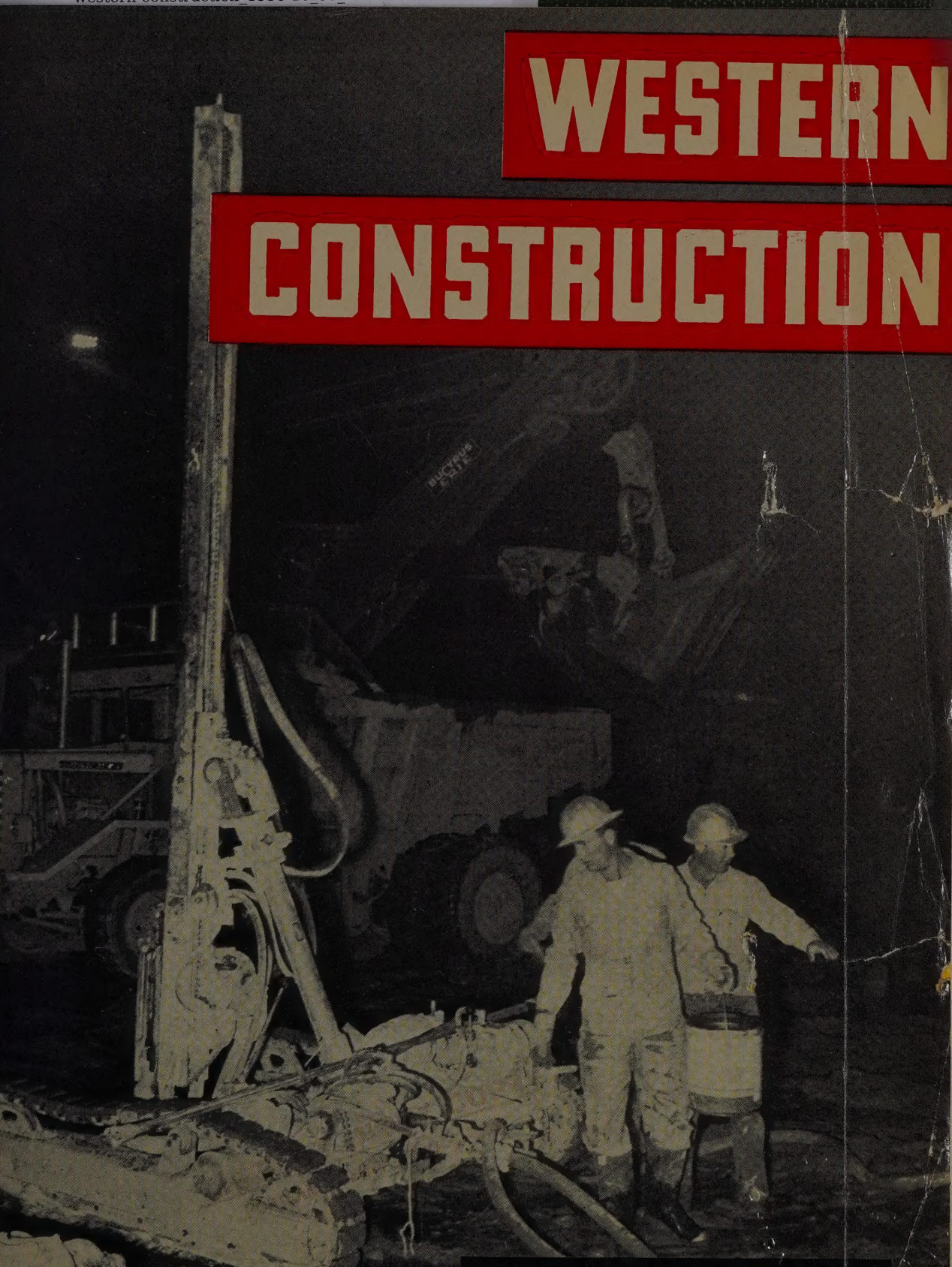
WESTERN CONSTRUCTION



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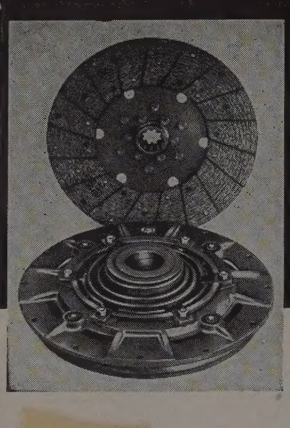
SEPTEMBER 1958



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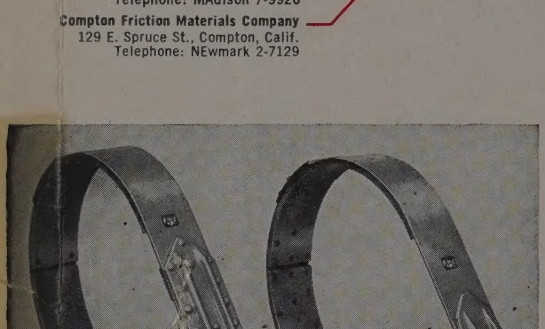

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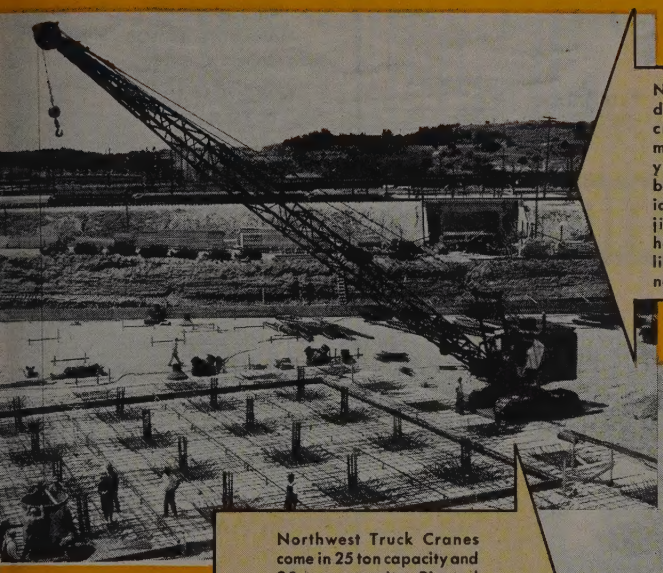
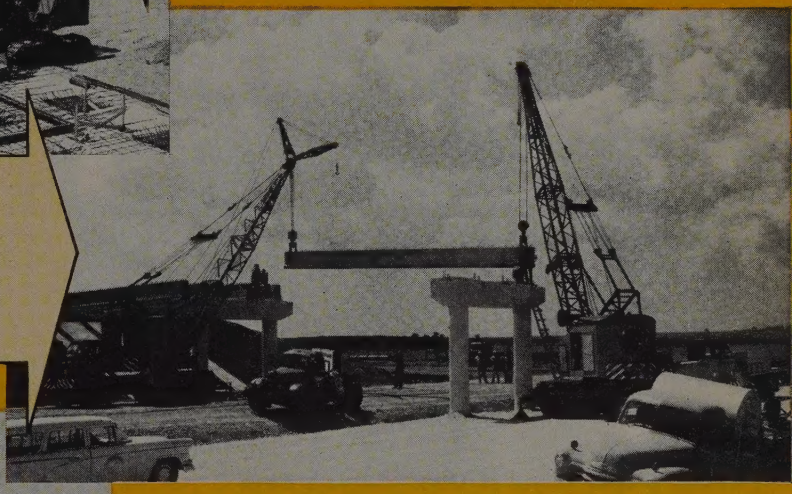


Northwest cranes are designed to meet any crane problem you may have. They bring you a full range of boom hoist and auxiliary equipment such as jibs, sectional boom hoist rigging, pendant lines, etc. What do you need?

Northwest Truck Cranes come in 25 ton capacity and 35 ton capacity. Pivoted gantries, High Speed Boom Hoists, Pendant Lines, Telescopic Boom Struts, Removable Counterweight and many other advantages are available.



Northwests are Rock Shovels. They bring you advantages for ck digging such as the Northwest Dual Independent Crowd, the shion Clutch, the Feather-Touch Clutch Control, Uniform Pressure ing Clutches and other advantages that help produce output rock and make easy digging easier.

YOUR equipment may look like a cyclone for speed *when it's running* but it's the output at the end of the month that counts. That's when the real yardage shows up. Remember even small shutdowns can total into costly losses! Your Northwest is *always ready to go.* We hear it everywhere and *Northwest users will tell you so!*

From the easy starting qualities of its properly engineered power plant to Northwest ease of convertibility, Northwest equipment has demonstrated a dependability that has made one out of every three Northwests sold a repeat order.

Heat Treated Cast Steel Machinery Bases, the Cushion Clutch, Uniform Pressure Swing Clutches, the Helical Gear Drive, the Feather-Touch Clutch Control that gives ease of operation free of the complications of compressors, pumps and other delicate mechanisms, all combine to give performance when it's needed.

