the John Deere Credit Plan

Just a reasonable amount down, and you can paint your name on the side of any John Deere Industrial Unit—put it to work earning the monthly or seasonal payments agreed on. All arrangements are made with the dealer in strict confidence.

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The WEST from WASHINGTON

By E. E. HALMOS, JR., Washington, D. C.

When you're looking for construction money in the appropriations bills that Congress grinds through as a session ends, don't stop with the obvious ones like Army Civil Works, Bureau of Reclamation and such. There's a lot more construction money even than the sizeable amounts in those two measures, tucked away in many strange places. In fact, the total construction money appropriated by Congress so far (without counting a housing bill and the highway expenditures), now adds up to something like $3.5 billion.

A rundown by departments and agencies reads this way:

Health, Education and Welfare —$300 million, including $61.1 million for assistance for school construction, $143.7 million for hospital construction;

Military construction (other than civil works)—1.2 billion.

Atomic Energy Commission — $165.4 million, including $2 million for a physics building at Lawrence Radiation Laboratory and $3.8 million for a research reactor at Ames Laboratory, both in California.

Army Civil Works—$863.4 million.

Bureau of Reclamation — $253.4 million.

National Aeronautics & Space Agency — $53 million for construction.

Department of Interior — $100.2 million, including $46 million for parks and facilities; $26 million for forest roads and trails; $28 million for the Bureau of Indian Affairs.

State Department — $4.5 million for completion of the Rama Road in Nicaragua.

Justice Department—$4.4 million for construction and rehabilitation of prisons.

Federal Aviation Agency—$173.5 million for grants in aid for airports.

General Services Administration —$85 million for maintenance, repair and acquisition of sites for public building projects.

Veterans Administration — $30.2 million for hospitals.

Department of Agriculture — $133.1 million for soil conservation programs and construction.

U. S. Information Service — $9 million for completion of East Coast Broadcasting Facility (to beam information to South America).

U. S. Bureau of Fisheries — $6 million revolving fund for construction and rehabilitation of processing plants.

And that's only a sampling.

* * *

The West, incidentally, gets a fair share of the $1.2 billion military construction money. Army will spend about $20 million on various facilities in the Western states; Navy, about $63.9 million; Air Force, about $40 million.

Biggest items include: Army — $7.3 million for facilities at Ft. Bliss, Texas; $5.7 million for work at Ft. Sill, Okla. Navy—$30 million for operational facilities, troop housing and the like at the Pacific Missile Range at Pt. Mugu, Calif.; $24.6 million for facilities at Naval Air Station, Lemoore, Calif. Air Force — $10 million for NORAD headquarters at Colorado Springs.

* * *

Expenditure of more than $2.2 billion on national forest work — a large share of it for new roads — over the next 12 years, has drawn support of 22 senators for a new bill (S 2240) now before the Senate Public Works Committee.

Although the measure has the backing of the Eisenhower administration as well as almost the entire senatorial delegation of the Western states, prospects of passage are still about fifty-fifty. Similar bills have been introduced — and gotten nowhere—in every Congress since 1956.

A total of $720 million would be appropriated out of federal funds, starting at $40 million for the year 1962, and moving upward to $60 million a year by about 1964. In addition, the bill contemplates that timber purchasers will spend about $564 million over the 12-year period to build roads and trails—this money to be made available to them by reducing national forest timber valuations.

Net result, said Montana's Senator Murray, will be addition of some 90,000 mi. of forest roads and trails in the roughly 180-millio acre national forest system.

Under existing authorizatio about $25 million a year is bein spent by the government on fore roads and trails.

* * *

The Senate's Public Works Su committee has given very sho shrift to a proposal by Wyoming two senators that would have th effect of giving a state governo virtual veto power over the Burea of Public Roads in the selection o Interstate Highway routes.

The bill (S. 2205) contains onl two sentences—the second of whic is the most dangerous, in the ey of BPR: ". . . The federal-aid pr mary system shall consist of an ad quate system of connected mai highways, selected or designated b each state through its state highwa department, with approval of th governor, subject to approval o the Secretary (of Interior) . . ."

That sentence, said BPR repre sentatives (and most of the su committee appeared to agree would give a governor the powe to overrule engineering decision Further they commented, the go ernor now can control such dec sions, through his state highwa department or commission. BP wants to follow state departmen recommendations.

In testimony by Wyoming's Go ernor J. J. Hickey, it develope that the root of the attempte change concerned a 17-mi. stretc of Interstate between Laramie an Walcott Junction, where a grou of three small communities don want to be bypassed by the ne road. Further, it concerned the fa that Hickey is warring with hi highway commission—appointed b his Republican predecessor.

Chances of action on the bil virtually none.

* * *

It is getting harder to say muc more about the federal-aid highwa program and its money problem The fact is that as of the sta of the government's new fiscal ye on July 1, absolutely nothing ha been done by Congress to replenis the highway trust fund.

Best bet for action—and there still no doubt that funds will b found, somehow, to keep the hi roads program going without break—is still borrowing. Actio to watch, on financing, is the Joi Resolution (SJ 109) introduced b

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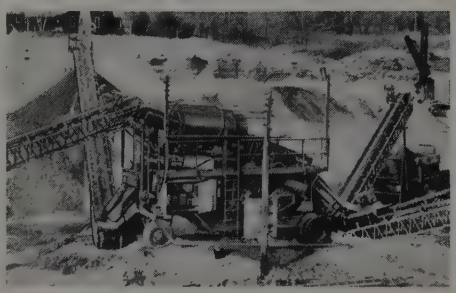

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South Dakota's Senator Case, whic would give the Treasury the powe to issue a limited amount of in terim bonds, payable out of rev nues due to the Trust Fund—i effect, lending the trust fun money against its future incom This would, in form at least, pr serve the pay-as-you-go princip on which the highway program wa set up.

Meanwhile, Administration fo ces have been bringing powerfu pressure to bear on the Congre to get some action.

Latest in the broadsides to Co gress, however, was the present tion of a BPR survey of state hig way departments, as to what woul happen if funds were severely lim ited, as is now the legal necessit The overall picture is black. Fo the Western states, here's a sam ling of reports:

Arizona — Would have to sto awarding Interstate constructio contracts by December, 1960.

California — Further advertisin discontinued as of May 15, no holding projects in excess of $5 million pending decision on 196 apportionment.

Colorado — Normal schedule o contract awards would utilize a funds on or before Sept. 1, 1960.

New Mexico — Will exhaust a Interstate funds and can let n further Interstate construction aft December, 1959.

Nevada—Will stop awarding co tracts by July 1, 1960.

Oregon—Forced to suspend a vertising for bids by Sept. 1, 195

Utah — Necessary to stop awar ing Interstate contracts by Octobe 1959.

Washington — Will have to sto awarding contracts by Decembe 1959.

Wyoming — No contract awar after October, 1959.

* * *

On highways, by the way, lo for intensification of the lon standing drive to modify navig tion requirements imposed on hig way builders for bridges.

Highway-user groups — arm with figures that show that navig tion requirements for clearanc and channel widths add as mu as 27% to the cost of road brid —are calling these expenses a "h den subsidy" to water transpor tion, out of highway funds.

Construction equipment, part ularly water-borne rigs like flo ing dredges, are among the big fenders that require high brid clearances.

Public Works Bidding Needs Reappraisal

PROCEDURES tend to develop ruts. Any established procedure deserves periodic review. Somebody once said that any practice which had been continued for five years should be treated with suspicion; after ten years it should be subjected to severe analysis and revision; after twenty years it should be discarded and a better one instituted.

The general system now used to carry out public works construction has been in effect for many years. Basically it consists of preparing engineering plans and specifications, calling for competitive bids, accepting the low offer, and inspecting and approving the work of the contractor. Relatively inflexible and based on legal requirements, this procedure is intended to secure public construction at the least expenditure of public money. Like so many other well-intended systems the difference lies between theory and practice.

Public works engineers and administrators are painfully aware that the "low bid" does not automatically produce the best result. It can result in delays, requests for extension of time, many "extras", added costs for closer inspection, and a generally unsatisfactory job. These can, and frequently do, balance the advantage of the low bid figure. It is the old principle that the initial price tag may not represent the final or lowest cost.

Public works officials and engineers are conscientious administrators of public funds with a sincere interest in getting the most for this money. On many occasions they would like to have an opportunity to take more direct action in selecting a contractor, but this usually creates legal problems or a public uproar. Engineers' experience and authority should entitle them to this exercise of judgment.

Construction projects have become much too complex to be purchased as a commodity. Commodities are normally bought on price through the function of a purchasing agent. A modern engineering construction contract should not be bought in this manner. Skill and experience sufficient to produce the best results do not necessarily result from open bidding. Integrity also remains an important job ingredient, and is worth money. A studied look should be taken at present procedure and some of its obvious weaknesses.

Such an analysis is presented in this issue by one well qualified to make a critical appraisal. C. P. Dunn is well known to the engineering profession and the construction industry of this Western region. His long career and recognition represents a world-wide background. With experience on both sides of construction contracts as they are normally secured, he is equally familiar with contracts which are arranged or negotiated. His discussion of present contractual procedures deserves attention by engineers and contractors alike.

Criticism is easy and the obvious faults of our present system have been pointed out in the past. Too frequently such comments end on the negative side, with no suggestion of solution.

Having reviewed these basic problems from his wide experience, Dunn proceeds to offer a definite and detailed proposal for their correction. Obviously any change in a procedure built up over decades will appear to be somewhat radical. Further, any proposal must start out with an idea, and as an ideal.

The proposal of this veteran construction engineer will develop controversy and may well be considered infeasible by many. Progress will involve thought and effort. The constructive proposal of C. P. Dunn is at least thought-provoking. It may not be a complete answer but could be a starting point for gradual improvement over a procedure that deserves attention.

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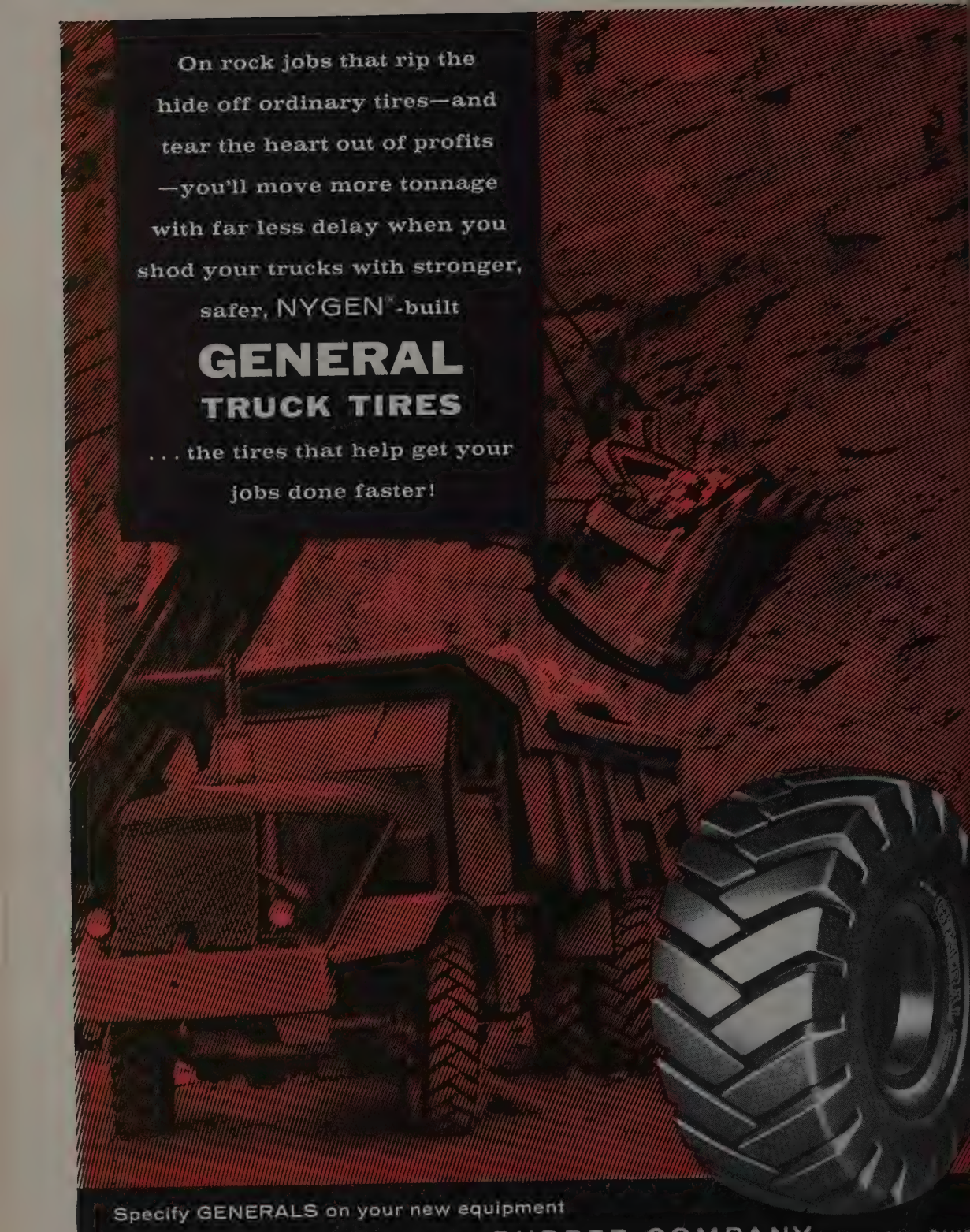

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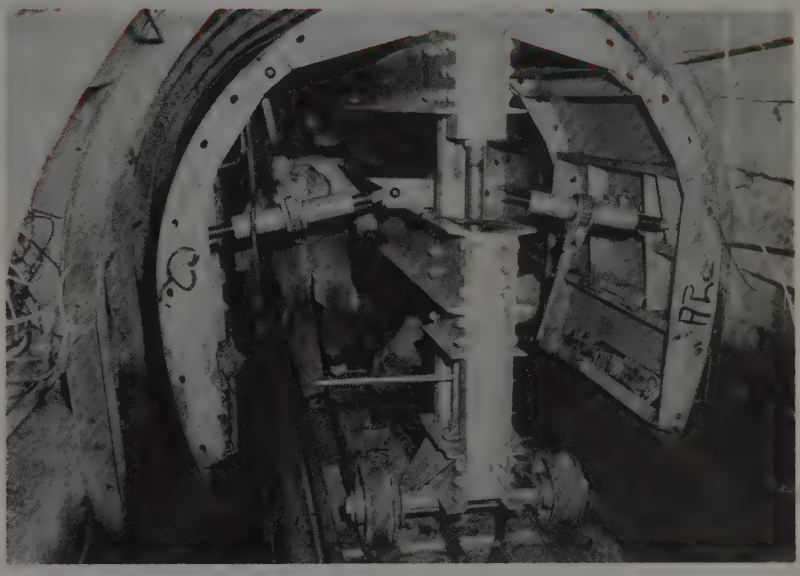
WESTERN CONSTRUCTION

KING PUBLICATION

GUST 1959

OPERATION HIGHLIGHTS

- **Side form placing guides invert and arch forms.**
- **Collapsible arch forms on rail carrier with hydraulic arms telescope through each other.**
- **Concrete placed by train feeding into 8-in. diameter slick line with air booster.**
- **Holes drilled through liner for back-fill grouting.**



ARCH FORM on hydraulic carrier positioned in the tunnel. Double hinges enable form to be expanded and contracted for movement. When form is bolted in place, carrier will be withdrawn.

oncrete lining of Montana tunnel

NCRETE LINING of the Hel- Valley Tunnel was done by the tinuous-placing method. Several nious procedures were used in ntaining a fast rate of place- t.

he tunnel is a 13,961-ft. long, diameter horseshoe-shaped ir- tion tunnel to convey water ugh the Spokane Hills from a ping plant on the Missouri er to the canal and lateral sys- being constructed by the Bur- of Reclamation in the Helena ey.

he bore is a key feature of the 000,000 irrigation project being tructed near Helena, Mont. to ish water to 17,630 ac. of new previously irrigated land, and municipal water for the City Helena. Construction on the ect was started late in Decem- 1956 when the $2,095,041 tun- contract was awarded to Guy ames Construction Co. All work he tunnel was subcontracted to A. J. Cheff Construction Co. eattle.

By THEODORE E. MANN,
Construction Engineer

and

ROBERT E. OLIVER,
Chief Inspector

Helena Valley Project Office
Bureau of Reclamation
Helena, Montana

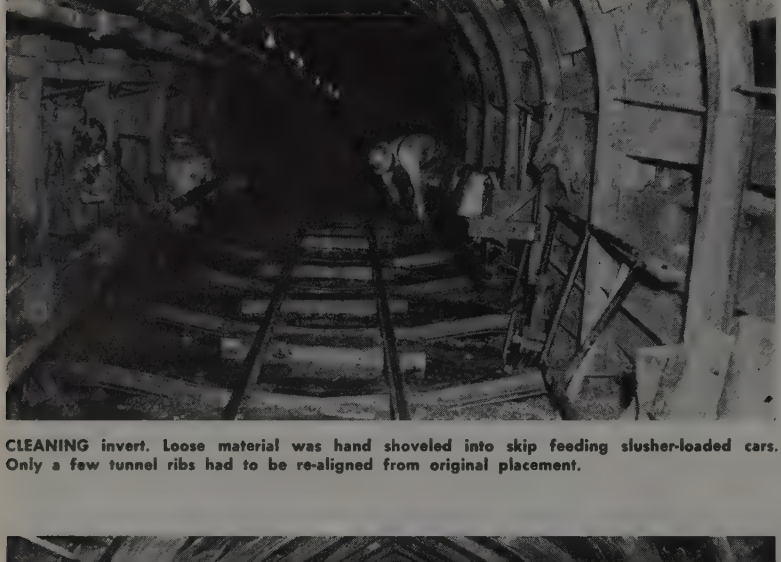
Driving of the tunnel was from two headings by the conventional method of drilling, shooting, and mucking. Four-foot rounds with from 9 to 26 holes and up to six delays were used. Drilling was done with jack-leg drills using tungsten carbide inset bits. Loading at each heading was done with a mucker loading overhead directly into job-designed and built slusher-filled cars. A train consisted of four cars and was pulled by a 6-ton battery locomotive. The cars were unloaded at the dump by tilting and discharging from the side.

The tunnel was supported through its length by timber-lagged 4-in. WF 13-lb. rib sections. The ribs varied in spacing from 2 to 4 ft. depending on the material encountered. Steel floor spreaders were used in the heavy-ground areas.

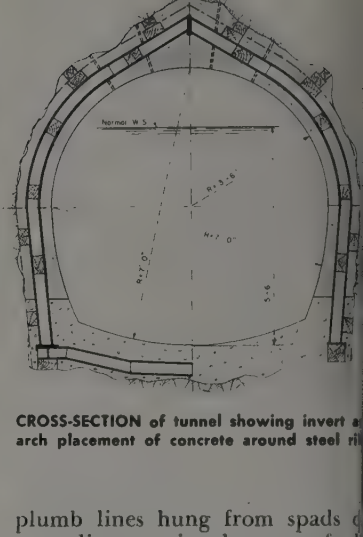
Starting from the outlet end of the tunnel about 500 ft. of tuff or consolidated volcanic ash was encountered, followed by 9,600 ft. of argillite with occasional faults and wet areas, and the remaining 3,861 ft. was hard, brittle, heavily-fractured hornfels. The argillite and hornfels are metamorphosed shales that occur in the Belt Series and are Cambrian in age.

Clean-up operations

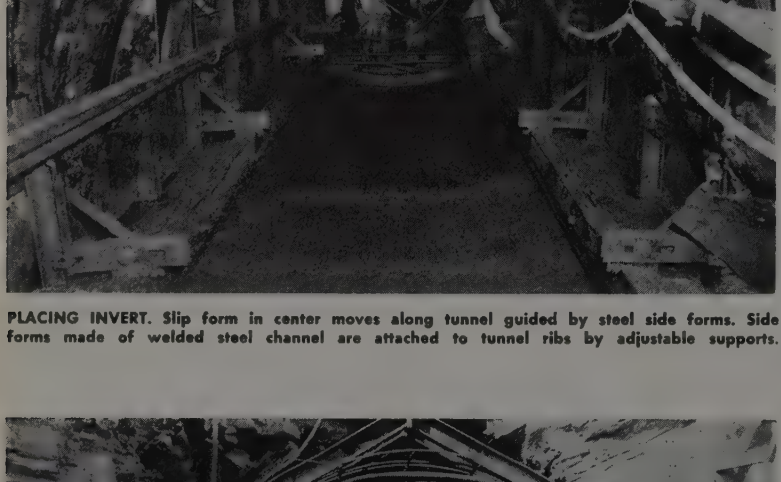
After holing through, tunnel cleanup operations were started on a three-shift, six-day-week basis to prepare the invert for concrete lining. During the cleanup operations steel supports were reblocked and re-positioned where necessary to obtain proper lining thickness. Alignment was determined from



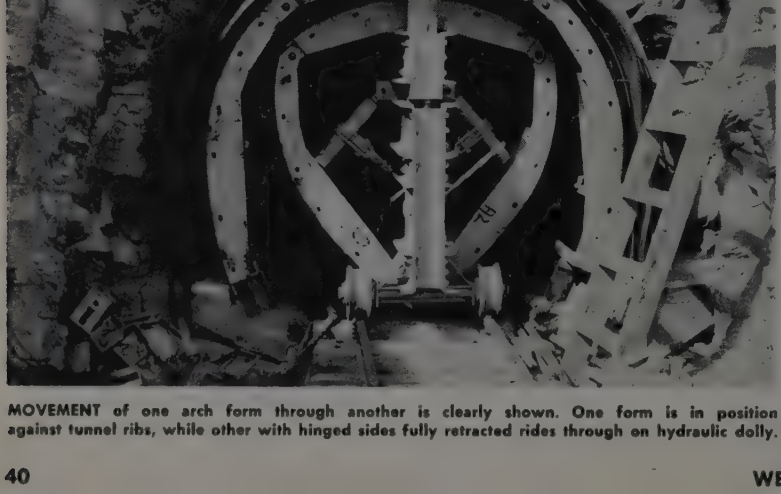
CLEANING invert. Loose material was hand shoveled into skip feeding slusher-loaded cars. Only a few tunnel ribs had to be re-aligned from original placement.



CROSS-SECTION of tunnel showing invert a arch placement of concrete around steel ri



PLACING INVERT. Slip form in center moves along tunnel guided by steel side forms. Side forms made of welded steel channel are attached to tunnel ribs by adjustable supports.



MOVEMENT of one arch form through another is clearly shown. One form is in position against tunnel ribs, while other with hinged sides fully retracted rides through on hydraulic dolly.

plumb lines hung from spads c centerline set in the top of th tunnel. Grade was set from the tru spring line marked by punchin and painting on the steel suppor Correct stationing was marke every 50 ft. on the supports. On a few supports were moved eithe laterally or vertically because of th care used in driving the tunnel.

Invert cleaning and removal loose material from the sides an arch with some relagging in th arch was started near the center the tunnel and progressed towa each portal. Excess material in th invert that had been loosened air spades was hand shoveled in a skip that dumped the muck in the converted slusher loaded ca These cars were the same ones us in the driving operations, wi some modifications made at th end to allow the skip to enter.

Concrete placing

Placing of concrete in the inve was started near the center of th tunnel in order to allow clean operations to proceed uninterru ed toward the inlet portal and a due to placing starting in the low freezing weather in Februa Cleanup from the outlet end pr ceeded ahead of concrete pla ment and was done on the sw and night shifts. Usually 300 ft. invert was placed per day wh was the amount of invert fo available. This amount of inv lining was placed in 6 to 8 depending on haul distance.

Invert forming and pouring

The invert was formed so a ho zontal construction joint existe

PLETED LINER, with forms stripped away, shown in foreground. Both vertical and sloping s were used and proved equally satisfactory. Placement averaged 265 cu. yd. per day.

up on the sides (see drawing). ing part of the side with the rt allowed room for the barrel ns to be anchored along their om edge. The 7-in. high side formed by a 7-in. channel weld- ace to face with a 5-in. channel. space between the lower lip he two channels acted as the le and rail for the invert slip n to travel in and controlled h the lateral and vertical move- nt of the form.

he channel forms were made 50-ft. sections and connected ach other by four dowels weld- nside at the corners of the box le by the channels. Support for channels was furnished by ad- able arms fastened to the steel nel supporting ribs. Extreme was used in setting the channel members to line and grade. s was easily done with a tem- e using plumb lines from the ls and from the grade mark el-worked and painted on the l ribs at spring line.

he stiff side forms made by ing the channels and the care l in setting to line and grade e an extremely straight and true ace to set the barrel forms to. cisely drilled holes through the forms were used for holding 1- bolts with screw anchors. All the rt used in making and setting side forms was justified when me time to set the barrel forms. e precise setting of the bolts e a point from which to set the er lip of the barrel forms. This ance was 1½ in. and was easily by a spacer. No other measure- nts were needed to obtain line grade for the barrel forms, al- ugh occasional checks were made n plumb lines on center and the distance from the invert to the top of the form.

Concrete conveyor and chute

Concrete was placed in the invert by a conveyor and swinging-chute arrangement. It was placed back of the side forms by the swinging chute and then vibrated, excess concrete worked out into the center of the invert and just ahead of the slip form. The slip form, 8 ft. long, was moved by an air tugger and cable attached to the rails ahead. The top edge of the side forms was used as a grade strip and the concrete was wood floated between the forms and steel ribs to obtain a straight smooth construction joint.

Light wood floating of the invert followed about 50 ft. behind the slip form. Small streaks or lines which were actually shallow elongated air pockets left by the slip form were removed by the wood floating. After the wood floating a clear curing compound was sprayed on the fresh concrete.

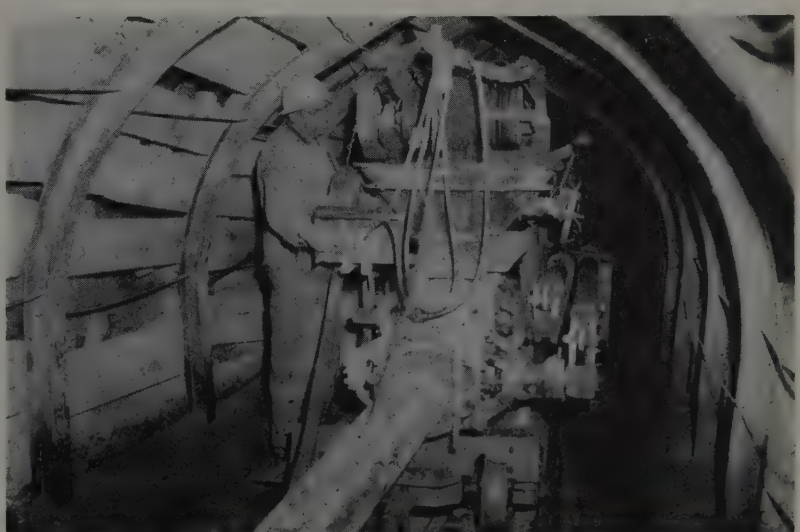
Concrete and handling

The invert construction joint was sandblasted prior to placing concrete in the barrel forms. All of the invert lining was placed before any of the arch section was placed. The side forms were stripped on night shift, cleaned, oiled and moved ahead for the concrete placing on day shift. The two side forms were supported and carried ahead by an overhead monorail crane that ran on a movable track attached to the steel ribs.

Concrete for the lining was produced by a batching and mixing plant set on the open cut slope beyond the outlet portal. An accumulated weigh batcher traveling on rails supported from the bottom of the aggregate bins was used to charge the 1-yd. mixer. The mixer was set high enough to discharge directly into job-built concrete cars. A 5-yd. capacity concrete car had a 12-in. diameter air-motor-driven screw full length in the bottom of the car. The screw was used for forcing concrete out of the end of the car onto a conveyor belt.

The discharge end of the car was closed by both a split gate that

(Continued on page 88)



SURGE HOPPER feeding slick line in foreground. About 10 ft. of pipe was buried in fresh concrete for maximum penetration around timbers. Line was supported on hangers with pipe rollers.

Eight past-presidents of WASHO in attendance at the conference were (l. to r.) W. E. Willey, Arizona; J. R. Bromley, Wyoming; Earle V. Miller, Idaho; President Williams; Roy A. Klein, Oregon; Lacey Murrow, Washington; Al Winkler, Montana; R. H. Baldock, Oreg

Washo holds 38th annual meet

BILLINGS, MONTANA, was the scene of the 38th Annual Conference of the Western Association of State Highway Officials held the last week of June. Over 600 were in attendance at the 6-day event. The highly successful conference was highlighted by the presentation of the Dr. L. I. Hewes Award, the welcoming of Hawaii as WASHO's newest member, and the great concern about financing problems for the Interstate Highway program.

AGC-WASHO conference

On Sunday, June 21, a very fruitful meeting was held between the Associated General Contractors and key state highway officials. A number of possible areas of conflict between contractors and highway departments were brought up for discussion so each could better understand the other's problems in order to reduce misunderstandings.

The moving of overweight equipment was one of the perennial problems discussed. The system of special permits in Colorado was of great interest to those in attendance. An official from Arizona related that the Air Force after constructing a missile in California which it intended to shoot to the moon from Florida, couldn't get it across Arizona.

How big should contracts be? The idea was expressed that the maximum size of contracts should be related to the general volume of work in the given area. If a large portion of the work in an area is brought together in one contract then many contractors will be idle.

Maintenance of existing roads used for hauling purposes was another subject which was explored. The problem arises when a county road, for example, is damaged by a contractor who uses it as a haul road while building an Interstate Highway project. The Federal Government won't pay the damages. Who determines the damage? How much damage would have occurred in the same period of time without the nearby construction project? In what condition was the road to begin with?

The Buy-American Act also came up for discussion. Many states have no restrictions at all on the use of foreign materials. It was the general feeling that no handicap greater than 6% could be placed on foreign made materials without running legal risks.

Difficulties in getting access to borrow materials were pointed out by the contractors. Land owners controlling property between borrow pits and construction projects often raise prices when a number of contractors make inquiries. It was felt that the taxpayer would be saved money if the state would acquire access before the project was advertised.

Traffic control on construction projects was brought up and the opinion expressed that the pro lems are greatly lessened when t cost of flagmen and traffic co trol is shared by the contractor a the highway department.

Other subjects briefly discuss were highway financing, sub-co tracting, effects of concrete mixi time, and clarification of the effe of strikes on working time.

Hewes Award

The presentation of the Dr. L. Hewes Award was made at t Family Dinner by Robert Byr managing editor of *Western Co struction.* The Award is made a nually at the WASHO meeting honor the memory of Dr. L. Hewes, one of the founders WASHO who for many years w Western Regional Director of t Bureau of Public Roads. Each st submits a nominee and the exe tive committee of WASHO sele the winner. The $500 first prize a suitable certificates for the win and runners-up are provided *Western Construction.*

The first prize was shared t year by W. O. Widdows, assist maintenance engineer of Oreg and Joseph D. Meyers, engineer geologist of Arizona.

W. O. Widdows won his aw as a result of outstandnig work the experimentation and devel ment of more efficient stripi equipment. The new equipment creases by 30% the mileage wh can be obtained from a gallon

O-WINNERS of the "Dr. L. I. Hewes Award" for 1959 are Joseph D. Meyers, engineering ologist of Arizona, and W. O. Widdows, assistant maintenance engineer of Oregon. Bob Byrne, naging editor of Western Construction, which sponsors this annual award, is shown making e presentation to L. F. Quinn, chairman of the Arizona State Highway Commission, who cepted the award for Meyers.

aint. The drying time is reduced bout 50% and better penetration nd longer wear is obtained. The inimum road temperatures for ainting operations are greatly re-uced. W. O. Widdows is 57 years d. He began employment with the regon Highway Department in nuary of 1918. For the past 21 ars he has been assistant main-nance engineer in charge of signs, gnals, traffic striping and illumi-tion.

The co-winner from Arizona, seph D. Meyers, is 36 years old d is a registered professional ge-ogist in Arizona. His award is sed on his important contribu-on in initiating and developing ethods used in making a state-de inventory of aggregate mate-als in Arizona. One of the out-anding original features of his oject is the fact that the data on ch aggregate source is compiled a tabulating punch card and us can be reviewed easily and ought up to date.

Honorable mention was given to hn L. Beaton, supervising high-y engineer, and Robert N. Field, aterials and research engineering sociate, both of the California vision of Highways, for their re-arkable work in conducting large ale laboratory tests of median rrier designs.

Linne Erickson of Idaho was ven honorable mention for origi-ting and improving designs of ecial laboratory equipment.

Stearns Eason of Washington s the other honorable mention nner for 1959, recognized for ne very valuable work in devel-ing reversible lanes for use on e Seattle Freeway.

Technical sessions

The conference schedule provided for 3 days of technical group sessions built around the following topics: administration, commissioners, construction, electronics, legislation, maintenance, materials, public relations-personnel, right-of-way, standards and design, and use of radio.

Included in the papers delivered in the Construction sessions, were: "Reinforced concrete paving by the slip-form paver method" by George N. Miles, district engineer, Colorado; "Labor compliance on Interstate projects" by H. E. Cunningham, Western Counsel Bureau of Public Roads, San Francisco; "Control of embankment compaction" by E. C. Simpson, construction engineer, Washington; and "Carrying heavy traffic through construction projects" by J. C. Womack, assistant state highway engineer, California.

In the Materials section two papers on control of materials during construction were delivered, by L. F. Erickson, materials engineer, Idaho, and R. E. Livingston, planning and research engineer, Colorado.

In the Maintenance section a paper entitled "Snow removal equipment and practices for 2 and 4-lane facilities" was given by Charles E. Shumate, assistant chief engineer, Colorado. Shumate showed his audience a short but hair-raising film on an artificially induced snow slide.

New officers

Officers elected to serve until the next conference scheduled to be held in Portland, Ore., in June 1960 are:

President—Fred C. Quinnell, state highway engineer, Montana;

Vice President—L. D. Wilson, chief highway engineer, New Mexico;

Secretary-Treasurer—T. D. Sherard, deputy state highway engineer, Wyoming.

Executive committee members are:

Milton Reay, state highway commissioner, Arizona;

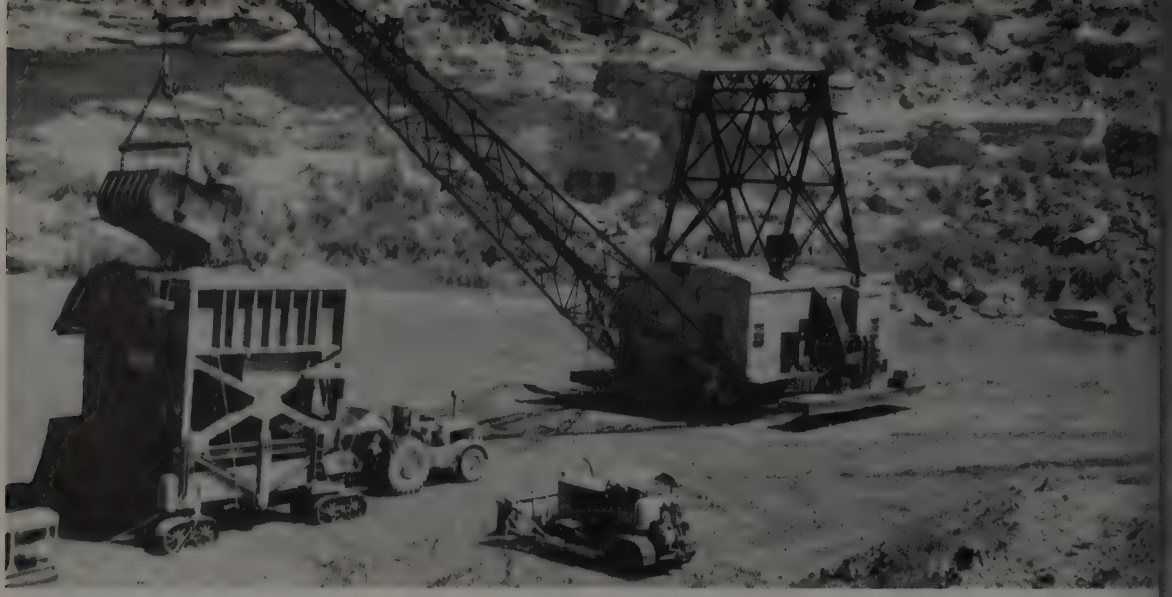
M. K. McIver, chairman of the Oregon Highway Commission;

John C. Myatt, deputy territorial engineer, Hawaii Highway Department;

G. Bryce Bennett, state highway engineer, Idaho Department of Highways;

W. C. Williams, state highway engineer, Oregon.

OUTGOING president "Dutch" Williams of Oregon applauds incoming president, Fred Quinnell, Jr., State Highway Engineer of Montana. The 1960 meeting will be held in Portland, Ore.



SPEARHEADING the earthmoving operation is a Monighan dragline wielding a 15-cu. yd. Esco bucket loading into a specially designed portable hopper to eliminate truck delays. Hopper has both sl and drop gates and air jets to move sticky material.

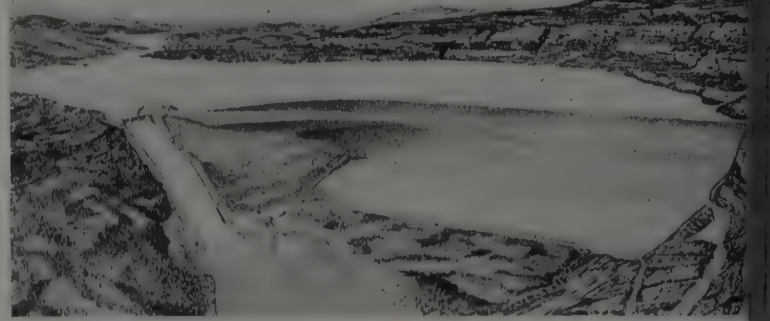
Fast earth-moving at Navajo Dam

Huge Bureau of Reclamation earthfill structure in northwestern New Mexico will be one of the world's largest. Contractor makes full use of modern machines and mild winter to put earth-moving ahead of schedule. Target date for river diversion is October this year.

A FLEET of the latest and largest construction equipment is putting on a daily demonstration of mod ern construction methods at a re mote site in northwestern New Mexico. The project is Navajo Dam, a 26,000,000-cu. yd. earth and rock-fill structure being built for the Bureau of Reclamation by a joint venture of Morrison-Knudsen Co., Inc. (sponsor), Henry J. Kaiser Co. and F&S Contracting Co. When completed three years from now only Trinity (30,000,000 cu. yd.) now under construction in Northern California will be larger Bureau of Reclamation dam. Nava jo Dam will rise 388 ft. above the San Juan River bed and extend 3,800 ft. along the crest. The reser voir created will be 34 mi. long and will store more than 1,700,000 ac. ft. of water.

Every major unit in the equip ment fleet is perfectly matched to the job it has to do. Spearheading the entire earth-moving operation is the mightiest machine of all, a 450W Monighan with a cavernous 17-cu. yd. dragline bucket. Shut tling between the Monighan and the pervious zones of the embank ment on a 2-mi. long haul road are a dozen 30-yd. Euclid bottom dumps. Excavating and placing ma terial for the impervious core are 11 twin-engine Euclid TS5-24 scrap ers, push-loaded by a team of 4 twin-engine Euclid TC12 crawlers. Ten Euclid 17-yd. end-dump trucks and a dozen Allis-Chalmers HD21 crawler tractors round out the earth-moving fleet, perhaps the most powerful ever assembled, in terms of horsepower per unit.

The latest and largest machines, carefully matched to the job, a describe the compaction operati On the pervious zones, steel-dru vibratory rollers, drawn by craw tractors, keep compaction costs a minimum. On the central i pervious zone a spectacular rig ferred to as "The Blob" mo quickly back and forth. It's a F guson tamping roller consisting 4 sheepsfoot drums mounted o frame, each powered by a separ engine. Slated for arrival on the j soon is a gang of 4 sheepsfoot r



ARTIST'S SKETCH shows large overflow spillway and road across downstream face. Volum dam is about 26,000,000 cu. yd., height is 388 ft., crest length is 3,800 ft., lake is 34 mi. l

from Peterson Tractor Co. in Leandro, Calif.

Navajo Dam is located on a ...p curve of the San Juan River, ...mi. by road east of Farmington, ...w Mex., in Rio Arriba and San ...n counties. Navajo Dam is one ...the 4 presently authorized stor... units in the Bureau of Recla... ...ion's Upper Colorado River ...ject. Glen Canyon Dam on the ...orado River near the Arizona-... state line (*Western Construc...*, December 1958) and Flaming ...ge Dam on the Green River in ...theastern Utah (*Western Con...ction*, May 1959) are already ...er way. The fourth project is ...ecanti on the Gunnison River ...estern Colorado which is in the ...l stages of study.

Navajo Dam will make possible ... direct diversion of water for ... proposed 110,000-ac. Navajo ...ject to serve lands in the Navajo ...ian Reservation. Also, through ...trol of San Juan River flows, ...tream diversion can be made for ... proposed San Juan-Chama ...ch would provide supplemental ...er to the Rio Grande basin in ...th-central New Mexico.

LINING diversion tunnel with concrete is under way now with Blaw-Knox steel form 48 ft. long. Rail-mounted dolly carries form and hydraulic rams collapse it when it moves ahead.

...bankment

...he 26,000,000-cu. yd. embank... ...t will be placed in 3 zones as ...vn in the drawing. Zone 1 is ...cted clay, silt, sand and gravel ...pacted in 6-in. layers. Zone 2 ...lected sand, gravel, cobbles and ...lders compacted in 18-in. lay... Zone 3 is miscellaneous mate... compacted in 12-in. layers. The ... is ideal for a structure of this ... as all the necessary materials ...located in borrow areas imme...ely adjacent to the site. The ...est haul will be no more than ...i. and the average haul will be ...h less. The only material which ... readily available is 150,500 cu. ...f protective riprap which will be placed on the upper portion of the upstream face of the dam embankment. The nearest source of suitable rock which has been located so far is in southern Colorado about 50 mi. from the site.

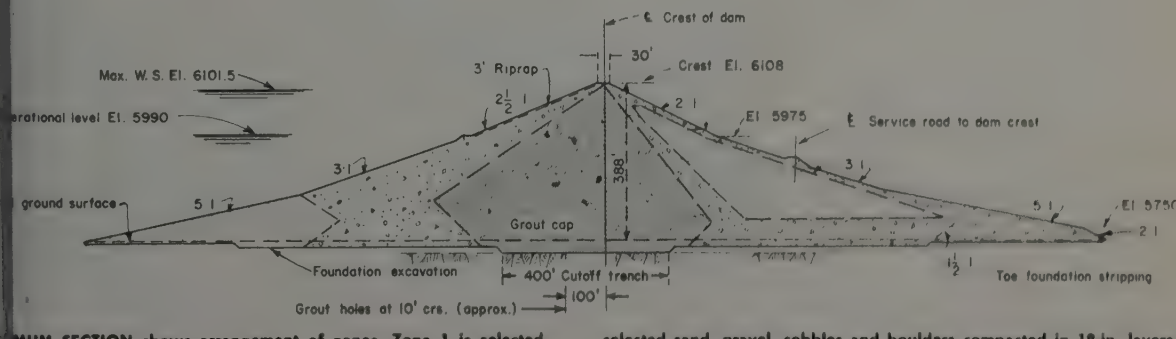
There is about 75,000 cu. yd. of concrete required for the project, about half of which will go into the large overflow spillway on the right abutment. The spillway will consist of an approach channel, concrete crest section, spillway bridge, chute, stilling basin, outlet channel and access house for the drainage gallery.

About 39,000 cu. yd. of concrete will go into the outlet works structures. The main features of the outlet works are a concrete tower intake structure, 280 ft. high, an 18-ft. 9-in. diameter concrete-lined tunnel containing a 110-in. diameter steel pipe downstream from the gate structure; a gate structure and 14-ft. diameter concrete-lined shaft for a 6 ft. x 13 ft. fixed-wheel gate, access tunnels and shaft; a concrete stilling basin and outlet channel.

The auxiliary outlets works will consist of a concrete intake structure, a 7-ft. diameter concrete-lined circular tunnel, a gate chamber for two 4 x 4 ft. gates, and a 6 x 8 ft. concrete-lined arched tunnel.

The Bureau of Reclamation awarded the $22,822,624 contract on June 25, 1958 to Morrison-Knudsen Co. Inc., Henry J. Kaiser Co., and F&S Contracting Co. Completion date was set for March 1963.

The construction camp for Bureau of Reclamation employees is located five miles downstream from the dam site and provides temporary community facilities for about 45 persons. It is not contemplated



MUM SECTION shows arrangement of zones. Zone 1 is selected silt, sand, and gravel compacted in 6-in. layers. Zone 2 is selected sand, gravel, cobbles and boulders compacted in 18-in. layers. Zone 3 is miscellaneous material in 12-in. layers.

DRY CLIMATE means moisture content of core material is far below specified amount. Water is added in borrow areas weeks before excavation starts by extensive program of irrigation.

that the Navajo camp will be a permanent installation.

The nearest railhead is Aztec, New Mex., 32 miles from the dam site by existing highways. By the time bids were opened a 9.3-mi. paved road was built from State Highway 17 to a point near the dam site. This access highway was built under the direction of the State Highway Department of New Mexico under an agreement which provided that the Bureau of Reclamation contribute a portion of the funds. Included in the prime contract was the building of 4.7 mi. of access and service roads.

First construction

The beginning of work in August 1958 coincided with the completion of the Kings River project in California. The contractor's first step was to transfer supervisory personnel and equipment from Kings River to the Navajo site. Work on the access and service roads and camp facilities was under way within a month after the contract was awarded. The camp consists of separate Butler buildings for warehouse-shop, paint, tire, lube, automotive - electrical, mess hall, 50-man barracks, a tunnel change house, and an office. The one barracks building is supplemented by six 4-man tents. The mess hall serves 6 meals a day, as two 9-hour shifts, 5 days a week, are being worked. There are about 550 men on the job at present.

The initial trailer court area had space for 92 units. Several months later space for 60 additional units was provided.

To provide power, Morrison-Knudsen brought in a 1,250-kva. diesel generator owned by The Basin Light & Power Co. (since purchased by the City of Farmington). The power company has recently completed a line into the project which removes the contractor from dependence on the generator.

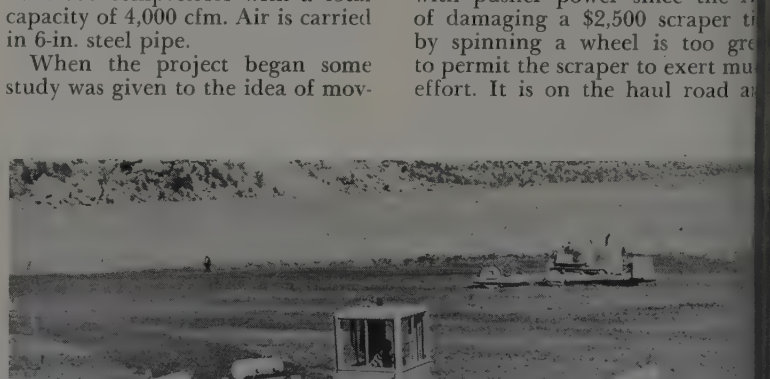
To develop a water supply the contractor first tried to bring in wells in the camp area and in the trailer court area but this was found to be impossible because of the large amounts of decaying vegetable matter in the soil. It was necessary to go to the river and pump water from here. A separate water supply has been developed for the two areas. Water passes through a crushed rock filter, a diatomaceous earth filter and a chlorinator. Sewage treatment is by septic tank and leeching field.

The centrally-located compressor house contains 6 Ingersoll - Rand dual 800 compressors with a total capacity of 4,000 cfm. Air is carried in 6-in. steel pipe.

When the project began some study was given to the idea of moving the conveyor belt in from Mo rison-Knudsen's Great Salt Lak railroad fill. This was found to b impractical because most of th borrow material was located belo the center of gravity of the em bankment. Conveyors are usuall practical only on downhill run Also, the borrow areas are broa and shallow which would requir an excessive number of conveyo moves.

The main sources of material fo the embankment occur in th stream bed from a point 2 mi. u stream from the dam to a point mi. downstream from the dam. A other large borrow area is locate on the mesa overlooking the da site. All of the borrow areas a similar in that 10 to 15 ft. of mat rial suitable for the imperviou core overlays 10 to 20 ft. of gra elly material for the pervious zone The stream-bed borrow areas wi be worked until the embankmen has risen to within 50 or 75 ft. the crest. Then the high elevatio borrow area will be opened up f the final material. In this way t grades on the haul roads will kept to a minimum.

Excavating the impervious m terial is a scraper-pusher operatio The material is hard to load, pecially when wet and for this re son plenty of power is neede Twin-engine Euclid scrapers a used, along with twin-engine TC Euclid pushers. Tandem pushi of the big scrapers is common a occasionally three pushers fall in place behind the scraper. Scrap loading is done almost entire with pusher power since the ri of damaging a $2,500 scraper t by spinning a wheel is too gre to permit the scraper to exert mu effort. It is on the haul road a



THE BLOB is term job personnel apply to this 4-drum self-propelled tamping roller... tamping roll has separate engine. Operator is located in center. Machine has bright fut

Walter Ware, president and general manager, Tru-Mix Concrete, Inc., Portland, Oregon

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not in the borrow pit where the extra scraper engine pays off. Because most of the material is being lifted from the borrow areas to the embankment the extra engine on the scraper is a big help. A 10% haul road grade can be handled easily and high speeds can be maintained at all times.

The twin-engine crawlers are used almost entirely for push-loading. The fact that one truck can be put in reverse with the other in forward allows the units to spin on a dime and get into pushing position with no lost time. This high degree of maneuverability is a real asset in a high speed push-loading operation.

Moving pervious material

After the overlying impervious layer has been stripped the big Monighan comes into play. Since much of the gravel layers are beneath the water-table it was a natural dragline operation. Several smaller draglines could have been used but the big Monighan had just finished its work on the St. Lawrence Seaway when the Navajo job started, so it was moved in piece by piece.

The big rig handles perforated Esco buckets ranging in size from 13 to 17 cu. yd. So that the 30-yd. Euclid bottom-dumps won't have any unnecessary delay at point of loading, a 65-cu. yd. hopper was constructed by the Conveyor Company to the contractor's design and specifications. The hopper is 19 ft. long, 20 ft. 9 in. wide and 28 ft. high, with a truck clearance 16 ft. high and 11 ft. 6 in. wide. The entire hopper is mounted on 30-ton Athey tracks so that it can be readily moved. The hopper is merely a rectangular bin with gate openings in the middle of its floor. This design means that there is a certain amount of dead storage in the hopper at all times. Thus the material itself serves to funnel new material into the gate openings, doing away with necessity for steel wear plates—which wouldn't last long under the beating of abrasive gravel.

Unfortunately the dead storage often builds up and constricts the gate opening and in time even blocks it completely. To handle this situation air jets have been inserted at each corner of the hopper which can dislodge the material when necessary.

When the hopper was first put into operation it was thought that hydraulic rams operating drop gates would be all that would be needed. However, it was found that when working in wet gravel the material would surge around the drop gates resulting in excessive spillage. For this reason hydraulically operated slide gates have been installed below the drop gates. In dry material the drop gates are used and in wet the slide gates.

COMPACTION of Zone 2 material is speeded by this trio of Essick steel drum vibratory rol drawn by a single crawler tractor. Results are excellent and there is less equipment on the

In addition to a portable air compressor to activate the corner air jets, a crawler tractor is assigned to the hopper at all times, to move it from place to place and to keep access to it open for the bottom-dumps.

The labor force at the loading operation consists of the Monighan operator, an oiler, an operator for the hopper, the crawler operator, and a loading superintendent who oversees the operation and plans the movements of the dragline and hopper.

Because the Monighan is such an unusual piece of equipment the men who operate it also handle its maintenance. The loading operation is under way during two 9-hr. shifts, 5 days a week. On Saturday the Monighan crews put in another two 9-hr. shifts on maintenance. This means putting in one shift of maintenance for every five of operation. This is well worth it considering the importance of the Monighan to the entire operation.

In case the Monighan does break down during an operating shift a Euclid elevating grader is available to keep the trucks rolling.

In order to give clayey material the required moisture content an extensive program irrigating t borrow areas is under way. Addi water in the pit rather than on t fill has several advantages: It duces equipment congestion on t fill, it reduces dust, and it provi a more workable material. Conv tional agricultural equipment is ing used. The pressure in the alu inum pipe is varied with the ty of soil being sprinkled so that t size of the water drops will not so large as to cause compaction the top soil layer.

Of course some water must added at the fill. To facilitate t the contractor is setting up a la water tank overlooking the fill speed up the filling of water truc

For compaction in Zone 1 t specifications state that there m be 12 passes made with the shee foot roller with the following p vision, "If, with the required mo ture content, it is found desira to roll each 6-in. layer more or l than 12 times to obtain the quired compaction, the number rollings shall be changed acco ingly as directed by the contra ing officer, and adjustment will made in the unit price for earth in embankment Zone 1, in amount of 35/100¢ a cu. yd. each additional or lesser numbe rollings required."

To cut down the rolling time Zone 1, the contractor has put i use a compactor that promises become common on dirt-fill jobs the future. It is a 4-drum shee foot self propelled, with the ope tor mounted in the middle. As as is known there are only 3 r

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The Madonna Construction Company switched to *ESCO* cutting edges after on-the-job tests that "represented every known strata in southern California." Richard Chafin, project engineer, relied on *ESCO* bits to move 200,000 yards of sandy gravel, studded with 36-inch donickers... and in doing so compiled maintenance figures that showed *ESCO* bits averaging 200 hours before reversing.

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HORSEPOWER in record amounts is applied in scraper loading operation. Here two twin-engine Euclid tractors assist a twin-engine Euclid scraper in clayey pit where traction is poor.

chines of this type at work in the United States, each made by a different manufacturer. There are down-time bugs to be worked out, as there is with any new piece of equipment, but the advantages of this particular design are so obvious that it seems certain that manufacturers will persevere with the idea. A look at the photograph of the machine shows that the Ferguson type uses a separate diesel engine for each roller. The unit consists of four 5-ft. diameter, 6-ft. long sheepsfoot rollers with removable hard-surface tips. Each drum is individually driven by a 100-hp. GM diesel engine with Allison torque converter and Clark multiple gear transmission, all controlled from the central cage by the operator who sits in a swivel seat. There is no front or rear to the machine and no turning around is necessary.

Each drum is free to oscillate in every direction, allowing the unit to follow undulations of the fill without undergoing undue structural strain. Shifting gears on all units is simultaneous and practically automatic with operating speeds from 2 to 6 mph. On average work the unit moves at about 4 mph.

Steering is done with 2 large double-acting, hydraulic cylinders between the front and rear units. The rig empty weighs 96,000 lb., and 120,000 lb. ballasted with water.

At the Navajo Dam project the machine is referred to either as "the monster" or "the blob." Whatever you call it, it looks like it is here to stay.

On the Zone 2 material compaction time is being reduced with the help of 3 Essick steel drum vibratory rollers pulled by crawler tractors.

The main diversion tunnel and a small auxiliary by-pass tunnel have been drilled and are now being lined with concrete. It is planned to divert the river through the tunnels by means of a low earth cofferdam in October or November of this year. This is the low water season of the year with flows as low as 200 cfs.

The stream has been manhandled quite a bit already. The river flows at present through a gap left in the main embankment. The cut-off trench and grouting operation was completed in this gap by first confining the river to one side and then to the other.

It is interesting to note how the diversion plan affects the earth-moving operation. The upstream

MAJOR EQUIPMENT
NAVAJO DAM PROJECT

19 Chevrolet pick-ups
1 International Harvester Travellette
2 Ford 6-yd. dump trucks
3 Chevrolet flatbed trucks
2 Chevrolet grease trucks
1 White fuel truck
5 Dodge shop trucks
1 Chevrolet shop truck
1 Chevrolet tire truck
12 Euclid 30-yd. bottom-dumps
12 Allis-Chalmers HD 21 crawler tractors
4 Euclid TC12 crawler tractors
11 Euclid twin-engine scrapers
10 Euclid 17-yd. end-dump trucks
3 Euclid water wagons
1 Johnson portable batch plant
1 Bucyrus-Erie 88B shovel
1 Northwest 80D shovel
1 Bucyrus-Erie 71B shovel
1 Monighan 450W dragline
1 Northwest 95 dragline
1 Northwest 25 truck crane
12 light plants
1 Euclid belt loader
1 Towner disc harrow
1 McCoy disc harrow
4 Essick vibratory rollers
1 Ferguson self-propelled 4-drum roller
1 Peterson gang roller

borrow area is being worked fi because it might be flooded duri the next high water season. Af the river is diverted through t tunnel the contractor will ha only 4 or 5 months to fill the g in the main embankment befc the spring high water season, wh stream flows could be as high 20,000 cfs.

This means that in as little 4 months the contractor may ha to place 4,000,000 cu. yd. of ma rial to bring the entire embar ment up to a safe and specifi elevation. That's why the upstrea end of the borrow area is bei worked first—equipment will be the dam site during the rush pla ment period so that hauls will short. When the equipment mov to the downstream borrow area t near side will be worked first f the same reason.

Concrete

All concrete work for the proje has been subcontracted to t Whittle Contracting Co. of Dall Tex. Whittle is using a 240-t Noble batch plant and a series transit trucks to move concre from the batch plant to the poi of pour. In the tunnel a Blaw-Kn steel form 48 ft. long is being use It is carried by a dolly mounted rails with vertical and horizont rams for collapsing the form wh a move is made.

The aggregate for the concrete supplied to Whittle by the prim contractor. The Conveyco aggr gate plant has a capacity of 1 tons per hour and is the same o used at the Kings River proje The primary crusher is a 22 x Cedarapids jaw and the seconda crusher is a 4¼ Symons cone.

Drilling and blasting

There is about 600,000 cu. yd. rock which must be blasted on th project, most of it in the huge spil way on the right abutmen Ammonium nitrate is used in a blasting where close control is n needed. On small or wet shots where close control is needed re ular 40% 1⅛ x 8 stick dynami (Apache Powder) is used.

Here's how a typical 3-in. dia eter, 30-ft. deep hole is loaded an shot. Two cartridges of semi gel tin 2 x 12 dynamite are lowered t the bottom of the hole on Prim cord. Then 5 ft. of ammoniu nitrate is poured into the hol then ½ stick of powder, then

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"The Chevy not only pulled the load out, but I discovered I'd left the trailer brakes on! So the truck pulled about 37 tons out of deep mud *even with the trailer brakes on.* You can't top that!"

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ft. of ammonium nitrate, then ½ stick of powder and so on to the top. Stemming is only 4 ft. if a dozer will work the resulting shot rock because a dozer can't handle blocky material. But if a shovel will work it, then 8 ft. of stemming is satisfactory. The holes are connected in rows by Primacord with 9 millisecond delays between rows.

About ¾ gal. of diesel oil is added to a bag of ammonium nitrate about 24 hr. ahead of loading. In case the diesel oil doesn't seep through the ammonium nitrate prills evenly, the ammonium nitrate is sometimes mixed in an empty powder box before loading into the hole.

Personnel

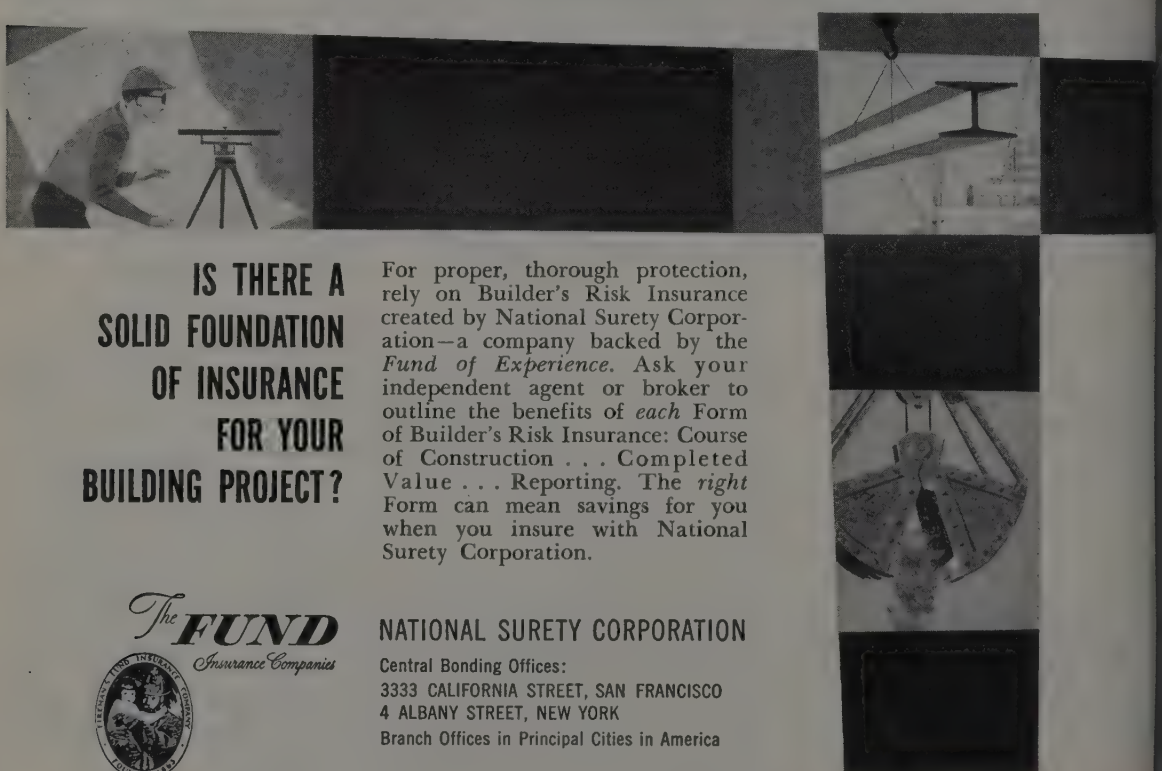
Floyd Dominy is Commissioner of the Bureau of Reclamation, Grant Bloodgood is Assistant Commissioner and Chief Engineer, and E. O. Larson is Director of Region IV. On the Navajo Dam project W. W. Brenner is project construction engineer, Ed Henry is field engineer, and J. D. Seery is office engineer, assisted by E. A. Lundberg.

KEY PERSONNEL at Navajo Dam: (l. to r.) H. D. Gard, project manager for M-K, Kaiser, F&S; W. W. Brenner, project construction engineer for the Bureau of Reclamation; B. L. Perk district superintendent for Morrison-Knudsen; Max Daley, project engineer for the contract and Ed Henry, Bureau field engineer.

George A. Harvey is administrative officer, M. D. Newsom is chief inspector (embankment), John E. Rogert is chief inspector (concrete), E. B. Anderson is chief inspector (excavation and foundation treatment), and J. T. Wynoff is in charge of the materials lab.

For Morrison-Knudsen-Kaiser-F&S, H. D. Gard is project manager, Max Daley is project engine Chet Dapron is equipment sup visor, John Cooney is office en neer, and Tony Campbell is off manager. Day shift superintende is Marvin Moore and night sh superintendent is Joe Phillips.

D. L. Perkins is district super tendent in the Los Angeles off of Morrison-Knudsen Co., Inc.



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Memorandum . . .

A method for selecting contractors on public works project

By C. P. DUNN
Consulting Engineer
San Francisco

ALONG WITH the growth of our economy, there has been a change in the conditions surrounding construction contracts, and there has been no corresponding change in the methods used for administering the business affairs of those contracts. The methods we now use, particularly on contracts administered by governmental bodies, are inefficient in the use of time and money, resulting in increased cost to those who provide the money.

This comes about partly because the size of individual contracts has increased tremendously, with corresponding increase in complication because of size, but mostly because the things we build now are much more complicated technically, and many of them are under pressure for speed, and they are difficult to describe clearly in advance in a contract document.

A construction contract is actually an arrangement for highly specialized technical and professional services. It is commonly treated as if it were the purchase of a commodity, which it definitely is not.

There has been a widening of the gap between the "contractor" and the "engineer", and each regards the other with suspicion, and the age-old attitude that a construction job is a contract between contractor and engineer to see who can outwit the other seems to be growing in intensity.

Integrity on both sides

Actually, the success of our "American way of life" is founded on integrity. There really exists a very high degree of integrity in both contractors and engineers. We ought to make use of it. To whatever extent we fail to make use of the good things which exist, we deteriorate. It is shameful to use construction documents and administrative practices which assume, as a basic principle, that contractors and engineers are all potential crooks.

The custom of working at arm's length in an atmosphere of suspicion is very costly, because it destroys the effect of mutuality of interest and, after all, the thing to be accomplished is to build a safe and useful job at low cost, and everybody on the job ought to be working to that end.

The foregoing statements may seem like an excursion a bit too far into idealism — they are strongly stated for the purpose of attracting attention, but we cannot escape the necessity of realizing that in the final analysis *somebody* has to be trusted. If we say that we have to carry on our affairs on the basis of fear and suspicion of each other, we have sunk a long way. If we can't trust anybody, we might as well give up.

How to improve the situation

We need to do some serious thinking about practical ways to improve the situation.

Most governmental bodies who have the responsibility for arr ing large construction contr are controlled by laws which quire that the award of a const tion contract shall be by "c petitive bidding" or "open con tition". The requirement is pressed in various ways and in v ing degrees of vagueness, wri by people who are not comple familiar with construction p lems. Almost universally there lack of definiteness as to just w is or is not truly competitive." usual result is that contractors selected on the basis of the " bid"—the "price", and price al when actually "price" is only of the elements entering int truly competitive appraisal. I within reason to say that there many occasions when price m up less than half of the factors termining the true worth of a ticular contractor on a partic job.

The basic idea of competi is admirable and is necessary, the machinery as now set up accomplishing competition is good, and the reason is that t is no set-up for measuring w is or is not truly competitive no way of evaluating a "price" a job which is not clearly descri "Truly competitive" is not by means indicated by the "low b

About the author . . .

Charles P. Dunn, ASCE, was the recipient of a "Beaver" at the annual dinner of The Beavers last January. The citation at the time the award was made related some of the highlights of his career as follows:

"In 1931, he was superintendent on Madden Dam, Panama Canal Zone, then for two years construction engineer on piers for the San Francisco - Oakland Bay Bridge.

"Since 1934, Dunn has he various positions with Morriso Knudsen Co., Inc. and its sub diaries. While chief enginee he designed the U. S. Navy underground fuel tanks at Pea Harbor.

"Since 1946 he has been pr ident and general manager International Engineering Co Inc., San Francisco."

(Mr. Dunn has recently retir from M-K.—Editor)

Approach Highways?

Stabilize Slope?

Stream Erosion?

Replacing Existing Wall?

Holding Back Slope?

Bridge Wing Walls?

Gain Parking Area?

Elevated Railroad?

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lanning to install a retaining wall?

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because the low figures are not a measure of the competence or integrity of the low bidder, and are not a measure of the final total cost of the job to the buyer.

That is just where you start. If the figure is too low because the bidder is too hungry for work or because he is incompetent, then everybody is in trouble. Poor performance and bickering begin. In the final analysis the owner pays, with costs exceeding the original bid prices by very substantial amounts. After all, you have to get the job done within a reasonable time, at the lowest possible cost, and as nearly as possible free of "claims" and "adjustments". And, it is the duty of public officers to make an effort to obtain the most advantageous arrangement possible. Their reputation is involved.

The reason this subject is so interesting is that really there is so little change required in existing laws and rules to accomplish what is wanted and intended—*true competition.*

DEFINING COMPETITION

All that is needed is a definition of what is "competitive", and a proper way of determining the status of contractors competitively.

Obviously, the desire of the people who write the law is to obtain for their constituents the "best buy" possible, free of the taint of collusion and corruption. Their desire is sometimes clearly set forth in the form of a requirement for "firm unit price" bids (sometimes called "lump sum") or a true "lump sum" (guaranteed total price regardless of variation of quantities). Where the requirement for competition is not expressed with clarity, it is usually interpreted to mean "firm unit price".

"Service" is not a commodity

The trouble which too often develops in the operation of a construction contract stems from the fact that law-making bodies are "laymen" in the sense that they do not understand that *a construction contract is an arrangement for skilled service with integrity behind that service,* and is *not a purchase of a commodity.* Most of the laws which control contracts are written with a "purchasing agent's approach", and the buying is done on price. Malfunctioning occurs when the services to be delivered for the agreed price cannot be described with clarity; that is, it is usually not possible to accurately forecast the conditions and circumstances which will surround the performance of a construction contract.

Many times the deviations from the original description of the work are such that there should properly be an adjustment of price and, where there exists a spirit of reasonableness and fair play between the contractor and the owner, these adjustments are made without too much difficulty. However, where the contractor who was the "low bidder" does not operate on the highest plane of integrity and ability, the job deteriorates into a sorry mess of "claims"—claims for money, claims for extension of time. The sorry performance, while costly because it is slow and inefficient, is not quite bad enough to legally be declared a "breach of contract" and the owner is stuck with slow performance and high costs.

Laws define procedures

It is not reasonable to be too critical of public officers who award contracts the way the law tells them to. They really have no choice. However, some of them who have a conscientious feeling of responsibility are deeply concerned. The procedures prescribed by law are obviously wrong and should be corrected, and they have reason to worry for fear that, in "taking the easy way out"—obeying the law literally but not obeying its intent—they may be seriously at fault in not displaying more courage and real integrity, and are not doing the best possible for the people they represent.

APPRAISING CONTRACT FORMS

In an attempt to find a way to correct the situation, let us think in these terms:

1. An ordinary firm unit price contract is the most common way of performing public works construction and a preponderant proportion of work is done by this method. It is commonly accepted as being the way to do work—so it can't be completely bad, but the majority of people who have a knowledge of the way contracts function will admit that it is a clumsy, faulty, thing.

2. A firm unit price contract, as ordinarily written, puts a disproportionate share of the risks on the shoulders of the contractor. Some of this risk would better be c ried by the owner. This comes abo by reason of a mistaken idea the part of those writing the co tract that it is to the benefit the owner to dump the risk on t contractor. The owner pays a way, either in the form of hi prices to cover the risk, or in t form of claims and delays.

Under such a contract, there little mutuality of interest. It considered sometimes as a bat of wits, between people of confli ing interest, and the contract considers that he has a right to c lect all he can collect throu claims—limited only by law, not ethics. The discrepancies whic cause trouble lie in the inability the specification and contra writer to foresee and describe curately the services which a wanted.

3. A construction contract is smoothly operating, happy, thin or a confused and costly and u happy thing, depending on the d gree of good faith and integri existing between the owner and t contractor. This is more importa than the words written in the doc ment. Without mutual good fait there is endless trouble and hig cost.

4. The goal to be achieved is find a way of selecting an expe enced contractor who desires operate on a high level of inte rity, and also to find a way to wri a contract which establishes a m tuality of interest as between t owner and the contractor. That to establish a situation where the day-to-day procedure of inte pretation of specifications an changes in specification requir ments, all leading to a good sa job on time and at low cost, wi benefit *both* parties to the contrac When both benefit, they work t gether; when only one benefit there is a battle. We need an ear est attempt to get away from co tracts based on fear and mistru and suspicion. We need arrang ments based on good faith.

5. The best form of contrac where mutual respect and integri exist, is the "target estimate" for of contract, described in its simple terms as (a) an estimate, mutual agreed upon between the parti as being the most probable co under the conditions of normal e ficient performance; (b) provisio for the contractor to be reimburse for the costs, and (c) provision f the contractor to be paid a fee f his skilled services—said fee to va

Young and Arrieta...

Dirt Work at the Crossroads

.I.T. Is On The Job, Too!

ng together the right fleet of machines for a new the first step to a profitable contract. You've have the right *number* and *kind* of machines to the working requirements of each job with top ncy.

ke the $3,500,000 Grossmont Summit Inter-e where U.S. Highway 80 crosses California Highway 94. For Young and Arrieta, contrac- it meant blasting, digging, hauling, dumping, preading out more than a million-and-a-quarter of dirt and rock to make 3 miles of 6-lane ay.

do the job efficiently and profitably, Young and a needed more big, fast-moving, high-capacity -moving equipment. They turned to C.I.T. for and got it. When they hit the field, they had a f 26 major pieces exactly right for the Inter-e job. As Mr. Esby C. Young says, "I get the ve get the equipment and C.I.T. provides the "

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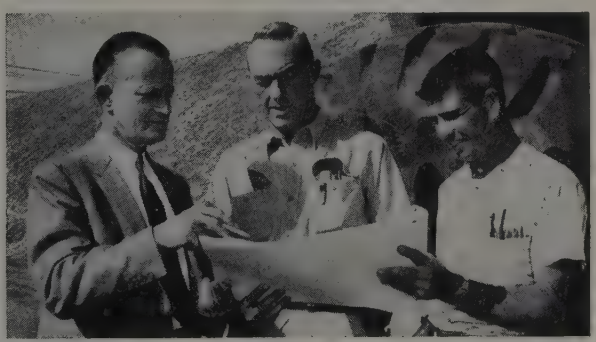

Standing before the massive tire of an earth-mover, C.I.T. representative C. O. McGruther, and Esby C. Young and Manuel Arrieta of Young and Arrieta discuss progress of the Interchange job.

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up or down, depending on whether actual costs are above or below the agreed estimate.

There are many possible variations of the detail of such a contract; the basic principle, however, is to establish a mutuality of interest, the contractor being rewarded for good performance and the owner also gaining thereby. The owner is then in position to save money for himself by reasonable and judicious interpretation of specifications with the contractor also benefiting thereby.

This type of contract is not a new idea. It is well tried, and it works. It is most often used, of course, on "private enterprise" jobs where the contracting officer has freedom of action and is not required by law to follow an inefficient procedure.

Conditions for the "target estimate"

It is to be noted here, however, that the "target estimate" type of contract is an instrument which must be used under proper conditions of selection of the contractor. It is definitely *not* suitable for so-called "competitive bidding". There have been some disastrous results where this type of contract has been put out for "competition", because the least scrupulous contractor will put out the lowest estimate (for which he is not financially responsible), and the contractor who has the least respect for himself will offer to work for the lowest fee.

We come now to consideration of the problem of how a public officer can select a contractor with whom to work out the details of a target estimate contract, and be sure that he has selected the right one and be sure that he, himself, is in-the-clear from unjust public criticism.

The criticisms are of many kinds, occasionally just, but mostly unjust. They are sparked by the selfish interest of some party. For example, it is common for United States senators and representatives to "put in a plug" (strong pressure) toward the award of a Federal contract to a contractor who lives in their district. The argument is that it is this contractor's "turn" to have a job. This argument is put up time after time, with no regard whatever for the ability or lack of ability of the contractor who is being recommended. There is not even any attempt to justify his ability. Public money is wasted in this sort of procedure; the threat behind the pressure is sometimes of considerable magnitude — hints of appropriations being withheld, and the like.

Sometimes there is pressure in favor of a "little" contractor because the little fellow asks, "How do I ever gain experience or how do I ever grow to be big if you don't give me a job?" Sounds like a reasonable question but, in an attempt to answer it, you come to another question: "How far should I go in expenditure of public money toward the education of the small, inefficient, and incompetent?"

RATING OF CONTRACTOR FOR PROJECT By Board Member

ITEM	3 GOOD	2 FAIR	1 POO
a. Experience in this particular kind of work, including consideration of experience of individuals and, on a joint-venture proposal, experience of available individuals in organizations other than that of the sponsor, giving preponderance of weight to the sponsor's experience. Do not rule out a small contractor because he is small; give him a job his size, if he deserves it. If he is newly organized, look to see whether he has hired any experienced personnel.		x	
b. Experience in general. Weigh similarly to (a) above.		x	
c. Reasonableness of estimate (not necessarily the lowest). Maybe the average should be considered correct; maybe 3% or 5% below the average; maybe the second from low.	x		
d. Reasonableness of fee (not necessarily the lowest). Rate similar to (c) above.		x	
e. Reputation for performance—meeting time schedule and forecasted costs, to be substantiated by such affidavits as the contractor wants to submit.	x		
f. Reputation, in general, for integrity and reliability—to be substantiated by such affidavits as the contractor wants to submit.	x		
g. Availability of personnel and equipment.			x
	9	6	1

Total - 16 — this contractor's rating by one Board member; average of the several ratings determined by all Board members is the final competitive rating of the contractor for this particular job.

EXAMPLE of score sheet for rating bidders under the procedure proposed by Mr. Dunn. board member would compile his own rating of individual contractors bidding on pr

A SUGGESTED PROCEDURE

The following procedure is suggested for consideration. Its workability is open to question and discussion. However, it is likely that it could be the basis for a correct, workable, scheme:

First, how do we "screen" the contractors who want to submit proposals, eliminating those who are obviously not qualified? It is attempted quite often, arbitrarily, to eliminate the undesirables from the "list of bidders" on many types of bids. It is seldom successful cause the man you have elimin is very unhappy, and can b pressure to bear on you thro political channels, or newspa or he can threaten to sue you damaging his reputation, and finally break down and put name on the list.

No arbitrary screening

My recommendation is — d try to accomplish an arbitr screening. Tell them all they welcome to submit proposals at the same time, tell them cle the way the proposals will measured. Tell them publicly print, the way it is going to done. When they realize that are not going to get anywhere cept on the basis of real merit that the selection will be m justly, they will screen themse and proposals will be received from those who honestly bel they are able to handle the job; incompetents will fade out of picture of their own accord.

Before this scheme could w it would be necessary to change

(Continued on page 91)

NGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL

FIRM EDWARD KEEBLE CONSTRUCTION CO. San Jose, California

RPM DELO Oil keeps tractor on the job 15 years

Working after 15 years using RPM DELO Oil in this D-8 Caterpillar operated by Edward Keeble Construction Co. Block, crankshaft, most other parts of original engine are still in use. Another firm's D-8's using RPM DELO Oil ran 12,000 hours without engine repairs. When torn down, maximum crankshaft wear was .004".

Crawler Crane, like firm's other heavy-duty equipment, uses RPM DELO Oil. Keeble operates 120 pieces of construction equipment—has as many as 30 jobs going at once.

V-8 10-Yard Dump Truck (left), one of a new fleet of 12, also RPM DELO Oil. Mr. Keeble (right), says, "For the past 15 years we have kept our heavy-duty engines in top operating condition with RPM DELO Oil. In several instances engines have actually outlasted equipment."

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts – hot or cold, running or idle
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CRAWLER drills on basalt outcrop outside Coeur d' Alene. Half-pound of powder per cu. yd. dices the rock without damage to nearby hous

Freeway features delicate blasting

The Coeur d' Alene Belt Route is Idaho's largest single highway contract and involves nearly 1,000,000 yd. of close blasting. Pre-stressed beams in crossing structures are first in the state.

SEVERAL notable "firsts" and some unusual blasting problems are embodied in construction of the Coeur d'Alene Belt Route, a 5-mi. freeway around the landward side of Idaho's second city, on the shores of Lake Coeur d'Alene.

The $3,094,467 primary grading and surfacing contract, being executed by Cherf Bros. Inc. and Sandkay Contractors, Inc., is the largest single contract awarded by the Idaho Highway Department. The twelve crossing structures, all being built by the Henry Hagman contracting company of Spokane, incorporates Idaho's first prestressed bridge girders, 124 of them in all; as well as 8 super-beams post-tensioned in place. The beams are the first output of a new prestressing bed installed at Spokane by Central Pre-mix Co.

Coeur d'Alene's Belt Route is made up of two 38-ft. roadways separated by a 22-ft. median strip, providing two lanes each way. Each roadway will have two 12-ft. lanes with a 10-ft. outside and a 4-ft. inside shoulder. Road surface will be made up of 7 in. of base topped by 4 in. of plant-mix. Provision is made for addition of 1 in. of plant-mix in the future.

Drilling and blasting

An outstanding feature of the project is its delicate blasting, the objective of which is to crack basalt and shale into neat cubes while leaving nearby plaster and window glass undamaged.

Blasting is conducted in two areas, one of some 90,000 cu. yd., the other a mountain shoulder totaling more than 900,000 cu. yd. Both areas are uncomfortably close to civilization. The smaller outcrop is at the edge of a residential area; the larger flanks the present highway, with its attendant commercial construction.

D. J. "Koke" Thompson, project manager for Cherf-Sandkay, and his drilling and blasting foremen, John Sunwall and Orville Louth, have devised a grid shot hole pattern involving 17 lines of 8 or more holes each. Half a pound of powder per cubic yard is used, and lin are fired in ranks of millisecon delays to dampen total blast ar confine its effect to the blast are

Drilling is done with three rig a Chicago Pneumatic 600-cfm. co pressor driving two crawler C. drills which drill 3-in. holes; 600-cfm. Gardner-Denver with sin ilar set-up; and a self-containe Schramm Rotadrill mounted on Federal 5-ton truck. Equipped wi a down-the-hole percussion dr unit, the Schramm drills a 4⅝-i diameter hole. The big automat rig drills about 450 ft. per shift.

The pneumatic rigs drill abo 500 ft. each per shift, and a operated two shifts a day. T Schramm unit works a single shi

Rock strata are covered to va ing depths by dirt and sub-s which are left in place during dri ing and blasting operations. Dr area is benched off by bulldoze often in terraces on the steep slopes, and drilling rigs move ov these benches. Holes are drilled varying depths to compensate f

-DUTY drill equipped for percussion
otary drilling produces 4⅝-in. hole.

PRESTRESSED girders, 99 ft. long, are used in this overcrossing. Job included 124 prestressed beams, the first such application in Idaho. Beams were poured in Spokane, 32 miles away.

ences in surface elevation.
e smaller 3-in. holes are drill-
n 9-ft. spacing each way. The
r 5⅝-in. holes are on 20-ft.
ng. Holes range from 20 to 40
depth.
sting agent is fertilizer-grade
onium nitrate of 37½% analy-
ixed with 5% diesel oil. The
is loaded by placing a stick
asting gel and primer in the
m and packing the oil-nitrate
rial on top of it to the desired
. Blasting gel is used to trig-
he nitrate which, even after
g with oil, requires a good
o induce detonation.
mmonium nitrate is shipped to
ob in 80-lb. polyethylene bags
n are stacked for storage in the
actor's equipment yard and
d to the blast site on a flat-
truck. About the only danger
bag breakage, in which case
ydroscopic material spills out
quickly reverts to its original
ose: fertilizer. Breakage is fair-
gh, which prompted a wry com-
from Koke Thompson. Eying
e of broken sacks, he said,
re will be a lot of green lawns
nd here this summer."
so there will be a lot of broken
Shooting takes place about
a week, and each shot uses
three to five tons of nitrate.
grid of shots prepared for each blast necessarily varies in size and shape to conform to the terrain. The standard pattern consists of 17 parallel lines of 8 holes each. The rows are wired to fire with millisecond delays in this sequence: 0-1-2-3-4-3-2-1-0-1-2-3-4-3-2-1-0. Delays are used to partly break up the plaster-shattering effect of one big blast, as well as to provide relief along designated "furrows" in the blasting pattern for more effective rock breakage. Thompson also noted that more than 1-millisecond delay between adjacent lines might cause detonation failure in the delayed line.

Final precaution

As a final precaution against any damage to nearby property, Thompson has retained Lou Oriard, consulting geophysicist of Spokane, to monitor the blasting. Oriard makes a seismographic record of each shot. This not only tells the safe limits of the blast, but provides excellent evidence in the event of damage claims.

Rock moving is handled by a heavy equipment spread based on a Manitowac 3600 shovel with 3½-yd. dipper, which fills three 18-yd. Euclid rear-dump trucks. Two fill areas are worked from the big outcrop. A small creek bed directly in front receives the dirt overburden pushed off the cut by two dozers, supplemented by a scraper when needed. Rock is hauled downhill to a second fill area running parallel to the cut at its base where a complex system of access ramps and frontage roads is being constructed. Eucs cross the existing highway, where flagmen direct traffic, to get to the fill area.

Hard on tires

Abrasive character of the rock makes it hard on tires and drill steel. The Euc's are all shod with Firestone supertread rock tires. The CP drill rig uses Atlas Copco steel with rope threads, good for 12,000 ft., and bits which run 8,000 to 10,000 ft. The Schramm unit employs tri-cone bits which run from 400 to 1,000 ft., and carbide insert bits which have yet to be replaced, after more than 22,000 ft. of drilling.

Cost of the blasting, even at the half-pound per yard level, is about 20¢ a yard over the cost of normal excavation. Five cents is chargeable to drilling and 15¢ for shooting. Thompson believes that for optimum blast breakage he should use about double the amount of powder, i.e. 1 lb. per yd. However, at that level, damage to nearby houses would probably more than

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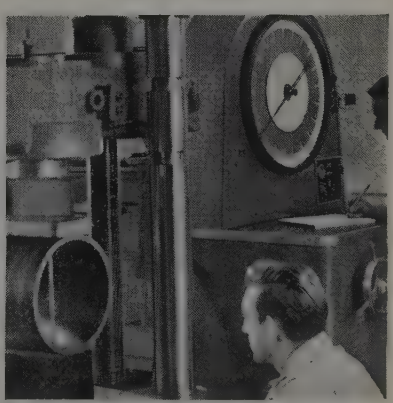

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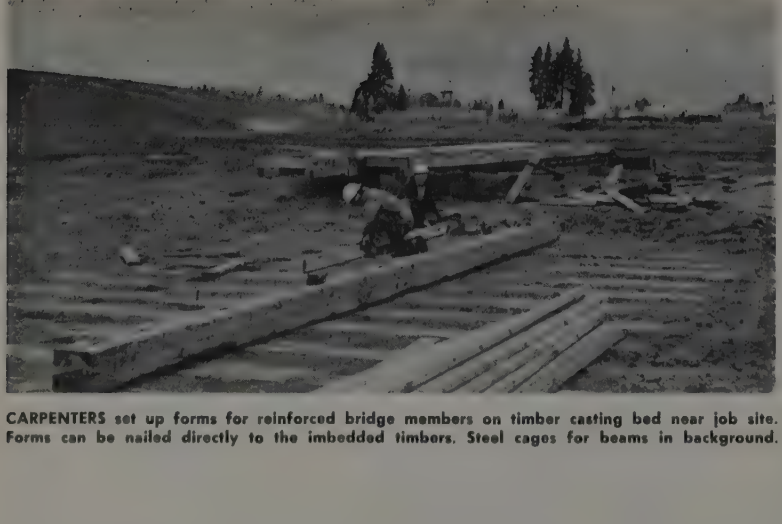


CARPENTERS set up forms for reinforced bridge members on timber casting bed near job site. Forms can be nailed directly to the imbedded timbers. Steel cages for beams in background.

MONORAIL scaffold speeds stripping forms from beneath bridge sidewalk.

offset any gains in blasting efficiency, and would certainly create a monumental public relations problem.

Public relations

Public relations are already a factor. Despite the fact that construction forces are working to create a magnificent new freeway which will solve much of the city's traffic congestion, their operations are not viewed with unanimous approval by nearby residents. Problems involving public relations can generally be divided into three categories: (1) Complaints on loss of business, inconveniences and miscellaneous individual situations. (2) Kids on the right-of-way who create a continuing hazard. Fortunately, parents are eager to cooperate in keeping their children out from under the earthmovers pounding along a haul road, but kids don't always obey, and it is a constant problem to keep them out of danger. (3) Noise and dust. There is very little a contractor can do about noise, but the dust problem can be settled with a water truck which Thompson keeps on regular right-of-way patrol.

Most of the complaints fall on the shoulders of state, county and city highway officials, many of whom have no connection with the job. (An angry citizen who wants his front yard un-dusted makes very little distinction between public officials at whatever government level.)

Complaints are kept to a minimum, however, by explaining the project and its operations in talks before various civic groups, newspaper articles and other public information means undertaken by both the highway department and the contractor.

In general operations, the primary contractor, Cherf Bros. Inc., and Sandkay Contractors, Inc., has concentrated on the grading and earthmoving phases, letting much of the specialty work out on subcontracts.

Project manager Thompson has divided the grading project into six sections. The first two of these are excavation areas, the next a fill, followed by a self-contained rock cut-and-fill, another fill area, and finally the big rock excavation and its local fill areas on the end of the project.

Thompson schedules his cut-and-fill work in a leap-frog sequence, so that material from the first cut area will be transported over the second to the first fill area, and material from the second cut area will cross the first fill and the intervening rock area to be placed in the second fill area.

In this way, haul distance is kept close to the 5,700-ft. average for the entire project, and his equipment spread of 6 scrapers and 1 push tractor will remain constant.

Thompson noted that adjacent cut-and-fill areas could be handled with only 4 scrapers and a tractor, but this would leave the remaining cut-and-fill sections separated by almost the length of the project, and would require 8 scrapers to keep one pusher busy.

Coordination of the 32 different operations which make up the project including work of nine subcontractors is arranged in a master calendar prepared by the contractor.

Allowing for a maximum month winter shut-down, the c endar calls for substantial comp tion by November 1960. Value work done in any month avera about $220,000, and ranges fr $162,000 to $330,000, giving t work a relatively constant rate progress.

Using the calendar as a gui Thompson can predict (as accura ly as these things can be predicte his equipment and personnel nee and can put emphasis on those jo which might bottleneck items wh are scheduled to flow.