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WESTERN CONSTRUCTION

KING PUBLICATION

September
1958
Vol. 33 No. 9

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★

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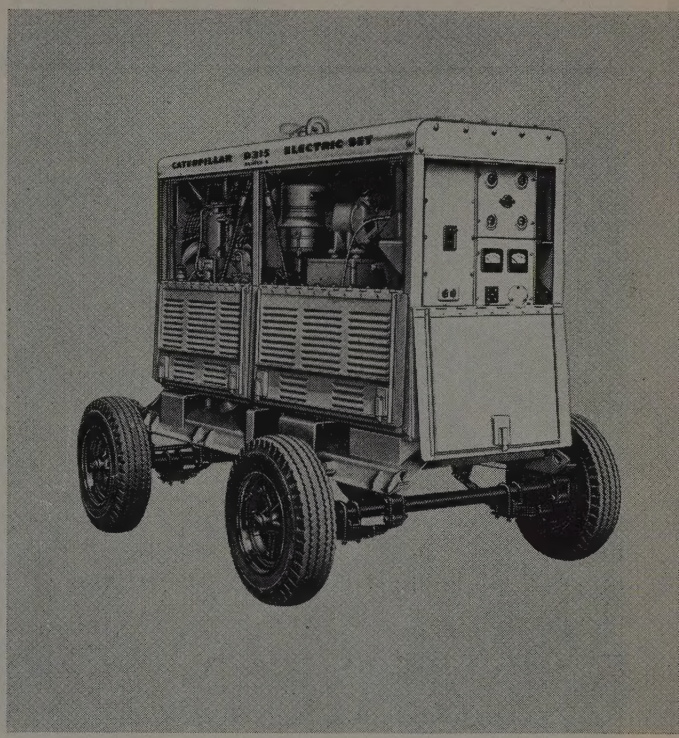
For 32 years serving the construction needs of the 11 Western States

ach time their batching plant moved



4 Performance and savings with this plant brought Mr. Jack Hartmann, Vice President (right), and Bud Moore, his C.D.E.S. (Caterpillar Dealer Engine Specialist), out to the job to plan a second batching plant installation. Satisfaction resulted in an order for a second identical Cat Electric Set for this contractor's expanding operations.

Mr. Hartmann remarked, "ABOUT ONE MORE MOVE AND OUR FIRST PORTABLE ELECTRIC SET WILL HAVE PAID FOR ITSELF IN SAVINGS FROM MOVES ALONE AND IN LESS THAN TWO YEARS. THAT WE LIKE TO SEE."

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U.S.A.

5 The all-new, self-regulated generator for Cat Electric Sets is simple to operate. Voltage is adjustable from 5% above to 10% below nominal rating and regulated within 3½% of rated voltage. It has unsurpassed motor starting ability. Other performance features Mr. Hartmann liked were:

1. Low over-all cost per operating hour.
2. No down time due to power failure or engine failure.
3. No additional help required, due to the unit's simplicity and self-regulating standard equipment.
4. Advertised power produced and maintained.
5. His Caterpillar Dealer Engine Specialist, Parts and Service teams were on around-the-clock availability if anything went wrong. It didn't.

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If something has gone wrong with your present engine or it just won't produce in your excavator, crusher or other construction machinery, talk it over with your C.D.E.S. He can aid you profitably when repowering older machines or specifying engines for new equipment.

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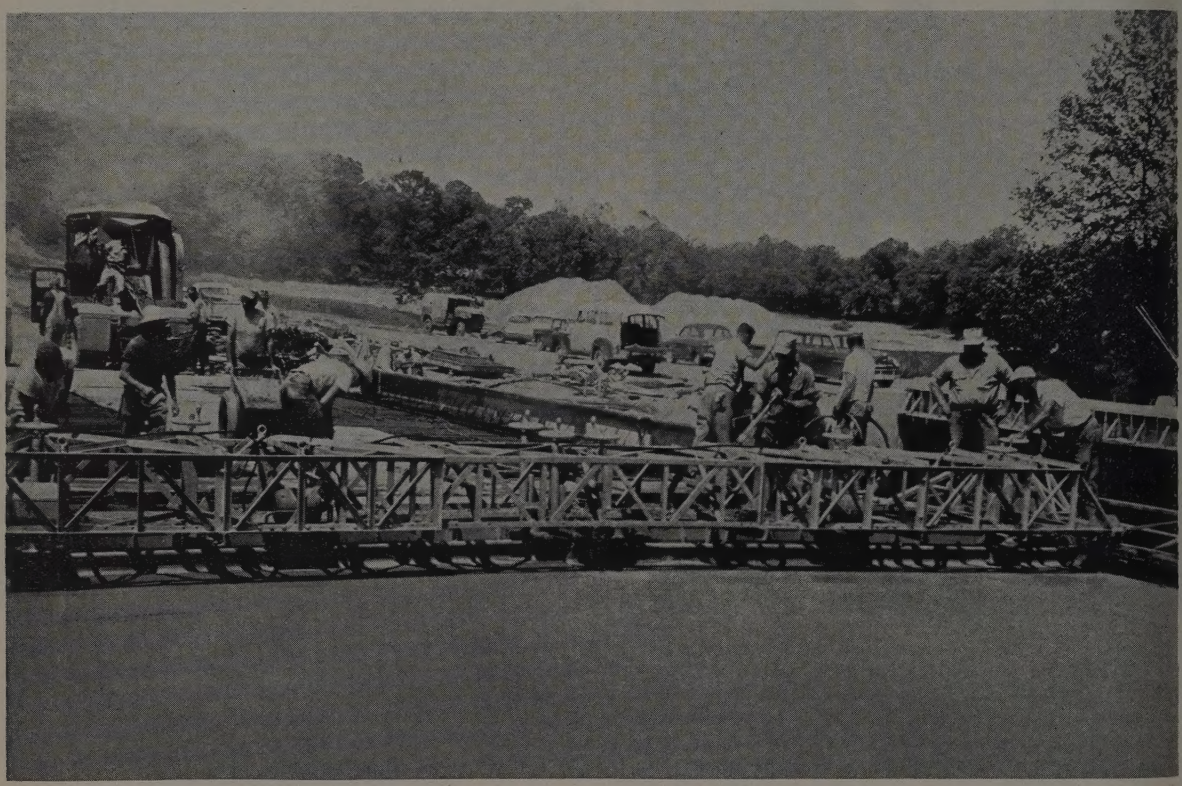
NEW EQUIPMENT

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



Bridge finisher can span 31 ft.

An entirely new type of concrete bridge deck finisher — far lighter and easier to handle than any other types now being used — has been put into production by the **Master Vibrator Co.** It has a total weight of less than 3,000 lb., and does a job on bridge decks equivalent to that done on roadways by highway finishers.

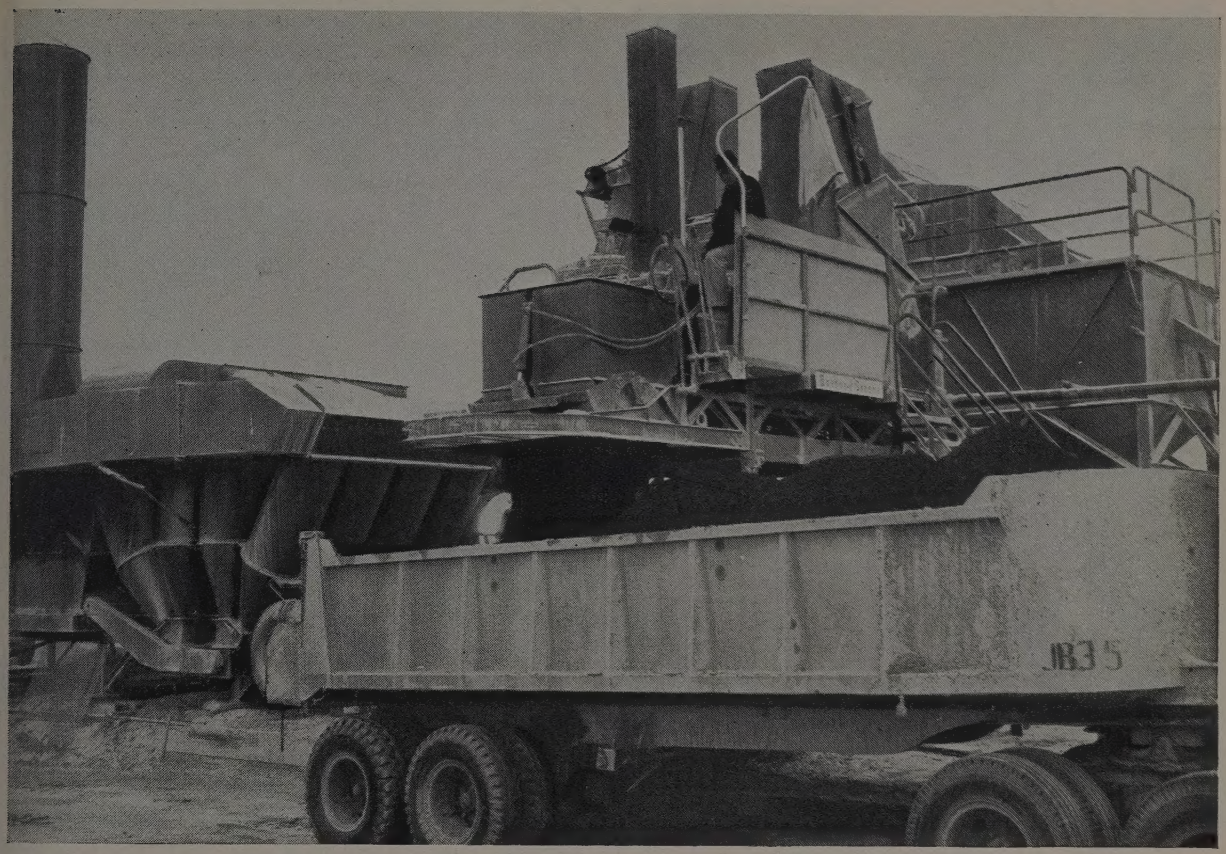
This new machine strikes off, vibrates, compacts and finishes concrete to specifications in one pass, providing a smooth, accurate finish. It is simply designed, 5 ft. wide, 2 ft. 11 in. high, and adjustable in length from 15 to 31 ft. There is little to go wrong; no complicated hydraulic or control systems to worry about. The entire unit can be easily moved by a crane or A frame and comes equipped with a special sling for picking it up.

The finisher has four 12-in. flanged wheels which ride on standard forms, bulb angles or pipe rails with no damage due to weight. Low-geared winches on each side of the machine have 100 ft. of 3/16-in. aircraft cable which is strung out in front of the machine and fastened by a special hook to the bulb angle. As the cable is reeled in, the machine pulls itself forward at a uniform rate of travel —approximately 2 to 6 ft. per min., eliminating waves in the concrete.