Current equipment line-up cludes:

- 6 scrapers
- 3 TS24 Euclids
- 3 DW21 Caterpillars
- 1 Euclid C6
- 1 Euclid TC-12 push tractor
- 3 T24 International tractors
- 1 TD24 with Bucyrus-Erie scraper
- 2 D8 Caterpillars
- 1 D7 Caterpillar
- 3 Caterpillar No. 12 motor graders
- 1 50-ton rubber-tired roller
- 1 sheepsfoot roller
- 6 portable light plants
- 3 welding machines
- 5 pick-ups
- 2 2-ton trucks
- 1 3,500-gal. Mack water-truck
- 3 18-yd. Euclid trucks
- 1 3½-yd. Manitowac shovel

Crossing structures

The 4.955-mi. freeway will clude 12 crossing structures, 8 s ple street bridges and 4 com cated interchange structures.

Eight of these structures, incl ing three of the interchanges, w

for more details, adv. obtg. circle No. 19 on Reader Service Postcard

ilt last year by Henry Hagman, ntractor, on a prime contract. is company is now building the naining four on a subcontract for erf-Sandkay.

The structures employ concrete ders exclusively. These include: prestressed beams for spans ging from 60 to 99 ft.; 118 pre- t beams in lengths of 47 to 60 and 8 post-tensioned girders of ft. These last will make up the longest spans on the job, and carry an off-ramp over the hway at an acute angle.

casting bed

uperintendent for Hagman com- y on both bridge contracts Oliver Braaten. Braaten set up own precasting bed for rein- ed stringers midway on the job. bed is made up of heavy wood- timbers set like cross-ties in a viously levelled piece of ground. aten prefers the timbers to a ventional concrete slab because forms can be nailed directly to n. Steel for the beams was sup- d by Soule Steel Co. and as- bled into cages by Soule men at job site. Beams were poured on ssembly line basis and stored l needed.

restressed members were de- ed by the Idaho Highway De- ment in conventional shape two heavy flanges separated by ep web. They were cast on a bed set up for this job by Cen- Pre-Mix Co. in Spokane 32 s away. The bed, located at the 's big gravel plant on the out- s of town, is 462 ft. long, with airs of heavy steel anchor posts ther end. Bed itself is a slab n. thick ending in concrete ments 9 ft. deep. Anchor posts rude 7 ft. from the abutments are made up of 36-in. steel I- s with flanges filled in with orced concrete.

. T. Y. Lin, noted University alifornia engineer, served as ultant on the design of the bed h has stressing capacity of 1.- 00 pounds.

llowing usual practice, forms et up end-to-end along the h of the bed, and cables from mounted at the dead end are g in a continuous line through . Some of the stressing cables arped, i.e. draped to approxi- a parabolic curve downward each beam end. To preserve curve under tension, harped s are run over heavy steel A-

CLOSENESS of houses to blast area requires special precautions. Seismographic records are made of all shots, and four delays used in pattern to dampen blast effect and reduce its area.

CYLINDER jack for tensioning cables examined by Walden Westerman and Dennis Frie.

PRESTRESSING bed at Spokane Premix Co. set up for roof beams. Length is 462 ft.

frames at each joint, and through hold-downs on threaded studs in the beams.

When cables are in place they are tensioned at the live end with a 300-ton hydraulic jack. About 18,500-lb. tension is applied to each 7/16-in. cable.

After casting, beams are cured with steam at 110 deg. for about 72 hr. This curing time and the following cable-cutting are the two critical points. With as many as 7 beams on the line, cables must be cut in a definite sequence working from both ends of the bed, with each pair of cuts made simultaneously.

Once the beams are released from the bed there remains the problem of transportation and handling, both difficult operations with prestressed members. The units must be kept upright, and lifted and supported only at the ends.

All of the bridge members going to the Coeur d'Alene Belt Route were shipped without mishap on rigs patterned after a logging truck, with the front end of the beam set on a cradle over the fifth wheel of the tractor, and the rear end on a self-steering trailer attached to the truck by safety chain. Beams were set in place from their delivery rigs by a 701 Lima and a TLD 20 Lorain crane. Braaten observed that the prestressed units are noticeably arched even after receiving their dead load of bridge decking and concrete diaphrams. This, he says, is all to the good from a public appearance standpoint, since laymen are not likely to notice a slight arch. But let a bridge beam show a correspondingly small sag, and comments are frequent.

In some cases, Braaten pointed out, prestressed beams are used on relatively short spans where simpler and somewhat cheaper precast unit could handle the span. The critical factor at these points, he noted, is not strength but clearance. A prestressed beam may be as much as 2 ft. shallower than a conventional

concrete member of equal load capacity.

Two over-crossings are single-span structures with beams set directly on vertical concrete abutments. The other structures involve one or two main spans with shorter cast-in-place or precast approach spans at either end.

Girders rest on concrete bents made up of 4 cylindrical columns and a concrete cap. These columns were cast with one-piece steel forms. Closure of the single vertical joint on the forms is made by high-strength bolts spaced about 12 in. apart along flanges welded to the form. Braaten used two sets of these forms, of 24- and 27-in. diameters.

Later the forms were modified for smaller sizes by simply cutting out a vertical strip and re-welding the flange. Braaten noted that it is important to use plenty of bolts to hold the form together, and to keep them tight. Otherwise pressure exerted at the bottom of a column may cause one bolt to give way. This transfers excessive loads to the other bolts and the joint opens up like a zipper, causing financial consternation clear back to the home office.

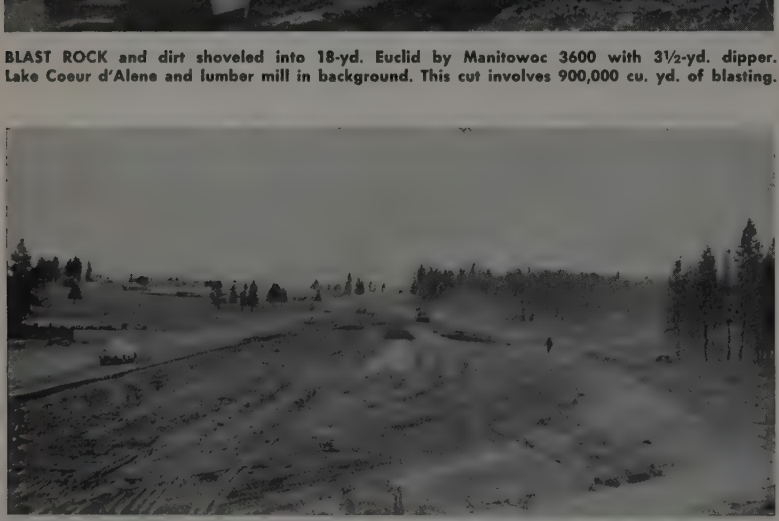
Decking is poured in place in the conventional manner, using plywood forms and timber falsework. Concrete is delivered in transit-mix trucks from Ace Concrete Co. in Spokane.

Braaten uses a couple of job-made labor-saving devices to speed removal of the deck forms. One of these is a heavy timber scaffold built on an old dump-truck; it provides a stable platform for removing form panels from beneath the deck. Another is a scaffold slung between a pair of rubber-tired wheels which roll along the bridge sidewalks in monorail fashion to enable workmen to remove forms and braces from beneath projecting sidewalks.

High point in the Belt Route's bridgework will be construction of the eight 117-ft. post-tensioned girders. These are in two spans of 4 each, and will be poured and tensioned in place. Forms for the fir four will be used for the secon group.

Tensioning of the cables will l done by Central Pre-mix Co. Aft pouring, and as soon as the concre attains the required strength, t cables will be drawn and tensione

BLAST ROCK and dirt shoveled into 18-yd. Euclid by Manitowoc 3600 with 3½-yd. dipper. Lake Coeur d'Alene and lumber mill in background. This cut involves 900,000 cu. yd. of blasting.



SCRAPER SPREAD places granular fill material at western end of Belt Route. Cut and fill is handled in leap-frog sequence to keep the same spread working throughout the project.

Personnel

Under direction of C. Bry Bennett, Idaho Highway Depa ment engineers associated with t Belt Route include Jack Pearin district engineer; Al Sachse, assi ant state construction engine Willard Sheetz, project chief, a Kurt Luerzer, resident in charg Bridge design was by the Highw Department under the direction Walter Albrethsen, bridge en neer. Resident bridge engineer Ken Durtschi.

Top men of the staff of the p mary contractor, Cherf Bros. I and Sandkay Contractors, Inc., Koke Thompson, project manag Grant Peacock, general forema Bill Anderson, master mechan Ted Moore, mechanic forema Lour Howard, shifter forema Floyd Wine, scraper foreman; Hancock and Jim Scott, shovel fo men; John Sundwall and Orvi Louth, drilling and blasting fo men; and Dick Downs, office m ager.

Key men in the Hagman co pany crew include Oliver Braat superintendent, and carpenter fo men Bob Kirk, William Heath, a Ray Hayworth, and Al Oster and Al Shaw, labor foremen.

Placement of the reinforcing st was supervised by Wally Phillip of Soule Steel Co. The 200,0 cu. yd. excavation on the 1 bridge contract was done by N. Degerstrom Co., with Tex Bre as superintendent.

In addition to Henry Hagm the principal subcontractors suppliers are: S. & S. Sand & Gra Ephrata, Wash., crushing; Geo V. Nolte, Moses Lake, Wash., pi Colorado Fuel & Iron Co., fenci Electric Smith, Spokane, electr work; Basin Paving Co., M Lake, Wash., curb, gutter and s walk; L. W. Vail, Pasco, Wa oiling; Nelson Landscaping Spokane, seeding slopes; Far W Fence Co., Seattle, guard-rails markers; Standard Traffic Cont Co., Spokane, precast separators previously noted, Soute Steel is supplying the steel; Central mix the prestressed beams; and Concrete Co., transit-mix conc

ORE TONS PER DOLLAR

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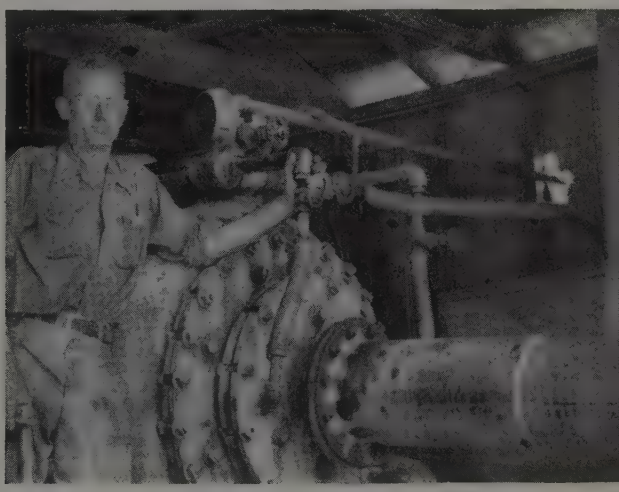

"29 YEARS WITH THE SAME 8" AMSCO PUMP"

Haskell Peel, Plant Superintendent at Consolidated Gravel Company, Columbus, Georgia, has shared many experiences with his 8" AMSCO PUMP. One of his favorites is the time that he and his pump almost dried out a lake to recover a sunken dredge. He hooked the 8" AMSCO to more than 1,000 ft. of 10" pipe, and ran it continuously for three days. No wonder the pump is his pet . . . it's been doing the job, pumping 75% sand and 25% gravel, for more than 29 years.

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Motor pool cuts equipment costs

Efficient maintenance, careful accounting, and pay-as-you-go replacement are keys to successful municipal motor pool rental system.

CAREFUL cost accounting and a thorough preventive maintenance program are the foundations of the Santa Rosa, Calif., municipal motor pool system, which has yielded big dividends in the form of extended equipment life, reduced costs and pay-as-you-go financing of replacement vehicles.

Now commencing its 12th year of operation the pool, officially known as Equipment and Replacement Pool (E&R), includes 104 pieces of equipment with an insured valuation of $203,000, covering all city-owned vehicles and equipment except those of the fire and police departments (which are serviced by E&R). Santa Rosa was one of the first cities of its size in California to set up the motor pool system, which was then confined to much larger cities. Since 1948 smaller city pools have become widespread. Several are modeled on Santa Rosa's set-up.

When it was organized in 1948, the pool took over 25 pieces of service equipment and 27 city trucks, many of which had attained voting age. Patriarch of the fleet was an ex-army ambulance built in 1917 and subsequently converted to a flat-bed truck. Insurance value of the whole lot was $7,000, and the availability factor was very low.

In fact, the maintenance force usually began its work day by selecting the truck most likely to start, and using it to tow the others around the block until all were running.

This proceedure has been replaced by a rigid inspection schedule which requires that each truck or equipment item be given a maintenance check at least once a month, and in some cases (sweepers for example) once a week.

If there is a truck that won't start, and this is a rare occasion, or if a truck is pulled out of the working force for repair, the pool has two standby vehicles which fill in the gaps.

The vehicle maintenance program is directed by Fred S. Farquar, Jr., superintendent of the Corporation Yard, which encompasses a city parts and supply store, storage of records and supplies, and the E&R pool. Farquar has headed the pool since its organization. He set up the basic record system and designed many of the forms used.

Generally, here is how the pool works: All the city vehicles, construction equipment such as rollers, oilers and graders, and miscellaneous machinery such as pumps, generators, and paint sprayers are property of the pool which supplies them with fuel, oil, grease, service, maintenance and repair, and insurance. As units reach the end of their working life, the pool purchases replacements.

Equipment is operated by th various city departments, at a fi hourly rental fee. Rental rate computed to cover all the cos including a proportionate share the labor and administrative cos plus a depreciation charge whic will provide enough cash to r place the unit when it is wo out. Time is figured "portal t portal" from the time a truc leaves the yard until it returns, an kept to the nearest full hour.

Most of the units are assigne permanently to one departmen but some are available to any ci department on a first come fir served basis.

In establishing the hourly charg for each class of vehicle or equip ment, Farquar draws on the dat developed by his extensive cost a counting system. Basis of this a ledger sheet for each piece equipment, listing its gross cos expected salvage value and n amount of depreciation during op erating life (arbitrarily 5 years fo vehicles, 10 years for most othe equipment). Ledger income lis total hours of operation eac month, and total charges for thes hours. Against this revenue is del ited all direct charges: batterie tires, fuel, oil, grease, labor, part and supplies, and proportiona charges for indirect expenses; in surance premiums, administrativ salaries, and miscellaneous over head (office phone, postage, etc Remaining balance is added to cumulative replacement fund fo

(Continued on page 82)

MOTOR POOL EQUIPMENT COSTS

Equipment	No.	Avg. Cost Each	Annual Hours Each	Replacement Charge	Maintenance	Insurance	Administration	Hourly Rental Rate
½ Ton Pickup	9	$1838	1940	$ .14	$ .37	$.03	$.03	$.57
¾ Ton Pickup	4	2008	1768	.175	.455	.04	.03	.70
¾ Ton Utility	5	2306	1965	.19	.44	.04	.03	.70
1 Ton Truck	9	2632	1760	.235	.385	.04	.04	.70
2 Ton Truck	9	4111	1699	.41	.47	.04	.07	.99
2 Ton Truck w/Loader	3	9135	1298	.93	.77	.06	.20	1.96
Hoist Truck	2	5735	170	3.02	2.41	.46	.95	6.80
Autos	10	2604	1939	.21	.35	.04	.04	.64
Compressors	6	3517	1042	.58	.48	.04	.10	1.20
Loader	1	5238	780	1.16	1.35	.03	.19	2.73
Rollers	2	4782	960	.82	.53	.04	.14	1.53
Small Oiler	2	1207	1440	.08	.35	.01	.02	.46
Large Oiler	1	2100	216	.79	.54	.06	.27	1.66
Welders	2	366	330	.20	.67	.01	.03	.91
Graders	2	14360	528	2.55	2.36	.36	.77	6.04
Tractors	2	3395	426	1.34	1.16	.10	.23	2.83
Chain Saw	1	510	96	.91	1.44	.11	.17	2.63
Spray Rig	1	962	372	.46	.66	.04	.07	1.23
Fork Truck	1	3500	180	1.83	1.22	.12	.21	3.88
Backhoe	1	6134	400	1.70	1.43	.33	.43	3.89

"TWIN" SCRAPERS and CRAWLERS

hese big twin-power scrapers of nearly 600 total moving 30 yd. loads of impervious core ma- the fill. They are push loaded in the borrow pit d TC-12 Tractors of 425 net h.p. to get maximum the shortest possible time. Four TC-12's were purchased to push load the "Twin" Scrapers. With two engines and independent track drive, these "Euc" tractors have exceptional maneuverability with power and speed that give them unequalled work-ability on all big tractor jobs.

igh Production at

NAVAJO DAM

See your Euclid dealer for information on the complete line of "Euc" Scrapers, Crawler Tractors, Rear-Dump and Bottom-Dump Haulers . . . he can show you that Euclids give greater return on investment.

MOTOR POOL

(Continued from page 78)

that individual unit, and is shown as the final column on the ledger sheet.

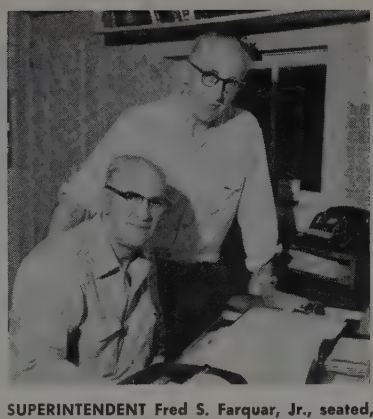
Data for the ledger, as well as other operations recaps, come from a succession of daily and monthly report forms beginning with a simple time chit filled out by the operator, showing equipment number, hours worked, and department or project to which it is charged. Daily time reports are entered on a monthly distribution card showing the departments or projects to which the unit's time is to be charged. (A long, complicated "invoice" is rendered twice a month showing charges against each department for all equipment time.)

Maintenance records start with the same daily time chit filled out by mechanics, showing the equipment number and hours worked on it. All repair work is recorded on an individual job sheet for each vehicle, showing materials and costs. Fuel and oil consumption are kept on separate records. All maintenance and service reports are gathered on a monthly maintenance card, and its totals transferred to the ledger.

During the current fiscal year, equipment charges were increased an average of 2¢ per hour to cover additional cost of gasoline which is purchased on bid. Low bidder this year was $4,000 over comparable cost the previous year. This, incidentally, is the first increase in equipment rates in the past three years, despite steadily rising costs of labor, parts, supplies and replacement equipment. These were offset by lowered maintenance costs reflecting increased efficiency of the operation.

As the table shows, administrative charges made to each piece of equipment go up as the hours of operation go down. Total annual administrative costs, which include one-half of Farquar's salary, one-quarter of assistant superintendent Roy Langdon's salary, plus office and overhead charges, are proportioned among equipment units according to their valuation. This proportionate share is then divided by annual hours of operation to get the hourly charge figure.

Farquar pointed out that according to his cost records it is as economical to operate a 1-ton truck as a ¾-ton truck or ¾-ton pickup. Despite a $300 difference in cost, both sizes have the same hourly



SUPERINTENDENT Fred S. Farquar, Jr., seated, and Roy Langdon, assistant superintendent, study vehicle cost records kept by the Santa Rosa motor pool.

charge, 70¢. The bigger truck, he says, not only can do more work, but has a greater over-load factor, and costs less to maintain.

This bears out the superintendent's contention that heavy-duty equipment more than pays for itself over the life of the unit. When writing specifications for new equipment, he includes heavy-duty batteries, generators, radiators, springs, and other items. Thus the equipment is beefed up at all possible points.

Top quality batteries (140 vs. 100 amp.), nylon cord tires and standard factory parts are purchased exclusively. Farquar notes that the added life more than offsets added original cost.

He also learned to list exactly what he wants in writing out bid specifications because, he says, on a bid purchase you don't get any extras. Virtually all purchases are made on a bid basis, although Santa Rosa ordinance permits direct purchase. Farquar prefers the bid practice because it prevents ill will among competing distributors. He also tries to purchase from firms located within the city itself.

Motor pool operations provide good evidence on the value of specialized equipment. As an example the superintendent cited a new Case backhoe - loader combination purchased this year. The unit cost $6,134 which, since it was an addition to the equipment, required an additional appropriation by the city council. Its hourly rental rate is $3.82. However, with the backhoe in operation the city has been able to reduce its charges for sewer connections by $40, since it replaces 4 men and can dig the necessary trench in half the time formerly required.

Another example is provided by the front-end loaders mounted three pool trucks. The loader crease the truck investmen 80%, but they enable the hauling crew to double its pro tion.

The physical plant for eq ment maintenance and storage sists of a 2-stall repair garag lube room with two hoists, a number of parking stalls in shaped building surroundi paved courtyard. Shop forema Donald Deffenbaugh, and his is made up of 6 mechanics a garage attendants, working in shifts. Deffenbaugh runs the ventive maintenance program termines when units need m repairs, maintains repair rec and the separate tire and ba account records. All tires are vidually numbered, and recap as many times as possible. S most of the trucks get relat low mileage (about 6,000 mi. year) more tires are retired fo age than for wear.

Pool vehicles usually are lim to one major engine overhaul the time a truck goes through engines, Farquar says, so n other things are ready to b down that it doesn't pay to re it again. This is one reason vehicles are carried on a 5-year expectancy.

Headquarters for the pool the corporation yard is an wooden stable built in the 18 and now converted to parts sto and offices.

It also is headquarters for city's radio dispatching sys which covers 19 cars and tr plus 4 remote stations locate the offices of various departm heads. Main transmitter is in "round house," and is presided by David Britt, Jr., radio patcher.

The $17,000 Motorola sys was installed about a year ago, has already paid for itself se times, in Farquar's opinion. savings is in working crews' t since they can be sent from job to the next without retur to the office or stopping to ca

Farquar estimates the total v of his maintenance shops at 000. He has requested an additi $75,000 to enlarge and mode them; to provide eight repair instead of the present two, an enable him to add a badly-ne paint room and additional st stalls. He notes that the proj expansion will handle half a as much equipment, and thi pacity will soon be needed.

Ask your Allis-Chalmers dealer to show you **"And A Great Deal More"**

Longer-Reaching TRACTOLOADER Stays Back 'rom Truck and Still Dumps Load Right in Center

ıere's reach to spare with a TRACTOLOADER. ote that this TL-20 is not even up to the body this 12-ton truck — 8 feet high, 8 feet wide — t it's dumping right in the center. No time-con- ming loading from both sides . . . no pitching . . . wasting time dozing to distribute material evenly and no banging-up truck and loader.

In addition to extra-long reach, both the big -20 and TL-16 loaders, and the medium-size -14 have *exclusive* ONE-LEVER speed and ection control. Operator works fast because he es into and out of *any* forward or reverse gear at l, while moving, with one lever.

To make your TRACTOLOADERS even more oductive, you get bigger-than-ever carry capacity. ıe TL-20 carries 9,000 lb and has a 130-hp diesel engine. On the TL-16, you get 7,000-lb carry capacity and a choice of a 109-hp gasoline or a 104-hp diesel engine. The new TL-14 has 5,300-lb carry capacity and gives you either an 83-hp diesel or an 86-hp gasoline engine.

To further increase the efficiency of your work, each of these loaders has a whole family of buckets. You choose the size that is most suitable for your operating conditions and the materials you handle. Buckets range from 2¼ to 5 yd for the TL-20; 1½ to 4 yd for the TL-16; 1 to 3 yd for the TL-14.

Let your Allis-Chalmers dealer help you decide which TRACTOLOADER would be best for you. Start getting that extra reach and extra production now. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

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...power for a growing world

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Fill begins to move into Salt Lake

TOP—

STAGE 2 of Willard Dam is under way v 10,000,000 cu. yd. of fill being placed dike off a 10,000-ac. area of Great Salt L Under the back-drop of the towering Was Range, the machines of George M. Br ter & Son, Inc. are putting a 15-ft. raise the 13.6-mi. embankment.

The project, including engineering probl and construction program, was describe detail in the last issue (Western Construc July 1959, pg. 31). The Bureau of Recla tion project is under the immediate direc of Clinton D. Woods, project manager.

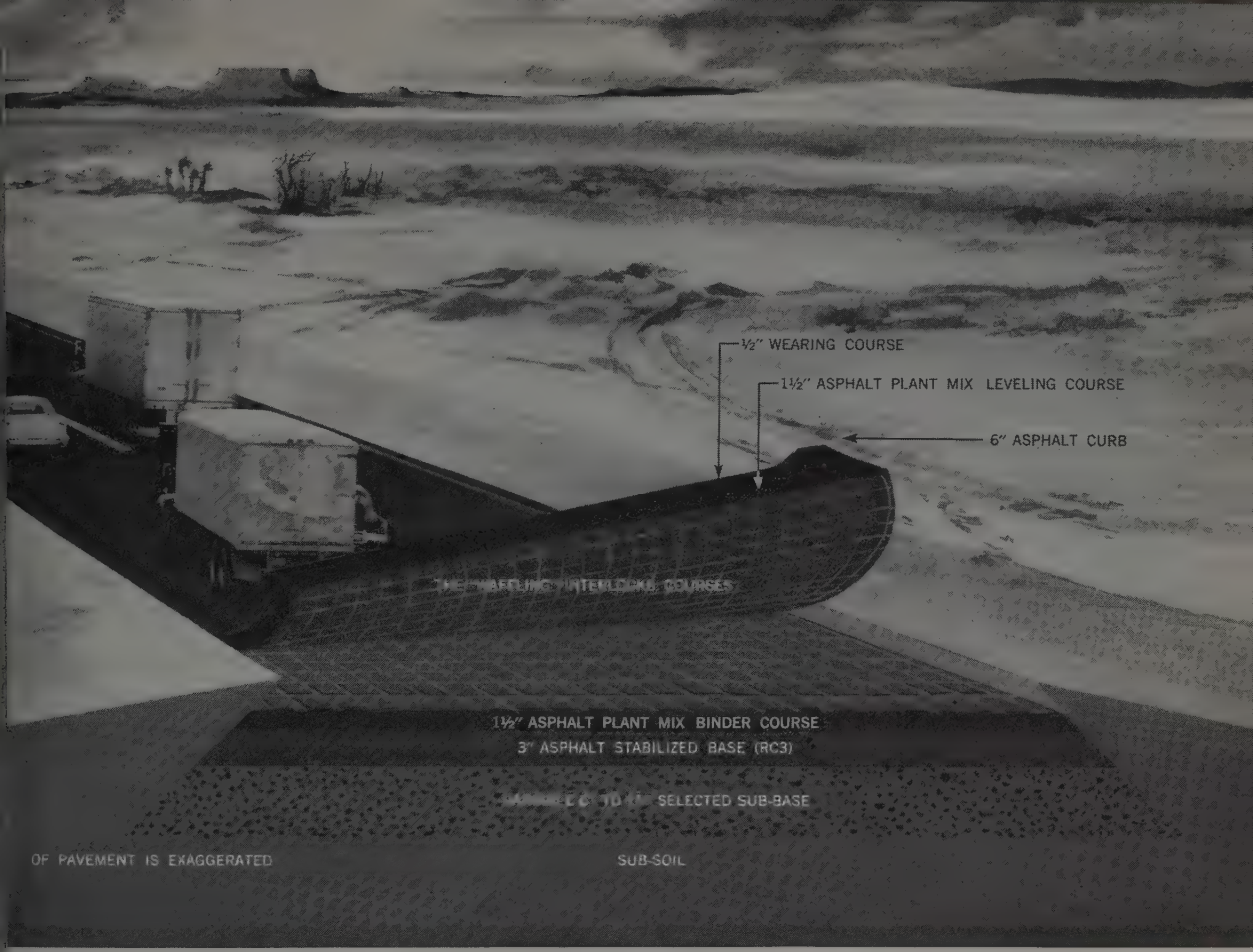
CENTER—

ZONE 1 material moves into the fill Weight of the fill and heavy equipmen some areas, brought water up to the su ahead of the fill. The soft foundation req a base width of 455 ft. Full height, Stage 3 is completed, will be 34 ft. plu allowance for settlement.

BOTTOM—

TO AREATE wet material in one of the bo areas the contractor is using a sub-soil capable of turning a furrow 4 ft. deep, a 6-ft. moldboard, although a 2-ft. dep usually turned.

Bureau of Reclamation p



egment Asphalt-Paved!

ements leads to decision

e cross section above shows you in detail how t Asphalt materials were used to give this pave- sting strength despite the scarcity of aggregate.

otice, first, the use of Asphalt 3-inch base. This base, a ravel, was road-mixed on the d sub-base using RC-3 liquid

otice, second, (see right y above) that the 3-inch course was asphalt plant- d down in two courses. A novel between-course ck was provided by "waffling" the lower course ill hot with a 4-inch square grid pattern, impressed ⅛-inch into the surface. A tack coat was applied econd course constructed. Then, a ½-inch wearing was laid to insure a non-skid surface.

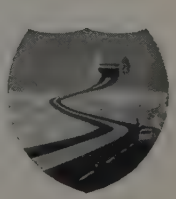
otice, third, that both base and surface courses form across the whole width of the road, shoulders as traffic lanes.

Notice, fourth, the use of Asphalt curb to provide controlled drainage, prevent embankment erosion and aid safety.

BEAT SCHEDULE BY TEN WEEKS

With today's equipment, modern heavy-duty Asphalt concrete pavement is being laid at record, reputation-building, tax-fund-conserving speeds. In this case, construction was completed 10 weeks ahead of schedule . . . in plenty of time to accommodate the bulk of the summer tourist traffic.

Modern Asphalt concrete pavement can help **you** speed your highway modernizing program. It provides, as well, strength, durability and economy in full measure. Specify it for your Interstate Highways. Primary and farm-to-market roads, too.



Ribbons of velvet smoothness . . .
***ASPHALT**- paved Interstate Highways*

THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Maryland

CONCRETE TRAIN shown in operation at tunnel portal. Batch is fed into 5-yd. agitator car in foreground, which in turn feeds surge hopper for 8-in. slick line, with air booster.

TUNNEL

(Continued from page 41)

opened at the end of the screw and a horizontal gate that moved back to uncover an opening at the bottom end of the screw. The discharge rate was controlled by regulating the speed of the air motor that drove the screw. Two concrete cars were made on the job and were used to deliver concrete to the invert conveyor and to the concrete pump system for lining the arch of the tunnel. Battery-powered locomotives were used for moving the concrete cars.

Concrete mix for the invert consisted of 1½-in. maximum size aggregate containing 5.2 sacks of cement per cubic yard, 33% sand by weight and 4½% entrained air. The 2½-in. slump concrete averaged 3,580 psi. at 28 days, using Type II, low alkali cement.

Arch forms

Forms totaling 200 ft. in length were used to complete the sides and arch of the horseshoe-shaped tunnel section. These forms were designed to collapse so they could be telescoped through the forms ahead and then expanded and bolted into position. Continuous concrete lining was placed for as much as twelve days at a time.

The 200 ft. of form was long enough to allow sufficient time for the concrete to set before being moved ahead. The forms were usually left in place 12 hr. but stripping times as short at 8 hr. were tried with no difficulties from spalling, sloughing, or cracking of the concrete. After 20-ft. sections of the forms were stripped and telescoped through the forms ahead they were cleaned and oiled, and then expanded into position. Following stripping operations the concrete was cured by spraying on a clear curing compound.

Placing behind forms

Concrete was placed back of the forms by pumping through a 50-ft. 8-in. slick-line. The whole placing assembly consisting of line support, concrete pumping equipment with feed conveyor, and surge car with feed conveyor moved as a unit on rails on the invert. The slick-line was usually buried 10 ft. into the fresh concrete to obtain maximum filling of concrete around and above the lagging. The line was supported above the forms by easily moved hangers with pipe rollers attached to the steel tunnel ribs. Movement of the unit was by an air "tugger" mounted on the line-support car and through a cable and block arrangement anchored to the rails ahead of the unit.

Concrete was delivered to the placing unit in 5-cu. yd. agitator cars. These cars had an air-motor-driven screw in the bottom of the car that discharged the concr onto a conveyor belt. This conv or discharged into a surge agitator car of the same design the concrete cars. Discharge of c crete from the agitator car o the conveyor belt feeding the c crete pumping equipment was c trolled so there was a steady fl of concrete into the small hop above the pump. Only a sm hopper could be used because the limited head room. The c charge rate of the agitator was c trolled by the concrete pumpi equipment operator varying speed of the air motor driving screw.

The rate of concrete placing w controlled by the rate of delive A by-pass was constructed by wi ning the tunnel about midway its length. This in effect cut traveling distance of the concr trains down to a maximum of 000 ft. Two trains were used a were able to maintain an adequ delivery rate.

Consolidation of the concr behind the forms was by both ternal and form vibrators. Inter electric vibrators were used throu the form windows until the w dows had to be closed. Form brators were clamped to the phragms of the forms for the fi consolidation. To assist in drivi the concrete into as much of arch of the tunnel as possible air booster was attached to the st of the slick-line where it left line support car. Feeding air i the slick-line helped move the c crete through the line and had effect of vibrating and forcing concrete into all small openi upon discharge from the pipe.

The concrete mix for the bar section of the tunnel consisted 1½-in. maximum size aggreg containing 5.6 sacks of cement yd., 36% sand by weight and 4½ entrained air. A strength avera of 3,675 psi. at 28 days was tained using Type II low alk cement. Concrete with a slump low as 3 to 3½-in. at the point placement was pumped with li difficulty although the average 4 in. Consolidation of the concr was on a slope of about 4 to 1, a run-out of about 30 ft. On flat slope the concrete vibrated i place easily and was found to s "alive" up to two hours.

At the end of the first few 6-c placement periods, bulkheads w used to obtain vertical constructi joints and to afford a point

... for more details, adv. opp. pg., circle No. 47 on Reader Service Poste

arting the next cycle. Later, slop-
ng construction joints were used
nd found to be satisfactory. By
orking through the windows the
oping concrete surface was lightly
ood-floated to consolidate the
ncrete and to remove the feather
lge up over the arch. Before start-
g the next concreting cycle the
een concrete was cleaned by
ater cutting. A sand-cement grout
as applied to the slope just prior
the start of concrete placement.
The average rate of placing con-
ete in the sides and arch of the
nnel was 297 ft. in a 24-hr. day
d averaged 265 cu. yd. placed.
he maximum rate was 451 ft. in
e day and this occurred near the
d of the tunnel when all the
ncrete the pump could handle
s delivered. The maximum
ngth of arch placed between con-
uction joints was 2,455 ft.

After the completion of all concreting operations a program of back-fill grouting was started. Only those areas in the tunnel that were through faults, large over-break areas, or showed water leakage were grouted. A sand-cement grout mixture using two parts fine blow sand, one part cement, and two parts of water by volume was pumped through a circulating line to the grout connections.

Holes were drilled through the lining at previously marked points and connections were made with an expanding rubber packer. Slightly over 29,000 cu. ft. of grout was placed with pressures varying from 20 to 50 psi. Along with the grouting operations several weep holes were drilled in the sides of the tunnel just above the invert. These holes were drilled where water previously had been encountered.

Personnel

The Commissioner of the Bureau of Reclamation is Floyd E. Dominy, Grant Bloodgood is Assistant Commissioner and Chief Engineer, and Frank Clinton is Regional Director.

At the Helena Construction Office Theodore Mann is construction engineer, Maurice C. Wren, field engineer, Nathan Young, office engineer, Gilmore Hanson, survey chief, Robert Oliver, chief inspector on pumping plant and tunnel, and Sam Rey, administrative officer.

For the A. J. Cheff Construction Co., Oscar Cheff was job superintendent, Homer Cheff and Robert Cheff, assistant superintendents, Ed Bonderenko, master mechanic, Sam Van Hise, chief electrician and William Butler, engineer.

ELECTING CONTRACTORS

(Continued from page 62)

verning laws or rules so as to
ow it — and this is not such a
astic change as it might seem; it
more like an improvement on
e definition of the word "com-
tition" to establish what "com-
tition" really is.

iting the proposals

With proper legal authority es-
lished, the next step is to invite
posals, supplying plans and a
ft of the proposed form of con-
t and specifications, and at the
e time, tell the interested con-
ctors and the public and the
ss how the selection will be
de, and let the criticism come
n, if it is going to come. How-
r, there may not be much criti-
n of an honest effort to do a
. And, at that time, beforehand,
re is little likelihood of a con-
tor objecting, because he would
putting himself in the position
objecting to fair competition
l, if a contractor does not object
the beginning where he is in-
d to talk, he cannot very grace-
ly object later when he misses
job.

posals reviewed by board

My suggestion is that the pro-
als should be reviewed and the contractors rated by a Board of 5 to 7 members, in the way described in following paragraphs. The members would not necessarily be connected with any specific governmental body. *They would be people whose integrity would be beyond any possibility of being questioned, and who would be willing to serve in the interest of the public on big jobs.* One might be the Governor, one a judge, one the mayor, one an editor, one a councilman, and one a bank president, and two might be directly connected with the Public Works Department involved.

Critics of this idea will say "It's no good"—"It won't work because the Board will be subjected to all kinds of pressure, and the best people will not want to serve." My answer is—we can create a Board of this type with the integrity of a high court, with authority to enforce their decision, and it will work if it is initiated with sincerity.

When the invitation is extended to contractors, they should be told the way they will be rated, so that they can submit anything they may desire as to their experience and record of performance — anything they want to submit to substantiate their claim that they deserve to have the job.

The proposals, when received, should be submitted to the Board for review and preliminary rating, and the top three (or more) under the preliminary rating should be requested to attend a hearing where the Board may interview the contractor's people and ask direct questions prior to each Board member defining his final rating of each contractor. This hearing should be open to the public and to the press.

The scheme for rating, which appears on page 62, is obviously susceptible to infinite variation as to detail. The example shown there is for illustrative purposes only. It is a sample of the way one Board member might rate one contractor.

STUMP BURNER devised by *"Chick" Dwyer* (with hat), construction superintendent of M. W. Brown Co., Redding, Calif., examined by Dwyer and *R. J. Felton*, California Highway Division construction engineer. Burner consists of a salvaged blower fan driven by a small gasoline engine. Air stream directed at base of stump pile speeds burning and keeps hot fire going.

WESTERN CONSTRUCTION NEWS

First contract on $68,000,000 Aqueduct goes to Young & Anderson

THE 33-mi. first stage of the East Bay Municipal Utility District's third aqueduct line will be started this fall. Contract for the initial pipeline link in the 92-mi. aqueduct has been awarded to Young & Anderson Co., Brea, Calif. The firm was low bidder of ten with a figure of $14,975,491.

Total estimated cost for the new aqueduct is approximately $68,000,000. It will provide an additional 125 mgd. of Mokelumne River water.

The entire aqueduct line totals 92 mi., running from Pardee Reservoir in the Sierra foothills, to Orinda. Other sections of the line will be built in seven additional contracts. Total elapsed time will be three and one-half years from start to finish of the project in October 1962.

The following is the timetable for the eight aqueduct contracts: Starting this year will be:

1. Pipeline: Bixler to Walnut Creek—33 mi.
2. Tunnel: Lafayette Tunnel through Charles Hill to Orinda Filter Plant—3½ mi.

Starting in 1960 will be:

3. Pipeline: Pardee Dam to San Joaquin River—34 mi.
4. Concrete pile supports: San Joaquin River to Bixler—14½ mi.
5. Pipeline: San Joaquin River to Bixler, elevated portions.
6. Underwater sections: San Joaquin River to Bixler — three crossings.
7. Tunnels: Near Walnut Creek and Lafayette.

The three river crossings will require submerging the line to elevation minus 50 ft. because of the San Joaquin River's deep water channel to the Port of Stockton.

Inside diameter of all 82 mi. of pipeline will be 87 in. Other portions of the aqueduct, totaling 10 mi., will be larger diameters. Total footage of the 82 mi. of steel pipe is 428,000 ft. and total weight is 120,000 tons, equivalent to all the steel, including the cables, used in building the San Francisco-Oakland Bay Bridge. The 82-mi. stretch of pipeline will be the longest of its size in the United States.

Three types of pipe will be considered for the third EBMUD aqueduct. The first is welded steel pipe cement mortar lined and mortar coated. The second is prestressed concrete pipe, and the third is a modified prestressed concrete cylinder pipe. The purpose of the steel cylinder is to withstand the maximum hydrostatic head.

The original Mokelumne Aqueduct, begun in 1926 and completed in 1929, was 65 in. in diameter. Aqueduct No. 2, begun in 1946 and completed in 1949, was 68 in. No. 1 was all-steel constructio No. 2 was steel and concrete, wi the concrete pipe used in the foo hill sections, where the head lower. Steel was necessary for t second aqueduct along the Centr Valley floor where water pressu within the pipe is greater.

The job of building the thi aqueduct in eight contracts w speed the completion of the enti 92 mi. Another important adva tage of breaking the job into se ments is that the total contra would otherwise be so large th smaller contractors would be eli inated from the bidding compe tion.

Contracts will call for the co tractor to supply the fabricat pipe, as well as to install the pip The general contractor will obta the necessary material from pi fabricators. Each section of the t tal length will be about a two-ye construction jobs.

Joseph D. DeCosta is chief en neer of the East Bay Municip Utility District, and Walter R. M Lean is supervising civil engine

HIGH GORGE DAM GOING UP

The Skagit river has been diverted from its original course to a new man-m channel to permit excavation for second stage construction of Seattle City Light's h Gorge Dam. Water now going over the Gorge diversion dam is turning nearly at ri angles into the new channel and in an S-curve as shown flows through a low sec purposely left in the first stage of the high dam.

While the diversion was taking place, contractor's men were already excavating the second stage construction. City Light personnel had been operating the Skagit pla for many months in a manner to maintain a dry channel at the dam site, enabling contractors to proceed with the excavation, preparation of the diversion channel construction of the cofferdam. The dam, being constructed by Merritt-Chapman Scott, is scheduled for completion in 1961.

Heavy jobs like this are easy for the big new Cat No. 14 Motor Grader, working here on a section of Interstate Highway System near Corsicana, Texas. Owner: T. L. James & Co. Inc. and R. W. McKinney, Corsicana.

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first and only Turbocharged Motor Grader, the big 14 delivers high production at low operating cost n on the roughest and finest grading work. It packs HP and 29,280 lb. heft to handle heavy work kly. Operates at the highest practical working eds with either a 12-ft. or 14-ft. moldboard. You 't have to pick "spots" to make it pay off. You can it profitably on many different applications such as:

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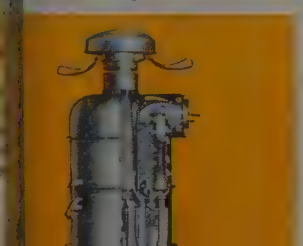
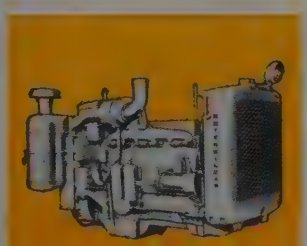
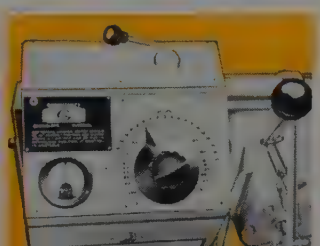
DRY-TYPE AIR CLEANER. Removes of all dirt from intake air during service hour. Can be serviced in utes. Cuts maintenance time by up %. Extends engine life.



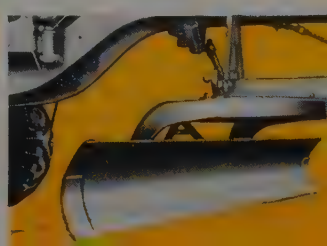
NEW TURBOCHARGED CAT ENGINE. Turbocharger utilizes waste energy from engine exhaust to increase efficiency and economy. Engine provides high torque rise that pays off on the job.



PRECO AUTOMATIC BLADE CONTROL. Optional. Operator selects desired slope on dial. Now transistorized, unit automatically controls blade slope within ⅛ in. in 10 ft.



HIGH THROAT CLEARANCE. New design permits increased clearance between moldboard and circle for greater loads. Also extra-strong frame, circle and drawbar.



Colorado halts Interstate awards

SHORTAGE of Federal Aid funds which has caused Colorado to halt the awarding of construction contracts on the state's 964 mi. of Interstate System will take $13,000,000 from the pockets of Colorado workers in the next 12 months, according to Chief Engineer Mark U. Watrous, Colorado Department of Highways. "We were forced to halt the awarding of new contracts because we were told that there is not enough money in the Highway Trust Fund to pay for construction commitments that already have been made by the states," Watrous said.

Affected by the shortage are 32 projects for construction and right-of-way totaling approximately $28,000,000. Of these, 26 projects, amounting to $22,124,000, are in the current budget which became effective July 1, and six projects, costing $5,800,000, are carried over from the 1958-1959 budget.

Atkinson wins Ice Harbor bid

GUY F. ATKINSON CO. of San Francisco, with a bid of $20,744,405, was low at the bid opening in the Walla Walla District Office, Corps of Engineers, calling for a contract to complete the north shore construction work at Ice Harbor lock and dam on the Snake River. The runner-up bidder was Montag-Halvorson-Austin and Associates of Portland, with a bid of $21,798,730. The Government estimate for the north shore construction work was $22,027,422.

Four contractors submitted bids, which in part called for completing the second step cofferdam, including unwatering and maintaining the work area within the north shore closure. Completion of the cofferdam will require the placing of 1,100 tons of steel sheet piling, and 31,000 cu. yd. of gravel cell fill. The two connecting embankment legs that will close off the cofferdam from the north shore and connect with the cells in midstream will require 71,500 cu. yd. of rock fill and 251,500 cu. yd. of impervious fill.

Excavation necessary for various structures in the north shore closure, including the embankment for abutment, will require 320,000 cu. yd. of common excavation, 134,000 cu. yd. of rock excavation and 227,000 cu. yd. of impervious fill, along with 156,000 cu. yd. of rock fill and 350,000 cu. yd. of random fill.

The structures to be built within the north shore work area include 2½ bays of the spillway, along with the installation of four spillway tainter gates, construction of the non-overflow dam section, the north shore fish ladder and fishway pumphouse, and pump installation. The 86 x 675-ft. Ice Harbor navigation lock and guide walls will utilize some 655,000 cu. yd. of mass concrete.

"PORTABLE" VAULT OF PRECAST CONCRETE

Thirty-two ton "portable" bank vault awaits installation in temporary quart of new Bank of America branch in Sacramento, Calif., following truck trip from p fabrication site 100 mi. away. An innovation in bank construction, the 9½ x 9½ x 12 prestressed concrete and steel vault can be moved to larger permanent bank buildi when growth of branch warrants. Meanwhile it will provide regular safety deposit s vice and cash vault protection. During morning of moving day, workmen using gan crane loaded vault on heavy-duty low bed truck, and hauled the load to its destinati the same day. The following day construction crew skidded it off truck and hauled t load to its destination the same day.

The vault was skidded off truck and installed by use of block and tackle and wood rollers. Built-in steel padeyes on top and shallow holes for removable handling be on sides enabled maneuvering through service entrance having less than 1-in. margi clearance, and anchoring at exact level to accommodate 3½-ton precision door. Va was manufactured in Petaluma by Ben C. Gerwick, Inc., of San Francisco.

Water supply drops at Hoover Dam

FORECASTING below average snow-melt inflow to Lake Mead during the April-July period, the Bureau of Reclamation has met with representatives of Hoover Dam power allottees to program integration of operations of the power plant for the next operating year which began June 1.

W. H. Taylor, Director of the Bureau of Reclamation's Region 3, explained that the meeting is h annually as provided for in t Hoover Dam contracts.

Melting snows of the Rocki now flowing down the Colora River into Lake Mead, are pected to raise the reservoir o a small amount this year. T high runoff in 1957 and 19 raised the lake from a critical l caused by four consecutive ye of subnormal precipitation on t watershed. Operations during past year have resulted in the l remaining at a high level for t time of year.

The poor water supply will quire considering the possibility reducing the output of Hoo power plant during the next twe months below 100% of contr firm power output.

The mean forecast as of Jun for April-July inflow to Lake M this year is 4,500,000 ac.-ft. or ab 4,000,000 ac.-ft. less than the year average. Actual run-off m ured near Grand Canyon dur the April-July period last year 9,926,000 ac.-ft., 12,887,000 ac.-ft 1957, and 6,185,000 ac.-ft. in 19

6 Crawl-IR drills deliver
POWER-HOUSE PUNCH
at Rocky Reach Dam

This concentrated battery of fast-acting, mobile drilling power is sinking 25 to 30 foot holes for the main power house excavation at Rocky Reach Dam on the Columbia River, north of Wenatchee, Washington. Under construction by the Rocky Reach Contractors, this major project is a joint venture sponsored by the L. E. Dixon Company of San Gabriel, Cal. For high sustained drilling speeds, these six Ingersoll-Rand Crawl-IR drills are using 2¾" Carset bits and I-R Carburized Drill Steels.

The Crawl-IR units are also used to drill 90 foot grout holes around the circumference of the coffer dam.

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

BEAR TIME AGAIN — Now that the salmon are beginning to move upstream, construction men in remote Alaskan areas must be on their guard for Alaska's huge—and sometimes deadly—bears. The annals of Alaska construction record many an instance wherein bear and man met unexpectedly. Generally, both parties take off at a dead run. In some instances, one runs and one chases. I know of no instance where a non-hunter was ambitious enough to chase a bear. A few instances from the past of bear activities in Alaska may serve both as instruction and as warning. In one case, miners at a diamond drilling site high on a mountain were disturbed because they could not keep water flowing through new plastic pipe which had been air dropped to them. Upon inspection of the line, drillers found a bear chewing on the pipe. Near Juneau, Walter Johnson, a mechanic encountered a bear suddenly. Bruin made a couple of swipes, inflicting scratches. Then he attempted to bite Johnson. In retaliation, Johnson grabbed the young bear by the ears and twisted his head. It was touch and go for a few minutes until Johnson got the upper hand and booted the bear into the brush.

NEW ALASKA LIFELINES — Nowhere under the American flag is there so vast an area still untapped by any road. It's pretty generally recognized in the Northland that one of the main keys to the development of this untamed area is an expanded program of road construction. Alaska's need for roads and other forms of transportation was recognized by the recent extension of the life of the Alaska International Rail and Highway Commission. The Commission must report to Congress on the feasibility of a railroad to Alaska and additional road connections between Alaska and the other states, plus feeder roads.

DREAM ROAD TO NOME — a route which is opening up some of the most beautiful country on the North American continent is being extended at a snail's pace—or what seems to be such a pace to those impatient to see the link completed. It's the Fairbanks-Nome road, which will be some 550 miles long. The route is through rugged Alaskan terrain and hasn't been completely surveyed on foot, although aerial reconnaissance has been carried out. The Bureau of Public Roads says work is progressing as fast as funds become available, from both ends. Some "sidewalk experts" in both Nome and Fairbanks enjoy guessing when the road will be complete. The BPR answer: from 4 to 20 years depending on availability of funds.

OTHER ROADS — Other significant highway work now going on in Alaska's interior includes a 7-mi. paving job on the Steese Highway, and a number of bridge projects in the Nome area. A 40-mi. strip of the Alaska highway from the Yukon, Canada border into Alaska has been completed, with a 70-mi. stretch scheduled to be completed by fall.

UNREST IN ALASKA—As this is written, the labor situation in Alaska still is unsettled and has grown so ominous that the governor of the state has offered to help settle the dispute. At this writing, some 2,500 carpenters are off the job. Large military construction projects have been shut down. The carpenters walked off at the Clear missile detection project. A total of 17 jobs in the Anchorage area and 11 in Fairbanks are affected. The unions want free room and board on bush jobs, preferential hiring at the rate of five for the union to one for the contractor and a 50-cent hourly wage increase. A newspaper in Fairbanks declared editorially that the economy of Alaska was being so seriously affected by the walkout that the governor should step in. Shortly afterward, Governor William Egan telephoned representatives of both the carpenters and contractors urging early resumption of negotiations. Meanwhile, precious Alaska construction days are going down the drain.

TOMORROW'S ENGINEERS Engineering students from vario colleges and universities are enjo ing a refreshing switch from t theoretical to the practical in Al ka this summer—and earnin money to boot. The U. S. Arm Engineer District, Alaska, as it h in years past, is giving a sele group of fledgling engineers chance to gain know-how in the profession while earning funds continue their studies. This yea 84 young men are in Alaska in co nection with the program. Th have been hired as engineerin aides and work with experienc engineers and construction expe on civil and defense projects. T students come from many parts the United States and some forei countries to learn and earn duri their summer vacations. Many those who come to Alaska duri their undergraduate years gain special liking for the country a return to make their homes he

NUGGETS—A federal loan of $ 800,000 to the City of Sitka for i provements and expansion of wat facilities and construction of power dam has been approved the Community Facilities Admi stration in Washington . . . For fires in Alaska are taking up mu of the slack in employment the days because of the large amou of manpower needed. At one poi more than 800 men were fighti the fires . . . Work is progressi on a $700,000 bowling alley-sho ping center project in Fairban which will provide a total of additional lanes for that commu ity . . . Alcan Pacific Co. of A chorage has been awarded a $ 628,415 contract for constructi of 138 new family quarters for t U. S. Air Force at Eielson Air For Base . . . The Urban Renew Division of the Alaska Housing A thority is now calling for bids land in the 13-ac. downtown Fa banks redevelopment project. C struction of buildings in the n area is expected to start in 1960 Construction of commercial a residential structures in Anchora is expected to hit an all-time hi of about $20,000,000 for 1959 cording to City Manager Geo Shannon as compared with a pre ous high of $7,500,000 last year Congress has been asked by the Force to approve $19,682,000 fo number of construction and equ ment projects in Alaska.

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Mullen low bidder on John Day dirt job

OVER a million dollars separated the high and low estimates of ten bidders at a bid opening in the U. S. Army Engineer District, Walla Walla, Corps of Engineers, competing for the contract of moving over a million cubic yards of excavated material and forming a million cubic yard embankment at the John Day lock and dam project on the Columbia River.

Apparent low bidder for the work was S. S. Mullen, Seattle, with a bid of $941,246. Runner-up was the Montag-Halvorson Co., Portland, with a bid of $1,211,905. High bidder submitted a bid of $2,136,660. The Government estimate on the work was $1,133,274.

Excavation work at John Day consists of 950,000 cu. yd. of common excavation and 240,000 cu. yd. of rock excavation which will accommodate the foundation base of the 20 spillway bays. The contract also requires the continuous unwatering of the 20-ac. area behind the north shore cofferdam.

A million cubic yards of excavated material removed in forming the foundation base for the 20 spillway bays will be utilized along the north shore of the Columbia as a protecting embankment to the permanent relocation of right-of-way of the SP&S Railway past the dam.

The contract specifies that the work must be completed by November 15.

Handbook issued on bidding practice

HOW proper bidding procedure can pay big dividends is told in a new bidding guide prepared jointly by the American Society of Civil Engineers and Associated General Contractors. Low costs, sound design and better construction are high on the list of benefits to owner, engineer and contractor, according to the 12-page brochure, which is the product of qualified engineers and contractors. It is called "A Recommended Guide to Bidding Procedure on Engineering Construction."

The document is not intended for use in drawing up building contracts. However, it has broad application in the heavy construction field. Vital areas specifically covered are (1) preliminary investigation; (2) plans; (3) specifications; (4) bidding; (5) separate contracts; and (6) sub-contracts. Clearly noted for ready reference are such items as: local ordinances; royalties and patents; bases of payments; details of plans; contract documents; deposits; etc. These are but a few of the subjects that make the new brochure a useful guide to economies in engineered construction.

Single copies are free. Quantity orders, two or more, are available at cost — 25¢ a copy. Address requests to ASCE, 33 West 39th St., New York 18, N. Y. In ordering, be sure to mention "Recommended Bidding Guide."

Irrigation reservoir project approved

A PROPOSED $1,327,000 loan under the Small Reclamation Projects Act of 1956 for construction of an irrigation water supply for the Jackson Valley Irrigation District, near Ione, Calif., has been approved by the Department of the Interior. Before work can begin on the project a repayment contract with the water users must be executed and validated and funds appropriated by the Congress.

The main feature of the project to be constructed under this loan would be a dam and reservoir on Jackson Creek, a tributary of the Mokelumne River. The work would also include a minor diversion structure and a diversion canal. The development would provide irrigation water for 3,600 acres.

California gas tax spending tops $31,000,000

A RECORD of $31,560,053 in state gasoline tax revenues has been apportioned to the 354 cities in California for street work and engineering during the current fiscal year. This is $1,132,401 more than last year's record.

The gas tax distributed to cities is the revenue from five-eighths of a cent per gallon out of the state gasoline taxes paid by highway users. It is apportioned by the Division of Highways from the state highway fund according to law on a population basis. The additional allocation to cities for engineering, also apportioned on a population basis, is taken from other state highway funds and varies from a minimum of $1,000 for cities under 5,000 population to a maximum of $20,000 for cities with more than half a million people.

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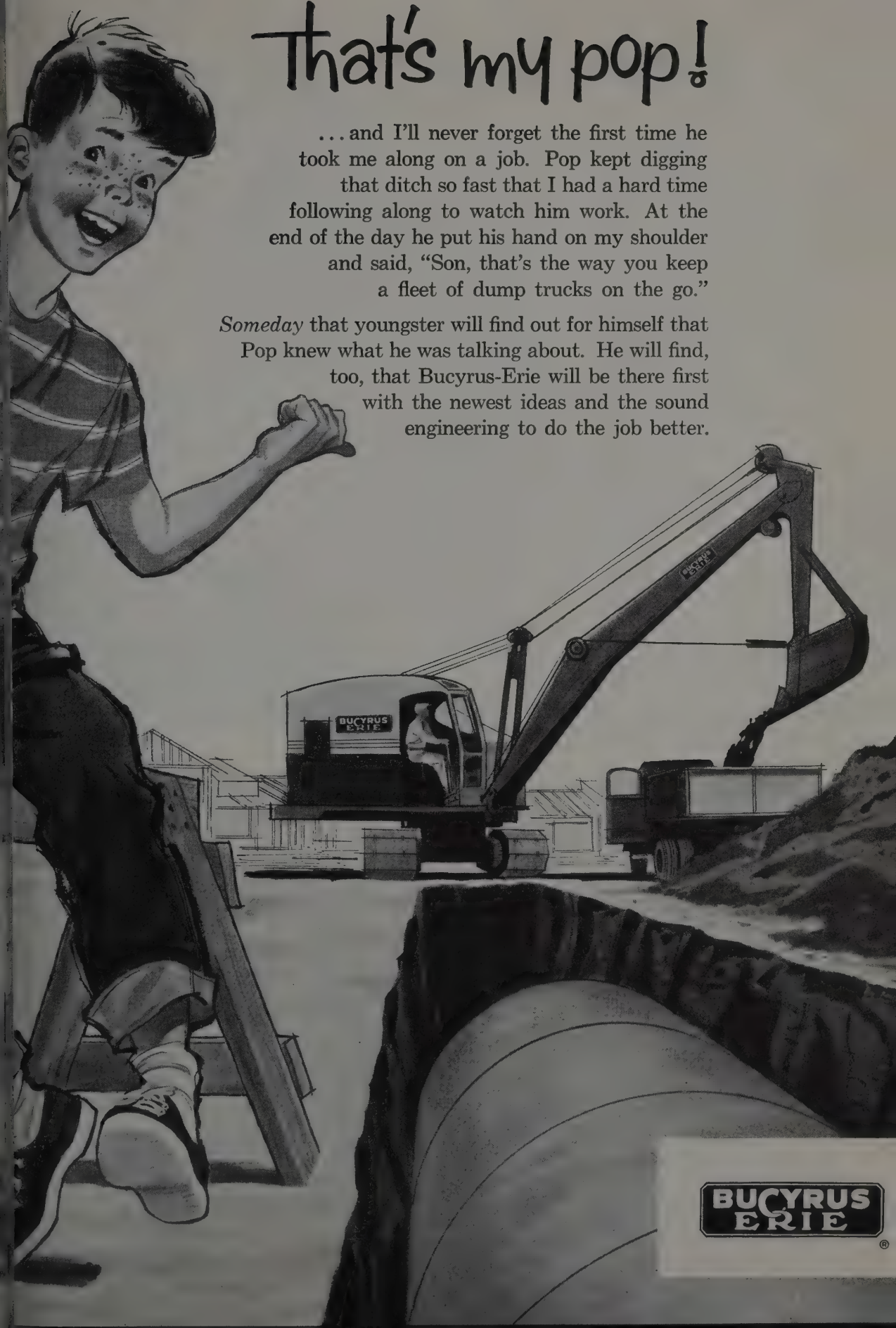
That's my pop!
...and I'll never forget the first time he took me along on a job. Pop kept digging that ditch so fast that I had a hard time following along to watch him work. At the end of the day he put his hand on my shoulder and said, "Son, that's the way you keep a fleet of dump trucks on the go."
Someday that youngster will find out for himself that Pop knew what he was talking about. He will find, too, that Bucyrus-Erie will be there first with the newest ideas and the sound engineering to do the job better.
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HAWAII Report

By ALAN GOODFADER, Honolulu

MORE ON THE EARTH-SHAKERS — Henry J. Kaiser has vowed "the battle has just begun" in his cement-struggle with the Dillingham family. The fight between Hawaai's construction industry titans has been front page news here for months—with both sides having its cheering sections among the citizens. Kaiser made his vow the day before this writing after the Honolulu City Planning Commission turned down his request to zone 200 acres of land for quarrying in an area the Dillinghams want to develop as a resort area. Kaiser wants to dig coral there for a proposed cement plant. He originally wanted to build his cement plant there, but moved it to another area which received City Planning Commission approval. City lawyers have said Kaiser can quarry stone at his preferred site without zoning under local laws. Kaiser and the Hawaiian Cement Corp.— in which the Dillinghams have an interest—are racing to see who will be the first to set up a $12 million cement plant here to supply Hawaii's booming construction industry. Kaiser now supplies most of the cement used in the Islands in bulk from his West Coast plants. The Dillinghams' Hawaiian Construction and Dredging Co. started leveling ground a month ago for the Hawaain Cement Corp. plant. Completion is scheduled the end of 1960. Kaiser says his plant will be in production six months before that.

MOVING MOUNTAINS — Meanwhile, Kaiser has branched out in yet another area here. He bought himself $1,000,000 worth of equipment to push construction on the first two subdivisions of a $350,000,000 resort residential city he's developing on Oahu's Koko Head area. Then he picked up a dredge and some barges. This, of course, led to purchase of a tug to haul them.

THE DUST IS FLYING—Reports on Hawaii's building boom are becoming monotonous in their frequency. The latest, contained in the Bank of Hawaii's review of local business conditions for June, call the construction industry a "star performer" in advancing Oahu (Honolulu) business growth to the greatest peacetime advance in production, income and employment in a three-month period. The advance was during the first three months of the year. Construction completed during the period was a "remarkable" 45 per cent higher than previous year levels, the bank said. And plans announced for residential, commercial and governmental construction in the last two months mean construction totals will be even higher than the record-breaking levels predicted earlier. It lists these projects among those newly announced: Development of a 137-acre light industry area near Honolulu International Airport; a Territorial Board of Harbor Commissioners $1,800,000 land development and marina near Koko Head; a $3,000,000 development for retired people in the Kaneohe area of Windward Oahu; a joint Territorial-Federal $3,200,000 low cost house project and a $14,200,000 Territorial low income project; more than $3,000,000 worth of apartment construction and $4,100,000 worth of office and miscellaneous buildings.

EVERYONE GETS IN—The bank and its biggest competitor, the Bishop National Bank, also will be contributing to construction work here. Bank of Hawaii has approved plans for a $1,700,000 program including construction of a nine-story annex to its main building in downtown Honolulu. Hawaiian Construction and Dredging is contractor. Completion is scheduled early next year. Just across the street, Bishop Bank plans to put up a 10-story multi-million dollar building. Work is tentatively scheduled to start in February with construction to take nine months or a year.

DEFENSE SPENDING — Air defenses for Hawaii's vast complex of defense and training areas here will add to the construction crush, according to stories out of Washington. Early warning radar stations are to be built soon on the islands of Kauai and Maui by the Air Force. Total cost wasn't given, but the Kauai station will cost about $300,000. And the Senate Armed Services Committee has approved the construction of bases for eight Nike-Hercules missile batteries in the Islands.

MORE OFFICES—Office buildings also are becoming a large construction item here. Two of the biggest will be constructed by Hawaiian Dreding at its monster Ala Moana Shopping Center in Honolulu. Financing has just been assured for the previously announced first 25-story building. Plans have been announced for a second 25-story structure costing more than $5,500,000.

MORE INDUSTRY—And the construction boom has become a somewhat self-perpetuating thing. A $250,000 pipe plant to feed construction projects is to be built in the new industrial area in Oahu's Ewa district by U. S. Industries, Inc.

TOURIST EXPANSION—The Island of Kauai will have some big building work soon as Inter-Island Resorts, a tourist hotel firm here, moves to expand along with Hawaai's tourist industry. The plans call for a 1,500-room resort to be built at Kauai's Kalapaki beach. The firm plans immediate development of the resort.

LOW BIDDERS—Pacific Construction Co. is apparent low bidder on two major projects here. It bid $567,590 on a contract to build a chapel and two-story administration building for the Hawaiian Evangelical Assn. and $478,760 to build an apartment house . . . S. Kitajima's $286,448 bid was low on a 28-unit apartment building job . . . Moses Akiona, Ltd., was low with a $114,308 bid on the Kalihi Valley trunk sewer project of the City of Honolulu . . . United Construction Co. was low bidder with an offer of $1,094,362 on the contract to build a new home for the Territorial Department of Health . . . Pacific Utility Contractors submitted a $1,000,630 low bid on a site preparation contract for the Ft. Shafter Capehart Housing project . . . and Moses Akiona, Ltd., offered a $35,304 low bid on a contract for utility work at the Smithsonian Institution's satellite tracking station atop Mt. Haleakala on the Island of Maui.

How one contractor dismantled G60 Plant, moved 100 miles, set up and started producing in 3½ days!

Schultz & Lindsay Construction Company, Fargo, North Dakota, have moved their Cedarapids G60 Batch-type plant 12 times in 3 years!

They can dismantle the plant and get it ready for transport in 12 hours. They can set up the mixing unit, drier, dust collector, cold-feed equipment, yard piping, steam generator and wiring in 3 days. Their record move required just 3½ days to tear down, transport 100 miles, set up, and start operating! They never have a crane on the job.

Such fast and frequent moves are made possible by Cedarapids portable design and the exclusive self-erecting mechanism, not only on Model G60 plants, but also on G50 and G40 Models.

100% Portable—Self-Erecting CEDARAPIDS BITUMINOUS MIXING PLANTS Reduce Profitless Between-Job Delays

Count what these portability benefits of Cedarapids batch-type Model G plants mean to you! Each sectionalized unit is carefully "packaged." Nothing, except the delicate scales, has to be removed or changed for transporting. In dismantling, each section is ready to roll the minute the built-in running gear hits the ground. At the new site, the *only* available truly self-erecting mechanism quickly raises each section into place. No crane is necessary. The "packaged" sections fit together perfectly. You're back in operation almost before you know it, turning out exact-specification material. There are no costly relocation delays to nibble away at your season's per-ton profit. Add in the many other Cedarapids Bituminous Mixing Plant benefits in the complete line of both portable and stationary batch-type plants or continuous-mix plants. Ask your Cedarapids Dealer to prove that no other make can match them for profitable production.

IOWA MANUFACTURING CO. • Cedar Rapids, Iowa, U.S.A.

Low bids and contract awards

ALASKA

A $8,974,230 contract was received by the **Empire Construction Co.** of Atlanta, Ga. for construction of a heat and power plant for the U. S. Air Force at Clear.

ARIZONA

Givens Construction Co. of Phoenix submitted 2 low bids for roadwork in Coconino and Gila counties: a low bid of $513,320 for grading, surfacing, and draining on Flagstaff-Valle Airport highway northwest of Flagstaff in Coconino County, and $168,372 for grading, surfacing and draining on 2 mi. of the Apache Trail highway near Globe in Gila County. **Tom L. Mulcaire** of Cottonwood submitted a low bid of $233,278 for 5.3 mi. of grading, surfacing and bridges in Tonto National Forest in Gila County. A low bid of $209,731 was submitted by **Palmer Contracting Co.,** Phoenix, for 9 mi. of grading and surfacing on the Perkinsville-Williams highway south of Williams in Coconino County. A low bid of $183,603 was submitted by **Mohamed Earthmoving Contractor** of Phoenix for 4 mi. of grading and surfacing northwest of Glendale in Maricopa County. **C. H. Leavell & Co.** of El Paso, Tex., received a $2,081,000 contract for construction of a base hospital at Davis Monthan Air Force Base, Tucson. A $4,119,000 contract was received by **M. M. Sundt Construction Co.** and **M. J. Bevanda Co., Inc.** of Tucson for construction of runway and taxiways at the U. S. Marine Corps Auxiliary at Yuma.

CALIFORNIA

Isbell Construction Co., Reno, Nev., received a $3,532,415 contract for grading and surfacing to relocate 7.6 mi. of Rte. 198 around the future reservoir and spillway area of Terminus Dam, north of Lemon Cove and south of Three Rivers in Tulare County. **Morrison-Knudsen Co., Inc.,** of Seattle, Wash., submitted a low bid of $4,912,329 for construction of 4 bridges, drainage facilities, grading and surfacing on 7.5 mi. between Myers Flat and south of Dyerville in Humboldt County. A $2,093,222 contract was received by **A. Teichert & Son, Inc.,** Sacramento, for constructing interchanges, crossing structures and widening to 6-lane freeway west and east of Davis in Solano and Yolo counties. **Sully-Miller Contracting Co.,** Orange, received a $1,186,166 contract for grading, paving and widening 6.5 mi. of State Route 2, at the Los Angeles County line in La Habra and Fullerton, Orange County. A low bid of $824,082 was submitted by **Hood Construction Co.** and **F. W. Case Corp.** of Newhall for construction of Corning Canal pumping plant and discharge lines, Sacramento Canals Unit, Central Valley Project. **A. J. Diani Construction Co., Inc.** and **A. J. Diani,** Santa Maria, submitted a low bid of $355,438 for 11.5 mi. of grading, surfacing and widening south of Santa Maria in Santa Barbara County. **M. W. Brown,** Redding, submitted a low bid of $325,588 for grading and surfacing on 16.3 mi. on Feather Lake highway, northwest of Susanville in Lassen County. **E. L. Yeager Co.** of Riverside received a $296,222 contract for grading and paving to construct additional 2 lanes on U. S. 395 near Perris in Riverside County. **F. W. Case Corp.,** Newhall, submitted a low bid of $227,636 for repairing an existing pier in Manhattan Beach State Park, in city of Manhattan, Los Angeles County. **L. C. Smith Co.,** San Mateo, received a $208,243 contract for resurfacing 27.3 mi. of highway at various locations, San Mateo and Santa Clara counties. A low bid of $182,610 was submitted by **Chandler - Newman Construction Co.,** Eureka, for 6.2 mi. of grading and surfacing on Route 1089 in Trinity County. **W. F. Maxwell Co.,** Fontana, received a $176,773 contract for construction of 2 bridges to carry U. S. Highway 60 over an entrance road to the University of California at Riverside, Riverside County. **Valley Paving & Construction Co.,** Pismo Beach, received a $170,219 contract for reconstructing 3.1 mi. of county road between Arroyo Grande and U. S. Highway 101 in San Luis Obispo County. **Flores & Perry,** Hanford, received a $150,265 contract to widen and reconstruct 4.9 mi. on county road 1134 southeast of Strathmore in Tulare County.

COLORADO

A $1,669,359 contract was received by **Davis & Butler Construction Co.,** Salt Lake City, Utah, for construction of a concrete pipeline system for the Collbran Project in west-central Colorado. **Domenic Leone Construction Co.** of Trinidad received a $583,000 contract for 6.3 mi. of grading and surfacing the Greenhorn highway in San Isabel National Forest, Custer County. **H. E. Lowdermilk Co.,** Englewood, received a $519,000 contract for 6.8 mi. of grading and surfacing the Nederland-Raymond route in Roosevelt National Forest, Boulder County. A low bid of $377,419 was submitted by **Brannan Sand & Gravel Co.,** Denver, for 1.8 mi. of grading and surfacing in Jefferson County. **Gardner Construction Co.** of Littleton submitted a low bid of $241,488 for construction of bridge and approaches between State Highway 96 and 50 in Pueblo County. **C. H. Leavell & Co.** of El Paso, Tex., received a $6,859,000 contract for U. S. Post Office Terminal Annex at Denver.

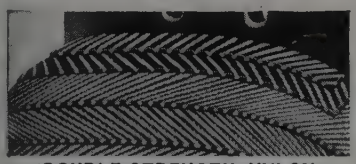
IDAHO

Fischbach & Moore, Inc. of Seattle, Wash., received a $495,000 contract for the installation of instrumentation systems for the Flight Engine Test Facility at the National Reactor Testing Station. **Arrington Construction Co., Inc.,** Idaho Falls, received a $166,330 contract covering miscellaneous construction projects at the Test Station.

MONTANA

Holland Construction Co., Bozeman, received a $835,350 contract for 8.9 mi. of grading and surfacing on the Chester-Gilford road in Hill County. **Sletten Construction Co.** of Great Falls received a $569,388 contract for construction of steel and concrete overpasses over Great Northern Ry. and Northern Pacific Ry. on Boulder Ave., in city of Helena. A $543,201 contract was received by **Baltrusch Construction Co.** of Havre for 7.1 mi. of grading, surfacing and related work on the Gilford - Havre East road in Hill County. **Naranche & Konda,** Butte

(STEEL CABLE)



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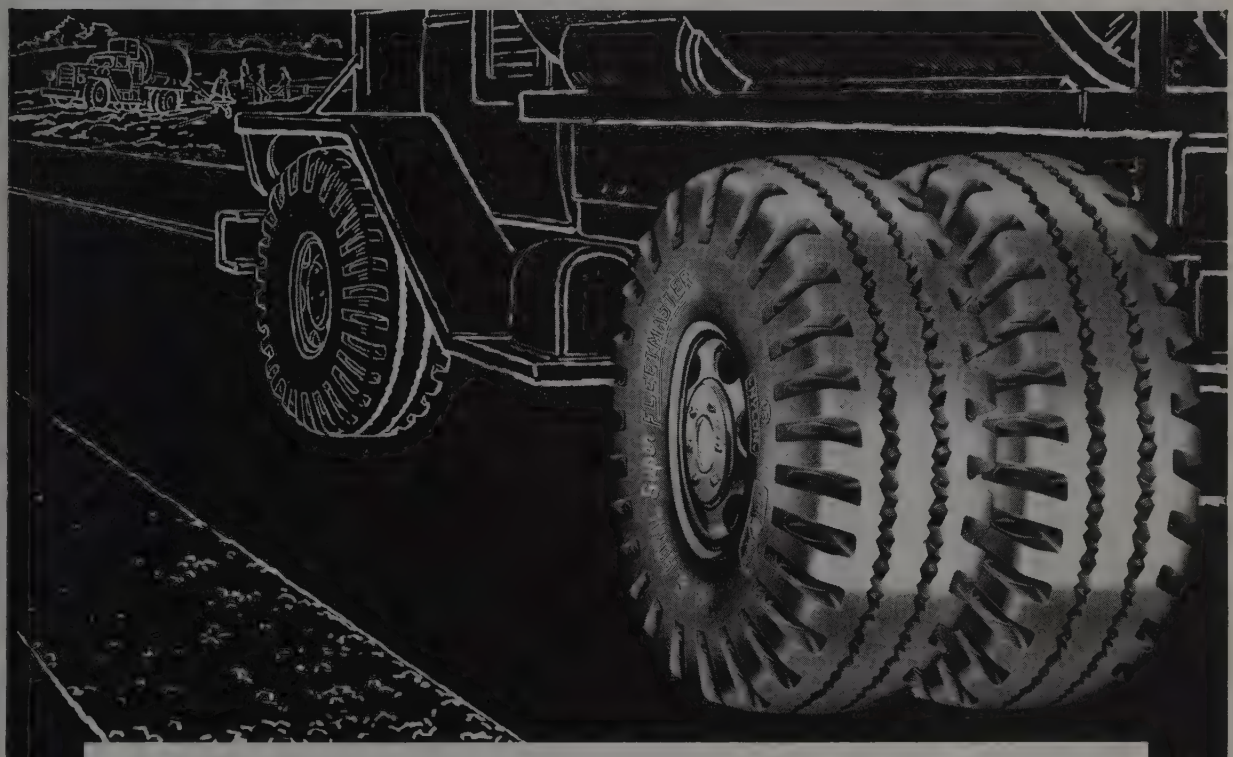

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Now you can travel improved roads at full highway speeds, yet have two-way protection against heavy impacts and cutting in off-road service!

Exclusive "U.S." **Safety Steel Shield** puts two layers of tool-hard steel cables between the tread and cord body—forms an impregnable barrier against ruptures, cutting or penetration. Provides permanent protection during life of original tread and all retreads. **Double-Strength Nylon**...twice as strong as the nylon cord used in ordinary heavy-service tires gives utmost protection against impact breaks and blowouts that result in on-the-job delays.

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Only your Caterpillar Dealer offers you these three protected buys on used equipment. Which is best? That depends on how you want to use a unit and what you want to pay. Whatever you want, you'll find it in his lot.

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BEST BUYS IN NEW AND USED EQUIPMENT

received a $342,351 contract for 7.3 mi. of grading, surfacing and draining on the Valier - North and West road in Pondera County. A $316,685 contract was received by **G. E. Marshall** of Roundup for 6.4 mi. of grading, widening and surfacing on the Fishtail Southwest road in Stillwater County. **S. Birch Inc. & S. Birch & Sons Construction Co.** of Great Falls received a $275,216 contract for 16.5 mi. of grading and surfacing on the Ovando - Rogers Pass road in Lewis and Clark County.

NEW MEXICO

Brown Construction Co., Albuquerque, submitted a low bid of $835,599 for grading and surfacing on 2.4 mi. from Bernalillo County line to San Mateo interchange in Bernalillo County. A low bid of $462,317 was submitted by **James P. Johnson,** Santa Fe, for 7.6 mi. of grading and surfacing No. 10, Golden-Madrid, in Santa Fe County. **Armstrong & Armstrong** of Roswell submitted a low bid of $285,786 for 8.6 mi. of grading, surfacing and related work on U. S. 66 toward Norton in Quay County. A low bid of $178,786 was submitted by **Floyd Haake** of Santa Fe for 13 mi. of sealing in Sandoval County. **James P. Johnson,** Santa Fe, submitted a low bid of $147,705 for 2.1 mi. of grading and surfacing on State Highway 519, La Madera - Petaca in Rio Arriba County.

OREGON

A. L. Harding, Inc., Stayton, submitted a low bid of $422,501 for 2.4 mi. of grading and paving on the Smith Bridge-Kellogg Bridge section of the Elkton - Sutherlin highway south of Elkton in Douglas County. **Workman Construction Co.** and **Geo. W. Irwin Construction Co.** of Canby submitted a low bid of $291,510 for construction of 4 structures on the Lancaster Drive-Sublimity Gun Club section of the North Santiam highway in Marion County. **Babler Bros., Inc.** of Portland submitted a low bid of $139,119 for 4.9 mi. of grading and surfacing on Sand Creek-Silver Lake road highway in Klamath County. **P. S. Lord Mechanical Contractors** of Portland received a $418,304 contract for levee improvement along the left bank of the Columbia River in Multnomah County Drainage District No. 1. **Tom Lillebo Construction Co.,** Reedsport, submitted a low bid of $134,437 for 2 structures on the Oregon Coast Highway in Coos County. **Kuckenberg Construction Co., Inc.,** Portland, submitted a low bid of $128,372 for construction of 1 bridge on the Pacific highway in Multnomah County. **Steelman-Duff, Inc.** of Portland received a $270,359 contract for relocation of a section of the Southern Pacific railroad and Oregon St. Highway No. 58 at Lookout Point Dam on the Middle Fork Willamette River in Lane County. **H. Barnhart and Leonard Ward,** Medford, submitted a low bid of $499,437 for earthwork and structures, South Fork collection canal, Talent Division, Rogue River Basin Project.

UTAH

Floyd S. Whiting of Murray submitted a low bid of $772,337 for grading, surfacing, overpass structure and concrete box culvert on the Helper - Castlegate section of Highway 6 and 50 in Carbon County. A low bid of $749,032 was submitted by **V. C. Mendenhall Construction Co., Inc.** of Las Vegas, Nev. for 8 mi. of grading and surfacing from Washington-Iron County line southerly to Pintura in Washington and Iron counties. **Pritchett Construction Co.** of Farmington submitted a low bid of $265,480 for construction of bridge, grading and surfacing approaches, north of Brigham City over the Bear River in Box Elder County. **Whiting & Haymond Construction Co.,** Springville, submitted a low bid of $219,111 for 9.4 mi. of grading and surfacing in Delta, Millard County. A low bid of $174,707 was submitted by **LeGrand Johnson Construction Co.,** Logan, for 2.2 mi. of grading and surfacing in city of Ogden.

WASHINGTON

Ostruske - Murphy, Inc. of Tacoma received a $186,986 contract for construction of military road overcrossing, vicinity Lake Dolloff in King County. A $173,294 contract was received by **Olympia Oil & Wood Products Co., Inc.,** of Olympia for 11.8 mi. of grading and surfacing, Pacific county line to Joe Creek, Grays Harbor County. **Frank G. Baulne, Inc.,** Yardley, received a $142,231 contract for 2.1 mi. of grading and surfacing, Ensley Change in Almota road and Pullman-Wawawa road in Whitman County.

Weather bad... No. 955 terrific... job on schedule!

No. 955 excavates part of a total of 19,000 yd., preparing for base an area 20 ft. wide, 12-13 in. deep. Cuts are made by Cat No. 12 Motor Grader and windrowed. Job is part of a $1,828,366 project by Gulf Bitulithic Co. on U. S. 75, to be part of the Interstate Highway System.

Says Operator F. H. Leggett: "I can move over 100 cu. yd. a day more with the side dump than with other loaders. It doesn't spill dirt because you don't have to jockey for position. A Traxcavator is easy to operate and I'm less tired at night. It's the best on the market."

Bad weather cut work days during the first six months to 20 per cent, but the highway project stayed on schedule. Reason: a Caterpillar No. 955 Traxcavator with Side Dump Bucket.

Gulf Bitulithic Co., Houston, Texas, first tried a drag line on a 2½-mile widening job on U.S. 75 at Conroe, Texas. Production was poor in the shallow cut. Switching to a No. 955, five-yd. trucks were loaded in an average time of three minutes; four buckets to the truck.

"We increased production 25 per cent," says Superintendent Thomas "Red" Brown. "I like that Side Dump Bucket. You can't beat it!"

In-line loading of trucks with the Side Dump Bucket paid off in less traffic congestion on the busy highway, and it also avoided tearing up the subgrade with twisting and turning.

Side Dump Buckets are available on all three Traxcavators: No. 977 (2¼ cu. yd.), No. 955 (1⅝ cu. yd.) and No. 933 (1⅛ cu. yd.). Other buckets, teeth, 'dozers and forks help make a Traxcavator the most versatile excavator-loader.

Ask your Caterpillar Dealer to demonstrate on *your* job how a Traxcavator can make money for you. He stands behind every machine he sells with round-the-clock service and parts you can trust.

Caterpillar Tractor Co., San Francisco, Calif.; Peoria, Ill., U. S. A.

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NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

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$20,000,000 port for Saudi Arabia

ONE of Saudi Arabia's most important ports, the Port of Dammam on the Arabian Gulf, will be tripled in capacity under terms of a $20,000,000 contract awarded to Brown Engineers International (Liberia) Inc. Contract work will be performed by a joint venture known as Brown-Pomeroy-Hawaiian, consisting of Brown Engineers International (Liberia) Inc., New York; Pomeroy Constructors, Inc. of San Francisco, and Hawaiian Dredging and Construction Co., Ltd., International, Honolulu.

Initial phases of the work must be carried out entirely over water, and the project will include creation of a man-made island 2,000 ft. long and 700 ft. wide. Its surface will be raised an average of 32 ft. above the harbor floor. Dredging phase of the project will require lifting more than 2,500,000 cu. yd. of material from the harbor bottom, and its removal to the new island. Approximately 1,000,000 cu. yd. of rock will be quarried and placed. The project also will include installation of utilities and paving, erection of eight heavy portal cranes and building of an electrical generating station.

Utah Interstate project to hit $30,000,000

UTAH's Interstate Highway program is gaining momentum over previous years, according to state road officials. Work now under contract for Utah's 965-mi. share of the system totals $22,000,000. The total for all of last year was $13,500,000. These projects are distributed over 10 counties of the state. The Road Commission expects over $30,000,000 will be involved on construction on the Interstate by the end of the year. The first project to be completed was the $1,400,000 overpass in North Salt Lake. In addition, the state had completed ten other major structures located in Box Elder County, and in the Washington-Iron County area. Nearing completion is the Low overpass in Tooele County, which also involves some three miles of divided highway.

The program of the Commission calls for the state to build to freeway standards any construction project that is situated on the Interstate route. Director of Highways, Elmo R. Morgan, has stated, "We hope that the traveling public will understand this program when they see these freeway projects in some of our more remote areas. In some sections in rural sections, we are only building at present two lanes of what will eventually be a four-lane divided highway."

Road authorities have further indicated that much of their effort has been devoted to the planning, engineering and holding public meetings preparatory to deciding on definite route locations. The state has completed a total of 44 meetings that have been held in the past one and one-half years. They have included 21 informational meetings and 23 public hearings. This has involved the location of 658 mi. of Interstate System out of a total of 965 mi. in Utah. According to official estimates, some 9,000 citizens have attended these meetings to participate in the decisions of these routes.

Oregon changes rules for highway trailers

THE Oregon Highway Department has announced changes in transportation permit policy and procedures as a result of action of the highway commission in keeping with 1959 legislation. The changes will result in greater administrative uniformity and will accommodate the nation-wide trend toward larger equipment in the trucking industry.

Effective this month, 60-ft. overall semitrailer combinations, which for the past two years have been allowed to operate by statute over several U. S. Routes and Oregon Route 58 (Willamette Highway) will be required to operate under permit from the highway department. The same legislative act which made this change also removed the restriction of 32 ft. between kingpin and the last trailer axle of the 40-ft. semitrailers which are used in such combinations.

However, the department points out that test runs originally conducted over the highway routes mentioned and other highways which are still under permit were based on equipment limited to the 32-ft. distance. The department has been advised that operators of the long semitrailer equipment will wish to increase this distance from 32 to as much as 35 or 36 ft. which will necessitate additional test runs over all highways where the 40-ft. semitrailers are now allowed to operate either by law or under permit.

See These BLAW-KNOX Dealers

BLAW-KNOX

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Anchorage, Alaska

ARIZONA

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NORMONT EQUIPMENT COMPANY
S. Great Falls, Montana

TREASURE STATES EQUIPMENT COMPANY
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LIVELY EQUIPMENT CO.
Albuquerque, New Mexico

OREGON

AIR-MAC INC. OF OREGON
Portland 14, Oregon

UTAH

FOULGER EQUIPMENT COMPANY
Salt Lake City, Utah

WASHINGTON

HATTEN MACHINERY COMPANY
Seattle, Washington

INLAND DIESEL & MACHINERY COMPANY
Spokane, Washington

WYOMING

STUDER TRACTOR & EQUIPMENT COMPANY
Casper, Wyoming

Blaw-Knox P-160 at work on Interstate By-Pass 35 outside Oklahoma City. Pugmill mix was laid down to 8-inch depth, 14-foot width at a rate averaging better than 600 TPH.

65,000 tons of Macadam base through this P-160 without downtime!

Amis Construction averages 600 TPH with 15% more compaction

"We selected the Blaw-Knox P-160 Base Paver attachment because of superior design features like the oscillating screed and wide-spread wheels. Since we began using it in July, we've put down more than 65,000 tons of Macadam base course with water binder, without any downtime or maintenance difficulties," says John R. Waugh, project manager for the Amis Construction Company, Oklahoma City, Oklahoma.

"We've experienced a big reduction in equipment requirements over our previous method of spreading with blades. The V-type hopper eliminates the material segregation problem. And the real extra feature on the Blaw-Knox P-160 is the oscillating screed that knits the material in place. That gave us the extra compaction that permits our roller operators to work without fear of pushing the base course before the rollers. It's an important feature when matching adjoining passes too," he adds.

Specially engineered—rugged Blaw-Knox paving equipment like the P-160 Base Paver attachment enables contractors all over America to keep ahead of contract obligations, at a profit. If you would like a technical report on Amis' experience with the P-160, check your Blaw-Knox distributor. Or you may wish to write direct.

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Construction Equipment • 300 Sixth Avenue • Pittsburgh 22, Pa.

. . . for more details, circle No. 55 on Reader Service Postcard

Hoover generator contract awarded

A $1,601,200 Bureau of Reclamation contract has been awarded for manufacture and installation of a 95,000-kw. generator, the final generating unit in the Nevada wing of the Hoover Dam power plant.

The contract goes to the Allis-Chalmers Manufacturing Co., low among four, all domestic firms. The unit must be installed by the summer of 1961.

The generator is the 17th and last major generating unit to be installed at Hoover Dam on the Colorado River. It will bring the hydroelectric plant to its full installed capacity of 1,344,800 kw. This final unit will be the largest unit at Hoover, the existing units having a rating of only 82,500 kw.

Contracts for manufacture of a 115,000-horsepower turbine and a 168-inch butterfly control valve were let in mid-March. These awards totaled $1,840,806. The House Public Works Appropriations bill contained $2,900,000 to advance construction of the turbine, generator and allied facilities in fiscal year 1960.

Barrier strips slated for California freeways

THE California Division of Highways will install barriers in the center strip of some of the state's more heavily-traveled freeways as the result of newly completed research into the problem of infrequent but often deadly head-on freeway collision. New types of barriers, developed in a series of laboratory-controlled crash tests, will be installed shortly on sections of freeway in the Los Angeles and San Francisco Bay areas.