The front strike-off, set approximately ½ in. above grade, can be adjusted in a matter of seconds. It meters the concrete to the L-shaped beam-type vibrators which are set about ¼ in. below grade. A Master 3-kw. d.c. generator, mounted on the finisher, furnishes power to the two 1-hp. vibrator motors on the vibratory beams. These vibrating beams provide more effective vibrating action than conventional vibratory screeds due to the "whip" action of the trailing edge. Maximum vibration through the entire depth of the slab in excess of 20-in. is assured. An adequate layer of grout is brought to the surface enabling any final finishing to be done quickly.

Only one machine is necessary to do the work on any bridge job, including approaches. The entire machine telescopes in order to finish any deck 15 to 31 ft. in width. Any shape crown, including parabolic and circular, can be put in the front strike-off through rapid crank adjustments. Beam vibrators can be raised or lowered through accurate rapid crank screw adjustments.

. . . Circle No. 151



Barber-Greene Continuous Plants offer capacities from 20 to more than 200 tons per hour. Write for 24-page *Principles of Barber-Greene Continuous Plants.*

Barber-Greenes produce 274,000 tons of mix for access road at Glen Canyon Dam

Two Barber-Greene Continuous-Type Asphalt Plants produced over a quarter million tons of mix for the vital, 26-mile access road to the Glen Canyon Dam site in Arizona. The plants maintained a combined output of 560 tons per hour.

The new Model 848-A Plant (above) mixed high-type asphaltic concrete at 210 tons per hour. The other plant produced base mix at 350 tons per hour. This consistent high production allowed the contractor to produce and lay a total of 165,000 tons of base mix and 109,000 tons of asphaltic concrete in record time.

Two Barber-Greene Finishers easily kept pace with the fast-moving construction schedules. Operating speeds averaged 40 feet per minute, and 7% grades were negotiated regularly, despite 30-ton pay loads in some of the supply trucks.

The new Model 879-B Finisher offers a new transmission, higher speed tamper, new crawlers, and new power unit.

58-13-A

Write for information on the world's finest asphalt road building equipment

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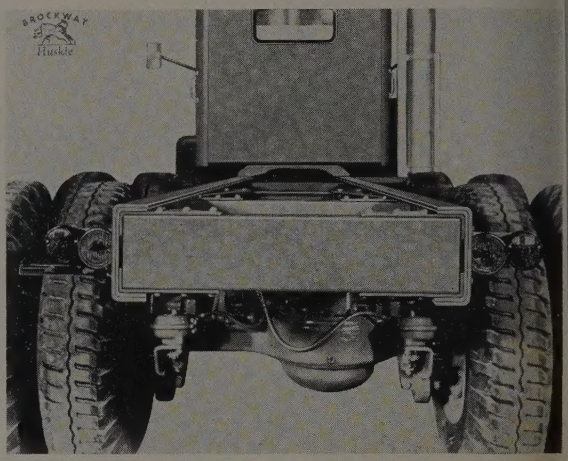
CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

. . . for more details, circle No. 12 on Reader Service Postcard

Brockway introduces new Huskie line

Brockway Motor Trucks, a division of **Mack Trucks, Inc.**, offers a custom built truck, tailored to meet the exact requirements of each operation, while maintaining the economy of mass production. In the

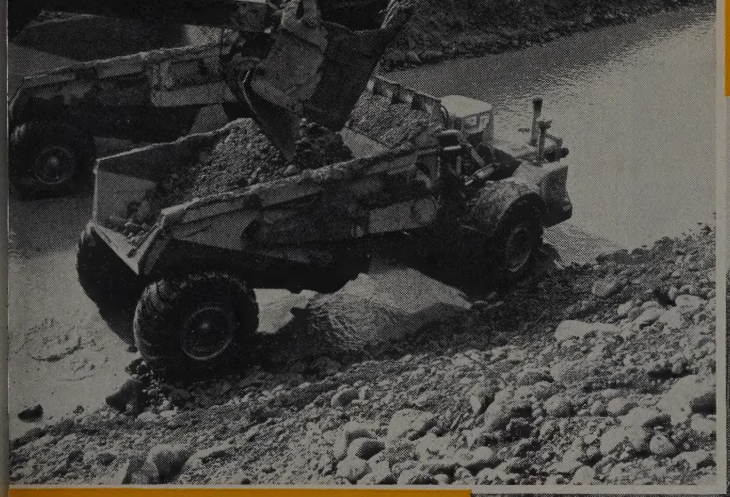


new Huskie line, over 30 basic gasoline and diesel powered models with numerous variations in all major components are available. The new line includes over 9 gasoline and diesel engines ranging from 120 to 220 in hp. It offers a choice from over 15 transmissions from 5 speeds to 10 speeds forward. Included in the standard specifications is an extensive choice of ratios for single-speed, two-speed, double-reduction and tandem-drive rear axles. The new line also has 10 models of dual drive tandem axle models with differential lockout. Tandem drive models feature double frame construction as illustrated. Literature and specification sheets available on request.

. . . Circle No. 152

Trojan shovel has 14 to 29-cu. ft. capacity

To meet the equipment requirements of the producers and users of bulk materials, the **Contractors Machinery Division** of **The Yale & Towne Manufacturing Co.** is now placing in national distribution



Athey-CAT HAULERS

take Oregon's mountain rock and river mud in stride on Hills Creek Reservoir and Dam Project

The Hills Creek Reservoir and Dam project at Oakridge, Oregon has 3 goals: (1) to control seasonal flooding of the lower Willamette Valley, (2) provide electric power, (3) create a large lake for recreation facilities. Contractor on the job is Green Construction and Tecon Corp. of Oakridge.

Three Athey-Cat Rear Dump Units take the rough work in their stride. The narrow cut and roadways need the Athey-Cat's ability to make short turns and dump fast and clean. The units have excellent traction and roadability for the slippery haul roads – even in the river bottom when necessary.

Haul length is 1½ miles – material is earth and rock – haul road conditions vary from river bottom mud to rock. Howard Flake, Superintendent of Repair and Service, says, "The Athey-Cat DW21-PR21 Rear Dump Units are doing an excellent job."

There's a wide selection that offers a unit to do your job faster, at lower cost. Why settle for less than the best? Why not gain all the advantages of the Athey-Cat team on *your* job? Talk to your Athey-Cat dealer today. Athey Products Corporation, 5631 West 65th Street, Chicago 38, Illinois.

Athey *The Only Complete Tractor-Trailer Line... And By the Leaders*

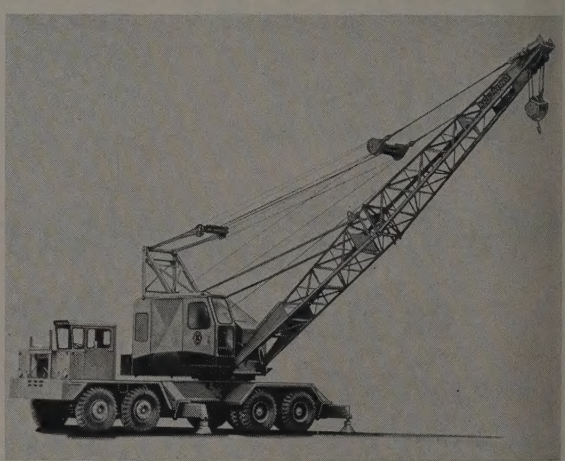
... for more details, circle No. 14 on Reader Service Postcard

the Trojan T-18, a new tractor shovel with six interchangeable buckets of 14, 16, 18, 20, 22, and 29-cu. ft. capacities. The ability of the T-18 to operate at maximum efficiency with any of these six buckets in use permits it to function as a multi-purpose bulk materials handling machine. This newest addition to the Trojan line has an operating capacity of 2,500 lb., 500 lb. greater than similar units on the market. This greater capacity, plus its 4-ft. wheel base and short overall length of only 117 in., makes the T-18 well suited for working in tight areas with a minimum amount of operating space. The T-18 is powered by a 6-cylinder, 230-cu. in. displacement, Model 30 Chrysler engine developing 72 hp. at 2,000 rpm. It is equipped with fully automatic Yale torque transmission which provides instantaneous response for fast acceleration and transmits the engine power into loading capacity.

. . . Circle No. 153

Koehring truck crane handles 35-ton lifts

Safe load lifts up to 35 tons with a 40-ft. boom, on or off the pavement, can be made with the new Koehring 435 truck crane. A top travel speed of



26.5 mph. means quick movement from job to job. Capable of swinging a 120-ft. boom, the 435 can use boom jibs 15, 20, 25, or 30 ft. long when extra reach is necessary. Safety boom limit stops and automatic power boom lowering are standard equipment. Combination pin-pad connected boom permits two-man boom length changes. Lugs on the pendant suspended boom allows folding for transportation, even when maximum boom is needed for the job. Total weight of the truck crane is 89,800 lb. Removal of the counterweight, pedestals, outriggers and boom lowers that weight to 62,500 lb., well within highway load limits. Powered by a 216-hp. engine at 2,400 rpm., the truck has 8 speeds forward—four in main and two in auxiliary transmission. Either gasoline or diesel power units can be furnished for the upper machinery. All four axles of the 435 are equipped with air brakes.

. . . Circle No. 154

(Turn to page 104 for more New Equipment. New Literature can be found on page 94.)

Men Who Keep The Machines Moving

GONE ARE THE DAYS when a "wrench and screw driver man" was the answer to construction equipment maintenance. Today, these complicated and costly machines on construction projects of the West demand men who are mechanical experts, qualified to handle problems extending from the properties of lubricants to the details of hydraulic controls. Even more important, these men charged with the effective operation of equipment must be familiar with record keeping and cost analysis. The old familiar term of Master Mechanic has a touch of the dramatic, but "Equipment Maintenance Supervisor" is more appropriate.

That is the title taken by a group from contracting companies in Southern California that has organized to keep pace with improvements in modern construction equipment. The need for such an organization is proven by the fact that this young association has already established local groups in the San Francisco Bay Area and more recently in San Diego. It is both logical and proper that the organization expand to include these key men in contracting outfits throughout the entire West. Affiliated with this group are those concerned with similar problems in the shops of distributors and manufacturers.

The importance of equipment maintenance places the person charged with this responsibility on the executive team of contracting organizations. This means that the individual must have administrative talents in addition to a full knowledge of all types of equipment and its care.

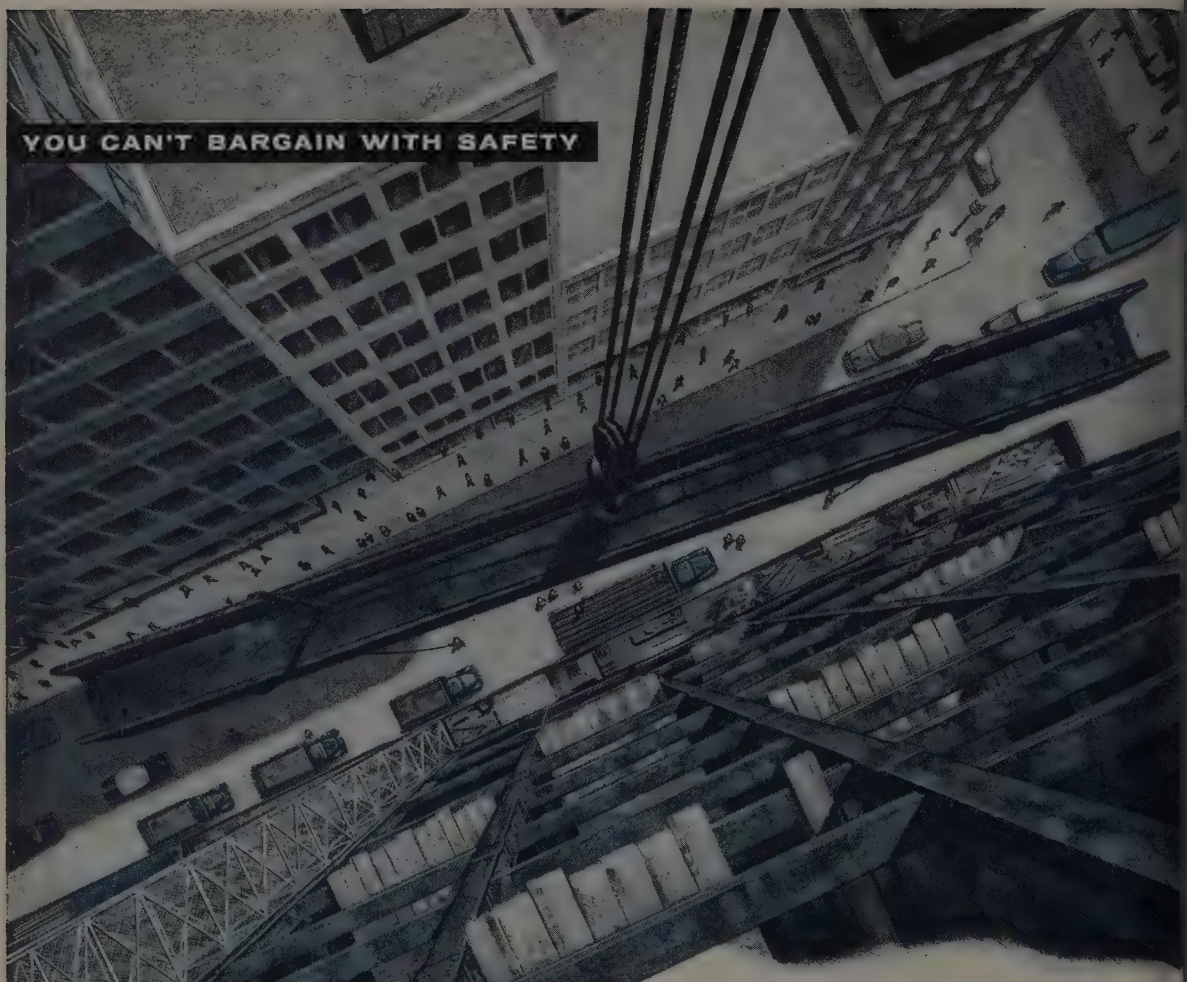
Preparation of bids begins with the known cost figures of the contractor. An important element of these basic figures is the cost of operating, servicing, maintaining, repairing and finally trading-in each piece of equipment. No one is in a better position to accumulate, digest and have available these important figures than the equipment supervisor. Thus he becomes a more and more important element in the supervisory team.

It is particularly fitting that this group should have its origin in the West where construction equipment must be heavier, more rugged and take more abuse than in any other region of the country. Equipment manufacturers recognize that if their units are adequate for Western working conditions they will be satisfactory in other regions. The reverse is not true.

Such field experience develops information that can be used by manufacturers to improve models and try out new ideas. Alert manufacturers have always been interested in constructive ideas originating from alert Western contractors. Now, this type of valuable information for all types of equipment can be exchanged and analyzed within an organization qualified to pass constructive conclusions up to the manufacturing level.

The "Equipment Maintenance Supervisors Association" represents an important advance within the construction industry of the West and can be of great service to contracting, and indirectly to the improvement of construction equipment.

Jim Ballard



Lifting heavy beams for steel-skeletoned skyscrapers, over the heads of pedestrian and vehicular traffic, calls for careful loading — with safe slings, stout wire rope and a crane that's securely guyed with steel cables. Structural steelworkers practice safety because they know that . . .

life depends on it

Today, taller buildings, bigger bridges, deeper oil wells, greater construction projects require stronger, safer wire rope. And equipment operators know that when you buy "bargain" rope you're heading for headaches, trouble and expense. So don't bargain with safety. Buy wire rope on the basis of *quality*. Buy Wickwire Rope.

5696

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LOOK FOR THE YELLOW TRIANGLE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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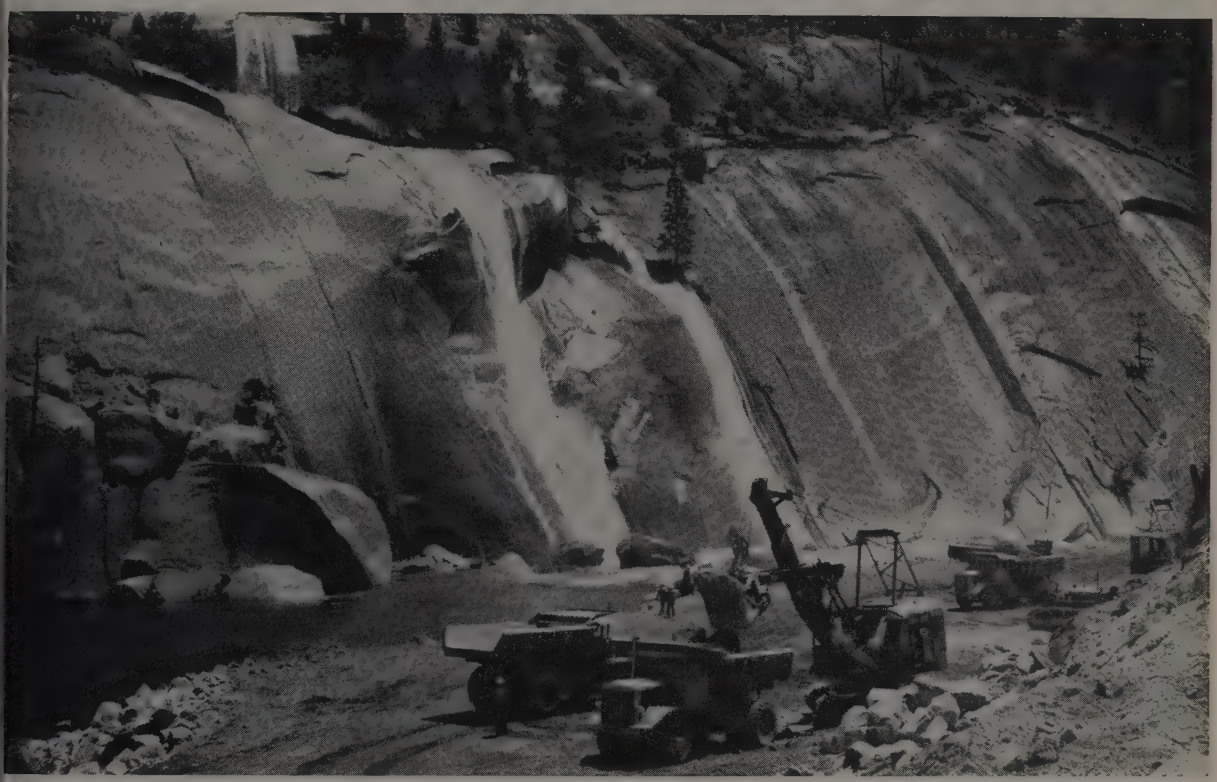
SEPTEMBER 1958



FLEET of ten new International Harvester Payhaulers is backbone of excavating operation. Included in first steps were blasting down to size the many huge boulders which littered site, and the diversion of the waterfall (above) by digging a new channel on the hillside.

Mammoth Pool excavation begins

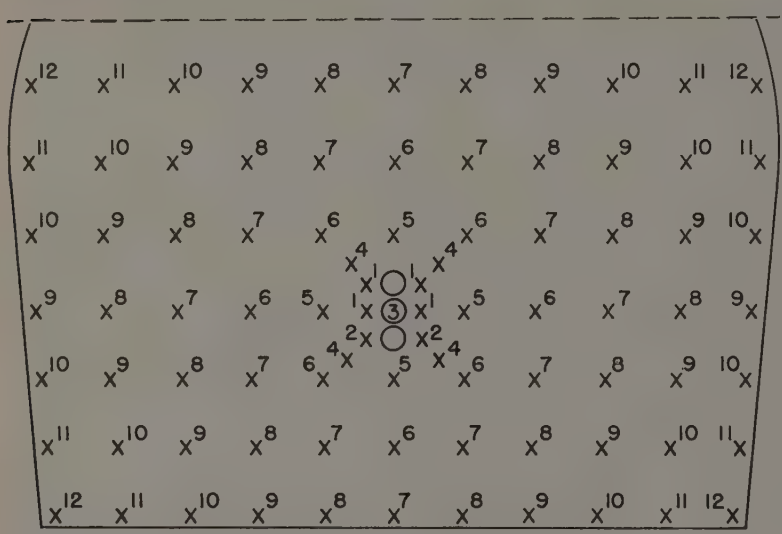
Fast tunnel work means early river diversion on Southern California Edison hydro project. Excavation for cut-off trench at site of earthfill dam progresses round-the-clock to beat coming winter rains. Big fleet of new equipment carefully managed and maintained is highlight of construction program. Work on long power tunnel.