Along with the crash tests, a detailed study of recent freeway accidents was made to help determine where the new type barriers would be likely to do the most good. If experience with the initial installations proves successful, barriers will be installed on other highways which carry heavy traffic.

The first major installation will be on a 13.2-mi. section of the Hollywood and Santa Ana freeways (U. S. 101). The division expects to call for bids on this project within the next few weeks. A total of $500,000 is budgeted for the job. Another 3.6 mi. of median barrier are included in landscaping projects which have been advertised for bids on sections of the Ventura and San Diego freeways in the San Fernando Valley.

Fifteen basic barrier designs have been tested with speeds up to 60 m.p.h. ramming into a variety of barriers at a 30-deg. angle. In some instances the barrier failed to prevent the car from smashing through to the opposing lanes. Some of the barriers caused the car to ricochet at high speed into the path of following vehicles. In nearly all cases, the impact was so abrupt and severe as to cause serious and possibly fatal injury to human occupants.

But one design was discovered which appears to be nearly satisfactory in all respects. This design utilizes ordinary chain-link fence, light steel posts and three ¾-in. steel cables. The cables are strung horizontally along the fence, if possible from natural anchor points such as structure abutments. Two of the cables are suspended about 30 in. above the ground, and the third is located along the bottom of the fence.

This type was the only design which permitted deceleration within the test car which would be tolerable to human occupants. Because the cables give or deflect slightly when engaged in high speed impact, this design is only suitable for freeways where the dividing strip is at least 12 ft. wide.

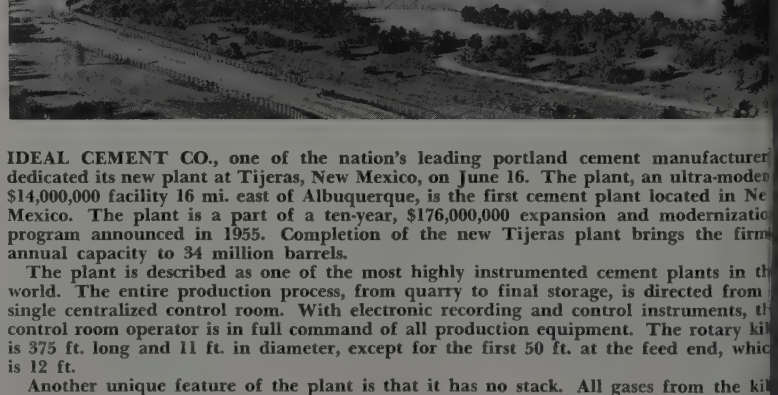
For medians with a width of from 5 to 12 feet, the more effective barrier would be another design new to California highways. This barrier is made up of back-to-back steel guard rails attached to wooden blocks and posts. There is also a supplemental lower rail to prevent rigid parts of the car from hooking into the posts. The wooden blocking and posts and the lower rail tend to reduce the severity of collisions with the barrier.

Buy American deadline extended to 1960

STATE HIGHWAY departments have until January 1, 1960, to begin complying with policies and procedures pertaining to restrictions upon the use of foreign materials in Federal-aid highway work. Federal Highway Administrator B. D. Tallamy has announced a 6-month extension of the deadline for application to Federal-aid highway work from the original effective date of July 1, 1959.

The extension was provided to give both the state highway departments and industry more time to adjust their operations to the new regulations governing restrictions on the use of foreign materials.

The Buy American Act, enacted in 1933, gives preference to domestic materials, subject to considerations of reasonableness of price and the public interest. The Executive Order, issued in December 1954, among other things, provides a yardstick for determining the reasonableness of the price of domestic materials in relation to that of foreign materials.

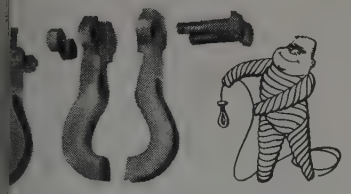


IDEAL CEMENT CO., one of the nation's leading portland cement manufacturers, dedicated its new plant at Tijeras, New Mexico, on June 16. The plant, an ultra-modern $14,000,000 facility 16 mi. east of Albuquerque, is the first cement plant located in New Mexico. The plant is a part of a ten-year, $176,000,000 expansion and modernization program announced in 1955. Completion of the new Tijeras plant brings the firm's annual capacity to 34 million barrels.

The plant is described as one of the most highly instrumented cement plants in the world. The entire production process, from quarry to final storage, is directed from a single centralized control room. With electronic recording and control instruments, the control room operator is in full command of all production equipment. The rotary kiln is 375 ft. long and 11 ft. in diameter, except for the first 50 ft. at the feed end, which is 12 ft.

Another unique feature of the plant is that it has no stack. All gases from the kiln are filtered through a system of 1,280 glass cloth bags. These glass bags are 11½ in. in diameter by 25 ft. in length. More than two acres of glass cloth are used in this system.

Use the Right Fittings



ht fittings add life expectancy to e rope. Fittings which derive ding power from crimping action harmful.

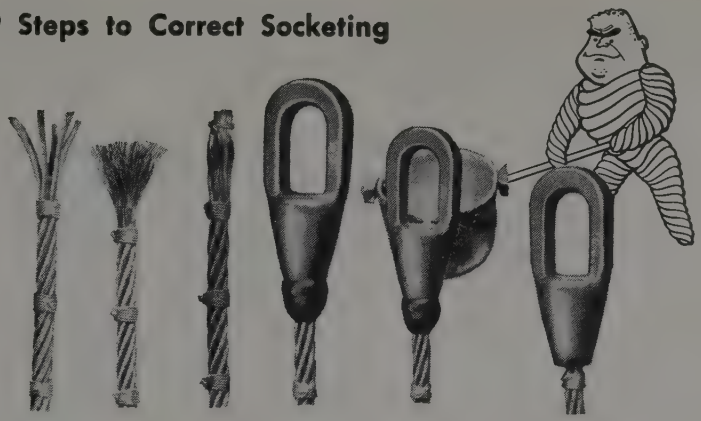
own here is a clamp that has no rong side"—can be put on either y. It snugly saddles the rope, ps larger surface area in such a y that loads are carried almost irely by friction instead of crimp- action. Combined in its two parts a thimble. The parts are inter- ked to prevent collapse of the mble and eliminate all shear on bolts.

ecommended sizes:

Diameter of Rope	Min. Dia.	Max. Dia.
¼-⅝	+ 1/64"	+ 1/32"
⅜-¾	+ 1/32"	+ 1/16"
⅞-1⅛	+ 3/64"	+ 3/32"
1¼-1½	+ 1/16"	+ ⅛"
1⅝-2¼	+ 3/32"	+ 3/16"
2⅜ and larger	+ ⅛"	+ ¼"

w ropes are usually over-size. It is visable to have groove diameters sheaves or drums as large as the tual calipered diameter of the new pe, or slightly larger. We recom- end sizes as above charted.

9 Steps to Correct Socketing



1. Securely seize and serve with soft wire ties before cutting, and have at least two additional seizings placed at a distance from the end equal to the length of the basket of the socket.

2. When the rope is properly seized, take off the end seizing. Cut the fiber center back to the seizing, as shown in 1 above. Untwist and broom out the wires. See illustration 2.

3. Clean the wires for the distance they are to be inserted in the socket. Use benzine, naphtha, gasoline or other solvent. Then wash off in boiling water or boiling ammonium chloride used in Step 5.

4. Then dip cleaned wires in commercial muriatic acid to a depth not greater than ¾ of the cleaned length of wire. Keep the wires immersed for 3 minutes, or until the acid has thoroughly etched each wire. Be sure acid does not contact any other portion of rope.

5. Immerse wires into boiling ammonium chloride. A white coating will be left on the wires.

6. Place a temporary tie wire over the ends of the cleaned wire (see illustration 3). Be careful not to get the cleaned wires greasy or oily.

7. Insert the rope end into bottom of socket. Remove temporary tie wire.

8. Holding the rope vertically in a vise, set the socket so that the wires are flush with top of the socket basket and seal the bottom with putty or clay (See illustration 4). Pour in among the wires about ½ teaspoon of sal ammoniac crystals.

9. Pour molten zinc into the basket until it is full (see illustration 5). When zinc is solidified, the seal is removed and socketing complete as shown in illustration 6. The zinc must not be too hot or it will anneal the wires, particularly of small ropes. Temperature must not be above 925° F. Use pine stick test: if stick chars but does not ignite, the zinc is ready to pour. Overheated zinc will have a red color and stick will catch fire. When zinc has solidified sufficiently, the socket may be plunged into cold water.

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ENGINEERS and CONTRACTORS

Richard Ward, 71, engineer in charge of the enlargement of Lake Mathews for the Metropolitan Water District of Southern California, died in Arlington following a heart attack. At the time of his death he was directing work to increase the storage capacity on the terminal reservoir of the Colorado River Aqueduct.

* * *

Jack Y. Barnes, district engineer, Portland Cement Association, Helena, Mont., was recently elected chairman of the 10-state Pacific Northwest Council of the American Society of Civil Engineers. **Richard M. Arenz,** engineer with the Bureau of Public Roads, was elected secretary-treasurer.

* * *

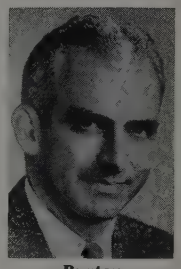
Appointment of two new assistant commissioners of the Bureau of Reclamation is announced: **N. B. Bennett, Jr.,** who will be assistant commissioner for engineering and power, and **W. I. Palmer,** who is named assistant commissioner for project development and irrigation. Both are from the ranks of career personnel of the Bureau.

Bennett is presently chief of the division of project development, a position he has held since 1953. He first worked for the Bureau in 1933 on the Kendrick Project in Wyoming. After some private employment and three years as assistant State Engineer, and engineer-secretary for the Wyoming Water Conservation Board, he returned to the USBR at Salem, Ore., in 1942. Palmer, who is presently chief of the Irrigation Division, served in various capacities in the Department of Agriculture before transferring to the Bureau in 1944. He has worked in regional offices in Salt Lake City and in Sacramento, Calif., as well as in Washington, D. C.

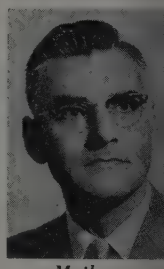
* * *

Appointment of **Kenneth M. Allen** as chief engineer for Pacific Bridge Co. is announced by **William G. Swigert,** president of the Alameda, Calif., firm. Allen has been associated for the past six years with the engineering company of Moffatt & Nichol at Long Beach, Calif. As project engineer he supervised development of plans for subsidence remedial measures at the Long Beach Naval Shipyard, and the design of USN berthing facilities at North Island, San Diego. He also was a designer on the Alamitos Bay marina project at Long Beach. Allen is a member of the American Society of Civil Engineers and a registered California civil engineer.

Appointment of **James A. Bur**ton, Boise, Idaho, to the new position of district engineer for the states of Idaho and Montana, is announced by The Asphalt Institute. Burton, former chief engineer of E. B. Steele Co., Boise, consulting engineering organization, will establish new headquarters at Helena, Mont. For seven years following receipt of his engineering degree, Burton had worked with McAtee & Heathe, Inc., asphalt paving contracting firm of Spokane, Wash.



Burton



Mathews

Laurence C. Mathews has joined the staff of the Portland Cement Association. He will represent the association in central Washington from headquarters in Yakima. A registered civil engineer, Mathews was for a time assistant city engineer of Walla Walla. He has spent over four years with consulting engineering firms, and just prior to joining PCA was public works commissioner for the City of Yakima for three years.

* * *

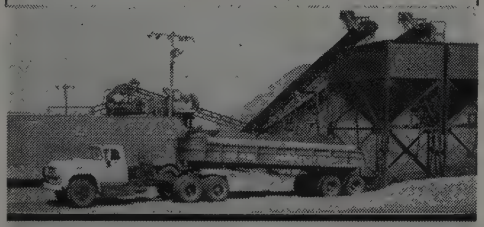
Otto Ehrenburg, formerly concrete technologist with Pacific Gas & Electric Co., is now research laboratory engineer with United Concrete Pipe Corp., Baldwin Park.

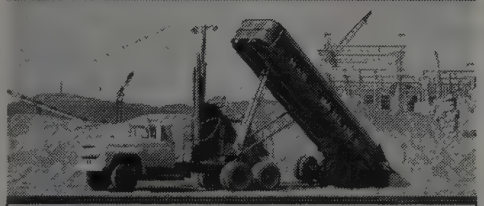
OFFICERS Dinner at the opening of the WASHO Conference. Left to right are: T. D. Sherard of Wyoming, secretary-treasurer; R. C. Rich, Idaho, member of Executive Committee; Charles E. Waite, California, member of Executive Committee; C. Taylor Burton, Utah, member of Executive Committee; W. E. Willey, Arizona, past president and member of Executive Committee; President W. C. Williams, Oregon; Fred Quinnell, Jr., Montana, member of Executive Committee. Review of Conference appears on page 42.

C-B Stabilifts help keep Two Big Montana projects on schedule

Stockpiling 1½" gravel near Kiewit concrete plant on Glasgow Air Force Base.

A C-B Stabilift with load of 1½" gravel starts on another fast cycle to Glasgow Air Force Base.





C-B Stabilift stockpiles sand near Eagle-Western concrete plant at Fort Peck Dam.

C-B Stabilift Semi Trailers are made in 16 to 60 Ton Capacities —16' to 28' lengths

Phone, write or see your nearest Stabilift dealer for all the facts on the cost trimming Stabilift Semi Trailer.

H & S Hauling Company, Glasgow, Montana, reports their team of 6 Big C-B Stabilifts are trimming hauling costs - cutting cycle time on their aggregate trucking contract with Kiewit Co.

On the Glasgow Airforce Base Job, the C-B Stabilifts are hauling as much as 24 yds. of aggregate per load on a 4 mile cycle from the Kiewit gravel plant to their concrete plant at the base. The Stabilifts are racking up cycles of 22 to 30 minutes per round trip — each unit delivering from 48 to 65 yds. per hour.

The 90 mile round trip to the Eagle-Western project at Fort Peck Dam is kept to a trim 3 hour cycle by the C-B Stabilifts, hauling from the Kiewit plant near Glasgow to the dam project.

Says, Mr. Savelkoul, a partner in H & S Hauling: "I think the Cook Bros. Stabilift is one of the best trailers on the market — our drivers really like them."

You can expect Cost-Cutting performance with Stabilifts on your hauling jobs. These versatile, easily maneuverable units have a wide range of application for: stockpiling, spreading, batching, fill work . . . and for use with concrete or asphalt pavers.

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Manufacturers of: Stabilift End Dump Trailers, Bottom Dump Trailers, Transfer Trailers.

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Arizona—Cook Bros., Phoenix*
Utah & Idaho—Harris Truck & Equipment Co., Tremonton & Logan, Utah; Boise, Idaho
Colorado & Wyoming—Jacobs-Kerr & Co., Denver, Colo.
New Mexico—Inland White Truck Company, Albuquerque

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Calif. Prior to his employment with PG&E, Ehrenburg was an engineer with the Bureau of Reclamation. He is the author of a number of engineering articles and technical papers and is active in the American Concrete Institute.

* * *

Robert W. Jennings has succeeded **H. F. Bahmeier** as projects manager at Grand Junction, Colo., for the Bureau of Reclamation. Bahmeier reached the mandatory retirement age and left the Bureau service on May 30. Jennings was formerly regional director for Region 5 in Texas.

* * *

Carl H. Wittenberg, partner and co-founder of Twaits - Wittenberg Co., Los Angeles constructors and engineers, announces the acquisition of full ownership of the company through purchase of the interests of the late Ford J. Twaits.

In making the announcement Wittenberg revealed that the firm has more than $40,000,000 of construction work in progress, including the Los Angeles County Hall of Records and the Ramo Woolridge Laboratories project at Canoga Park.

STUDYING plans for modern 4-lane highway development along U. S. 99 in Northern California are engineers of California Division of Highways District II at Redding. From left, *George Barry*, construction engineer; *H. S. Miles*, district engineer; and *R. J. Felton*, construction engineer.

Ben L. Peterson, chief of the engineering division of the Portland District, Corps of Engineers, is planning to retire on medical advice. He is recuperating from a heart ailment. During his service with the Portland District, Peterson played a major role in the planning and construction of The Dalles, Lookout Point, Dexter, Hills Creek and Cougar dams, and in the planning of Bonneville, Mud Mountain, Green Peter, Fall Creek, Blue River, and Holley dams.

* * *

B. A. Claussen, consulting engineer from Alameda, Calif., left recently for Pakistan, India, as a general adviser on dam construction under the United Nations Technical assistance program. The project when completed in 1960-61 will irrigate some 2,500,000 ac. of land for food crops.

* * *

Appointment of **John F. Schrunk** as assistant manager of Cornell Manufacturing Co., Portland, Ore., and also as manager of the newly organized Water Engineering Consultants, is announced by **C. C. Warren,** president of both firms. The new firm will take over the duties of Cornell's engineering department. Schrunk was for seven years a government engineer with the Soil Conservation Service and the Bureau of Reclamation.

miller

FIVE IN ONE

FIREBALL

Other Miller welders in this series include:

DA-300-L BIG RIG
Four-in-One:
AC arc welder; DC arc welder; 10 KW AC power plant; 1 KW DC while welding

D-250-L ROUSTABOUT
Three-in-One:
DC arc welder; 10 KW AC power plant; 1 KW DC while welding

D-250-W ROUGHNECK
Two-in-One:
DC arc welder; 1 KW DC while welding

Here's what makes this Miller model the "Five-In-One":
1. AC welder for metallic arc welding
2. DC welder for metallic arc welding
3. AC or DC welder for TIG welding
4. A 10 KW, 115/230v single phase 60 cycle power plant
5. 1 KW of DC while welding

The DAH-350-L Fireball, driven by Hercules 32 hp engine, is another Miller FIRST, offers both a-c and d-c for metallic arc or TIG welding with three separate a-c and d-c amperage ranges for each.

There's continuous high frequency for a-c TIG welding with choice of "start only" or constant high frequency for d-c TIG work.

Standard equipment includes built-in high frequency stabilizer, polarity switch, power supply for water coolant system, and automatic inert gas control panel with solenoid valve and post flow timer. Trailers are available for welder only or for welder with coolant system and gas cylinders.

SPECIFICATIONS

	Metallic Arc	Tungsten Arc
WELDING RANGE	35-100 Amps AC	35- 75 Amps AC
	65-160 Amps AC	65-160 Amps AC
	110-400 Amps AC	150-375 Amps AC
	35- 80 Amps DC	35-100 Amps DC
	75-175 Amps DC	85-225 Amps DC
	125-350 Amps DC	170-375 Amps DC
RATED OUTPUT	250 Amps Tungsten Arc, 100% Duty Cycle DC	
	300 Amps Tungsten Arc, 100% Duty Cycle AC	
CURRENT ADJUSTMENT STEPS	Infinite	
MAXIMUM O.C.V.	72 Volts DC	
	80 Volts AC	
1 KW DC AUXILIARY POWER	115 Volts	
AC GENERATOR OUTPUT	10 KW	
OUTPUT VOLTAGE	115/230 Volt, 1 Phase, 60 Cycle	

Complete specifications on these welders will be sent promptly upon request.

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BEATTY-PECCO CONSTRUCTION CRANE . . . a new GIANT reaching from 50 to over 300 feet in the air to place materials at points of use. Electronic remote control. Automatic safety. Practical—adaptable. Highly mobile. Thousands now in use.

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SUPERVISING the jobs

Earl Leavitt, superintendent for General Contractors Co., is in charge of job recently awarded to this contractor covering grading, realigning, and surfacing 13 mi. of U. S. 93 in Lincoln County, Nev. Equipment supervisor on the $341,173 job is **Cliff Pratt.** General expects the job to be complete by Oct. 1.

* * *

Mel Kilfoyle is superintendent, and **Joe Thomas,** foreman, on a recent award to Waterfall Construction Co. for 4.2 mi. of grading, surfacing and related work on Route 580, through West Warren in Weber County, Utah. Work will be finished in September.

* * *

H. M. Byars is superintending contract covering 3 mi. of grading, paving, and bridge east of Smith in Lyon County, Nev. This contract went to Isbell Construction Co. on a low bid of $267,957 and work started in June. Assisting as foremen are **Charles Lohr,** grading, and **Pete Thompson,** labor. Timekeeper is **Sam Barton.** Construction is now in the final stage.

* * *

D. E. Jordan, project engineer, and **James Thompson,** superintendent, are key men for the contracting firm of Paul W. Speer, Inc. on construction of jet engine test cell at Elmendorf AFB in Alaska. Speer expects to have the $364,800 project completed some time in October.

* * *

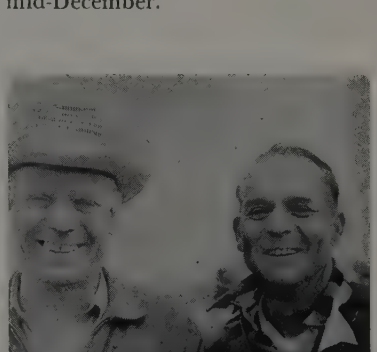
Ray Michlig is superintending, under the direction of **Ernest Kissee,** vice president in charge of all Alaska work for Lease Company, Inc., a contract award from the Army covering construction of additional aviation facilities at Fort Richardson. Other important contractor men on this $597,862 contract are **William Neve,** office manager, **Paul Duclos,** office engineer, and **Gordon Sprouffske,** field engineer. Scheduled for completion the end of October, work has been under way since May.

* * *

Milton Gracia, Oval Beeman, and **Bob Pate,** project superintendent, superintendent, and master mechanic respectively, are key men employed on contract to widen to 4 lanes an 8-mi. section of U. S. 101, north of Ventura, Calif. Donna Construction Co. successfully bid the job at $416,966.

* * *

Les Chrisman is supervising a $490,740 job, under **K. W. Fox,** district manager for A. Teichert & Son, Inc., covering grading, surfacing, related work in and north of Chico, Calif. Foreman on grade is **Roy Chrisman;** general foreman is **H. Bell,** and structure superintendent is **Vic Colburn.** June 1 was the starting date, and according to Fox work should be finished by mid-December.



SUPERVISING subcontract operations of Miles & Sons Trucking Service at the Navy's giant air base project near Lemoore, Calif. are *Harlan Thompson,* left, hauling superintendent; and *George Obenoskey,* paving superintendent. General contractor on the job is Griffith Co., with subcontracts held by Miles & Sons for hauling aggregate and material, and for placing part of the cement-treated base.

DREDGING superintendent *John Pitta* of Healy-Tibbitts Construction Co., shown at San Francisco's Yacht Harbor where a $225,000 addition and alteration project is under way. In the background is a No. 8 diesel-electric derrick barge which swings a 6-yd. bucket. The project involves ripping out a dividing strip between two smaller harbors and joining their breakwaters to make one big one. Job includes placement of 21,000 tons of core rock and 4,000 tons of armor riprap, as well as 75,000 yd. of dredging. Other key men on the project are *Andy Collins,* general superintendent; *Roy Smith,* superintendent of floats and appurtenances, and *John Homan,* superintendent of float installation. The project will add another 50 berths to the city's Marina.

Leon C. Sorensen, general superintendent, is in charge of a $176,026 award to Sorensen Construction Co. for 5.9 mi. of grading and surfacing near Woodruff, Utah. Other key men on this work are **William L. Dodge,** grade foreman and **Harry Sorensen,** maintenance superintendent. Started in June the job will close in October.

* * *

Art Cramer is supervising a $360,361 job entailing the grading and surfacing of 10.7 mi. in and near Mountain Home, Utah, for Nelson Bros. Co.

* * *

Douglas Hoxsey is superintendent for Murphy Brothers, Inc., on a $263,566 job in Franklin County, Wash. Contract is for 4.5 mi. of grading and surfacing from Connell to Adams County line. Work has been under way since May and is now in the closing stage.

* * *

Jack S. Budd, general superintendent, and **Herman Schumann,** job superintendent, are top men working on R. A. Heintz Construction Co.'s recent award of $1,852

TAKE-CHARGE D9

—ONE BIG REASON KEYSTONE MET AND EXCEEDED PRODUCTION SCHEDULES!

This giant Cat D9 Tractor with No. 9S Bulldozer and No. 9 Ripper is working on the Prineville Dam—Crooked River Project about 20 miles S.E. of Prineville, Oregon. Here it is busy on the side-hill excavation of a 3,000-foot-long access road. Says Project Manager Art Chinn of the Keystone Construction Co. Inc. & Associates: "We are meeting and exceeding expected production schedules. Our D9 was bought primarily to pushload DW21s, but we also find it a high producer on other jobs."

That's the key to this take-charge giant's value—high production. Whether 'dozing, ripping or pushloading, the D9 has the capacity to handle *more* work with *less* down time at *lower* operating cost than any other earthmover. Many features contribute to its ability to get a lot of work done fast day after day. Here are just a few:

Power steering and power brakes provide fast, positive response and ease of operation that help an operator maintain production anywhere.

Exclusive oil clutch provides up to 2,000 hours of service without adjustment—equal to about 12 months' "adjustment-free" operation.

Dry-type air cleaner removes 99.8% of all dirt from intake air during every service hour. Can be serviced in 5 minutes. Cuts maintenance time and costs.

Lifetime lubricated rollers and idlers never require further lubrication until time for rebuilding.

For your big jobs, you can't beat a D9. And you can't beat the backing you get from your Caterpillar Dealer. He's ready round-the-clock to help you meet and whip production schedules with prompt service. See him for complete information about the D9, available with direct drive or torque converter. Ask him to demonstrate this giant on your job.

Caterpillar Tractor Co., San Francisco, Cal.; Peoria, Ill., U.S.A.

CATERPILLAR

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BOOST PRODUCTION WITH A TAKE-CHARGE D9

for more details, circle No. 61 on Reader Service Postcard

309 for 4.1 mi. of grading and surfacing in Lane County, Ore. Located on the McKenzie River-Willamette section of the Pacific Highway, work started here in June and will be finished in November.

* * *

Wendall Galbraith is supervising a recent award to C. L. Hubner Co. for grading, structures, and surfacing on 2.1 mi. of highway, Fort Collins-south, in Larimer County, Colo. Scheduled to be finished in September, the $340,293 construction started in June.

* * *

Edward C. Roberts, superintendent, with the assistance of **Art Cramer,** grade superintendent, has charge of 6.7 mi. of grading, surfacing and related work in Wasatch and Summit counties, Utah. Roberts & Anderson Co. received the job on a low bid of $203,341; started work in June, and expects to finish in September.

* * *

Robert W. Martin, general foreman, and **Laurence A. Pederson,** driller, are key men on channel dredging of Neva Strait in Alaska. J. A. Troxell successfully bid the job at $122,910, started work in June, and will be finished sometime in September.

* * *

Bill Atkinson, project manager, and **Dick Bywater,** superintendent, key men employed by L. C. Smith Co., are drawing to a close resurfacing of 27.3 mi. of highway at various locations in San Mateo and Santa Clara counties in California. Smith received this contract on a low bid of $208,243 and has been working on the job since June.

* * *

W. H. Holcomb, project manager, and **Vern Wilson,** superintendent, for Wells-Cargo, Inc., are key men on contract which covers construction on a portion of state highway on U. S. 93 in Elko County, Nev. Wells-Cargo won the award on a low bid of $599,803.

* * *

Ray Travis is superintendent, and **Bob Kriese,** assistant superintendent, for $255,084 grade, drain and plant-mix surface job on 5 mi. of the Gila Bend-Ajo highway in Maricopa County, Ariz. Shift foreman is **John Brown,** while **Stan Beloat** is mechanics foreman. T. M. K. Construction Co., who successfully bid the job, started work in June and expects to be finished about October.

* * *

Jim Baun is supervising Baun Construction Co.'s recent award to widen a 2-lane highway on Route 29 near Kelseyville, Lake County, Calif. General foreman is **Wayne Stoll,** while **Everett Wentworth** is grading foreman. This State Highway contract covers 4 mi. of 2-lane to be graded and surfaced with double seal coat applied to untreated base, and drainage facilities costing $336,021. Scheduled for completion in November, work started in June.

Turtle Club

AMONG those Western workers who recently joined The Turtle Club, international organization of construction men who owe their lives to the use of a hard hat, are the following:

Arthur W. Payne, an employee of Northwood, Inc. of Kanab, Utah. While moving an air track drill, the boom fell, striking him across the head and left shoulder. The force of the 1,000-lb. blow was cushioned by his safety helmet, protecting him from serious injury.

Lavor Pugmire, employed by S. S. Mullen, Inc. of Culdesac, Idaho. Pugmire was driving a D-9 dozer when a column of rock fell on the canopy, smashing it and driving part of the supporting framework onto his hard hat. He was pushed forward to the dashboard by the force, but his safety hat completely protected him from serious injury.

James Tuningley, an employee of Jarvis Construction Co., Ltd., Vancouver, B. C. While shoring a trench in an endeavor to rescue two men trapped in a cave-in, one of the planks struck his hard hat, wedging it between the planks and the bank. He was able to remove his head from the helmet, which continued to hold the planks and prevented him from being crushed.

Vejno E. G. Andersen, also an employee of Jarvis Construction Co. While laying a pipe in a 15-ft sewer trench, his partner caught his foot between the pipe, and a small cave-in occurred. Andersen attempted to free his partner when a second cave-in occurred, burying them both under tons of clay. A plank lodged against the rim of his hard hat creating an air pocket which saved him from suffocation while rescuers dug down 5 ft. to reach him.

Anton Sorensen, employed by Commonwealth Construction Co. Ltd., Victoria, B. C. His crew was stripping plywood planks from walls and lowering them on ropes. In the process of untying the rope a second piece of 25-lb. plywood struck Sorensen on top of the head. He was saved from serious injury by his safety hat.

If you have had a similar experience to those noted above you can become eligible for membership in The Turtle Club by submitting a verified completed application form. Address your inquiry either to *Western Construction,* 609 Mission St., San Francisco 5, Calif., or to **E. W. Bullard,** International Sponsor, The Turtle Club, 26 Bridgeway, Sausalito, Calif.

Carl Jacobson, project manager for Tanner Bros. Co., Inc., has charge of a highway widening job in the city of Flagstaff, Ariz., with **Arthur W. Rogers** in the superintending spot. **John H. Tanner** is project engineer. The $378,470 contract is for grading various sections on U. S. 66 and 89A, including curb, gutter and asphalt paving. Additional key personnel for Tanner on this job are **E. O. Willis,** assistant superintendent, **Andy Telles,** foreman, and **Raymond Hershner,** office manager. Scheduled for November closing, the job started in July.

* * *

Keith L. Stone, projects manager, and **E. H. Hamdorf,** job superintendent, head the list of personnel working for Wells Cargo Inc., on freeway construction north

EQUIPMENT BY YUBA—*Southwest*

Southwest MULTIPLE-BOX COMPACTION ROLLER

Faster compaction of heavier lifts—proved by tests to give greater efficiency than any other tamping method. Fewer passes required.

Unmatched compaction performance — each wheel and tire assembly mounted in independently oscillating weight box. Gives constant, even wheel load pressure regardless of soft spots, uneven ground.

Rides slopes smoothly—individual vertical wheel oscillation eliminates bridging or shifting of load, cuts danger of turn-over.

Five models—10 to 100 tons rated capacity. Adaptable to any job assembled in any combination of 3 to 6 boxes with flanged yoke.

Southwest SELF-PROPELLED ROLLERS

Full multi-purpose unit—for sub-base and base courses, road shoulder, small earth fills, black-top, other paving.

Positive, uniform compaction—even on rolling or rocky surfaces, assured through exclusive vertical oscillation of rear wheels.

Big 84" rolling width—15 to 20% more rolling capacity.

Single lever forward-reverse controls—speeds from 0 to 15 mph through torque converter and "Revers-O-Matic" transmission. Smooth, even power flow.

Southwest SHEEPSFOOT ROLLERS

Greatest possible tamping and compaction to uneven surfaces made possible through Southwest design, individual independent oscillation of drums.

Heavy duty, highest quality rollers — ruggedly constructed for the worst kind of punishment. All models, both arch type and center tie cable type, equipped with large Timken Roller Bearings on heavy drum shafts for smooth, trouble-free operation.

Replaceable forged alloy steel tips—easily replaced in the field. Contractors find this cost-cutting feature saves important time and money. Also available in solid wedge type feet.

Southwest SPRINKLER TANKS

A truly well-engineered sprinkling tank — without doubt the finest units on the market today.

Provides highest sprinkling uniformity—from pressure spray bars both front and rear.

Maximum spray range and needling of water—result in faster area coverage and greatest possible water penetration.

Completely adaptable for use with Caterpillar — DW-21, DW-20, and DW-15 Tractors, and other suitable prime movers. Various draft beam or hitch arrangements available.

Choose just the size you need—5,000, 6,000, and 8,000 gallon capacities, with all accessories as required.

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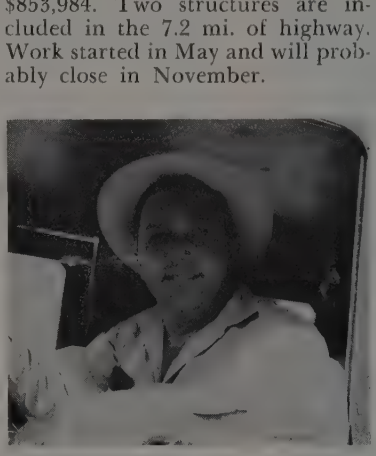
of Beaver in Utah. This job of grading, surfacing and an underpass structure was awarded Wells Cargo on a low bid of $1,724,939. Other key men working here are **Jack Chattele,** excavation superintendent; **Richard Peterson,** master mechanic, and **C. L. Kaufied,** concrete superintendent.

* * *

John Van Valkenburgh is acting as project manager, and **C. S. Stirewalt** is superintending a $995,261 award to N. P. Valkenburgh Co. for grading, surfacing and storm drain work in Phoenix, Ariz. Pipe superintendent on this storm drain, of 78, 72, 66, and 60 in., is **A. H. Reed.** Van Valkenburgh estimates the job will be finished sometime in December.

* * *

Robert Phillips, general superintendent for Jack B. Parson Construction Co., is head man on an Interstate highway project in Box Elder County, Utah. He has the assistance of the following supervisers: **D. Hodges,** grade superintendent; **W. J. Parson,** gravel and soil stabilization superintendent; **LaMar Jones,** fence foreman, and **Joe Richardson,** pipe foreman. Parson was low bidder on this job at $853,984. Two structures are included in the 7.2 mi. of highway. Work started in May and will probably close in November.



PROJECT Manager *Sam Martinelli,* Wunderlich Contracting Co., checks the 3.7-mi. Dunsmuir Freeway in Northern California from his radio-equipped jeep. The project includes extensive drainage work, 1,500,000 cu. yd. of earthmoving, and eight concrete structures along a steep mountainside.

Al Woods and **H. W. Bridges,** project manager and superintendent respectively, are in charge of Stan Owens Construction Co.'s recent award at $411,560 for grading and surfacing in Apache National Forest in Arizona. This 9.9-mi. highway improvement started early in June, and according to **Stan Owens** will be finished about Nov. 7.

* * *

Arnold Blair, superintendent, with **Ed Dempsey** as assistant, has charge of a grade, gravel and pave job in Washoe County, Nev. Other key men on this 6-mi. highway stretch on State Route 33 are **Clyde Rasor,** timekeeper, and **Don Collins,** labor foreman. Isbell Construction Co., successful bidder at $411,856, started on the job in June and has about another month to go.

* * *

Leon Pierce, general foreman, and **Jerry McCoy,** pile-driver foreman, are key men for Lord & Bishop, Inc., who recently won an award for a pile bridge with concrete deck, spanning the San Joaquin River at Patterson, Calif.

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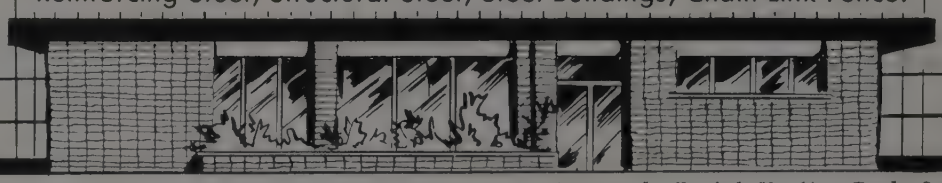

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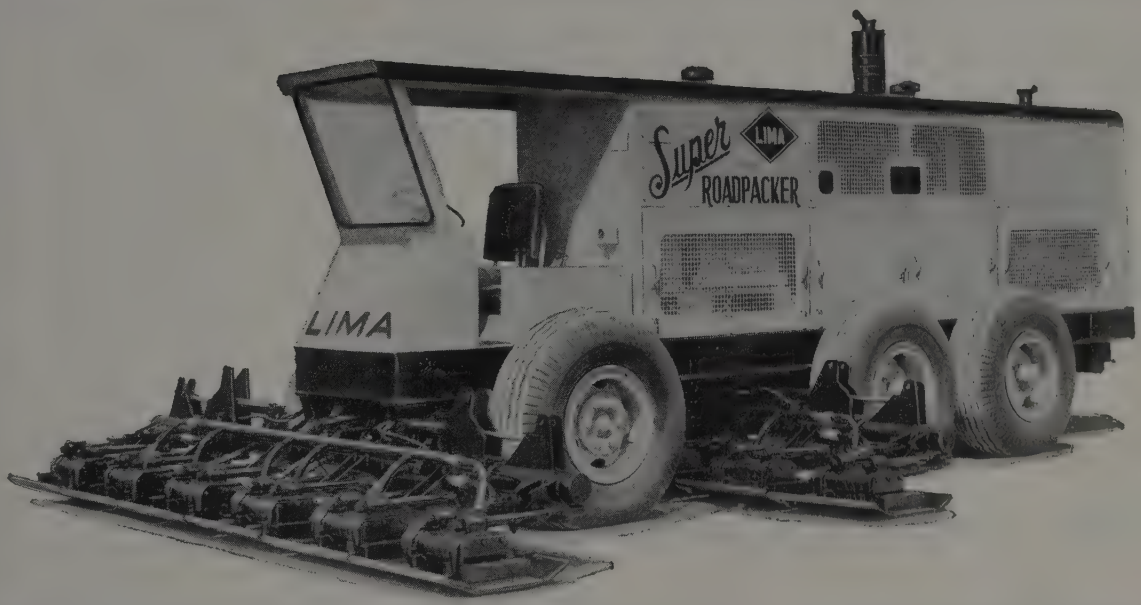
ANNOUNCING LIMA'S NEW *Super* ROADPACKER

...More than doubles the compaction production of any multiple shoe vibratory machine!



Profit with single course construction; cut number of passes in half with new Super Roadpacker

In only one pass, Lima's new Super Roadpacker achieves densities which require two or more passes to accomplish with any other multiple-shoe vibratory compaction unit! It's specially designed to meet the demands for high-production compaction on large construction jobs such as superhighways, air bases and earth-fill dams.

Even "tough-spec" materials can now be compacted on a production basis at speeds from 26 to 268 fpm—highway travel up to 24 mph. Two rows of six hydraulically controlled vibratory shoes can compact at varying widths up to 15 ft. High flotation tires; tandem rear driving wheels. Power brakes and power steering. Investigate. See your nearby Lima distributor today or write: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio, U.S.A.

LIMA MODEL D ROADPACKER

For the job that does not require the Super Roadpacker, the Model D—with six vibratory shoes and variable working widths—will give fast, wide, deep compaction at speeds from 20 to 95 fpm—road speeds to 30 mph.

Reno Equipment Sales Company, 1510 W. 4th Street, Reno, Nevada; **Feenaughty Machinery Company,** 112 S.E. Belmont Street, Portland 14, Oregon; **Evans Engine & Equipment Company,** 4300 11th Avenue, N. W., Seattle 7, Washington; **Bay Cities Equipment, Inc.,** 2792 Cypress Street, Oakland 7, California; **Bay Cities Equipment, Inc.,** 1178 West San Carlos Street, San Jose, California; **N. C. Ribble Company,** 1304 North Fourth Street, Albuquerque, New Mexico; **Modern Machinery Company, Inc.,** East 4412 Trent Avenue, Spokane 10, Washington; **Shasta Truck and Equipment Sales,** South 99 Highway, Redding, California; **Western Machinery Company,** 820 North 17th Avenue, Phoenix, Arizona; **Western Machinery Company,** 1111 West St. Marys Road, Tucson, Arizona; **Evans Engine & Equipment Co., Inc.,** Post Road—Box 894, Anchorage, Alaska; **Faris-Moritz Equipment Company,** 5790 Colorado Blvd., Denver, Colorado; **Western Machinery Company,** 2300 South Main Street, Salt Lake City 15, Utah; **Western Machinery Company,** P. O. Box 197, 590 West 19th Street, Idaho Falls, Idaho; **Smith Booth Usher Company,** 2200 S. San Gabriel River Parkway, Los Angeles 54, California

LIMA Construction Equipment Division, Lima, Ohio

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Facts about diesel fuel for improved performance

(From General Petroleum Corp.)

THE MAINTENANCE and life of a diesel engine depends largely on the quality of the diesel fuel it has to digest. Therefore, a fuel fit for engine use should possess certain qualities such as:

1. Cetane—Cetane is a measure of the ignition characteristics of the fuel and influences ease of starting, combustion cackle and smoke. Mobilfuel Diesel is always over 45 cetane.

2. Boiling Range—(Keep within 10% - 425 deg. F.—end point 675 deg. F.). Too low an initial boiling point indicates light ends which burn rapidly, building up shock cylinder pressures. A high end point would indicate the presence of heavy slow burning constituents that would not completely burn in the short time available and would go out the exhaust in the form of black smoke and unburned fuel. Such heavy ends tend to foul up piston rings and contaminate the crankcase oil and higher fuel consumption and loss of power may be expected.

3. Pour Point—Pour point is only important in that the fuel must flow rapidly through the lines at the lowest temperatures encountered.

4. Color—Some diesel manufacturers specify a maximum of 3 NPA. Color is usually an indication of the quality of refining—the lighter the color (the lower the NPA number) the lesser the contaminants.

5. Neutralization Number—The lower the neutralization number the less the acid content. Fuels having over .20 NN should not be stored in galvanized tanks otherwise the zinc will be dissolved and cause injector tip fouling.

6. Contamination—Sand, water, gasoline. Extreme caution is used in handling Mobilfuel Diesel to prevent contamination. Of course, condensation will occur in any vented tank and such accumulation should be drained out from time to time. Never add gasoline to diesel fuel as gasoline burns explosively, causing loss of power and may break piston rings or cause other parts failure.

7. Lubricity — Diesel fuel must have adequate lubricating properties to protect the finest injection systems even though clearances may be in the order of 1/125 diameter of a hair.

8. BTU Content—BTU is the standard abbreviation of British Thermal Unit — a unit of heat, which is approximately the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit. Mobilfuel Diesel is a high heat content No. 2 fuel of accurately controlled boiling range for maximum power and greatest utilization of BTU content.

9. Sulfur—Although some heat is produced when sulfur is burned, the sulfur compounds uniting with water vapor, also a product of combustion, forms sulfurous or sulfuric acids which are most injurious to an engine. Due to these injurious effects of sulfur most diesel manufacturers recommend a fuel be selected that contains not over ½ of 1% sulfur.

10. Gravity—The API Gravity is a scale developed by the American Petroleum Institute to more easily compare the density of petroleum distillates. API Gravity equals 141.5 divided by specific gravity at 60 deg. F., minus 131.5. Specific gravity equals 141.5 divided by the quantity API Gravity plus 131.5. The specific gravity of water is one which you will note corresponds to 10 API Gravity. It is evident then that the higher the API Gravity, the lighter the fuel, while the higher the specific gravity, the heavier the fuel. Diesel engine manufacturers usually specify a fuel between 30 and 42 API Gravity. Mobilfuel Diesel usually runs 33-36 API Gravity. API Gravity is usually determined by a hydrometer.

11. Conradson Carbon Residue on 10% bottoms is an indication of the carbon forming characteristics of the fuel and normally should not exceed .20% by weight. Most manufacturers of automotive

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Capitol Scaffolding & Equipment Co., North Sacramento, Calif.
James A. C. Talt Co., Portland, Oregon
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Evergreen-Stone Co., Tacoma, Washington
Columbia Concrete Pipe Co., Wenatchee, Washington
Johnny's Rental Service, Yakima, Washington
Reimer Masonry & Supply, Salem, Oregon
Boise Concrete Specialties, Inc., Boise, Idaho
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Steel
Lightens your work
Brightens your leisure
Widens your world

Westerners like these new ideas in USS steel

Owner: Janrick, Inc., Arlington, Wash. Contractor: Texmo Pole Structures, Inc., Bellingham, Wash.

New Ground Cover for Aircraft. When storm warnings fly in northern Washington, all planes are secure in weather-proof steel hangers at Arlington Airport. These structures were built to last from USS Galvanized Sheets, formed into special long length panels by Western Aluminum Corp., Seattle. This new application of USS Sheets provides extra strength and saves money, through faster erection time and easier handling.