CONSTRUCTION MOMENTUM is gathering rapidly on the $50,000,000 Mammoth Pool hydroelectric project 80 mi. northeast of Fresno, Calif. One reason the project is off to such a fast start is the high speed job turned in by the diversion tunnel contractors, a joint venture group composed of Macco, Morrison-Knudsen, Kaiser and Shea. The tunnel was holed through on the 77th day of a 120-day contract, enabling the turbulent San Joaquin River to be sent through it on May 20, a full month ahead of schedule.

FRONT COVER is a night view of the cut-off trench excavation. Workmen prepare to sink another hole with a Gardner-Denver Air Trac. Buried boulders make drilling and excavating difficult.

The Bechtel Corp., which is carrying out both the engineering and construction phases of the dam and powerhouse under the Southern California Edison Co., is rushing work on the excavation of the cut-

COFFERDAM CLOSURE took 12 hr. and was accomplished smoothly despite high flows. In photo a Payhauler backs in with a load of boulders which will close the final gap.



BOTTOM PORTION of blasting pattern for horseshoe-shaped diversion tunnel shows placement of center burn holes. An unusual idea was drilling the center large hole deeper than the rest and loading the bottom 12 in. This charge was fired after first relievers, lifting out rock in center and creating a 2-ft. diameter opening into which succeeding rings could be broken.

HOLING THROUGH the diversion tunnel came far ahead of schedule, another successful job for Morrison-Knudsen veteran P. "Whitey" Lee. Note waterfall on cliff opposite outlet.

off trench on a 3-shift basis. Th plan is to reach sound foundatio rock, which is located about 100 f below streambed, and build th embankment back up high enoug to avoid any damage which migh result from an unusually wet win ter with resulting high strea flows. The excavating work i extraordinarily difficult because o the jumbled and varied nature o the material, which ranges fro stream-deposited sand, gravel, an cobbles to huge boulders and roc slabs which have fallen into th gorge through the ages from th towering granite cliffs and dome which overlook the dam site. Thi accumulation of rocky materia actually forms a natural rock dam over 100 ft. high. Mammoth Poo is the name that was given lon ago to the small reservoir it im pounded.

The contract for drilling th 40,000-ft. long 20-ft. diameter horse shoe power tunnel was awarded t Utah Construction Co., in May o 1958. Utah has begun a headin at the outlet end and at this writ ing has advanced a little over 60 ft. An adit will also be opened u at Rock Creek which is locate near the half-way point (see accom panying drawing).

Five miles of access roads and a concrete bridge near the outlet por tal are being finished up by a join venture of Harms and Thomas.

The dam and power tunnel ar scheduled for completion in lat 1959 with power on the line by a least April of 1960. A review of th engineering aspects of the projec appeared on page 41 of the March 1958 issue of WESTERN CONSTRUC TION.

Diversion tunnel

The crew which drilled th 2,150-ft. long 28-ft. horseshoe di version tunnel with its 66-ft. lon bypass raise has worked togethe continuously since July 1955 an has developed into a highly skille tunneling team. Headed up by P M. "Whitey" Lee, in the last thre years they have driven the 1,100-f long Beardsley Dam diversion tu nel, the 1,200-ft. long Donnel diversion tunnel, the 7.2-mi. Do nells power tunnel, the 6.2-m Haas power tunnel and the Man moth Pool diversion tunnel. The finished ahead of schedule o every one of these jobs. Lee's ke walking bosses are Oscar Peterso R. "Rusty" Ray, Carl Cochran, an Carl Beranek. At Mammoth Poo W. Schweizer was project enginee

The Mammoth Pool tunnel r

quired 26,100 cu. yd. of open cut excavation for the upstream portal, 53,000 cu. yd. of tunnel excavation in solid granite and 830 cu. yd. of concreting for the upstream portal. All work in the tunnel was on a single heading basis because of the almost complete inaccessibility of the downstream portal which emerged at the base of a sheer cliff facing another sheer cliff on the opposite bank of the stream. Crews worked three shifts, 6 days per week. Record advance for a single day was 58 ft. and the top week was 339 ft.—very high production for a 28-ft. horseshoe tunnel.

Modern drilling pattern

Drilling was done from a truck-mounted, 3-deck jumbo carrying 14 Gardner-Denver drifters and a 5½-in. Gardner-Denver 143 center burn drill. Steels were equipped primarily with 1⅝-in. Sandvik Coromant detachable rock bits supplied by Atlas Copco Pacific.

The drilling pattern followed the relatively new trend in U.S. tunneling which utilizes three large center burn holes (in this case 4½ in. in diameter) which facilitates the breaking of each successive ring in the pattern toward the center. In surface rock at Mammoth Pool this was reduced to only two burn cuts. This pattern minimizes the risk of freezing the burn through human error and driving misaligned holes. Average hole depth was 13 ft. drilled with the conventional steel changes at the 5 and 9-ft. points.

One variation of the center burn pattern at Mammoth Pool was drilling the middle of the three holes an extra 18 in. deep, then loading the bottom 12 in. of this added depth. The purpose was to lift out the rock broken by the previously-fired relievers, creating a center opening approximately 2 ft. square into which the succeeding rings could be broken.

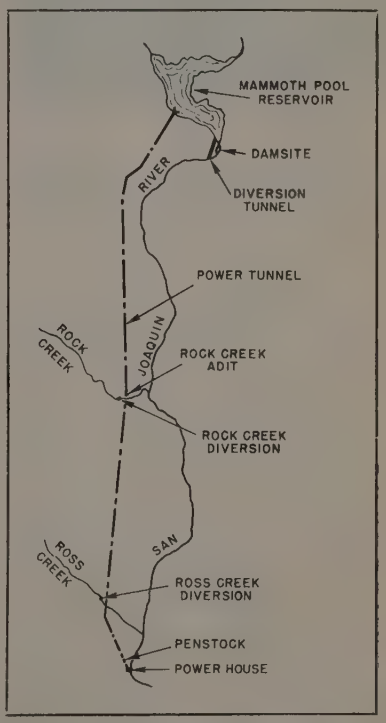
Two Eimco 105 muckers were operated side-by-side at the heading, loading material into Dart and Koehring rubber-tired haulers.

After the first 800 ft. of tunnel had been excavated, the 20-ft. bypass shaft was driven with Atlas Copco Model BBC-22 airleg drills. This 66-ft. long raise (28-deg. slope) was slusher-mucked, then partially lined.

Concreting of the upstream portal was the final step, handled with a Pumpcrete double 200 and three conventional transit-mix trucks.

MICROWAVE relay dish located near camp sends signals to station atop peak. Project is thereby tied in to Southern California Edison's microwave communications network.

MAP shows job features. Creeks will be diverted through vertical holes into the 7½-mi. tunnel. Head on turbines will be 1,009 ft.

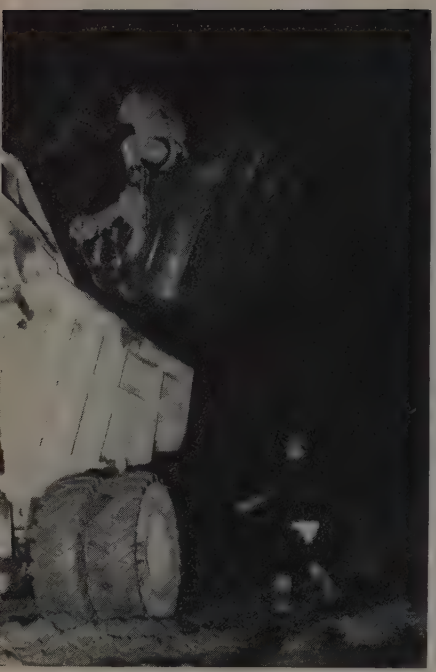


Peak project employment, including concreting crews, totaled 220 men.

The diversion of the river through the tunnel was done without much difficulty even though before the diversion there was a freakish rise in stream flow to over 10,000 cfs. from a flow of 5,000 cfs. The invert of the diversion tunnel is about 10 ft. below streambed so that when the tunnel's protective cofferdam was removed half of the river flow moved into the tunnel thus reducing the diversion problem.

The cofferdam across the river was built with shovels handling streambed material and stockpiled tunnel muck, and a fleet of 10 rear-dump trucks which hauled stockpiled boulders ranging in size up to 9 cu. yd. It required 12 hr. to close the cofferdam and force the entire flow of the river through the tunnel.

COMPRESSED AIR for the project is supplied by portable teams of Gardner-Denver compressors like the two 900's shown here. Job includes 1½ mi. of aluminum pipe with Wade couplings.



EXCAVATION is proceeding round-the-clock to beat coming winter rains. Night photo shows job-made "fence" atop Payhauler to help contain heaping rock loads. Foreman spots truck to minimize shovel movement.

No downstream cofferdam is needed because the river drops about 80 ft. through the dam site.

The construction camp

While the M-K group was at work on the diversion tunnel, access roads into the site and the construction camp were being constructed. About 10 mi. of access road had to be built, half by a joint venture of Harms and Thomas, and half by Bechtel. Bechtel is planning to build an overpass at a point within the site where the main access road crosses the main haul road.