Owner/Builder: Lindsay M. Waddingham, Lancaster, Calif.

New Design for Furniture Sales. Lindsay's Interiors, Lancaster, California—a new approach in store design, by Calcor Corp., Huntington Park. Structurals, wall panels and roof decking are formed from USS Steel. Post-free, clear spans provide maximum use of interior display space. Features like these make steel a fast-growing favorite of architects and builders throughout the West.

Contractor: Leiser Construction Co., Denver.
Steel Windows: Colorado Metal Products Co., Denver.

New Dash for Dwellings. Strong, light-weight framing of USS Steel, by Sterling Steel & Supply gives the Melbro Apartments, Denver, Colorado, rigid, lasting beauty.

Curtain walls: Fentron Industries, Inc. Architects: Mallis & DeHart. Contractor: H. Halvorson, Inc., Seattle, Wash.

New Class for School Buildings. Steel is making a major contribution toward solving the West's critical school shortage. Shoreline High School, Seattle, Washington, a case in point, is finished in style with porcelain-enameled panels of USS Steel for maximum service and minimum maintenance.

STEEL FOR EVERY PURPOSE FROM A SINGLE SOURCE

Western industry works better in steel buildings. And to keep pace with Western growth, USS produces steels for every building purpose. When you build—build modern with steel! Call your nearby United States Steel representative for full information.

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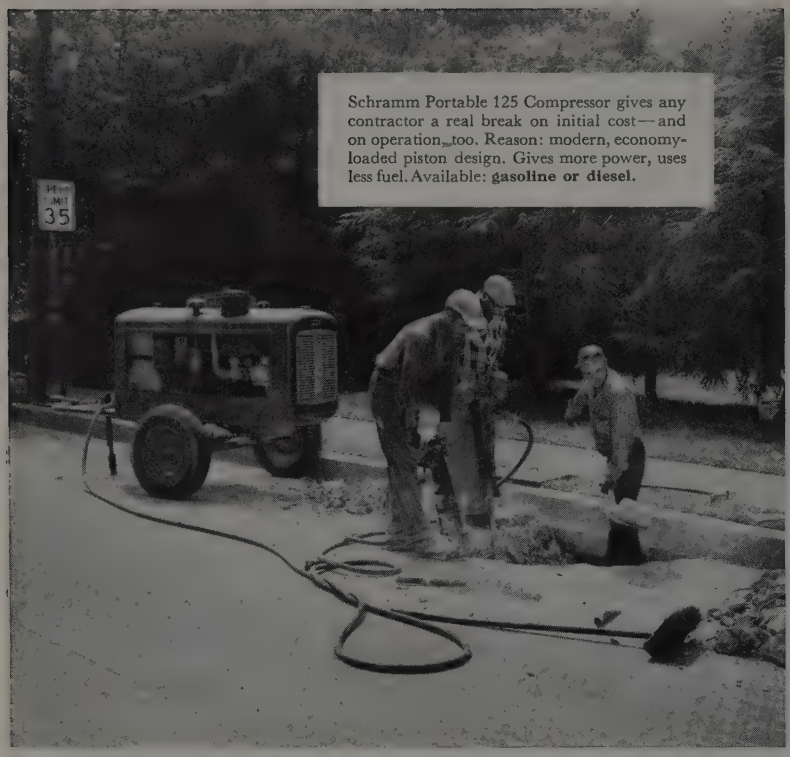

CONTRACTORS WHO WANT TO CUT OPERATING COSTS:

Save up to $1700 on Schramm 125 Compressors

Why pay more than necessary for a 125 cfm air compressor? Schramm gives you the lowest initial cost of any compressor manufacturer—plus additional cost savings in operation and repair. However, this lower cost is *not* from price slashing or quality cutting shortcuts, but is the result of lower manufacturing costs inherent in the production of piston-type compressors. It's a fact—you get superior quality at lower cost from the simplified design which can be manufactured more economically.

You also get increased savings with . . .

Lower fuel consumption Schramm Model 125 uses from 15% to 50% less fuel than competitive air compressors. Yet it delivers more power—a full 125 cfm of air, not just a fraction of it.

Fewer and Less Costly Replacement Parts 90% of the wearing parts between engine and compressor are interchangeable, fewer parts to replace. Replacement parts also cost less—as much as one-seventh of competitive parts.

Don't spend one cent extra for any size compressor until you can investigate *all* the facts. See your local Schramm Dealer, or write today for your copy of Bulletin SPB-58.

Schramm Portable 125 powers two pneumatic tools with *full* 125 cfm of air . . . produces full rated power—increases workers' efficiency.

Consider the money saved when you drive a compressor instead of pushing it. It takes an average of 15 minutes and $2 worth of manpower to push compressor ten feet; less than five minutes and 16¢ to drive Pneumatractor.

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diesels recommend a maximum of .15% to .25% and some as high as .50%.

12. Ash—A high ash fuel would tend to promote high cylinder wear. Therefore the ash content should not exceed .01% by weight.

13. The flash point of fuel is not particularly important only in that it indicates safety of storage. Some municipalities have laws stating that fuels of less than 150 deg. F. flash point may not be stored above ground. Mobilfuel Diesel has a flash point of over 150 deg. F. It therefore complies with all legal regulations.

14. Viscosity of fuel is the measure of the oil's resistance to flow. Any viscosity reading is meaningless without the temperature at which the viscosity was observed, as a variation in the temperature of a fuel changes its viscosity appreciably. In general, high viscosity fuels are difficult to atomize and burn slowly.

Cleaning Cummins injectors by back-flushing is about 90% effective. Simply back-off injector plunger adjustment one complete turn on 3 cylinders and alternately accelerate and decelerate engines some 15 times. Adjust injectors and repeat on other 3 cylinders. Excess fuel accumulated under the injector plunger will be forced at extreme pressure back through the metering orifice as the injector plunger is smacked down by the cam. This high velocity fuel usually quite effectively scours out any deposit accumulation in the metering orifice.

Arc welding training manual

Publication of an "Arc Welding Training Manual" designed for welders and instructors of manual metal-arc welding has been published by the American Welding Society. Contents include welding processes and recommended safety practices, the metal-arc process, accessories, exercises in arc welding, arc welding equipment, and metals and their structure. It is illustrated with 337 drawings, photos and tables. Fifty pages are devoted to arc welding exercises and the various techniques can be mastered by following step-by-step instructions.

Price of the manual is $3.00. It is available from the **American Welding Society,** 33 West 39th St., New York 18, N. Y.

Misuse of ladders

THE LADDER, one of the most frequently used pieces of equipment in the construction industry, is also one of the most mis-used and abused, according to a technical report published by Liberty Mutual Insurance Company.

From its analysis of accidents as the nation's number one workmen's compansation insurer, Liberty Mutual establishes the following eight basic rules as crucial to the safe use of ladders:

1. The horizontal distance from the wall to the foot of the ladder should never be more than ¼ the length of the ladder.

2. Place ladders on secure footing.

3. Tie in ladders at top to prevent movement when at all possible, especially if used as a fixed ladder.

4. Ladders with broken side rails or cleats, or of faulty or defective construction should be repaired or destroyed immediately.

5. **Replace,** do not repair, broken side rails or cleats.

6. Do not splice short ladders together to provide long sections.

7. Ladder should extend at least three feet above top landing so workers can grasp it firmly when descending.

8. When base of ladder is placed on steel or concrete, use uncleated end for base.

The following construction rules are also essential to safe ladder building:

1. Cleats and side rails should be clear lumber.

2. Cross grain in cleats should not be allowed.

3. Side rails and cleats should be dressed to remove sharp edges and splinters.

4. Use 2 x 4-in. side rails when length is 19 ft. or less.

5. Use 2 x 6-in. side rails when length is 19 to 30 ft.

6. Wood cleats should be housed into the edges of the side rails ½ in. or filler blocks used.

7. Cleats should be nailed to each rail with three 10d wire nails.

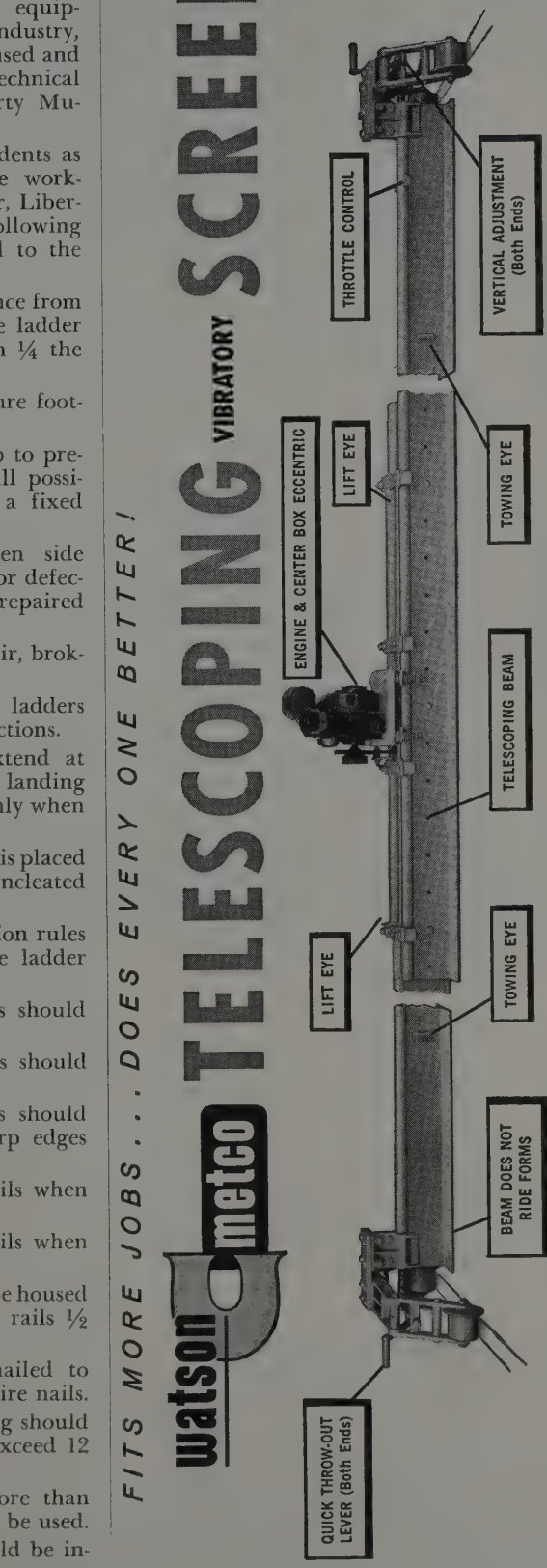
8. Uniform step spacing should be used, and should not exceed 12 in.

9. Portable ladders more than 30 ft. in length should not be used.

10. Non-slip cleats should be installed on end of ladder.

FITS MORE JOBS . . . DOES EVERY ONE BETTER!

Watson metco TELESCOPING VIBRATORY SCREED



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* EASY WIDTH ADJUSTMENT—Telescoping span eliminates investment in different-length beams, saves time changing beams, permits quick adjustment for variable curb widths.
* NO FORM DAMAGE—Beam does not overhang forms; practically no vibration is transmitted to form.
* SLOPE CORRECTION WITHOUT RESETTING FORMS—Shoe plate can be adjusted from ½" below to 1" above top of form, independently of either end, without stopping the screed!
* RE-TRANSMITTED WAVE PATTERN PRODUCES DEEP, UNIFORM COMPACTION—Center-box eccentric produces 8,700 vibrations per minute transmitted through double beam in an overlapping wave pattern that eliminates dead spots, spreads pile-up evenly, provides deeper compaction.

WHY GO ON LOSING TIME AND MONEY WITH OLD-STYLE SCREEDS? Put a WATSON-CMETCO to work **now**—you'll be set for practically any size or type of job in the future. Heavy duty Model 2B302 provides 15'6" to 23' beam length; Model 2B303, 22'6" to 36'. Light-duty models for tilt-up slabs and floor slabs provide 10'2" to 15', or 15' to 25' beams. Interchangeable beam sets, special crowned beams available. Also "Build-Your-Own" Economy Screed Kit. Write today for literature; address dept. W-8

Dealer Inquiries Invited

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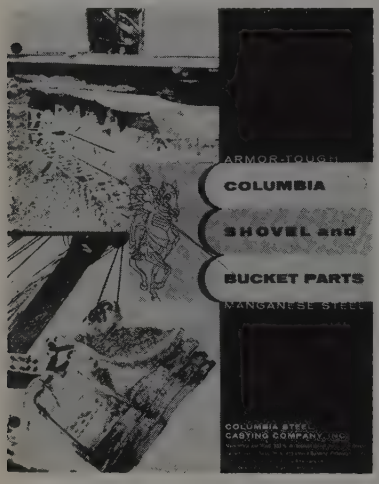
NEW LITERATURE

To obtain free copies of literature described in this section, circle the corresponding numbers on reply postcard.

Shovel and bucket parts

Columbia Steel Casting Co. offers a new 4-page bulletin covering its replacement parts for most makes of buckets and shovels. Products covered include solid 1-piece



tooth bases and points, tooth repointers, bushing and pins, bucket fronts, door assemblies, hinges, latch accessories and heel bands as well as crawler shovel pads, bevel gears and shaft pinions. Booklet features components made of Columbia Austenitic manganese steel.

. . . Circle No. 160

Tractor shovel specs

Specification bulletins on three Trojan tractor shovel models have been issued by **Yale & Towne Mfg. Co.** The single sheet, 2-page bulletins cover Model 104, 9,000-lb. capacity; Model 124, 10,000-lb. capacity and Model 154, 12,000-lb. capacity. The rubber tired tractor unit features safety curve lift arms. They are equipped with torque converters and are available with gasoline or three types of diesel engine power plants. Each bulletin provides complete dimensions and specifications and lists its operating features as well as standard and optional equipment.

. . . Circle No. 161

Moline tractor line

A group of bulletins covering the **Minneapolis-Moline** line of industrial crawler and wheel tractors and their digging and loading attachments has been issued by the company. Equipment covered includes: Series 335 industrial wheel tractor with 47 horsepower. Series 445 industrial wheel tractor with 57 horsepower. Series L3, front end loaders and backhoes for use in combination with 335 tractor. Series L4 loaders and backhoes for use with Series 445 tractor. Series G6 industrial tractors with LP gas or diesel engine of 72 and 67 hp. Moline 2-star crawler with 57 hp. gasoline engine.

Each sheet provides specifications, dimensions and operating features of the series covered. Among the features stressed are single hydraulic systems for both loader and backhoe and a single warranty which covers both tractor and attachments all manufactured by the same company. Illustrations include action photographs and cutaway drawings of tractor and components.

. . . Circle No. 162

Crawler units for tough terrain

Track laying under carriage units for all types of construction hauling in mud or rough terrain is described in a 12-page booklet issued by **Athey Products Corp.** The nonpowered crawler assemblies which replace wheels where high flotation is needed or rugged hauling conditions prevail are called Athey Forged-Traks. They are available with standard chassis frames, stake bodies, dump bodies or A-frame trailers. The booklet also shows custom application of the track units for moving oil well derricks, loading bins and other unwieldy structures. They can be used without haul roads and in areas where rubber tired equipment cannot travel. Included are diagrams and specifications of the track assemblies.

. . . Circle No. 163

IH loaders and back hoes

Loaders and backhoes for its line of utility wheel tractors are described in a 16-page catalog released by **International Harvester Co.** The booklet covers International Wagner equipment for models 240, 340, 460 and 560 utility tractors. The catalog gives specifications and operational features for the various models and lists a wide variety of buckets, blades, crane booms, forks and other attachments for the basic equipment.

. . . Circle No. 164

Concrete test equipment

Illustrated step-by-step methods of making three concrete tests are covered in a folder issued by **Soiltest, Inc.** The leaflet covers the slump test determination of air entrainment and compression testing. Also listed are various items of testing equipment produced by the company.

. . . Circle No. 165

Curb-gutter form catalog

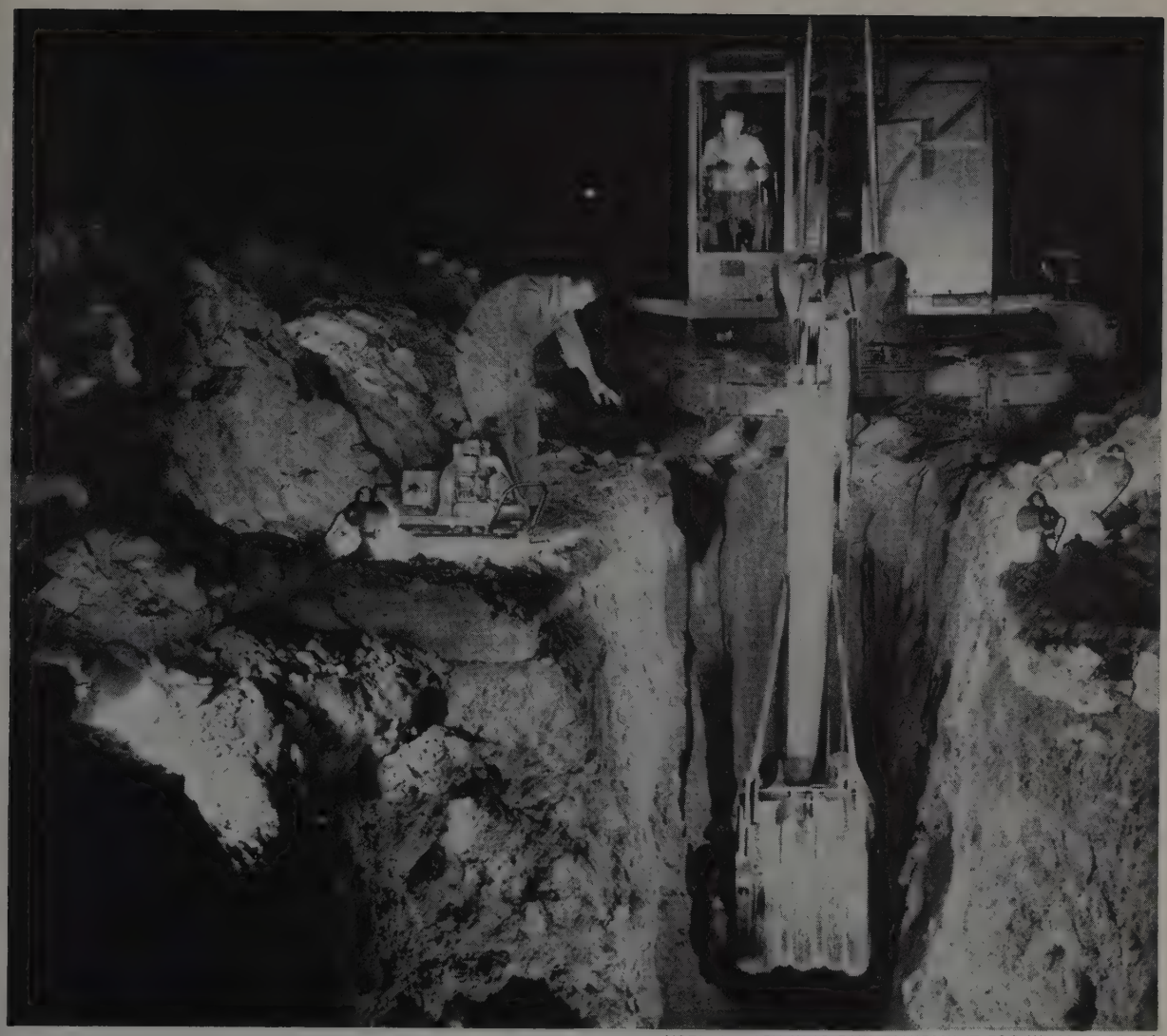
A well illustrated 20-page catalog describing its complete line of steel curb gutter and sidewalk forms has been issued by **Metal Forms Corp.** Perspective drawings show a wide

variety of forms and interchangeable attachments for both straight and curved work. Catalog also covers such accessories as steel stakes, spacers and plate clamps. Booklet includes cross section specifications and suggested specs for steel forms.

. . . Circle No 166

Concrete check list

A comprehensive check list of factors to be considered when specifying concrete and mortar is included in the **Master Builders Co.** publication, "Considerations for



USED BY MEN WHO BUY EQUIPMENT FOR WHAT IT SAVES

More For Your Money

New HOMELITE 3000 Watt Generators

You get more, you save more, with the new Homelite Model 8A Generators. You get more production power. Weighing only 140 pounds, complete with built-in gasoline engine, the 8A gives you 3000 watts. You get the power you need for electric saws, drills, floodlights and other labor-saving tools. You get the power you need for more work in fewer man-hours, quickly and easily.

Just as important, you get more performance with less maintenance and less operational trouble with the new Homelite Model 8A Generators. No rheostats or other controls to operate. Voltage is automatically controlled within four percent from no load to full load. There are no DC brushes. No commutator. No DC windings on armature. No trouble makers to slow down work and run up fix-it costs.

Three models are available . . . 115 volt and 115/230 volt, both 60 cycles, AC plus the 180 cycle model for running most efficient high cycle tools. Ask for free demonstration soon. The sooner the better for you.

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HOMELITE • A DIVISION OF TEXTRON INC., 9508 RIVERDALE AVE., PORT CHESTER, N.Y.
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Homelite Western Branches are in Seattle, Spokane, Washington — Eugene, Portland, Oregon
San Francisco, Sacramento, Los Angeles, Fresno, California — Salt Lake City, Utah — Denver, Colorado.

. . . for more details, circle No. 71 on Reader Service Postcard

Concrete and Mortar." The booklet covers job requirements and conditions, concrete floors, concrete in plastic and hardened state, curing, and surface after-treatments Also discussed are masonry mortar, grouting mortar and mortar for miscellaneous uses.

. . . Circle No. 167

Transit mixer data

Complete information on the full line of **Hercules-Galion** transit mixers is presented in a "fact portfolio" issued by the company. Included is a 16-page illustrated booklet which utilizes large drawings and cutaway diagrams to point up the features and performance of the transit mixers and the company's portable batching plant, and individual specification sheets for each mixer model. The literature covers three lines of transit mixers: Separate Engine Series, Mixomatic series with front-of-engine PTO drive, and T-series with straight PTO drive. A separate catalog sheet describes the portable batching plant. Mixers are offered in 4, 5, 6 and 7-yd. capacities.

. . . Circle No. 168

Automatic blade control

An all transistor automatic blade control for use on any current model Caterpillar motor grader is described in a new booklet issued by **Preco, Inc.** The unit automatically raises or lowers one end of the blade to maintain the desired transverse slope. It can be set to operate on either the right or left hand side. This enables the operator to concentrate his entire attention to his reference line and depth of truck. The unit operates in a range of 0 to 20-deg. slope. The booklet lists a number of job applications as well as illustrating features of the control unit.

. . . Circle No. 169

High speed batch plant

A new electrically controlled high speed portable batching plant for highway and airport paving is described in a 4-page bulletin issued by the **Blaw-Knox Co.** The plant includes autographic strip chart recorders and fully interlocked batchers to meet specifications of the Corps of Engineers. The bulletin describes and illustrates operating features of the plant's dual automatic cement batcher, 600-bbl. cement bin and 4-compartment aggregate bin and automatic aggregate batcher. Illustrated erection steps of the batch plant and aggregate batcher are included as well as photos of the various weighing and recording devices.

. . . Circle No. 170

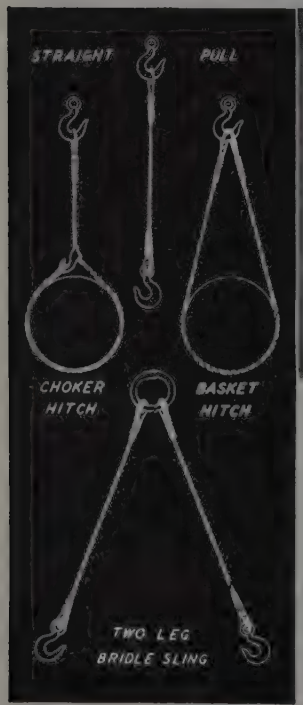
Shoring catalogs

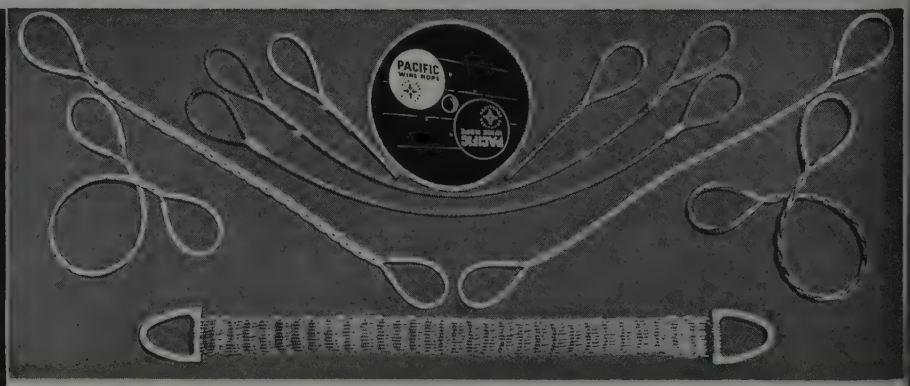
Three catalogs covering its line of horizontal shoring, vertical shores and scaffold units have been issued by **Acrow California, Inc.** These include:

Horizontal shoring — 4-page folder describing and illustrating the two-member adjustable units. Data includes maximum and minimum spans for various sized shores and loading table giving spacing for various slab thicknesses and spans. *. . . Circle No. 171*

Adjustable vertical shores — 12-page catalog showing basic shoring grid and providing tables on spacing or placing of shores for various loads and spans. Formula for computing allowable shore spacing along with chart of specifications

MAXIMUM *strength* **MAXIMUM** *savings*
with **PACIFIC WIRE ROPE SLINGS!**





Only Pacific Wire Rope is "Equalized"—giving added flexibility to slings. Maximum strength right from the start—removes initial stretch, back twist and tendency to kink—compacts rope, resists bridging, strand nicking and crushing caused by sharp edges and right-angle bends. Complete range of sizes and types of splice for use in or out of plant.

Pacific Wire Rope Company has the largest rigging loft on the Pacific Coast with complete facilities for standard splicing, swaging and plastic coating of slings, fittings, etc.

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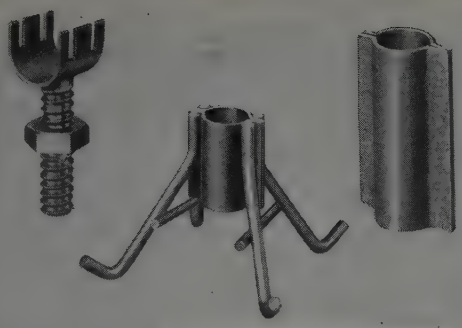
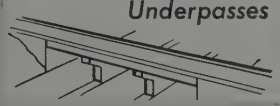
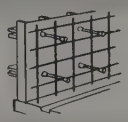


HEAVY-DUTY SCREED SUPPORTS

Overpasses and Underpasses

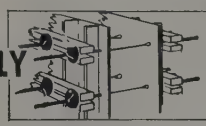


THREADED COIL TIES



Engineering Structures

SHE BOLT ASSEMBLY



Heavy-Duty Forming

4-STRUT COIL ROD ANCHORS

Temporary or Permanent Anchorage

SUPERIOR

One Source For All Accessories For Dependable Concrete Forming

These are examples of the numerous types of form ties, anchors, inserts, and other items in Superior's most complete line of concrete accessories. The illustrations show the variety of concrete form work and related jobs in which Superior accessories are used. All items are designed to provide the most dependable and efficient forming methods.

WHENEVER YOU ARE PLANNING FORM WORK... Superior's technical assistance is available to prepare suggested layouts. Call or write to nearest address shown below.

SUPERIOR CONCRETE ACCESSORIES, INC.

9301 King St., Franklin Park, Ill. *(A Suburb of Chicago)*

New York Office
1775 Broadway
New York 19, N. Y.

Pacific Coast Plant
2100 Williams St.
San Leandro, Calif.

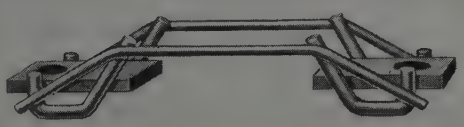
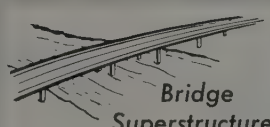
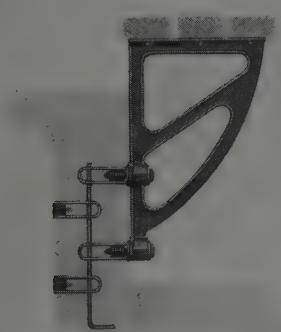


PLATE HANGER FRAMES

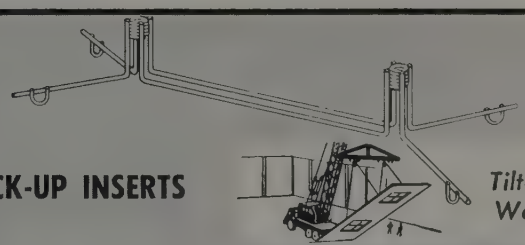


Bridge Superstructures



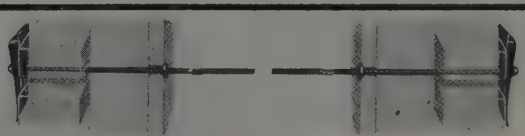
RISER-FRAMES

Stadiums and Grandstands

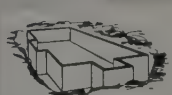


PICK-UP INSERTS

Tilt-Up Work



SNAP TIES



Ordinary Foundations

and drawings of Acrow shores is included. . . . *Circle No. 172*

Scaffold units — 12-page booklet illustrating assembly of steel scaffolding and listing dimensions and weights of the units. Many illustrations show scaffolding in use on both European and U. S. jobs. . . . *Circle No. 173*

Plastic covered plywood

Construction uses of Kimpreg high density overlaid plywood are discussed in a new booklet published by **Kimberly-Clark Corp.** The plastic coated plywood is recommended for concrete forms. . . . *Circle No. 174*

Cat tractor-scraper

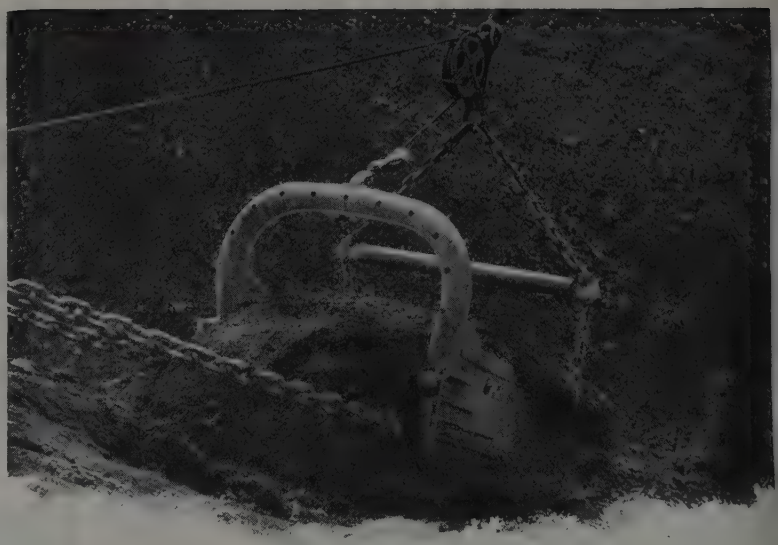
The new Caterpillar No. 619 wheel-tractor and No. 442 lowbowl scraper are described in a 6-page illustrated brochure recently issued by **Caterpillar Tractor Co.** The 225-hp., 2-wheel tractor is designed for high accessibility. The folder illustrates such features as swing-away dash, planetary final drive and unitized power train. Also covered are the high strength roadability and safety features of the scraper design. Brochure includes specifications and dimensions of the units. . . . *Circle No. 175*

Concrete finishing machinery

Two bulletins describing concrete finishing machinery have been issued by **Chain Belt Co.** One, titled "Rex Finishers," discusses such features of these machines as power frame widening, quick crown changes, hydraulic screed positioning and a working speed range totaling 48 different combinations. The other, "Rex Longitudinal Float Finishers," outlines the advantages of tubular construction to eliminate sagging deflection and weaving on forms. It also discusses transportability of these units for greater speed and handling ease. . . . *Circle No. 176*

Dump trailer equipment

"Profitable payloads," a 12-page brochure issued by **Hercules Steel Products Co.,** describes light, medium and heavy-duty dump trailers made for specific hauling applications. Among the single and tandem action models shown are steel and aluminum units of both frameless and frame type design. Sizes range from 16 to 30 ft. in length and 10 to 25 cu. yd. in capacity, plus self powered units and spe-



Bucyrus-Erie buckets have *LOADING SPEED* built in!

Weight is concentrated in Bucyrus-Erie buckets to help teeth, cutting edge, and thin "slicing-action" lip penetrate swiftly. Material flows in easily because the bucket is tapered properly.

Bucyrus-Erie buckets swing smoothly through the carry without bobbing and spilling because they're properly flared and balanced. The high arch and smooth inside design assure clean, fast dumping.

Don't penalize your dragline with a clumsy, hard-to-handle bucket. Get a high-output Bucyrus-Erie bucket from your distributor listed on the adjoining page or write Bucyrus-Erie Company, South Milwaukee, Wisconsin, Dept. 6R.

BUCYRUS ERIE

BUILDS BETTER EQUIPMENT

. . . *for more details, circle No. 74 on Reader Service Postal*

LET YOUR
BUCYRUS-ERIE
DISTRIBUTOR
HELP YOU DIG
UP THE FACTS

BORDER MACHINERY COMPANY
El Paso, Tex.; Carlsbad, N. M.

GREAT NORTHERN TOOL & SUPPLY COMPANY
Billings, Mont.

THE COLORADO BUILDERS' SUPPLY COMPANY
Denver, Colo.; Casper, Wyo.

INTERMOUNTAIN EQUIPMENT COMPANY
Boise & Pocatello, Idaho
Spokane, Wash.

WEST COAST ENGINE & EQUIPMENT COMPANY
Berkeley, Calif.

CROOK COMPANY
Los Angeles & Bakersfield, Cal.

R. L. HARRISON COMPANY, INC.
Albuquerque, N. M.

LANG CONSTRUCTION EQUIPMENT CO.
Salt Lake City, Utah

NORTHERN COMMERCIAL COMPANY
Seattle, Wash. (Alaska)

WESTMONT TRACTOR COMPANY
Missoula & Kalispell, Mont.

ROAD MACHINERY COMPANY
Phoenix, Ariz.

SANFORD TRACTOR & EQUIPMENT CO.
Reno, Nev.

CLYDE EQUIPMENT COMPANY
Portland, Ore.; Seattle, Wash.

BUCYRUS ERIE ®

. . . for more details, circle No. 75

cial models custom designed for special hauling and dumping requirements. Among the equipment options covered are special designs for under-body or front telescopic hoists, suspensions, various rolling components, wet lines and landing gears. Trailers are available in a variety of gauges in either corrugated or smooth surface. . . . *Circle No. 177*

Concrete finishing equipment

The Flex-Plane line of concrete finishing equipment is covered in a series of 7 new catalog sheets issued by **Heltzel Steel Form & Iron Co.** and its affiliate **Flexible Road Joint Machine Co.** Equipment covered ranges from a simple rail mounted finishing bridge to the new Flex-plane gas electric combination finisher-float machine and includes sub-grade testers in standard and self widening models, sub-grade planers, a DC gas electric concrete finisher which mounts its own running gear for highway transport, automatic spray curing equipment and a DC gas electric bridge deck finisher. Colorful catalog sheets show dimensions, specifications and operating details of each piece of equipment in the line. . . . *Circle No. 178*

Sand settling tank

A 4-page brochure describing the Wemco Sand-Sort, a free settling classifying tank for removing excess slimes and water from a sand slurry has been issued by **Wemco, Division of Western Machinery Co.** The tank can be used to eliminate unwanted sizes and to produce two or more sands of different size gradations. . . . *Circle No. 179*

Fractions to decimals

A linear conversion table for converting inches and fractions of inches into decimal parts of a foot has been issued by **The Tubular Products Division of the Babcock & Wilcox Co.** The table is printed on heavy paper and punched for standard 3-ring binder. Known as TDS 110, it is available without charge. . . . *Circle No. 180*

Defeating dirt

Special tips on how to maintain engines to reduce down-time and repair costs are contained in a new series of bulletins titled "Defeating Dirt," published by **Cummins Engine Co.** Bulletins are concise and cleverly illustrated, giving details on how to care for diesel engines to obtain maximum performance, economy and engine life. The 4 bulletins deal with (1) air cleaners, (2) tubing, hose and clamps, (3) breathers, filler caps and dipstick, and (4) lube oil filters and fuel filters. . . . *Circle No 181*

Descriptive pipe catalog

Details of pipe manufacture are shown in drawings and illustrations contained in a handsome new 40-page catalog issued by **Kaiser Steel Corp.** to describe its line of welded steel pipe. Much of the illustrative material is devoted to showing how each type of pipe is produced and plant photos are accompanied by the perspective drawings giving a clear view of the process. Catalog covers continuous weld pipe ranging from ½ in. to 4 in. in diameter, electric resistance weld pipe in diameters from 4½ in. through 18 in., and electric weld pipe from 20 in. through 36 in. Brochure also includes line pipe data tables which show weight per foot, wall thickness, test pressures and tons per mile. . . . *Circle No 182*

High strength bolt booklet

A 16-page, 2-color catalog on high strength structural bolt assemblies has been issued by **Republic Steel's Bolt and Nut Division.** The catalog contains interesting photographs and drawings to clarify and dramatize the several advantages of high strength bolting described in the text. Information for proper ordering of high strength bolts also is included. Data on bolt sizes and dimensions is presented in a number of tables. . . . *Circle No 183*

Wire rope block catalog

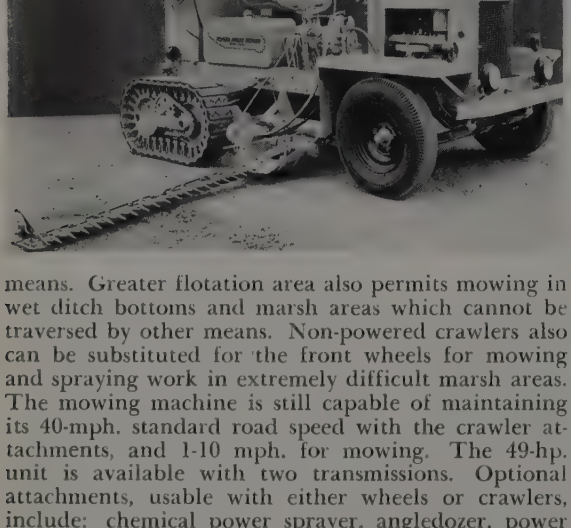
The full line of Sauerman wire rope blocks covering single and multiple sheaves with bronze or roller bearings is described in a new 10-page illustrated catalog issued by **Sauerman Bros. Inc.** Capacities of the blocks range from 1-ton singles to 600-ton multiple sheaves assemblies. Blocks are designed originally as components of Sauerman drag scrapers and cableway machines and are backed by a 50-year manufacturing history. Included in the catalog are many photos and drawings covering standard units as well as those built for such specialized applications as cableway towers. . . . *Circle No. 184*

NEW EQUIPMENT

Obtain more information on these new developments in construction equipment by circling the corresponding numbers on reply postcard.

Crawler assembly for highway mower

Crawler assemblies to replace the rubber tired rear wheels of the **Topeka Hiway Mower** have been announced by the company. Rubber shoed crawler assemblies which convert the vehicle to a half track can be installed in less than an hour. The rear crawlers give more than 400 sq. in. of ground traction and flotation area compared to 72 sq. in. with regular tires. They lower the center of gravity and permit mowing of steep slopes impossible to mow by conventional



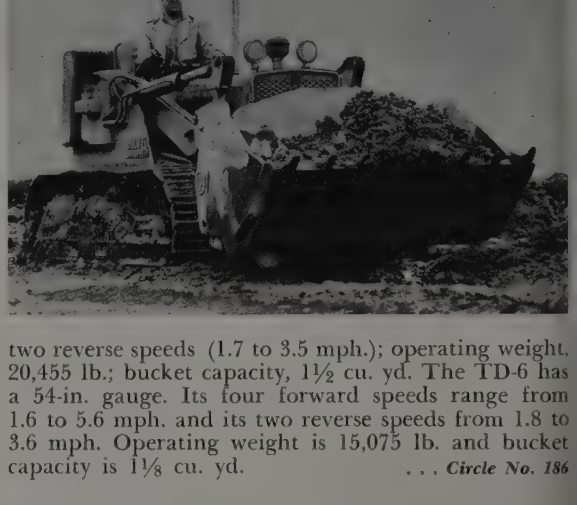
means. Greater flotation area also permits mowing in wet ditch bottoms and marsh areas which cannot be traversed by other means. Non-powered crawlers also can be substituted for the front wheels for mowing and spraying work in extremely difficult marsh areas. The mowing machine is still capable of maintaining its 40-mph. standard road speed with the crawler attachments, and 1-10 mph. for mowing. The 49-hp. unit is available with two transmissions. Optional attachments, usable with either wheels or crawlers, include: chemical power sprayer, angledozer, power broom, paint striper, front-end loader and all-weather cab. *. . . Circle No. 185*

Drott Four-in-One skid shovels

New **International Drott** TD-9 and TD-6 Four-in-One Skid-Shovels now are in production. The units feature new six-cylinder diesel engines, increased track length for greater stability and flotation and newly-designed track roller shells increasing lubrication capacity 300% to provide 500-hr. lubrication intervals.

Instantly available under one operator's control, are four machine functions — full-sized bulldozer, carry-type scraper, clamshell unit and Skid-Shovel. The recently-announced International UD-282 direct-starting engine powers both models. The turbo-charged engine of the TD-9 delivers a net 71 hp. and the naturally-aspirated TD-6 power plant produces 55 hp.

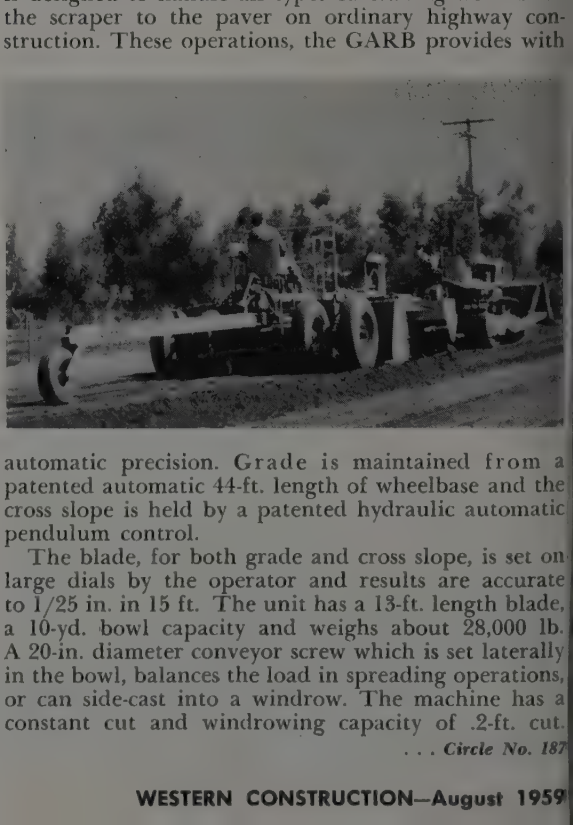
Brief specifications of the TD-9 Four-in-One are: gauge, 60 in.; four forward speeds (1.5 to 6.3 mph.);



two reverse speeds (1.7 to 3.5 mph.); operating weight, 20,455 lb.; bucket capacity, 1½ cu. yd. The TD-6 has a 54-in. gauge. Its four forward speeds range from 1.6 to 5.6 mph. and its two reverse speeds from 1.8 to 3.6 mph. Operating weight is 15,075 lb. and bucket capacity is 1⅛ cu. yd. *. . . Circle No. 186*

Precision grader has 44-ft. wheelbase

For both rough and fine grading on highway jobs, **Gurries Manufacturing Co.,** has announced the Gurries Automatic Road Builder—GARB, for short. The unit is designed to handle all types of blading work from the scraper to the paver on ordinary highway construction. These operations, the GARB provides with



automatic precision. Grade is maintained from a patented automatic 44-ft. length of wheelbase and the cross slope is held by a patented hydraulic automatic pendulum control.

The blade, for both grade and cross slope, is set on large dials by the operator and results are accurate to 1/25 in. in 15 ft. The unit has a 13-ft. length blade, a 10-yd. bowl capacity and weighs about 28,000 lb. A 20-in. diameter conveyor screw which is set laterally in the bowl, balances the load in spreading operations, or can side-cast into a windrow. The machine has a constant cut and windrowing capacity of .2-ft. cut. *. . . Circle No. 187*

More earning power! That's what Western truck operators asked for, and the new lightweight "A" model Autocar produced it. More Truck Lines, Southern California hauler, gets

29 TONS PAYLOAD

Put more earning power into *your* hauling operation with the new "A" model

AUTOCAR

Autocar
"World's Finest"

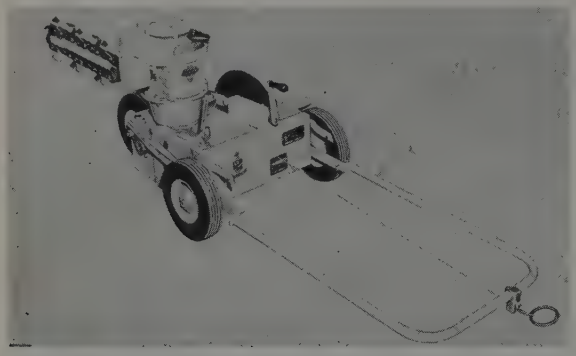
Division of
White Motor Company
Exton, Pa.

"Better Service Means MORE TRUCK LINES!" And More lives up to their slogan with Autocar diesels. More hauls cement, roofing granules and aggregate mostly throughout Southern California with their 4 Autocars. Their latest units, shown above dumping a load, are the new lightweight "A" models with Cummins NH-220 engines, Fuller Roadranger RA-96 transmissions and they pull Trailmobile hopper trailers. Let your Autocar representative help work out the best extra-earning-power package for *you!* Call him today!

. . . for more details, circle No. 101 on Reader Service Postcard

Small trencher works by itself

Designed to dig small trenches for gas and water pipes or power line installations, **David Mfg. Inc.** announces the "Davis Pup," a portable self-propelled trencher priced at $495 f.o.b. factory. The unit trenches in 2 and 3-in. widths down to a depth of 3 ft., and once started no operator is needed except for

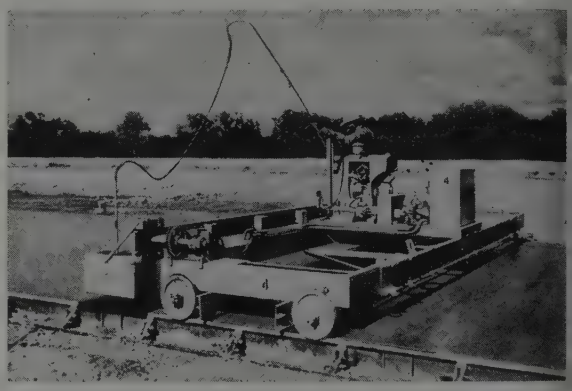


casual observation and to stop the unit. With its variable speed drive and unique winching mechanism it is drawn down the guard line as it digs. Six different speed settings are controlled by a single lever. A convenient self locking depth control lets the operator adjust to the desired trench depth. A combination guide-bridle and handlebar lifts into waist-high position for portability. The unit is available with both gasoline and electric power.

. . . Circle No. 188

Spray curing machine with many features

An improved automatic Rex Spray Curing machine has been announced by the Construction Machinery section of **Chain Belt Co.** It is adapted to automatic belting and brooming operations, and it fitted for an optional burlap drag attachment. The positive displacement pump on the unit delivers a uniform flow of curing compound with a by-pass system returning overflow to a storage drum. The spray pump is operated by V-belt drive independent of travel speed.



Powered by a 2-cylinder 12-hp. air-cooled gasoline engine, the unit has a 4-speed transmission. A simple clamping device eliminates bolting and affords fast width adjustments. The unit is available in standard sizes with the following frame adjustment ranges, 10-15, 12-25 and 20-32 ft.

. . . Circle No. 189

. . . for more details, circle No. 76 on Reader Service Postcard

MY JOB FOLLOWS ME . . . since I put my home on wheels!

This is the life! *Now* when I change jobs it's easy to change my home's location too. No more scrambling for a place to stay, worrying over how long it'll be before the wife and kids can follow along.

Where else and how else can a man keep his freedom to choose a job he likes, and still know the pleasures of home life? I've got roots, I'm as stable as any land—or job-bound citizen. And after a day sweating over a hot line or moving plenty of earth it's soul-satisfying to have my home close by to unwind in—a hot shower, a big easy chair to sink into, and seconds after I've got my feet propped up on the hassock, the wife's got a cold beer in my hand!

She's happy too, naturally. She's got as modern a kitchen as any we've ever seen, and as pretty decorated a house as she could wish for.

There's plenty of space for the kids (separate bedrooms!) and a living room large enough for partying. And we've saved so much since we've owned our mobile home that we've got a new car, plenty of insurance and a bank account that guarantees the kids a good education.

Our park neighbors got their information from a local dealer—found him in the yellow pages. We wrote the Mobile Home Division of the Trailer Coach Association. Step inside some mobile homes—our bet is you'll buy one.

CONTRACTORS: Your most dependable employee today is *the man with the Mobile Home.*

Within one day he can be completely and comfortably moved to the job site—no packing up, no furniture moving or storage problems, and no days wasted looking for a new place to live.

Best of all, his family moves with him, bringing all the comforts of his luxurious and modern mobile home.

A normal, stable and comfortable family life means fewer days lost to illness. He can devote all his energies to the job, undistracted by personal inconveniences.

If you have employees with housing problems, write for additional information and reprints of this ad.

TRAILER COACH ASSOCIATION TCA *607 So. Hobart Blvd., Los Angeles 5, California*

Look for the TCA seal—your guarantee of high construction standards.

. . . for more details, circle No. 77 on Reader Service Postcard

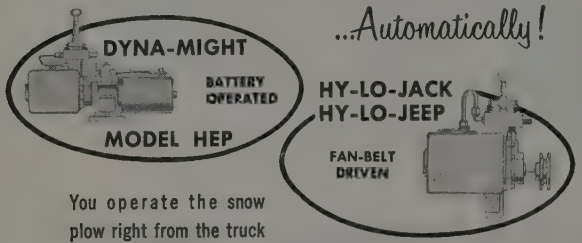
SNOW REMOVAL is faster, easier, more economical

WITH

MONARCH *Power Hydraulic* **CONTROLS**

that **LIFT** and **LOWER** the snow plow...

...Automatically!



You operate the snow plow right from the truck or jeep cab with Monarch Controls. Instant, automatic lifting or lowering that saves time, does the job more efficiently. See your dealer or write for illustrated folder.

MONARCH

MONARCH ROAD MACHINERY COMPANY

1331 MICHIGAN ST., N.E., • GRAND RAPIDS 3, MICHIGAN

. . . for more details, circle No. 78 on Reader Service Postcard

Looking for a new employment opportunity, or for a man with specialized experience?

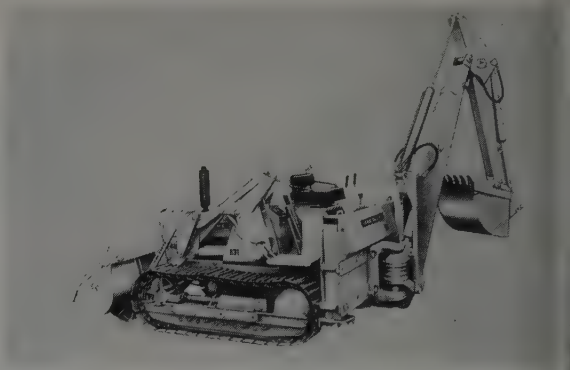
Have you used equipment to sell, or do you need used equipment?

Your ad in the classified section of WESTERN CONSTRUCTION will reach 18,000 construction men in the West, and at a cost of only $15.50 per column inch.

Send your copy today, enclosing check, to WESTERN CONSTRUCTION, 609 Mission Street, San Francisco 5, California. (If proofs are required, the closing date is the 5th of the preceding month of publication, or the 10th without proofs).

John Deere has two new diesel tractors

Powered by General Motors 2-cycle engines, selected for exceptional records of performance and economy,



John Deere Co. announces the new "440" crawler and the "440" wheel models. Extensive field testing indicates that the two new tractors will deliver 10% more power than previous models in the "440" line. Rated horsepower of the diesel engine plant is 33.25 at 1,850 rpm. The new units were designed to meet the increasing demand for diesel power on John Deere tractors with their accessories which provide loaders, backhoes and bulldozers. However, the tractors will continue to be offered with gasoline engines.

. . . Circle No. 190

Trojan adds 2-yd. tractor shovel

To meet the requirements of contractors the Trojan Division of **Yale & Towne Mfg. Co.** is introducing a 2-yd. tractor shovel capable of delivering fast work cycles. Now in distribution the Trojan 204 is a 4-wheel drive shovel specializing in stability and maneuverability. It has lifting capacity of 12,000 lb. and a full complement of attachments. Functional design affords maximum operating efficiency with full circle visibility and maximum safety for the operator. The instrument panel contains all gauges necessary for the

operator to carry out proper functioning of the tractor shovel, making it unnecessary to stop production to check a gauge. Reduction in daily service time has been accomplished by making the engine and battery compartment easily accessible. The front bumper is an integral part of the frame. Front lights are recessed to reduce damage. The unit is available in either gas or diesel power with travel speeds up to 21 mph. Hydraulic power steering is standard equipment.

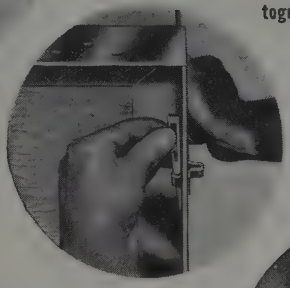
. . . Circle No. 19

simple
tie
installation...

secret of FASTER CONCRETE FORMING

SECONDS
TO INSTALL
UNI-FORM TIE
AND ASSEMBLE PANELS

1. UNI-FORM Tie Loop placed in square tie hole of Panel.



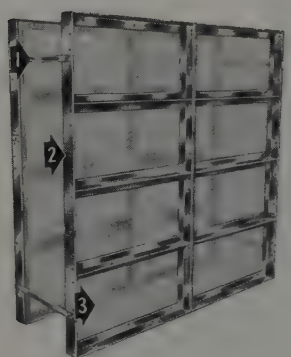
2. Tie Key set into the Tie Loop. Panel and Tie are now locked together into integral unit.

3. Next UNI-FORM Panel is placed in position. Tie Loop automatically enters square tie hole. Key is dropped in—assembly is complete. NO COMING BACK TO "FISH" TIES.

When you can tie and lock two concrete form panels in a few seconds, you're forming concrete fast! This is exactly what you can do with the UNI-FORM Panel System—the fastest system of forming concrete ever developed.

Faster tieing is only one of many UNI-FORM Panel features that makes them *the* pre-fab forms contractors are using on every kind of concrete construction. Write for the UNI-FORM Panel System Catalog and full details . . . or, call your nearby Universal Distributor or Branch Office for personal attention immediately.

UNI-FORM PANELS ERECT INTO A TIGHT, RIGID, AUTOMATICALLY ACCURATE CONCRETE FORM



1. Ties spread, lock UNI-FORMS into a form with automatically accurate wall thickness.
2. Steel frame provides structural strength and rigidity. Minimum alignment and bracing.
3. Best Exterior Grade Plywood face provides nailing surface. Easily turned for further reuses.

"Products from the Gold Tool Room"

UFC UNIVERSAL FORM CLAMP CO. 1238 N. KOSTNER AVENUE • CHICAGO 51, ILLINOIS

Distributors

UNIVERSAL FORM CLAMP CO.
13210 South Figueroa Avenue
Los Angeles, California

UNIVERSAL FORM CLAMP CO.
2051 Williams Street
San Leandro, California

. . . for more details, circle No. 79 on Reader Service Postcard

Heco announces new line of truck cranes

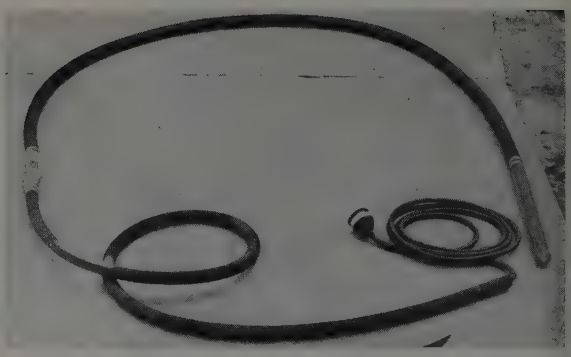
Featuring high stability, extra capacity and ease of operation, a new line of Heco cranes has been announced by that division of the **Hardwicke-Etter Co.** Two models, the RM-437 and RM-500 are rated con-

servatively at 9 and 11 tons respectively, with excavator sizes of ⅜ and ½ yd. The units are mounted on a carrier which has a solid H-Beam frame and features Budd interchangeable disc wheels. Torque converter drive is standard equipment. All wheels are interchangeable so only one spare is required and the pin-connected boom permits rapid erection.

. . . Circle No. 192

Small vibrator can move stiff concrete

A motor-in-head type of electric vibrator has been introduced by **Stow Mfg. Co.** which is powerful enough and has sufficient amplitude to handle the stiffest concrete. By eliminating brushes and commutators from the model which operates on 230 volts, the amplitude is increased and the 10,000 vibrations per



minute produce the high efficiency. It is available in two sizes with vibrator heads 1¾ or 2⅜ in. in diameter. A waterproof switch is located 7 ft. from the head, and is not harmed if immersed completely in concrete. Handling cases are available in 7, 14 and 21-ft. lengths. If a Stow HC generator is used the speed of the vibrator can be adjusted by shifting the throttle lever. These vibrators can be furnished to run on 110-volt power.

. . . Circle No. 193

Joy blasthole drill with new features

Designated the 450-DR, **Joy Manufacturing Co.** announces a new blast hole drill developed by adding dual rotation to a veteran Joy machine proved by years of performance. The drill features the rotation system of Joy which eliminates the need for conventional rifle-bar actuated reverse rotation and adds additional power to permit faster drilling in the roughest formations. This rotation is provided by a vane type air motor connected to the drill chuck and controlled independently. Because of this independent operation there is no hammering of the drill steel during coupling or uncoupling. Stuck steels are practi-

cally eliminated and maintenance costs are reduced. However, the new device does not sacrifice any of the advantages of standard rifle-bar rotation. The 450-DR can be mounted on the self-propelled TDL Trac-Drill or the deluxe self-propelled TDM Trac-Drill.

. . . Circle No. 194

HIGHWAY CONSTRUCTION or CITY MAINTENANCE

DOUBLE WORK LOAD of limited-duty equipment at a MINIMUM COST with

FROST LOADER SHOVELS

DISTRIBUTORS
No. Calif.
Edw. R. Bacon
So. Calif.
Calavar Corp.
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Truck Parts
& Equip.
So. Nev.
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Oregon (Eugene)
Star Equip. Co.
Arizona
WEMCO
Colorado
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Utah
WEMCO
Idaho
WEMCO

The FROST LOADER SHOVEL attached to any truck automatically converts it to a double duty vehicle capable of doubling or tripling its work load. Ruggedly built to withstand years of abuse, yet easily operated, the hydraulically operated FROST LOADER can fit all trucks regardless of make, model, or design. FROST LOADERS are available in three models from 3/4 to one yard load capacity, and from 2500 to 4000 lbs. lifting capacity.

Also available is the FROST cut out attachment for use in pipe line installation clean up.

Whether the job is to move gravel, sand, earth, snow or rubbish, the FROST LOADER can boost your truck's earning capacity and work load. Send for illustrated brochure.

P B LOADER MFG. CO.

P. O. BOX 314 FRESNO, CALIF.

. . . for more details, circle No. 80 on Reader Service Postcard

"This Buckeye is the best I've found in 20 years of operating ditchers"...

says Pat Lester, operator for the Glade Construction Company, Fort Worth, Texas

"On this Water District job we're digging four feet deep in hard limestone. These are tough conditions...a lot of punishment for any machine. But our Buckeye is more than a match for the job. I've never seen performance like this in my 20 years as an operator."

Pat Lester is right! The GarWood-Buckeyes can really "dig in" because more useful power is delivered to the digging wheel. Exclusive use of a "ditcher designed" transmission, liberal use of anti-friction bearings and a superior lubrication system result in a smooth and efficient flow of power.

Get the complete story from your nearby GarWood-Buckeye dealer. He can give you more proof why operators and contractors prefer the GarWood-Buckeye for top performance under toughest conditions.

GarWood
INDUSTRIES, INC.
Findlay, Ohio • Wayne, Michigan

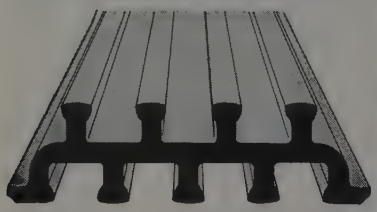
SEE YOUR GAR WOOD-BUCKEYE DEALER

A-D Machinery Company, Inc.—Elko, Nevada; **Air Mac, Inc.**—Seattle, Washington; **Buran Equipment Co.**—Oakland, California; **Cramer Machinery Company**—Portland, Oregon; **Equipment Sales Company**—Phoenix, Arizona; **Industrial Tractor Sales**—North Sacramento, California; **Reno Equipment Sales**—Reno, Nevada; **Seitz Machinery Company, Inc.**—Billings and Great Falls, Montana; **Shasta Truck and Equipment Sales**—Redding, California; **Smith Machinery Company, Inc.**—Roswell, New Mexico; **Southern Idaho Equipment Company**—Idaho Falls, Idaho; **Studer Tractor & Equipment Company**—Casper, Wyoming; **Warnock-Bancroft Equipment Company**—El Monte, California; **Western Machinery Company**—Denver and Grand Junction, Colorado; **Western Machinery Company**—Salt Lake City, Utah

. . . for more details, circle No. 81 on Reader Service Postcard

LABYRINTH® WATERSTOPS

A SOUND INVESTMENT FOR CONCRETE CONSTRUCTION!



LABYRINTH AVAILABLE IN 2, 3 or 4 rib.

ON YOUR CONSTRUCTION:

1. Consider the investment in design, materials and labor (to mention a few).

2. Then consider how important safe, secure *watertight* concrete joints are.

3. Thorough watertightness *can* be secured by installing Labyrinth Waterstops —a dividend that makes the low initial cost of the product insignificant when compared to your total investment—and one that insures watertight concrete joints for years!

- Corrugated ribs grip concrete, insure an everlasting bond between joints.
- Finest polyvinyl plastic resists chemical action, aging, severe weather.
- Takes just seconds to nail to form . . . easy to cut and splice on location (prefabricated fittings available).
- There's a Water Seal product for every type of concrete work!

If your aim is to stop water seepage, *stop it effectively with Water Seals' Waterstops!*

WATER SEALS, INC.
Chicago 6, Illinois by:

THOMAS CONCRETE ACCESSORY CO.
5341 Sheila St.
Los Angeles 23, Calif.

HYDRO PRODUCTS CO.
1350 Old County Road
Belmont, Calif.

CHAS. R. WATTS CO.
4121 Sixth Ave., N.W.
Seattle, Wash.

PLASTI-SPRAY CO.
353 S. State
Orem, Utah

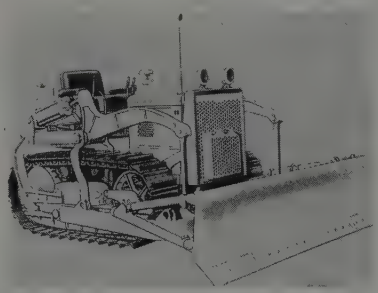
BAKER-THOMAS-WOOLSEY
300 S. Twelfth St.
Phoenix, Ariz.

E. W. ZUCK
1238 N.W. Glisan St.
Portland 9, Ore.

. . . for more details, circle No. 82

IH, TD-9, TD-6 crawlers

International TD-9 and TD-6 crawler tractors, featuring 6-cylinder direct-starting diesel engines and new track rollers providing 500-hr. lubrication intervals are now in production. Both machines are designed to be fitted with a

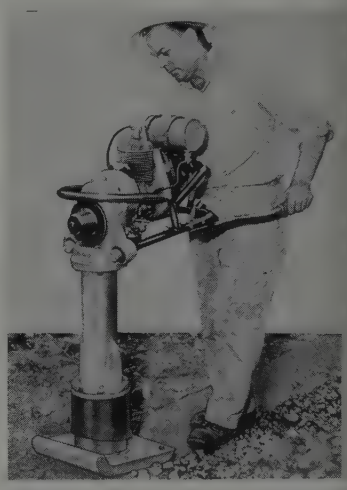


wide variety of dozers, loaders and other equipment for handling all types of earthmoving jobs. Powering the units is the new IH D-282 engine. The turbocharged engine of the TD-9 delivers 66 hp., while the naturally-aspirated engine of the TD-6 develops 52 hp. A rotary type fuel injection pump used with the D-282 engine is characterized by simplicity, efficiency and compactness. The track rollers have bushings supplied from 300% increased lubrication reservoirs.

. . . Circle No. 195

Light weight rammer-compactor

Weighing only 115 lb. and operated by a 3-hp. engine, the Vibro-Rammer has been announced by **Wacker Corp.** The engine drives the ramming shoe with a 3-in. stroke at 450 to 600 blows per minute. It is self propelled and the

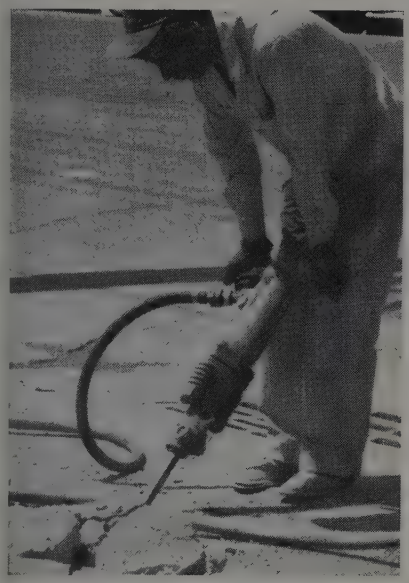


operator merely guides it. The rammer is 13 in. wide and 44 in. high. It was designed for narrow places, trenches and operating next to structures.

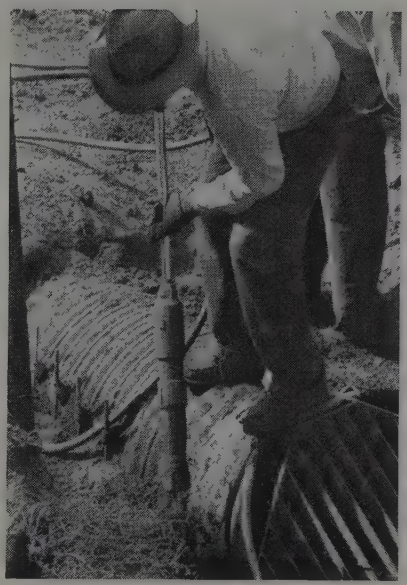
. . . Circle No. 196

FOR HANDLING bulk cement *Trailmobile, Inc.*, has a new trailer of simple mechanical design but exceptional efficiency. The unit is actually a light weight pressure tank on wheels. Discharge requires loading a single stage compressor mounted on the tractor, the trailer or at the point of discharge. Pressure required is only 15 psi., but cement discharge is at a rate of 1,300 lb. per minute. Discharge is controlled by a single lever which regulates flow of the cement and controls air pressure. A 4-in. pipe moves the cement to the top of storage silos or batch plants. *. . . Circle No. 197*

Break it up...pack it tight...drive it home



B67 paving breaker



T43 tamper

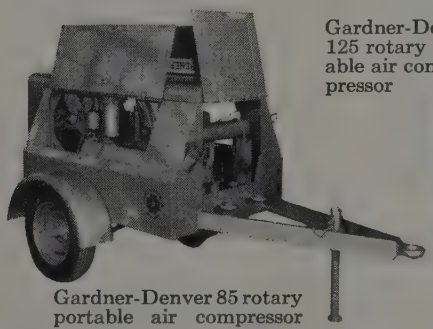
B87S sheeting driver

...with dependable Gardner-Denver air power and tools

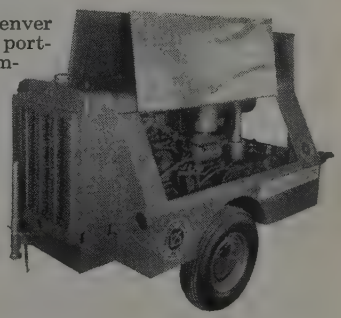
SERVICE CLOSE AT HAND

Wherever Gardner-Denver equipment goes, parts and service facilities are always close at hand. Skilled factory-trained service specialists take pride in keeping Gardner-Denver equipment productive. At Gardner-Denver there's no substitute for men—our 100-year philosophy of growth.

Gardner-Denver rotary portable air compressors deliver a steady supply of air year in and year out. They're easy on fuel . . . easy to care for. Plenty of tool storage, too! Rugged Gardner-Denver air tools help make toughest jobs easy. Look to Gardner-Denver for paving breakers, clay spaders, tampers, trench diggers, sheeting drivers, utility drills, rock drills, impact wrenches, air hoists, bit grinders, concrete vibrators and sump pumps. See your Gardner-Denver distributor soon.



Gardner-Denver 85 rotary portable air compressor



Gardner-Denver 125 rotary portable air compressor

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

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

. . . for more details, circle No. 102 on Reader Service Postcard

Crawler-mounted Lima Type 44 1-cu. yd. shovel loads sand and gravel into automatic feeder of Lima Austin-Western 101-SE Crushing and Screening Plant.

High output LIMA 44 shovel daily feeds over 1000 yards to portable crusher

"It takes a lot of digging to keep pace with a crusher plant that chews up over 1000 cu. yd. of gravel and rock daily," says John G. Yerington, Benton Harbor, Mich., contractor.

Lima Works Hard

"We get a lot of work out of our Lima 44 shovel. It works hard under rugged conditions, yet maintenance is low and we've had very little downtime with it.

"It has the built-in quality features you expect of Baldwin-Lima-Hamilton equipment. Besides the Lima 44, I have five Lima Austin-Western crushing and screening plants, plus three Austin-Western graders, five A-W rollers and an A-W hydraulic crane."

The Type 44 can be used interchangeably as a 1-yd. shovel, 25-ton crane, dragline or pullshovel. Available with crawler, truck or wagon mounts. Gas or diesel engine—torque converter is optional. Boom assembly or disassembly extra easy with pin or butt connections. Low gravity center. Large free-acting clutches—easy to operate and adjust.

Minimum Maintenance

Type 44, like all Limas, is designed and quality built to outperform with minimum maintenance requirements. Let a Lima tackle your toughest job. There's a type and size just right for your needs. Cranes to 110 tons, shovels ½ to 6 cu. yd., draglines variable.

Contractors everywhere are sold on Limas. Find out why!

See your nearest Lima distributor or write to us now. You'll profit with Lima!

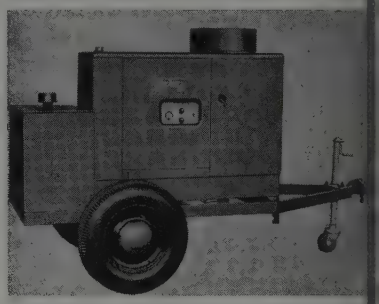
Our Seattle Office: 1932 First Avenue South, Seattle 4, Washington; **Our La Mirada Office:** 14120 E. Rosecrans Ave., La Mirada, California; **Feenaughty Machinery Co.**, 112 S. E. Belmont Street, Portland 14, Oregon; **Modern Machinery Co.**, 4412 Trent Avenue Spokane 10, Washington; **N. C. Ribble Co.**, 1304 North Fourth Street, Albuquerque, New Mexico; **Bay Cities Equipment, Inc.**, 2792 Cypress Street, Oakland 7, California; **Bay Cities Equipment, Inc.**, 1178 West San Carlos Street, San Jose, California; **McGaraghan Supply Company**, 529 Broadway, Eureka, California; **Evans Engine & Equipment Company**, 4300 - 11th Avenue, Northwest, Seattle, Washington; **Smith Booth Usher Company**, 2200 S. San Gabriel River Parkway, Los Angeles 54, California; **Evans Engine & Equipment Co., Inc.**, Post Road—Box 894, Anchorage, Alaska; **Faris-Moritz Equipment Co.**, 5790 Colorado Blvd., Denver, Colorado; **Shasta Truck & Equipment Sales**, South 99 Highway, Redding, California; **Reno Equipment Sales Company**, 1510 West Fourth Street, Reno, Nevada; **Western Machinery Company**, 820 North 17th Avenue, Phoenix, Arizona; **Western Machinery Company**, 1111 West St. Mary's Rd., Tucson, Arizona; **Western Machinery Company**, 2300 South Main Street, Salt Lake City 15, Utah; **Western Machinery Company**, P. O. Box 197, 590 West 19th Street, Idaho Falls, Idaho

LIMA Construction Equipment Division, Lima, Ohio
BALDWIN · LIMA · HAMILTON 5937

. . . for more details, circle No. 83 on Reader Service Postcard

Heat generator line

An 850,000-btu. heat generato available in 3 different mounting is announced by **Homestead Valve Manufacturing Co.** The "HT" gen erators are offered in stationary shop-portable or trailer-mounte models. Each generator is entirel self contained and offers a choic of burners for oil, manufactured



natural LP gas as well as a choic of electric motors or gasoline en gines for driving the pumps. Gen erators have automatic ignition independent fuel and chemical ad ditive systems with metering valve for each, and positive displacement pump. Because they have no pres sure vessels or steam domes HT heat generators are not classified as boilers and do not require li censed operators. They are easil convertible to steam generators b means of an adapter, vapor hos and cleaning gun. Literature avail able. *. . . Circle No. 19*

Fixed drawbar for TD-24

A new heavy-duty fixed drawba replacing the swinging type pre viously used is now available a regular equipment for the **Inter national** TD124 crawler. The draw bar offers a solid design with a 1 pin connection giving greater sta bility and additional ground clear ance. Heavy 1-in. steel plate is use in the drawbar bracket which is re inforced by 2⅞-in. steel gussets o each side. The clevis is made of 2 in. steel. Four 1-in. studs and nut hold the complete drawbar assem bly to the main tractor frame.

. . . Circle No. 19

Portable dust collectors

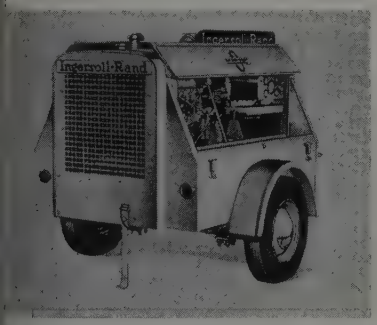
Three new cyclone-type dust col lectors available as portable or sta tionary units have been announce by **Barber-Greene Co.** The unit range in capacity from 12,000 t 40,000 cfm. All employ a multipl cone collection principle. Mode CA-50 collector uses a single ban of three sealed cyclones. Mode

CA-60 uses two banks for a total of six cyclones. Model CA-70 employs three banks totalling nine cyclone collectors. Each cone is fitted with a replaceable liner plate which greatly improves wear and abrasion resistance and permits renewal of the liner when worn. Steel ducting up to 3/16 in. in thickness is used at points of greatest potential wear. Portable models are equipped with fifth wheel towing hitch, single axle pneumatic tired running gear and jack-leg supports. Portable units include power unit for either high or low pressure fan and all piping except single straight section which connects the collector to the drier exhaust. Collectors are designed for operation with Barber-Greene asphalt plants as well as plants of other firms.

. . . Circle No. 200

Compact rotary compressor

A new Gyro-Flo 125 rotary compressor smaller and more compact than its predecessor is announced by **Ingersoll-Rand.** Features of the new unit include a more efficient compressor system, slower speed, automatic oil drainage from cylin-



lers when unit is shut down, safety compressor shutoff and provision for inspection of rotor vanes. Compressors are powered by Continental gasoline or diesel engine. Portable model of the Gyro-Flow 125 is mounted on wheels with 60-in. track. It is 10-ft. 1-in. long including drawbar and weighs 2,442 lb. ready to run. Unit has full length tool boxes and housing covering, fuel and air tanks. Unit also is available without running gear for truck or skid mounting.

. . . Circle No. 201

Concrete bonding compound

A new bonding compound, Epoweld 812, which permits casting of thin layers of new concrete directly over uncured material has been introduced by **Coast Pro-Seal & Mfg. Co.** Epoweld 812 is an equal part

Stationary Lima A-W installation, equipped with 32 x 40 in. primary jaw crusher, produces materials to 10 specifications. Conveyor covers help hold down dust, prevent materials from falling.

Lima Austin-Westerns CRUSH MORE FOR LESS!

"You simply cannot buy better crushing equipment than that made by Lima Austin-Western. It's tops—ruggedly built of high-quality materials; engineered to economically produce high tonnage hour after hour without lost production time or costly breakdowns. In our experience, maintenance costs and requirements on Lima A-W equipment are extremely low; distributor service excellent." That's what Craig Fenton, president of the Northwood Stone & Asphalt Co., Belle Center, Ohio, says about his company's stationary Lima A-W installation.

Lima Austin-Western offers a complete line of portable and stationary crushing and screening plants. Designed and quality built to set new standards of high-volume production of accurately sized gravel or rock over long years of trouble-free service.

The Lima A-W line includes many sizes of jaw and roll crushers, matching screens, elevators, conveyors and bins. Apron or reciprocating feeders control material flow, eliminate overloading, choking and surging. Centralized power plants, anti-friction bearings, and fewer shafts, belts and gears help keep operating costs low.

Learn how you can increase your pit or quarry production and at the same time reduce tonnage costs! See your nearest distributor or write us today: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Lima Austin-Western portable 101-SE crushing and screening plant with mechanical feeder is served by 1-yd. Type 44 Lima shovel.

Edward R. Bacon Company, San Francisco, California; **Columbia Equipment Company,** Portland, Oregon, Seattle, Washington, Spokane, Washington; **N. C. Ribble Company,** Albuquerque, New Mexico; **Western Machinery Company,** Salt Lake City, Utah, Idaho Falls, Idaho, San Francisco, California; **Keremi Tractor & Equipment Company,** Cheyenne, Wyoming, Casper, Wyoming; **Engineering Sales Service, Inc.,** Boise, Idaho; **Macdonald Equipment Company,** Denver, Colorado; **Graid Equipment Company,** Reno, Nevada; **Western Machinery Company,** Phoenix, Arizona, Tucson, Arizona; **Seitz Machinery Company, Inc.,** Billings, Montana, Great Falls, Montana; **Smith Booth Usher Company,** Los Angeles 54, California

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment
BALDWIN · LIMA · HAMILTON
CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO
5952

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For positive "Right-of-Ways"

use **REALOCK FENCE**

The giant steelman reflects the top-grade materials . . . years of continued research . . . and proud craftsmanship that are part of all CF&I steel products. You get these qualities in Realock Fence—the recommended way to establish positive highway "Right-of-Ways".

To make Realock rust-proof, the steel fabric is galvanized *after* weaving; you can depend on it for years of attractive, maintenance-free service. And Realock Fence is strong yet flexible. Installation over rugged terrain is no problem—whether a Realock crew erects the fence or you do the job yourself.

Realock is available in light or heavy construction . . . in steel or aluminum fabric . . . with or without barbed wire tops . . . in heights up to 13 feet.

Check your nearby CF&I representative for a free estimate and complete details on Realock Fence.

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION—Buffalo, New York

CF&I STEEL

REALOCK FENCE

THE COLORADO FUEL AND IRON CORPORATION

BRANCHES IN ALL KEY CITIES

7163

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epoxy which resists corrosion, abr sion and weathering as well as ac alkalis and oil. It is unaffected l expansion and contraction. It ca be used as a pavement notch spa filler, pavement coating, crack an fissure welding material and bonding material for glass, meta wood, brick, masonry, tile an many plastic surfaces.

. . . Circle No. 2

High pressure hose coupling

First coupling of high pressu steam or air hoses is offered by th new Le-Hi series 400, serrated ho stem. Called the "Two Incher" features a continuous and integr collar to engage positively the fro lug of an interlocking type ho clamp. Made by **Le-Hi Hose A cessories Co.**, the continuous coll cast in solid with hose stem shan is a standard feature on all 2-i stems. The new fitting is designe to prevent danger of hose blow-o caused by coupling slippage in hig pressure hose applications.

. . . Circle No. 2

80-ton rubber tired crane

Simplified controls and rugge construction are features of th new 80-ton rubber tired cran model MC875, announced by th

Thew Shovel Co. The new unit part of the company's extensiv line of Lorain Moto-Cranes. I "Joy-Stick" air control system us only two hand levers to apply m tered air to all turntable friction clutches. Levers are moved fo ward, backward or side to side fo fast responding single operation or to quarter positions for mult ple combined operations. Boom built lighter and stronger by use continuous round tubular lacin which is welded to the chords common points giving a bandi effect that has far greater strengt Boom sections are pin connecte for faster assembly. The machi handles up to 200 ft. of boom plu 40-ft. tip extension which also is tubular chord construction. Tur table is mounted on the carrier b

the Shear-Ball method in which 70 king sized ball bearings take all loads and thrusts. The Shear-Ball method eliminates center pin, a center gudgeon and turntable rollers. Carrier is built around a single piece box section frame of alloy steel casting. Carrier has 10 travel speeds up to 20 mph.

. . . Circle No. 205

Trenching attachment

Trenches up to 6 ft. in depth are dug at 800 ft. per hour by a new model trencher attachment

manufactured by **Auburn Machine Works, Inc.** for IH 40 and 460 utility tractors. The Auburn Gear-Draulic trenching unit incorporates a unique forward compulsion drive which reduces tractor speeds to the slow pace required by the trencher. Speed reducer can be disengaged to permit tractor to operate at regular speeds. Unit features a non-clogging digging ladder with alternate right and left cutting teeth that cuts the trench and lifts the dirt to ground level where augers convey it to both sides of the trench. Interchangeable digging chains and booms are available to accommodate various widths and depths of trenches desired. Special bits also are available for use in rock, shale and frozen ground. *. . . Circle No. 206*

Concrete curing paper

American Sisalkraft Corp. is marketing a new white plastic coated reinforcing paper for curing concrete highways and airports. The combination of tough paper and plastic coating gives the material maximum reuse performance and provides better moisture retention. It is available in widths ranging from 9½ ft. to 25 ft. Samples available. *. . . Circle No. 207*

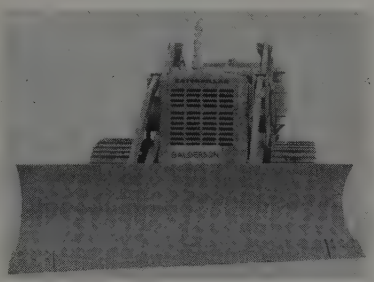
T-1 steel for Athey hauler

T-1 steel and more payload, durability, and efficiency highlight the new 25-ton member of the **Athey** line of trailers. Use of this material in an earthmoving rig gives the unit high resistance to the combination of impact abuse and abrasion. The yield strength of T-1 is nearly three times that of structural steel. The machine hauls up to 20 cu. yd. heaped. Among the features of the model PR619 Athey rear-dump loader are flared body top for bigger loading target, spill deflectors to retain load and protect tires during loading, reinforced cellular floor with spacer bars to add strength, self-aligning hoists, and 12-sec. dumping with fast-acting hoists and straight 57-deg. dump angle off the lip. With a Caterpillar No. 619 tractor the speed is 30.2 mph.

. . . Circle No. 208

Angle dozer blades

Angling dozer blades for all models of Caterpillar-built Traxcavators are announced by **Balderson, Inc.** Blades are quickly interchangeable with Traxcavator buckets, either front or side delivery. Change is made by removing



the bucket and attaching the Balderson blade frame using the Traxcavator pins. Blade advantages include greater maneuverability, better operation in restricted areas and increased visibility for the operator. Breakout action of the Traxcavator assembly which provides positive tilt and pitch makes the new blade ideal for pioneer dozing. Any excess side draft is eliminated by spacer plates fitted between the engine frame and lift arms. *. . . Circle No. 209*

Loader-digger combination

A heavy-duty front-end loader and power digger employing a common sub-frame and powered from a single hydraulic system have been introduced by **Sherman Products, Inc.** The loader has a break-

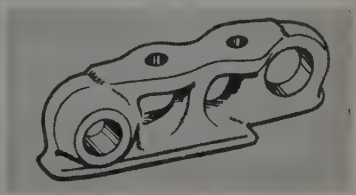
Even "the toughest track ever made" (Allis-Chalmers, of course) needs adjustment to give you the extra life that's built into it. Make this on-the-job track check.

Take a pry bar and see how far you can raise the track above one of the support rollers. More than *two inches* means it's too loose. Take up the slack, move the tractor back and forth to equalize the tension, then check again.

Regular track inspection is an easy way to make sure you get the most out of "the toughest track ever made."

WHAT **toughest**
REALLY MEANS

It's more than just talk. Take sidebars, for instance. Some track makers get by with mere *surface* hardening, which sacrifices wearing quality for easier machining. But Allis-Chalmers *deep*-hardens the forged steel, leaving a tough inner core for high impact strength. Then, *pin and bushing bores only* are annealed, and the superhard sidebar is machined to precise finish dimensions.



The moral of the story: *Stay on the right track*—"the toughest track ever made." Get original-quality parts from your Allis-Chalmers dealer.

move ahead with
ALLIS-CHALMERS
power for a growing world
. . . for more details, circle No. 86

ESSICK
VIBRATING COMPACTORS

Essick VR-28-W Self-Propelled Vibrating Compactor on Golden State Freeway

COSTS CUT IN HALF . . .
PRODUCTION TRIPLED . . .
SPECIFIED DENSITIES EXCEEDED . . .

ESSICK 28" VIBRATING COMPACTOR OUTPERFORMS OTHER EQUIPMENT ON SOIL OR ASPHALT

Charlie Brown of the Chas. T. Brown Construction Company states:
"We were working on the Golden State Freeway in Los Angeles, compacting backfill around bridge abutments and drainage pipes. At the start of the job, compaction costs were running about $1,300 per month per compaction unit which consisted of a compressor and three pneumatic tampers.

"Having successfully used Essick Vibrating Compactors on other projects, we felt that we could get better densities at less cost in the confined areas of this job with the Essick 28" self-propelled vibrating model.

"We put the Essick VR-28-W to work and cut monthly costs to about $650 per compaction unit (about one-half), tripled our production, and exceeded our best past compaction performance. Being self-propelled, the Essick 28" Vibrating Compactor is just the ticket for backfill operations on soil and in hard-to-get-at locations. It gives the most compaction at the least expense, and exceeds specifications in record time."

Many Contractors are finding that the 865 lb. VR-28-W, with its High Frequency Vibration, exceeds the compaction of a sixteen-ton static roller on soil. This multiple purpose tool has also revolutionized highway maintenance by putting down better asphalt patches at greatly reduced costs. Carrying hooks make it completely mobile, and being self-propelled, it will go just about anywhere compaction is required.

SEE YOUR ESSICK DEALER FOR A DEMONSTRATION

9 Models of Vibrating Compactors from 13" to 72" widths
Also 14 Models of Tandem Rollers from ½ to 14 Tons

ESSICK MANUFACTURING COMPANY

1950 SANTA FE AVENUE
LOS ANGELES 21, CALIFORNIA

850 WOODRUFF LANE
ELIZABETH, NEW JERSEY

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

. . . for more details, circle No. 87 on Reader Service Postcard

away capacity at bucket lip of 5,000 lb. and a full lift capacity of 2,500 lb. on Ford and Fordson tractors. The digger has an uninterrupted pivot arc of 188 deg. with a reach of 18 ft. at grade and 12 ft. below grade. Available digging force is 19,250 lb. from a hydraulic system rated at 15 gpm. at 1,750 rpm., with an operating pressure of 2,000 psi. The digger can be detached in two minutes without the use of special tools, freeing the tractor for other uses.

. . . Circle No. 210

Super wide film

Seamless polyethylene film in widths up to 40 ft., widest in the industry, is being produced by **Kordite Corp.** The film is available in 24, 28, 32 and 40-ft. widths for construction uses.

. . . Circle No. 211

New hammermill

A new hydraulically adjusted hammermill has been announced by **Pioneer Engineering Division of Poor & Co. Inc.** Breaker plates on the Pioneer Model 4034 are reversible and adjustment is simplified by means of hydraulic jack and shims. Grate bars with size openings of ¼ in. to 3 in. can be arranged in various combinations to produce the desired product. A hinged cover section permits quick and easy access to the crushing chamber. All wearing parts are cast from Hadfield manganese steel. The new model marks the entry by Pioneer into the hammermill field and will be added to its line of jaw and roll crushers and impact breakers. Specifications and literature available.

. . . Circle No. 212

Absorbs shock in push loading

Designed to speed up the cycle time for the push loading of scrapers, the **Pushin'-Cushin'** has been announced by a manufacturer with the same name. The unit is designed to absorb the shocks of impact which add life and reduce repair costs on both scraper and pusher. It also eases the work of the operators. Tests indicate that a pusher coming in contact with a stationary scraper at 6 mph. results in little shock. The unit is a self contained hydraulic system which functions automatically with no pumps or hoses and no controls requiring manual operation.