The camp consists of eight 43-man barracks, a mess hall seating about 200, an office, first-aid building, warehouse and the usual shop buildings.

The barracks, mess hall and office are of plywood construction and were prefabricated by Bechtel in their Fresno warehouse and trucked to the site.

Most of the steel shop buildings had been located at several of Southern California Edison's steam plant projects.

Water for the camp is supplied from the San Joaquin River by two pumps operating against a head of 550 ft. Water is stored in three redwood tanks with a total capacity of 45,000 gal. on the hillside above the camp. Before distribution it is chlorinated and is passed through Elgin filters. Sewage disposal is by means of a septic tank and a leaching field.

Communications

Motorola 2-way radios have been installed in 22 of the more than 40 automotive vehicles on the project.

Local telephone service is supplied by the Bigelow Telephone Co., an old organization.

For years the Southern California Edison Co. has used a microwave communications system to serve most of its territory. The Mammoth Pool project is tied into this system by a microwave "dish" near the camp which sends signals to a station atop a nearby peak.

Cut-off excavation

When the project began, the Mammoth Pool site was an excavation crew's nightmare. Daulton Creek spilled over the overhanging cliffs into the cut-off location and the stream was littered with huge boulders some of which had diameters as great at 25 ft. First steps were to dig a new channel for Daulton Creek high on the hillside above the dam site so that the water could pour into the river above the upstream cofferdam. The huge boulders were drilled with hand tools and blasted down to size.

Even with these preliminaries out of the way the work was by no means easy. In fact, there is probably nothing harder to excavate than material which consists of sand and gravel, cobbles, and large boulders. It is exasperating as well as expensive to position a drill rig, begin drilling, and find that it's working in nothing but sand, or to strike the sloping side of a big boulder and break the drill steel, or to drill all the way through a boulder and find that the charge results in a useless blow-out.

Despite these headaches material is being loaded out at the rate of 5,600 cu. yd. per day. About 200,000 cu. yd. has been removed, with the same amount still to go. The trench has been taken down about 40 of its eventual 100 ft.

Spearheading the attack are 8 Gardner-Denver DH123 Air Tracs and up to 20 Gardner-Denver S55 jackhammers. The Air Tracs use 1¼-in. hexagonal 10 ft. long Gardner-Denver carburized rods fitted with 2¾-in. Timken bits.

Air supply

Air is supplied by batteries of Gardner-Denver 900 and 600-cfm compressors spotted at convenient locations. From bullhoses at each compressor, air is carried through a 6-in. Victaulic steel pipe down each side of the site. Aluminum pipe takes the air from the steel pipe to the drill rigs. Aluminum is used for this because when a blast is ready the pipe can easily be moved to safety. A 30-ft. length weighs only 40 lb.

There is 4,200 ft. of 4-in. and 3,600 ft. of 6-in. aluminum pipe on the job. Wade couplings are used with seal under 5 psi. and are good to 350 psi. in water or air. Wade also makes the adapter for fitting aluminum pipe to the steel pipe. Headers containing six or seven outlets for jackhammer air are made on the job.

Several Caterpillar D8's and D9's equipped with rippers assist the power shovels. One of the D9's carries Double J Breakers and is performing effectively.

Blasting powder used is Hercules 45% Gelamite. Holes are detonated with both blasting caps and Primacord. Backbone of the excavating fleet is four power shovels: a Lima, Manitowoc, Northwest 80D, and Bucyrus-Erie 88-B. Hauling is done with 10 new International Harvester Payhaulers. To protect the cab and engine hood of the Payhaulers many of them have been modified by the addition of a small protective fence constructed of steel angles and 3-in. pipe at the front of the dump body. The protective device helps contain overflow rock loads. To help the dump bodies withstand the abrasive rock, steel angles have been welded on the beds 18 in. on center.

The equipment on the Mammoth Pool project, almost all of which is new, is owned by the Southern California Edison Company.

Just inside the upstream cofferdam an exploration pit is being excavated to determine how much of the stream bed material must be removed and how much can be left in place and incorporated

into the structure of the dam. Dewatering of this pit is being done with a Stang wellpoint system which at the present is removing around 3,000 gal. per min. Three stages are presently in place and a fourth stage will probably be required later. Each stage has a 10-in. pump and the well points are spaced 18 in. on center and are jetted 21 ft. deep if possible.

Borrow pits

The main borrow area is 180 ac. in surface area and is an average haul of 2.3 mi. from the dam site. The steepest grade will be 5½%. The borrow area consists mostly of brown to tan fine slope wash underlain by medium coarse grained tan to grey decomposed granite. In accordance with a Forest Service requirement, the top 3 in. of top soil will first be removed and stock piled and after the excavation is completed will be spread out over the area. Seedlings will then be planted to restore the natural beauty of the area.

Bechtel forces believe that most of the material can be removed by ripping and scraper loading with only a small amount of shooting and shovel loading required in the rocky "spines" which radiate through the area.

The schedule calls for nearly all of the dam's 5,000,000 cu. yd. to be excavated and placed next summer. To reach this goal a fleet of 25 Caterpillar DW20's will be assembled. The rigs will be Shepherd Machinery Co.'s special long-haul scrapers which are modified by lengthening so that they carry 25 cu. yd. struck instead of 20. (In addition to Shepherd of Los Angeles, the main suppliers of equipment for the project have been George M. Philpott Co., Inc., Allied Equipment Co., both with outlets in Fresno, and Pneumatic Machinery Co. of Los Angeles.) The rigs will be powered by new Caterpillar 335-hp. diesels.

To assist in braking the heavily loaded rigs on their trips down hill to the growing fill, Hydratarders will be mounted on the rear of each unit near the PTO.

Preventive maintenance

A comprehensive preventive maintenance program has been developed by the contractor which results in a detailed picture of equipment performance and costs. The program is characterized by a records booklet which travels

STEADY SHUTTLING of big rigs permits difficult excavation to progress at the rate of more than 5,500 cu. yd. per day. Note smooth granite cliffs which form dam abutments.

with the machine wherever it goes. The booklet contains such information as technical data and manufacturer's information about the machine, a record of all major repairs and replacement parts, a monthly summary of the unit's performance, amounts of fuel and oil consumed, the quantity of tires or cables placed, etc. The information necessary for such complete records is gathered from several sources. Each operator turns in a daily report, each mechanic turns in a report showing exactly what he did on each machine and how long it took, and the equipment maintenance supervisor sends in a general report about all the machines which came into the shop during the day.

At the end of each month the information from all the daily reports is compiled and such figures as "availability" are computed, which shows the percentage of the total working time that the machine actually was working.

Mechanics are furnished with check lists to guide them in preventive maintenance work on the equipment. Each piece of equipment is checked over every 100 engine hours by following the check lists. Check lists are provided for: each 100 hours from 100 to 500; 500 hours; 1,000 hours; each 100 hours from 1,100 to 1,400; 1,500 hours; each 100 hours from 1,600 to 1,900; 2,000 hours; each 100 hours from 2,100 to 2,400; 2,500 hours; each 100 hours from 2,600 to 2,900; and 3,000 hours. This thorough preventive maintenance program (which will be more fully described in a later issue) reduces down-time by virtue of the regular equipment checks, cuts down the mechanic's repair time by furnishing him with a record of everything that has already been done to the machine, provides detailed information for use when discussing warranties with equipment dealers, and provides accurate records of the cost of the equipment operation for bidding purposes. Of course, keeping an elaborate program like this up-to-date requires considerable bookkeeping and paper work—on this particular project two men devote most of their time to it. But Bechtel and Southern California Edison Co. construction supervisors are convinced that the savings far outweight the cost of the time spent recording the data.

The preventive maintenance plan briefly outlined here was developed from many sources over the past few years by dam superintendent H. V. "Art" Borba.

Controlling the fill

One of the trouble spots on earthfill dam construction is always the time lag between taking soil samples in the field and getting the result back from the laboratory. In an hour's time as many as three or four lifts may have been placed on the spot from which the sample was taken. On this project the problem is being met squarely and every effort will be made to reduce the elapsed time.

One major reason will be the so-called burn-out test as advocated by lab chief Lloyd Garst (previously on Beardsley Dam and Santa Felicia Dam). This involves mixing alcohol with a weighted sample of material, igniting and re-weighing after the burn-out is complete to determine the loss in moisture. The method is satisfactory for material with less than 25% clay-sized particles. The test takes only 10 minutes in the field.

Garst has developed a nomograph which eliminates most of the arithmetic involved and further reduces the time in obtaining the moisture content of the sample. By taking a 500-gram sample and weighing it after the burn-out, the nomograph gives the moisture content immediately.

(This technique is described more fully on page 60 of the August 1957 issue of WESTERN CONSTRUCTION by Neville Long, now resident engineer at Mammoth Pool and previously resident engineer at Tulloch dam.)

Another device which will be used is the Washington Densometer for obtaining densities. The device uses a closed system with a cylinder and piston which activate inflation and deflation of a rubber balloon inside the soil sample hole. The volume of the hole is read directly in cubic feet from the calibrated piston rod. After the hole has been dug it takes only 3 minutes to set up the Densometer and get the reading.

(The theory and method of operation of the Densometer was described in detail in the June 1954 issue of WESTERN CONSTRUCTION in an article by Herbert Humphres, senior materials engineer, Washington Department of Highways.)

Moisture control is important because of the great height of the dam (430 ft. above bedrock), and the non-plastic properties of the material. Predicted settlement will be in the neighborhood of 9 ft. The central select zone will be placed at between 1 and 2% on the dry side of optimum moisture content, while the outer zones will be placed between optimum and 3% dry. The zone next to the abutments will be placed 2 or 3% on the wet side of optimum or just as wet as the equipment can handle it. The reason for the special treatment near the abutments is to eliminate the possibility of the material pulling away from the smooth abutments as the structure consolidates.

Compaction next to the abutments therefore is of critical importance. The fill next to the abutments will be kept one or two feet higher than the rest of the fill and compacted by wheel rolling, hand tamping, truck-mounted hydratamping. A test program is under way to find the answers.

Compaction of the embankment will be by both sheepsfoot and rubber-tired rollers. The central core will be built up in 6-in. lifts and compacted with a tandem Southwest sheepsfoot roller pulled by a Cat D9. The outer zone will be compacted in about 10-in. layers by rubber-tired 50-ton Southwest rollers pulled by Cat DW21's. A Rome disc harrow will also be utilized. Moisture will be applied in the borrow area by a sprinkler system and on the fill by two 5,000-gal. Euclid water wagons.

Concrete aggregate

Concrete for the spillway, power tunnel invert, and powerhouse totals 30,000 cu. yd. Aggregate will be produced from tunnel muck by a portable plant set up first at the powerhouse and outlet portal of the tunnel, then at the Rock Creek adit, and finally at the dam.

The crushing plant was purchased from the Conveyor Co. In addition to the conveyors and framework constructed by the Conveyor Co., the set-up includes a 42-in. x 30-ft. Pioneer pan feeder, and Allis-Chalmers, 30 x 42-in. jaw crusher, a 4 x 10-ft. Symons double-deck screen, a 4½-ft. Symons cone crusher and a Symons 42-in. x 12-ft. 2½-deck screen. Total weight of the plant is 313,000 lb.

Tire "concession"

General Tire & Rubber Co. is taking care of all maintenance of tires for all vehicles. Working in a shop building provided by Bechtel, General fixes all flats, provides new tires and performs tire maintenance on an agreed fixed-fee basis. General furnishes to Bechtel a detailed labor and cost report so that Bechtel's overall cost-keeping program is complete.

Inventory limit system

A limit system has been established for the spare parts warehouse to eliminate the need for top supervisors continually having to write requisitions and authorizations for parts. For each part a minimum and maximum number is established. If the number on hand falls below the minimum the warehouse supervisors are authorized to order enough to bring it back up to the maximum.

Dust control

To control dust on the access roads and haul roads, Bechtel is trying a rosin-base product of Weyerhaeuser called Orzon. The material is sprayed from a truck at the rate of 1½ gal. per sq. yd. of surface.

Personnel

About 485 men are now on the Bechtel Corp. payroll at Mammoth Pool. This will rise to 550 next summer when the job hits its peak.

Project sponsor for Bechtel is E. J. Garbarini and job superintendent is G. W. Saul. Project engineer is K. V. Taylor; senior construction engineer is T. W. Grover; and G. O. Irby is in charge of administration. F. W. Yarbrough is field control engineer for the dam and L. E. Garst is field engineer in charge of the lab. Field geologist is H. A. Spelman. C. W. Hunt is in charge of inspection, with a crew of six dam inspectors and three grouting inspectors. There are nine lab technicians.

Also for Bechtel, Del Skinner is office engineer, and H. V. Borba is dam superintendent. Shift superintendents under Borba are Rex Mayfield, George Brem and "Swede" Edner. Equipment superintendents are Herm Berstler and Bill Rabe. Frank Landers is drilling superintendent, Mark Sholar is road superintendent.

At the powerhouse W. E. Johnson is job superintendent, with Jim Matheson as structural superintendent.

A consulting board consisting of Dr. Julian Hinds, Dr. K. Terzaghi, I. Cambell, and S. D. Wilson reviews design and construction periodically.

EQUIPMENT LIST

- **2 Northwest 80D shovels**
- **1 Manitowoc shovel**
- **1 Bucyrus-Erie 88B shovel**
- **1 Lima shovel**
- **1 20T Bay City crane**
- **1 35T Lorain crane**
- **3 Euclid water wagons**
- **1 GMC water wagon**
- **3 Caterpillar motor graders**
- **2 Caterpillar Traxcavators**
- **5 TD-24 International Harvester tractors**
- **12 D8 Caterpillar tractors**
- **2 D9 Caterpillar tractors**
- **10 International Harvester Payhaulers**
- **3 10-cu. yd. IH trucks**
- **3 5-cu. yd. GMC trucks**
- **5 Gardner-Denver 900 cfm. compressors**
- **2 Gardner-Denver 600 cfm. compressors**
- **6 Gardner-Denver Air Trac drills**
- **50 Gardner-Denver jackhammers**
- **43 Automotive vehicles**

Where bears are "Sidewalk Supers"

On Unimak Island in the Aleutians, Manson-Osberg have these frequent visitors to their DEW-line job. Among the many construction problems was the swirling volcanic ash that required every one to wear goggles.

ALASKAN construction projects and problems are reasonably well known to readers of WESTERN CONSTRUCTION. Especially out on the Aleutians where weather, winds, fog, and high seas make a construction battle of every job for the DEW-line extension. But when a project is located on an island that is a federal bear sanctuary a new element is added which provides both a nuisance and a novelty. This was the situation faced by Clyde Hovik, project manager for Manson-Osberg, Seattle, for their $3,500,000 Cape Sarichef job on lonely Unimak Island.

Hovik, who has the distinction of being classed as an "old Alaskan hand" with many years of Far North experience, had the following comment on the conditions at Sarichef.

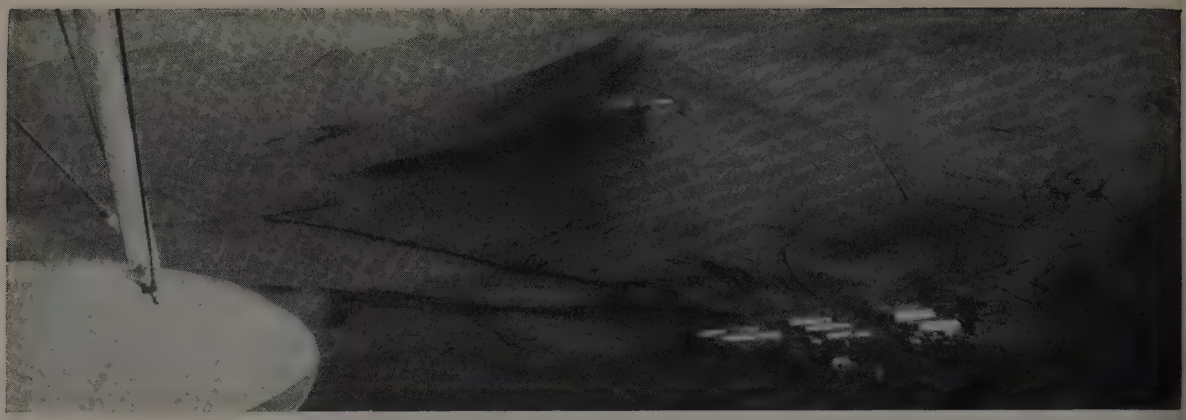
"I thought that Romanzof, Wales, Fort Yukon, and Kotzebue were tough Alaskan jobs due to isolation and rough weather, but Sarichef is the toughest I've ever experienced. It's the only job I've ever seen where all the men, including the government inspectors, had to wear goggles due to the ever-present wind blowing the volcanic ash and cinders like sand-blasting. Rough weather! You should have seen the sad sight of our camp flattened by a twister! And the time when our vital landing craft, which broached in the heavy surf and came in on the beach after pulling its anchors in a violent storm. Weather! Wow! You can tell the world that Sarichef has more than its share!"

Other locations along the Aleutians include many of these problems but the cinders and the bears were really a distinction.

Bear are many and curious

The bear population on Unimak is explained by the fact that this island is a federal bear conservation preserve where the animals are protected from unregulated hunting. The Fish and Wildlife Agency issues only 25 bear hunting permits annually. As a result, William C. "Bill" Phillips, Cape Sarichef project engineer for the U. S. Army Engineer District, Alaska, has the following comments: "Unimak is really a bear island. The big brutes are as thick as quills on a porcupine. When the job first started, we figured that the brown bear could develop into a job hazard but it did not turn out that way. During the day, the brownies stayed hidden out in the tundra feeding on parka squirrels and rodents with berries for dessert. Talk

GARBAGE can inspection by one of the big brownies was considered routine, but one night the pastry cook had to shoot one that insisted on coming in through the window for a pie. Dogs shown in the picture above are sled-dogs from the Coast Guard station.



ON THE red-cinder hill are the structures of the Cape Sarichef composite radar and troposheric communications outpost. The Manson-Osberg camp is in the foreground, and many fumerole mounds are evidence that there is still fire down below.

about a living dragline! Those big brutes can excavate a crater and chomp down on the small animals before you can shout 'dig!' At twilight they would wander up the hill to the construction site after the workers had left and look over the work like curious sidewalk superintendents. The only damage they did at the work site was to try out their king-sized claws on a bulldozer seat cushion and rip it to pieces. They would frequently stroll into the camp attracted especially by the aromatic odors coming out of the cook house when Joe the nightman was baking his bread, pies, and pastries for the next day. A 30-06 rifle was kept in the kitchen, but only had to be used once by Joe when a bull-headed bear was determined to break in a window and try the baking for taste.

"Gentry Schuster, pilot of the contractor's charter plane which shuttled between Manson-Osberg's Aleutian jobs, had to shoot another brownie at Cold Bay when the brute started breaking in his door. But in our camp at Sarichef the bears were not vicious. They proved to be conversation pieces and well-behaved models for the camera bugs."

The bear pictures with this story were taken by Howard Edison, a safety engineer for the U. S. Army Engineer District, on an inspection trip to the job. He had this to say about the bear sidewalk superintendents of Cape Sarichef:

"Before the job started, we knew about the abundant bear population of Unimak Island from our advance survey and soils exploration parties who pioneered the work on the island in 1956. They reported that the bears were friendly and curious as the only humans that they had come in contact with were the few coast guardsmen stationed on the island and those lonesome GIs had built up no bear animosity—the boys were only interested in how many days were left until they rotated back to the States where blondes were as thick as their bear neighbors.