. . . Circle No. 213

Versatile 45-ton crane

Model 2800 Mobile Crane of 45-ton capacity is announced by **Manitowoc Engineering Corp.** Mounted on a 12-wheel carrier, the unit is easily and quickly convertible into clamshell or dragline. Crane can remove its own outriggers, both front and back to reduce total weight by more than 5 tons if desired. Pin connected booms speed takedown and crane can be moved quickly from one job to another. Optional hinge enables boom to be folded under for short trips. Upper works of the unit has only 13 gears for reduced operating and maintenance costs. Other mechanical features include disc type swing clutches, independent boom hoists, 1-piece steel rotating bed, choice of gasoline or diesel engines, and big hydraulic torque converter for highest engine efficiency. Crane Carrier incorporates dual tandem rear and single tandem front axles, big removable outrigger side frames, power steering, 1-piece frame and massive ring gear and roller pad. Optional equipment includes a 5,000-lb. capacity third drum for fast handling of "sucker line" work. Literature available.

. . . Circle No. 214

Heavy-duty gear lube

A lubricant designed to function under adverse conditions of high temperatures and gear overloads has been marketed by **Alpha-Molykote Corp.** Known as Molykote type 223X the heavy duty gear lubricant is available in SAE 90 and 140 grades. It is made from solvent refined paraffin base stock with special formulation additives including Molykote type M-55. The lubricant is designed to provide satisfactory service in gear cases operating at excessive frictional temperatures or where gears are loaded beyond recommendations of the manufacturers. Type 223X has a viscosity index of 100, its flash point is 390 deg., it has a fire point of 420 deg. It contains a foam depressant and is corrosion and oxidation inhibited.

. . . Circle No. 215

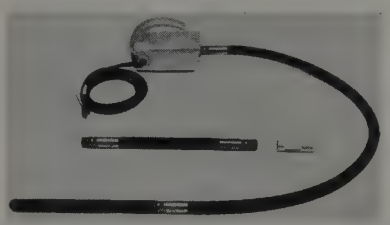
Perforated fibre drain pipe

A light-weight perforated fibre pipe for drainage installations is announced by **Line Material Industries.** The L-M Permaline pipe has high impact and crushing strength, weather and erosion resistance and chemical stability. It is available in diameters of 2, 3, 4, 5 and 6 in. in lengths of 5, 8 and 10 ft. An additional 8-in. diameter is available in 5-ft. lengths only. The perforated pipe has been approved by Corps of Engineers for subdrains and meets all requirements of Interim Federal Specifications SS-P-00358. It is recommended for use in construction of highways, airports, parking lots and other similar applications. The pipe can be connected to other pipes and sizes. One coupling is furnished to each standard length providing positive joints and tube alignment.

. . . Circle No. 216

Vibrator for narrow forms

An electric-powered flexible shaft vibrator with 1¼-in. diameter head has been introduced by **Master Vibrator Co.** The vibrator, called the "Pencil," is especially handy for vibrating concrete in narrow forms, between closely spaced reinforcing steel on all types of precast work and on small pours. The light-weight unit is powered by a 1-hp. Universal AC-DC motor that runs off 115-volt current. The "Pencil" weighs only 23½ lb. with a 6-ft. shaft and has a handle for easy carrying. It can be used with a 22-in. or a 12-ft. flexible shaft. The unit operates at 10,000 vpm. and has plenty of kick to move low slump concrete.



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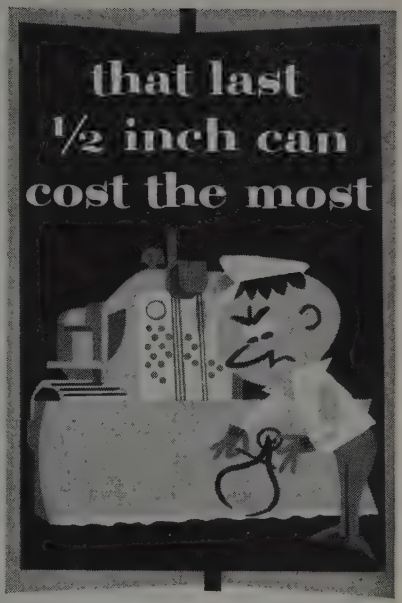


Don't kid yourself! An extra half inch of wear on the cutting edge of your dirt-mover can cost you plenty! Wear that chews into the moldboard weakens it—especially around bolt holes. Then you may have to rebuild or even replace the whole works!

Renew or replace cutting edges and bits before moldboard wear starts. You'll be money ahead on repairs and 'way out front in dirt-moving efficiency.

ONLY THE BEST IS A BARGAIN!

Speaking of moving dirt, Allis-Chalmers really has the edge! Take dozers, for instance. Cutting edges and end bits are made of finest alloy steel, forged and electronically heat-treated in a process that deep-hardens working faces for extra-long wear, toughens the core to resist impact. For rock-dozing or worse, Allis-Chalmers makes *heavy-duty* edges, end bits and wrap-around end bits.

The man from your Allis-Chalmers dealer knows all about moldboards—for a new machine or reconditioning one you own—and the edges he recommends are *right*. Whatever you need, get original-quality Allis-Chalmers parts—*made for the machine*, best for the job.

move ahead with
ALLIS-CHALMERS
power for a growing world

. . . for more details, circle No. 88 on Reader Service Postcard

Quaker Thermoid THUNDERBIRD ...the toughest (yet most flexible) air hose you've ever used

Give Thermoid-Quaker THUNDERBIRD Wire-Braid Hose the works . . . the roughest kind of impact, twisting, crushing, inside pressures. It'll take everything you can deal out, and then some.

THUNDERBIRD takes this punishment while remaining the most flexible, non-kinking air hose you've set eyes upon. Accurately-controlled angle of wire braid assures this extreme flexibility. Tough neoprene tube resists hot or cold oil. Yellow neoprene cover provides maximum abrasion-resistance and high visibility even in the dark.

Sizes from 3/8" to 4" I.D. Working pressures to 400 psi air or 2,000 psi water. Lengths to 50 feet. Ask your Thermoid distributor about THUNDERBIRD, or write *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Philadelphia 24, Pa.*

THERMOID PORTER DIVISION

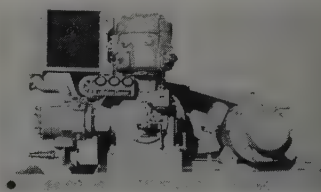
H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Copper and Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY DE MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

. . . for more details, circle No. 89 on Reader Service Postcard

Compressors for tough conditions

Two semi-portable air-cooled compressors delivering from 311 to 635 cfm. at 100 psi. have been introduced to the Western construction market by **Atlas Copco Pacific**.

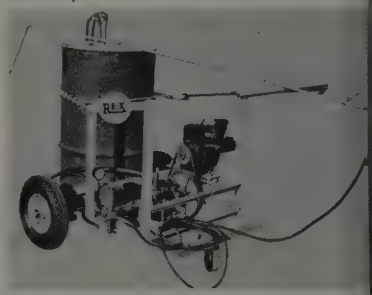


Designated the AT series, the machines are designed for use under extreme temperature ranges in areas where water is dirty, corrosive or expensive because of short supply. Good balance and smooth characteristics enable the 2-stage machine to be operated on skid frames. Built for 3-shift operation, each machine incorporates a high capacity fan in the air-cooling system driven either by a separate electric motor or by a V-belt take-off from the flywheel. Where installations have insufficient natural ventilation, air inlet and outlet vents can be connected to air ducts. Integral safety mechanisms automatically shut down the compressors in the event oil pressures fall below normal limit or air discharge temperatures rise too high.

. . . Circle No. 21

Portable curing machine

Two portable Rex Spray curing machines, one rubber tired, the other a hand-carried model, are announced by the **Construction Machinery section of Chain Belt Co.**



Machines are designed for use in limited or off-slab areas. Rubber-tired model has a mounting platform for a 55-gal. drum. Hand-carried model is equipped with steel base plate and convenient lifting handles. Both models include a one-cylinder gasoline engine, positive displacement pump, stainless steel spray nozzle on a 10-ft. wand and a 25-ft. connecting hose.

. . . Circle No. 21

News of DISTRIBUTORS

NEW QUARTERS at 2644 S. Railroad Ave., Fresno, Calif., enable Edward R. Bacon Co. to care for contractors' needs in the area, including availability of a full line of heavy construction equipment and specialized tools. Besides a large storage space, this new site provides shop facilities for heavy equipment service and repair. Plant operations are headed by *Phil Hamm*. District sales manager for the area is *Robert Decker*.

Personnel appointments by McCoy

McCoy Company, Caterpillar dealer in Colorado, announces the appointment of Gene Rickard as sales representative for the south-central district of the state. Rickard, formerly with Faris-Moritz Machinery Co., replaces Jack Yokley. R. Earle Honnen, who headed up McCoy's parts promotion department, has been appointed general promotion manager for the Denver firm. The general promotion department covers all facets of McCoy's operations.

Sales appointments and accounts

Melvin Seitz, president and general manager of Seitz Machinery Co., Billings, Mont., announces the following sales representative appointments under Sales Manager George A. Glass: Billings — Vince Bicek, Wayne Ford and Ray Tindall; Great Falls — Rolly Bowen; Bozeman — Mayo Mereness.

Seitz also announces that Austin-Western crushers are now being sold by Seitz Machinery Co., Inc., retail division, and that the wholesale division has taken on five new accounts: Anthony dump bodies and truck hoists; Danuser diggers; Giant truck beds; Seaman-Andwall fillers, and Wagner backhoes and loaders.

Masterson's Equipment named Yale representative

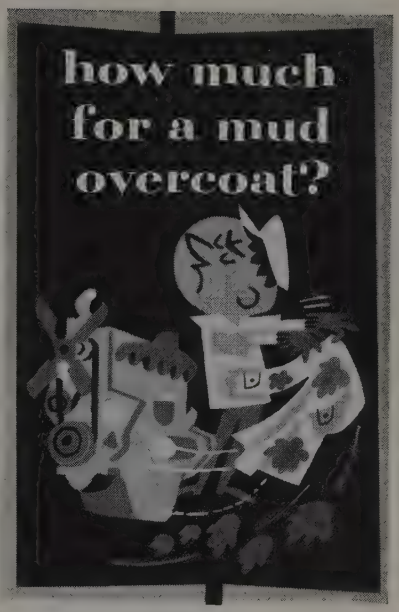
Masterson's Equipment, Inc., with sales and service center in Seattle and sales office in Tacoma, has been named franchise representative for Yale industrial lift trucks and tractor shovels in western and central Washington. General manager E. E. Masterson has had six years in sales and servicing of industrial truck equipment in this area. Jerry Petrich is in charge of sales at Tacoma. Headquarters for the company was recently moved to 1452 Elliott Ave., W., Seattle.

Insley appoints central California distributor

Insley Manufacturing Corp., manufacturer of excavators, cranes and concrete handling equipment, announces appointment of San Joaquin Tractor Co., 1201 Union Ave., Bakersfield, Calif., a distributor for its complete line. The territory covered by the new distributorship includes Mono, Inyo, Kern and San Luis Obispo counties.

Kwik-Mix distributor appointed

Appointment of Andrews & Andrews Equipment as a distributor for all products manufactured un-

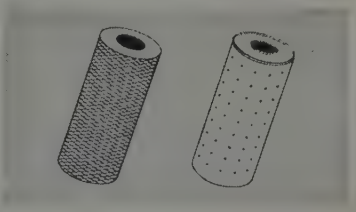


A thick mud overcoat on your tractor engine could cost you more than mink! Mud acts like insulation, impairs cooling of exposed surfaces—and you may be heading for an expensive overhaul. In any case, overheating steals power, spoils lube oil and cooks the life out of engines.

Hose the day's mud off. Clear away dirt or brush—especially around the engine and radiator. This not only helps cooling, it may also uncover trouble before it starts costing you money!

KEEP IT CLEAN INSIDE, TOO!

Efficient filter protection keeps Allis-Chalmers engines clean *inside*. Large fuel filters, full-flow oil filters and oil bath air cleaner with pre-cleaner are on guard against all kinds of sneaky, wear-causing dirt particles you might never see.



Help your engine live a long, healthy life. Service filters regularly and replace elements at recommended intervals. The service expert from your Allis-Chalmers dealer knows best replacement periods for any conditions. See him for genuine Allis-Chalmers replacement filters—*made for the machine*, best for the job.

move ahead with ALLIS-CHALMERS
power for a growing world
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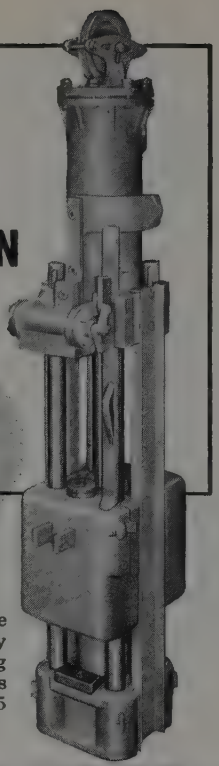
New Modern Design —Sound Engineering

produced this outstanding

WARRINGTON—VULCAN

Single-Acting

STEAM PILE HAMMER



- Heavy ribs give more support to cylinder head . . .
- Shorter channels permit easier insertion of hammer into leaders . . .

Operating at a medium steam pressure this versatile hammer delivers a moderate frequency of low velocity blows from a relatively heavy ram. A favorite for driving piles of all descriptions. Made in 6 sizes with Rated Striking Energy from 825 ft. lbs. to 30,225 ft. lbs.

Ask for full information

VULCAN IRON WORKS INC. 327 North Bell Avenue, Chicago 12, Illinois

Manufacturers of Pile Driving Hammers Since 1852

. . . for more details, circle No. 91 on Reader Service Postcard

Jaeger pays off with 600 cfm at 1700 rpm

This Jaeger rotary compressor, powered with the same GM 6-71 diesel used in other makes, produces 600 cfm of air with 100 fewer revolutions (1700 rpm instead of 1800), *consuming less than 1¼ lbs. of fuel.* Think of the long-term saving in fuel, and engine and compressor life. Other Jaeger sizes are comparably efficient. See your Jaeger distributor, or send for Catalog.

Sold and Serviced by:

EDWARD R. BACON CO. .....San Francisco 10
FEENAUGHTY MACHINERY CO. .....Portland 14
WESTERN MACHINERY Co.....Salt Lake City, Denver 4, Spokane 2 and Idaho Falls
WESTERN MACHINERY COMPANY.....Phoenix, Arizona
J. D. COGGINS & CO. .....Albuquerque
GASHMAN EQUIPMENT COMPANY.....Las Vegas, Nevada
SMITH BOOTH USHER CO. .....Los Angeles 54
A. H. COX & CO. .....Seattle 4 and Tacoma
THE SAWTOOTH CO. .....Boise and Twin Falls, Idaho
TRACTOR & EQUIPMENT CO. .....Sidney, Miles City, Glasgow
CENTRAL MACHINERY COMPANY..Great Falls and Havre
WORTHAM MACHINERY CO. .....Cheyenne, Wyo.

. . . for more details, circle No. 92 on Reader Service Postcard

der the trademark "Kwik-Mix" is announced by the Kwik-Mix Co., Division of Koehring Co. A & A will cover the entire state of Oregon plus the Washington counties of Wahkiakum, Cowlitz, Clark, Skamania and Klickitat, selling the "Moto-Bug," the new 6,000-lb. capacity "Hi-Lifter" fork truck, and the several sizes of mixers produced by Kwik-Mix.

Bob Carder elected Hensley v.p.

Announcement is made by Clyde Hensley, president of the Hensley Equipment Co., Inc., of the appointment of Robert Carder to the post of vice president. Carder's association with the firm began two years ago when he accepted a position as office manager of the San Leandro, Calif., branch.

A. M. Byers appoints J. R. Detering of Sacramento

A. M. Byers Co., Pittsburgh, Pa., has appointed J. R. Detering Co., Sacramento, Calif., to handle the firm's 4-D wrought iron pipe in this area. Byers also markets PVC plastic pipe, sheet and rods, and makes electric furnace alloy and stainless steel.

Universal Form Clamp announces new outlets

Two exclusive distributors in the West are announced by Universal Form Clamp Co., Chicago: Hatten Machinery Co., Seattle, Wash., and Hall-Perry Machinery Co., Billings, Mont. Complete stocks of concrete forms (Uni-Form panels), form ties and concrete accessories are maintained by each distributor to assure contractors rapid delivery and service.

Wood Tractor Co. to service Northwest

Appointment of Wood Tractor Co., Portland, Ore., as an Oregon-Washington distributor, is announced by K. R. Chandler, assistant vice-president, Koehring Division of Koehring Company. Koehring trademark equipment to be handled includes the full line of excavators; truck and "cruiser" rubber-mounted cranes; 16-E and 34-E pavers, finishers; Mud-Jacks and the Dumptor, an off-the-road hauling unit. Oregon territory assigned to Wood includes all counties north of the southern boundary of Lane, Deschutes and Harney, and west of the eastern boundary of Umatilla, Union, Grant and including Harney County. In

Washington, the counties of Wahkiakum, Cowlitz, Clark, Skamania and Klickitat will be serviced by Wood.

Construction equipment industry meeting

H. M. Doolen, Western Construction Equipment Co., Billings, Mont., and J. W. Hardesty of Baldwin-Lima-Hamilton Corp. presided as co-chairmen at a recent one-day meeting of 25 leading distributors and manufacturers. The participants are members of the "Industry Round Table," a major committee of the Associated Equipment Distributors, national trade association for the industry. Besides discussions of marketing and sales procedures, ten questions on distributor-manufacturer cooperation for improvement in service to construction machinery users were considered. The questions dealt with subjects suggested by distributors throughout the U. S. A. F. J. Fitzpatrick is president of AED.

Halton's new plant nearing completion

Construction of a new plant for Halton Tractor Co., Caterpillar dealer in Portland, Ore., is announced by E. H. Halton, president. The new building is being erected by Kuckenberg Construction Co., Portland contractor, on an 18-ac. site on Columbia Blvd. at 43rd Ave. The main structure will enclose 50,000 sq. ft., of which 10,000 will be used for offices, and the remainder will house the service and parts facilities. The new plant is expected to be finished by Sept. 1.

MANUFACTURERS

Forms new corporation

Sidney I. Blatt, president, announces the formation of Surface Research Corp., 2829 East Fourth Ave., Columbus, Ohio, which is now producing white pigmented and clear concrete curing compound, under the trade-name "BearCat." Richard G. Stutz, formerly with B. F. Goodrich Co. and Battelle Memorial Institute, is director of research for the new corporation.

Three new PM distributorships

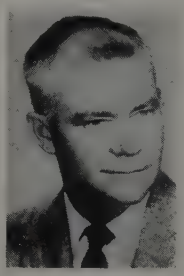
Three important outlets for its equipment in the Northwest are announced by Pacific Mercury Manufacturing Corp. In Seattle, Andrews Machinery Co. has been appointed a stocking distributor for the new PM Solo concrete vibrator. The company has set up a complete parts and service department for PM customers, according to D. W. Andrews, president. The vibrator is a one-man operated unit, operating on high frequency vibration 25,000 v.p.m.

The unit is sold in the Spokane area by Andrews Equipment Service, which markets also PM electric plants. According to R. B. Andrews, owner, his company maintains a complete parts and service department for the trade in this area.

Named a stocking distributor for Pacific Mercury electric plants in Portland, Ore., is W. J. Burke & Co. Burke will stock representative models of plants designed specifically for the construction industry.

New Michigan line-up

The Construction Machinery Division of Clark Equipment Co. announces a new territorial line-up of its district representatives in the West. The addition of two more



Allsup

Halleran

men to its team of Western district representatives permits the area of each existing man's territory to be decreased resulting in better service to distributors and customers. John A. Halleran, formerly a special field representative in the Northwest, becomes district representative for the territory of Alaska, Washington, Oregon, and Idaho. John A. Allsup, also formerly a Michigan field representative, is now district representative for Montana, Wyoming, Utah, Colorado, New Mexico, and west Texas. The territory of Clarence E. Zermer now comprises Northern California and Nevada. D. W. Pedley services Southern California, Arizona, and Hawaii.

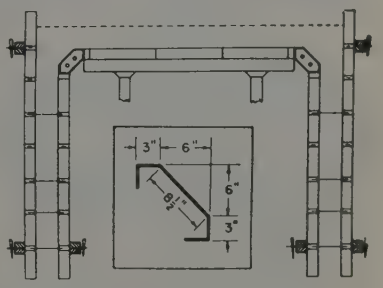
Job Finished 3 Weeks

How to Pour a Tunnel in a Hurry...

Symons Culvert Forms The Answer

When awarded a contract to build a 340 ft. tunnel, Schweiger Construction Company, Kansas City, Mo., faced the problem of how to do it fast and as economically as possible.

Symons Culvert Forms solved the problem. They eliminated the need for any special form or job-built construction.



Schweiger used Symons 1" steel channel filler horizontally on top of 6' vertical panels on the inside of the walls. Culvert Forms were placed on top of this filler. The forms underneath were stripped with no difficulty and the fillers and culvert forms were then removed without disturbing the decking for the slab, which was left in place for an additional curing period. Walls and top slab were poured monolithically in three pours. *Job was completed in three weeks.*

Symons forms, shores and column clamps may be rented with purchase option. Additional information on *Symons Culvert Forms* is available upon request.

Symons

SYMONS CLAMP & MFG. CO.

683 Thornton Street, San Leandro, California
Phone LOckhaven 9-9159

MORE **SAVINGS** FROM **SYMONS**

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"BERG"

HIWAY SURFACERS

"BERG" Hiway Surfacers are extensively used for removing high spots and surface variations from concrete roads, streets, floors, airport runways and many other applications.

Also "BERG" Concrete Surfacers for surfacing buildings, bridges, dams, walls, etc. Many models to select from.

Contact Your "BERG" Distributor

THE CONCRETE SURFACING MACHINERY COMPANY

4665-69 Spring Grove Ave.
Cincinnati 32, Ohio

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EASY TO REPLACE ON THE JOB

Tamprite Tips

NO WELDING!

DRIVE OFF WORN TIPS
DRIVE ON NEW TIPS

PREVENT COSTLY DELAYS by equipping your sheeps foot rollers with Tamprite Tips and Shanks. Simple to replace on the job. Available for immediate delivery. Write for information.

PATENT NO. 2101841

LOS ANGELES STEEL CASTING CO.
6100 So. Boyle Avenue, Los Angeles 58, California

. . . for more details, circle No. 95

COMPLETION of this building adds the third link in a chain of Intermountain branches maintained by Lang Construction Equipment Co., which has offices in Salt Lake City and Idaho Falls. Located at 4200 Federal Way, Boise, Idaho, the structure has 50,000 sq. ft. of floor space, is modern in design, and is highly functional in arrangement of office quarters, parts warehouse, shop area, and display space. *John Ballou* is Boise manager; *Eugene Murphy* is service manager, *Bob Fouts*, parts manager, and *Bob Jensen*, office manager.

Caterpillar forms new department

A new department called Defense Products has been formed by Caterpillar Tractor Co., Peoria, Ill., to participate more vigorously in the nation's defense program. The company's efforts will not be restricted to standard products or modifications, according to President H. S. Eberhard, but will seek to participate in development of new concepts, in engineering, and in production as a contractor.

Gar Wood names West Coast sales representative

Appointment of John Sommerville as Gar Wood-Buckeye district sales representative for the West Coast is announced by B. J. Davis, director of sales. Sommerville brings to his new position a background of ten years' experience in the construction industry. He will have his headquarters at the company's Richmond, Calif., plant, and will represent the complete Gar Wood-Buckeye line of ditchers, spreaders, finegraders, crawler excavators and truck cranes.

Thor appoints Shulters engineering director

Robert B. Shulters has been appointed director of engineering at the Aurora, Ill., works of Thor Power Tool Co., announces Neil C. Hurley, Jr., president. Shulters joins Thor with more than fifteen years of experience in supervision of power tool and electric generator design and engineering.

IH receives Army engineer school award

Harald T. Reishus, Construction Equipment Division vice president of International Harvester Co., has received the plaque of the U. S. Army Engineer School, Ft. Belvoir, Va., for his outstanding contribution to the training programs of the school.

You can move a Porta House on a pickup truck. Prefabricated, bolted, waterproof plywood panels. Quickly assembled and disassembled by unskilled labor.

available immediately

Sizes: 9'x6', 9'x9', 9'x12', etc.—to any length
12'x12', 12'x15', 12'x18', etc.—to any length

JUST ONE MAN . . .
. . . LESS THAN TWO HOURS

PORTA HOUSE

manufactured and distributed by . . . **RIDGELY K. DODGE**
6767 BROADWAY TERRACE • OAKLAND 11, CALIFORNIA • OLYMPIC 2-7237

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UNIT PRICES

elected abstracts for Western projects

IGHWAY — 12.3-mi. repaving of concrete free-ay

California—Kern County—State. Guy F. Atkinson Co. low of 8 bidders $1,895,777.90 for 12.3 mi. of repaving two southbound lanes of US99 Kern County, construction of traffic separation bridges, two additional es for 1 mi. at south end of project, and truck weighing and inspection ilities.

) Guy F. Atkinson Co.	$1,895,777
) Frederickson & Kasler	1,917,158
Griffith Co.	2,009,953
Gordon H. Ball & Gordon H. Ball Inc.	2,016,137
J. E. Haddock Ltd.	2,062,364

		(1)	(2)
20 each	Furnishing timber barricades	$ 50.00	$ 35.00
	Clearing and grubbing	26,500.00	45,000.00
	Dev. wat. sup. & furn. wat. equip.	57,500.00	40,000.00
,000 M. gal.	Applying water	.01	.01
,000 sq. yd.	Compacting original ground	.03	.03
,000 cu. yd.	Roadway excavation	.60	.60
,450 cu. yd.	Structure excavation	2.00	2.50
,340 cu. yd.	Structure backfill	5.00	3.60
,200 cu. yd.	Ditch and channel excavation	1.00	1.00
,000 sta. yd.	Overhaul	.01	.003
,000 ton	Imported borrow	.45	.45
,000 ton	Imported subbase material	1.00	.85
20 ton	Straw	56.00	65.00
900 lb.	Seed	.33	.35
200 cu. yd.	Steer manure	6.50	6.50
,000 ton	Untreated base	1.90	1.45
,400 sq. yd.	Mix, spread & compact cem. tr. subgr.	.45	.35
,000 bbl.	Portland cement	4.50	4.00
55 ton	Asphaltic emulsion (pnt. bdr. & fog. sl. ct.)	55.00	55.00
37 ton	Liquid asphalt, MC-2 (cur. seal)	55.00	45.00
240 ton	Liquid asphalt, SC-2 (prime coat)	34.00	40.00
,000 ton	Paving asphalt (P.M.S.)	5.20	25.00
,200 ton	Mineral aggregate (P.M.S.)	5.20	3.80
3,900 sq. yd.	Placing P.M.S. ditch & spillway dwndrns.	2.25	2.00
5,400 lin. ft.	Placing P.M.S. dikes	.20	.25
17 sack	Portland cement (cem. surface tr.)	22.00	10.00
46,000 cu. yd.	Class A concrete (pavement)	12.00	13.00
27,720 each	Pavement tie assemblies	.40	.30
94 cu. yd.	Class A concrete (structures)	40.00	45.00
83 cu. yd.	Class A concrete (minor struct.)	150.00	120.00
1,510 cu. yd.	Class A concrete (bridges)	96,779.00	100,000.00
5,700 lb.	Bar reinforcing steel	.17	.20
258,000 lb.	Bar reinf. steel (bridges)	33,000.00	35,000.00
3,570 lin. ft.	Furnishing concrete piling	4.00	4.50
107 each	Driving piles	100.00	220.00
406,000 lb.	Structural steel	67,000.00	70,000.00
	Steel sign structures	26,000.00	30,000.00
5,900 lb.	Miscellaneous iron & steel	.50	.25
450 sq. yd.	Bridge shoulder treatment	.50	.25
	Clean & paint structural steel	7,500.00	6,000.00
640 cu. yd.	Cl. B. concrete (curbs & gutters)	32.00	35.00
76 each	Survey monuments	12.00	20.00
520 lin. ft.	Metal plate guard railing	4.50	4.00
1,212 lin. ft.	Metal safety railing	3.20	5.00
335 lin. ft.	Pipe bridge railing	6.00	8.00
899 each	Gd. psts., mrks., horiz. refl. units	7.00	6.50
4,750 lin. ft.	Freeway fence (Type BW)	.52	.60
16,500 lin. ft.	Freeway fence (Type WM)	.57	.65
2,850 lin. ft.	72" chain link fence	1.60	1.80
780 lin. ft.	72" chain link security type fence	2.30	2.00

HIGHWAY—4.95-mi. Wyoming project

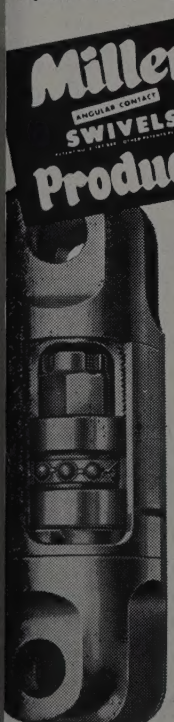
Wyoming—Big Horn County—State. A $218,568 contract was awarded to W. E. Barling, Inc. of Meeteetse, Wyo., for grading, draining, special embankment selected material surfacing, base course surfacing, surface treatment (inverted penetration type) and miscellaneous work of the Manderson-South road.

(1) W. E. Barling, Inc.	$218,568
(2) Husman Bros., Inc.	219,693
Forgey Bros.	229,597
Knisely-Moore	233,349

		(1)	(2)
158,000 cu. yd.	Excavation	$ .25	$ .19
6,500 M gal.	Watering	1.50	1.75
160,000 cu. yd.	Embankment compaction	.04	.04
2,800 cu. yd.	Backfill compaction	2.00	2.00
13,500 cu. yd.	Special embank. (embank., c. y.)	.50	.45
2,000 cu. yd.	Stripping	.20	.25
1,000 cu. yd.	Excavation for pipe culverts	1.00	1.70
79,000 cu. mi.	Cubic yard mile haul	.16	.15

Maximum SAFETY

plus SAVINGS



1. Matched set of angular contact bearings.
2. Practically friction free.
3. Seal keeps grease in, foreign matter out.
4. Faster hoisting due to non-spinning loads.
5. Faster load placement due to easy load turning.
6. Faster rigging due to elimination of cranky wire rope performance.
7. Elimination of twists and kinks means longer wire rope life.
8. Safer load placements due to non-spinning loads.

21 standard types available from ½ ton to 250 ton working load

DISTRIBUTORS

John Batchelor, Los Angeles, Calif.; **Weeks-Howe-Emerson,** San Francisco, Calif.; **Mallory Logging Equipment,** Portland, Ore.; **B & J Equipment,** Seattle, Wash.; **Power Rental Equipment,** Denver, Colo.; **Atlas Equipment Co.,** Salt Lake City, Utah; **Fresno Wire Rope & Rigging,** Fresno, Calif.; **Western Machinery Co.,** Phoenix, Ariz.; **Mine Supply Co.,** Albuquerque, N.M.; **Republic Supply Co.,** San Leandro, Calif.

Miller Swivel Products Inc.

P. O. BOX 938 • POMONA, CALIF.

MILLER HIGH LIFT BLOCK

Welded Construction, Large Diameter Pin; Shortest Headroom, Moveable Swivel Hook, Individual Sheave Lubrication; Bronze spacers between Sheaves. Available with MILLER SWIVEL HOOK or TIMKEN BEARING HOOK. 5-75 Ton Capacity.

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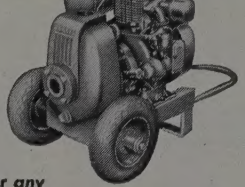
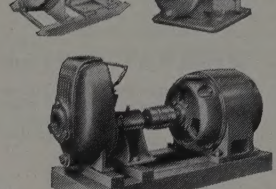
27 SELF-PRIMERS

and Barnes pumps prime without fail!



27 self-priming centrifugal models meet most construction needs—designed for any power source—deliver 2500 to 90,000 g.p.h.—all available from one source of supply nearby! All proved in our Blue Ribbon Quality Test Booth. All Barnes *Blue Ribbon* quality!

For any power source!



BARNES

Barnes Manufacturing Co.
Mansfield, Ohio • Oakland, Cal.

Dept. G-89

Get handy Construction Pump Selector FREE from any of these Barnes distributors:

5850-A

Central Equipment Co., Berkeley, California • Rasmussen Equipment Co., Salt Lake City, Utah • Larson Equipment Co., Los Angeles, California • Allied Equipment Co., Fresno, California • Action Equipment Co., Stockton, California • Central Equipment Co., Sacramento, California • Fullerton Equipment Co., Ukiah, California • Lowry Equipment Co., Redding, California • Star Machinery Co., Seattle, Washington • R. M. Wade & Co., Portland, Oregon • S & M Supply Company, Grand Junction, Colorado • O. S. Stapley Co., Phoenix, Arizona • Fincham Equipment Company, Denver, Colorado

. . . for more details, circle No. 98 on Reader Service Postcard

Looking for a new employment opportunity, or for a man with specialized experience?

Have you used equipment to sell, or do you need used equipment?

Your ad in the classified section of WESTERN CONSTRUCTION will reach 18,000 construction men in the West, and at a cost of only $15.50 per column inch.

Send your copy today, enclosing check, to WESTERN CONSTRUCTION, 609 Mission Street, San Francisco 5, California. (If proofs are required, the closing date is the 5th of the preceding month of publication, or the 10th without proofs).

19,000 cu. yd.	Topsoil	.28
35 acre	Seeding (crested wheat grass)	40.00
40 hr.	Road leveler operation	10.00
20,300 ton	Selected material surfacing Type I	.52
13,700 ton	Crush. gr. base course (¾ in. max.)	.67
151 ton	Asphaltic material MC-prime	32.50
136 ton	Asphaltic material MC-inv. pen.	32.50
1,800 ton	Crushed gravel surfacing (Inv. pen.)	4.00
76,000 T mi.	Haul of surfacing material	.10
406 lin. ft.	18 in. std. R.C.P.	5.55
1,320 lin. ft.	24 in. std. R.C.P.	8.60
192 lin. ft.	30 in. std. R.C.P.	11.20
334 lin. ft.	36 in. std. R.C.P.	14.65
104 lin. ft.	60 in. std. R.C.P.	35.67
42 ea.	24 in. R.C.P. flared end section	75.00
44 lin. ft.	36 in. x 23 in. std. R.C.P. arch culvert	13.75
108 lin. ft.	4 ft. - 0 in. x 6 ft. - 0 in. R.C. cattle pass	40.00
4 ea.	4 ft. - 0 in. x 6 ft. - 0 in. R.C. cattle pass F. E. section	430.00
616 lin. ft.	29 in. x 18 in. bit. coated corr. met. pipe arch culverts	7.80
10 ea.	29 in. x 18 in. bit. coated corr. met. pipe arch F. E. sections	50.00
417 lin. ft.	24 in. bit. coated siphon C.M.P.	16.00
90 lin. ft.	4 in. metal drain pipe	2.12
80 lin. ft.	108 in. struct. plate pipe (512-110)	48.10
200 lin. ft.	15 in. V.C.C.P.	3.50
100 cu. yd.	Class 1 riprap	20.00

HIGHWAY—9.47 mi. in New Mexico

New Mexico—Valencia and Bernalillo Counties—State. Skousen-Hi Contracting Co. of Albuquerque received a $1,327,700 contract for 9.4 mi. of highway east of Laguna on highway I-40 to be asphalt surface cement-treated base. Contract includes a prestressed bridge.

(1) Skousen-Hise	$1,327,700
(2) O. D. Cowart	1,381,467
J. W. Jones	1,490,537
Imperial Paving	1,602,129

		(1)	(2)
Lump sum	Rem. of old structures	$4,600.00	$2,100.
Lump sum	Removal of obstructions	100.00	100.
141,000 cu. yd.	Excavation-unclassified	.30	
2,484 cu. yd.	Excavation for structures	1.50	2.
533,840 cu. yd.	Ordinary borrow	.17	
37,250 M gal.	Watering	.10	
1,895 hr.	Rolling (tamping roller)	5.00	5.
3,046 hr.	Rolling (pneumatic tired)	4.00	5.
2,150 hr.	Rolling (steel tired)	6.50	5.
2,320 hr.	Fifty (50) ton roller operation	5.00	5.
2,279 hr.	Mechanical tamping	5.00	5.
1,137,228 sta. yd.	Station yard overhaul	.01	
603,100 ¼ mi. yd.	Quarter mile yard haul	.035	
338,745 ton mi.	Ton mile haul	.07	
2.05 mi.	Grading	1,000.00	1,000.
583 cu. yd.	Wire enclosed riprap	10.00	10.
11,224 lb.	Wire fabric for riprap	.25	
201 cu. yd.	Excavation for riprap	1.50	4.
265 lin. ft.	Steel stakes for riprap	2.00	3.
2 ea.	Cattle guard—42 ft. roadway	3,000.00	3,750.
2,475 lin. ft.	Steel plate guard fence	3.50	3.
47,520 lin. ft.	Galvanized barbed wire fence	.28	
78 ea.	Bracing	10.00	12.
12,300 lin. ft.	Galvanized woven wire farm fence	.35	
58 ea.	Right-of-way markers	7.00	10.
112 ea.	Treated timber warning posts, refl. (6 in. diam.)	6.00	6.
115,410 ton	Controlled gradation sub-base	.33	
10,190 ton	Base course	.53	
68,620 ton	Base course (cement treated)	.73	
10,950 bbl.	Portland cement	6.00	6
254,100 sq. yd.	Cement treated base—Class "C"	.13	
250 bbl.	Bituminous material, Type MC-1	8.50	8
1,515 bbl.	Bituminous material, Type RC-2	8.50	9
1,191 bbl.	Emulsified asphalt, AE-2	9.00	8
1,395 bbl.	Bit. material, Type 120-150	9.25	9
2,435 ton	Cover material	4.00	4
60,520 ton	Plant mix surface course	3.40	3
21,200 bbl.	Bit. material, Type 85-100	7.25	7
1,380 cu. yd.	Class "A" concrete	50.00	47
248,423 lb.	Reinf. for concrete structures	.16	
400 lb.	Wire fabric reinforcement	.30	
5,193 lin. ft.	Concrete curb and gutter	1.75	1
262 lin. ft.	Corr. metal culv. pipe—12 in. diam.	4.00	4
40 lin. ft.	Corr. metal culv. pipe—18 in. diam.	5.00	5
776 lin. ft.	Culvert pipe—24 in. diam.	6.00	5
2,206 lin. ft.	Culvert pipe—30 in. diam.	6.50	6
474 lin. ft.	Culvert pipe—36 in. diam.	10.00	10
182 lin. ft.	Culvert pipe—42 in. diam.	12.00	12
1,476 lin. ft.	Culvert pipe—48 in. diam.	13.00	13
960 lin. ft.	Culvert pipe—54 in. diam.	15.50	15
45,108 lb.	Structural steel	.30	
1,830 sq. ft.	Extruded sign frames	2.50	
4,450 lb.	Aluminum "I" beam posts	.85	
1,790 lin. ft.	Tubular posts	1.75	
134 ea.	Footings for tubular posts	15.00	
	Bridge		
344 cu. yd.	Excav. for structures (bridges)	3.00	
346.04 cu. yd.	Class "A" concrete—bridge superstructure	70.00	6
526.39 cu. yd.	Class "A" concrete—bridge substructure	70.00	60
167.20 cu. yd.	Class "C" concrete (piling)	40.00	3
1,586.8 lin. ft.	Metal bridge railing steel	5.50	
945 lin. ft.	Structural steel piles in place	3.50	
5,520 lin. ft.	Placing closed end steel pipe piles	2.50	
42 ea.	Pretensioned concrete beams, Type 36-53	900.00	1,06
38 ea.	Pretensioned concrete deck members, Type 27-49	910.00	96
38 ea.	Pretensioned concrete deck members, Type 33-65	1,175.00	1,29

IMA marks tenth anniversary

The Construction Industry Manfacturers Association on July 1 ›mpleted ten years of service to ıe construction industry. During ıis time it has provided a meum through which its 240 mem-er companies have been able to ›mbine their efforts in desirable ·oduct or industry activities. CI-A as a group develops, finances, ıd directs long-range programs to ·omote the best interests of the nstruction industry. First presi-nt of the association was the esident of Austin-Western Co., alph K. Stiles, now retired. G. A. ilbertson, president of The Frank Hough Co., is its current presi-nt.

E. Fowler named MP Association engineer

Kenneth E. Fowler has been ap-inted Division Engineer of the ational Corrugated Metal Pipe ssociation. He will make his adquarters in Denver and will present the national association the area covered by the member ociation, Corrugated Metal Pipe sociation of the Rocky Mountain ates. The purpose of the organ-tion is to perform technical ser-e in connection with the promo-n of metal pipe drainage struc-es for the CMP industry.

rporate change at Bethlehem

Changes in the corporate struc-e of Bethlehem Steel Co., West ast operations, results in the steel vision of Bethlehem Pacific Coast el Corp. now becoming Bethle-m Steel Co., Pacific Coast Divi-n. Principal officers of the Pa-ic Coast Division are H. H. Ful-, vice president; W. J. McClung, neral manager of operations; S. S. rt, general manager of sales, and L. Crarey, treasurer.

ul Christopher appointed Los Angeles manager

Appointment of Paul A. Christo-er as district manager of Ste-ens-Adamson Mfg. Co.'s Los An-es engineering sales offices, is nounced. Christopher has been ociated with S-A since 1949 and til this appointment has been nager of the Chicago office.

eher of CF&I heads trade group

Warren D. Dreher, wire products es manager, Western Division, lorado Fuel & Iron Corp., was cted president of the Wire Re-

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POSITIONS AVAILABLE

HELP WANTED

City Electrical Superintendent, Idaho Falls, Idaho. An administrative position requiring design, supervision, construction and maintenance of a power system serving nearly 10,000 metered customers. The present Electrical Dept. includes approximately 40 employees. This employee shall hold a key position in the administrative staff during the dynamic growth of Idaho's 2nd largest community. All applications must be submitted in writing, and all inquiries and replies are confidential. State the salary expected and address all applications to the City Engineer, Idaho Falls, Idaho.

HELP WANTED

ROCK PLANT EQUIPMENT SALESMAN FOR LEADING SOUTHERN CALIFORNIA EQUIPMENT DISTRIBUTOR. Should have some knowledge engineering and design. Age 28 to 45. Salary, expenses and other benefits. Send resume of education, experience, family status, etc. and photo if possible to: Box No. 8-A, WESTERN CONSTRUCTION, 609 Mission St., San Francisco, Calif.

Rates are $15.50 a column inch. Copy should be sent in by the 15th of month preceding publication date.

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For Sale

Construction Equipment

Batch Plant, Cableway, Conveyors, Cranes, Tractors, etc., —miscellaneous construction equipment from major hydro-electric project. For detailed listing contact

STONE & WEBSTER ENG. CORP.

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NEW T-35 BANTAM—Mounted on 6 x 6 carrier, equipped with backhoe, heavy duty options, Many Extras—**$13,750.00**

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COOK BROS. Truck & Equipment Co.
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10" & 12" H. BEARING PILES
600 pcs. 60' 10" 42 lb. 12" 53 lb.

9 DIESEL ELEC. LOCOMOTIVES
20 Ton, 25 Ton, 45 Ton, 80 Ton GEN. ELEC.

STANHOPE 60 E. 42nd St., N.Y. 17, N.Y.

inforcement Institute at the recent annual meeting of the welded wire fabric manufacturers' association.

New building for A. C. Horn

Harry Kennedy, Los Angeles branch manager of the A. C. Horn Companies Division of Sun Chemical Corp., announces completion of the latest addition to the company's facilities located on a 5½-ac. site at Bell Gardens, Los Angeles. This is the fourth addition to be made to Horn's West Coast operations within the past two years. Others include San Francisco, Portland, and a manufacturing and sales office recently opened in Denver Colo.

Two Westerners on Onan distributors council

Broader participation in management planning is being offered to its distributors for the first time by D. W. Onan & Sons, Inc., Minneapolis, leading manufacturer of electric generating plants. A newly-formed Distributors Advisory Council of ten members held a meeting recently with the objective of stepping up sales intensity and taking a long look at company plans for product expansion and diversification. Membership comprises five distributors on a permanent basis, and five rotating annually. From the West, Phillip Seynei of Ets-Hokin & Galvan, San Francisco, holds permanent membership, while Wendell Cross of B. K. Sweeney Co., Denver, is a rotating member.

C.I.T. names southern Oregon field representative

Announcement is made by C.I.T. Corporation of the appointment of John E. Laing as field representative for southern Oregon. C.I.T. handles installment financing of construction equipment and other industrial machinery.

ADVERTISERS in this issue