But we realized that with a high-balling construction job, the bears could be a safety hazard. I have worked in Alaska seven years for the Corps of Engineers, and have traveled, hunted, fished and camera-bugged extensively all over the territory. What I have seen and observed of the big brown bear is that he bears no inherent enmity to man. In my opinion, Mr. One Ton (some weigh that much and seem to tower totem pole tall when they rear up on their column-like hind legs) is not a vicious killer—he only fights man when he fears that man is going to kill him. The mother instinct of a sow bear will cause her to attack to protect her cubs.

"With the bear protected on Unimak Island, they presented no unusual safety hazard on the job. The only harm they did was to go swimming in the water supply lake occasionally and dirty up the water. One big brute scared the daylights out of some eager beaver photographers. Mr. Bear was parked by the front door of their barracks so they sneaked out the back door, climbed up on the roof, and crawled, silently, they thought, to the front eave to shoot a closeup picture downwards on the bear. Just as they reached the roof's edge, Mr. Brownie's sharp hearing alerted him and he reared up in their faces, towering up above the 8-ft. wall. Hitting the panic button, they retreated in disorder abandoning the rare chance for a sensational close-up.

"The dogs in the picture are sled-dogs from the Coast Guard station and how they worried the big bears at times! Frantic fights were frequent. But the dogs were too fast for the huge brutes to cope with as the one-ton brownies are very clumsy when it comes to close-in fighting. As cubs, they have had no tree-climbing training to give them agility as there are no trees on the tundra carpeted Aleutian Islands."

So much for the bear problem, and now as to construction problems:

The curving chain of Aleutian Islands are the tops of a volcanic range of mountains which have sunken below the sea. Unimak Island, on which Manson-Osberg's Cape Sarichef project is located, is typical of these rugged scenic isles. Mt. Pogromni, an extinct volcano, towers 6,520 ft. over the job site. On a clear day the photogenic snow-covered cone of Mt. Shishaldin can be viewed 50 mi. away sticking up 9,978 ft. with a plume of steam from the crater, a warning that there's still fire down below.

The weather is rugged with sudden storms sand blasting the jobs with the island's volcanic ash, stinging the workers' skins like needles and causing the wearing of goggles. The site is typical of the Aleutian Chain "banana belt" with temperatures from May to November ranging from a low of 30 deg. to a high of 70 deg., a nearly constant fog and drizzle from May to September, and wild williwaw storms of hurricane force at frequent intervals.

In spite of the mild climate, weather created a big transportation problem for men, materials and supplies into Cape Sarichef. Manson-Osberg Co. had chartered planes flying from Anchorage to the jobs at Cold Bay and Sarichef, but 25% of the time aircraft could

(Continued on page 38)

Pilot gravel plant at Glen Canyon

Exterior concrete for huge dam requires high-grade aggregate. To get it, the contractor is investigating a flotation process, and a pilot plant is supplying the answers.

A HEAVY MEDIA separation plant for beneficiation of concrete aggregate has been set up near the Glen Canyon Dam site in northern Arizona. Assembled by Southwestern Engineering Co. of Los Angeles for contractor Merritt-Chapman and Scott Corp., the pilot plant will eventually become part of the much larger permanent aggregate production set-up.

Of fairly simple design, the plant follows the method of flotation or beneficiation pioneered by the mining industry, for the separation of low grade ore. A mixture containing 75% ferro-silicon and 25% magnetite is fed into a separation tank with the raw aggregate. In the case of the mining industry the beneficiated ore would be skimmed off the top. At Glen Canyon, however, the undesirable "float" (mostly chert and sandstone) is removed while the aggregate sinks to the bottom of the tank to be washed, screened, and stockpiled for use.

Only 10% of an estimated 10,000,000 tons of aggregate to be used in the dam will be beneficiated. This rock, however, will go into the exterior of the dam, powerhouse, and tunnels where exposure to water and weathering might otherwise cause cavitation of the concrete.

M-C&S officials have indicated that more than 13,000,000 tons of aggregate have been explored in the Wahweap Creek area 5 mi. upstream from the dam site. A graveled road already links the construction area with the heavy media separation plant which is currently supplying aggregate for the lining of spillway and diversion tunnels. The plant has an output of 100 tons per hr. A quarter of this is the 4 to 8 sand fraction of the aggregate which is run separately from the ¾-in. to 1½-in. rock.

Parts of the present pilot plant will eventually be dismantled and incorporated into a permanent aggregate plant which will produce an estimated 750 tons per hr. About 50 tons per hr. will be beneficiated.

The plant has three major components: (1) a densifier where the magnetics are mixed, (2) a spiral separator where the float is separated from the heavier aggregate, and (3) a magnetic separator where the ferro-silicon and magnetite are recovered for eventual re-use.

Both the Akins separator and densifier were made by the Colorado Iron Works of Denver, Colorado.

Recovery of the finely ground magnetics is achieved by washing the treated aggregate as it is passed over Hewitt-Robins vibrating screens. The diluted magnetics drain into a sump at the bottom of the plant where they are returned to the magnetic separator by a Wifley centrifuge sand pump manufactured by A. K. Wifley and

(Continued on page 38)

Reilly Gravel

...Pay Di

A Northwest Model 6 Shovel drops its load of a yard and one half of caliche gravel into a waiting dump truck. Periodic analysis of this gravel allows Mr. Reilly to keep a check on PI content and liquid limit. To date, all samples have been 50% better than required.

Mr. Reilly (right) and C.I.T. field representative Bob talk over plans against the background of an Insley line. Both the dragline and the Northwest Shove financed through C.I.T. Corporation.

C.I.T. CORPORATION • MACHINERY A

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GRAVEL PLANT

(Continued from page 35)

Sons, also of Denver. The pump is driven by a 15-hp. Continental electric motor.

Reversing the polarity inside the permanent magnet breaks the magnetic field and allows the mix to drop back into the densifier. Only a fraction of the concentrate is fed back from the densifier to the spiral separator at a time to replace that lost through the washing process. A second Wifley pump is used to feed the magnetics from the densifier to the separator.

A specific gravity of from 2.45 to 2.50 is maintained inside the separator when running the 4 to 8 sand. The No. 4 to 1½-in. aggregate requires a specific gravity of about 2.50. The flotation process used in the heavy media separation reduces undesirable rock from as high as 40% in the pit material to 2% well within Bureau of Reclamation specifications.

Earlier attempts to run sand and gravel together failed when it was found the mass of the rock particle rather than the specific gravity controlled the rate of separation. Although the smaller aggregate has the same specific gravity as the larger rock it requires longer to settle to the bottom of the separator. As a result the 4 to 8 material was wasted with the float and only the coarse aggregate recovered.

For a more efficient operation with the present set-up, the contractor is shooting for three shifts —two running the 4 to 1½-in. aggregate and one running the separated sand. During the separation and screening of the larger sized rock the 4 to 8 material is stored in three 50-ton bins for eventual blending with the regularly produced sand.

The purpose of the present heavy media separation plant is twofold: First, to iron the kinks out of the separation process, and second, to provide aggregate for lining the diversion and spillway tunnels. Some idea of the method of pit excavation to be used during the construction of the dam will also be gained.

Equipment used in the present set-up includes a washing and screening plant manufactured by Smith Engineering Works; Barber-Greene conveyors; and one D-9 Caterpillar tractor with a dozer blade for general clean-up work. A fleet of eight trucks including four 30-yd. Euclids, three 15-yd. International Harvester Payhaulers, and one 20-yd. Mack haul the aggregate from the plant to a shuttle conveyor at the dam site where it is stockpiled for use. A Lima Model 1601 shovel with a 4-yd. bucket loads the trucks. A Lima 2400 dragline with a 7-yd. bucket is used in the pit.

Present schedules call for the first concrete to be poured by November of 1959 and the dam and powerhouse finished by 1963.

BEARS FOR SUPERS

(Continued from page 32)

not land at Sarichef due to fog and storms. Materials were barged up from the States and landed on the beach. Many times high swells prevented unloading operations, and the barges had to run for the leeward side of islands and wait until the storm subsided.

A war-surplus landing craft was utilized to transfer materials from Cold Bay to Sarichef. On its last trip in November, the boat unloaded in a storm and started to pull itself off the beach by an anchor which was always left out in deep water to get off the beach shingle. The anchor shifted, and the landing craft broached crosswise against the big swells. In it came, on the beach, where it may have to be abandoned.

The Cape Sarichef project is similar in design to the other DEW-line extension jobs. The particular job involves approximately 4 mi. of roads with crushed-rock surfacing from the beach, air strip, and water supply dam; an 100 x 3,500-ft. air strip with crushed-rock surfacing; two 60-ft. and two 30-ft. antenna towers for White Alice communications; an L-shaped composite building 130 x 150 ft. which houses living quarters, warehousing, and work areas under one roof with a high tower crowned by a radar "bubble"; and two 5,000-bbl. fuel tanks connected to the beach barge unloading terminal by a 6-in. pipeline.

On June 17, 1957 Manson-Osberg, the prime contractor, started earthwork operations on roads and air strip. Excavation of the building site on the top of the red volcanic hill followed. This cut called for slicing off 65 ft. of peak. At first it was pie-in-the-sky for the dozers as all they had to do was shove the cinders, ash, and boulders over the side and watch them slide down the hill. As the cut progressed, the true nature of the cinder hill was revealed—it was a volcanic vent with a solidified lava core in the middle. Shooting was required for this strange rock excavation.

Next, the job received a blow below the belt when it was discovered that the gravel of the beach was not adequate for concrete aggregate; it proved mostly sand, topped with small gravel. This necessitated a change in plans, and concrete placing had to be delayed until a rock crusher could be shipped in from the States to manufacture aggregate from a rock borrow pit. This crushing equipment arrived August 10. While the plant was being set up, the first concrete pour was made August 13, for a tank footing ring with concrete aggregate barged from Manson-Oberg's Cold Bay project. This was necessary so as not to hold up steel erection of the tanks.

On August 22, boilermakers started welding on the tanks. September 10 saw the crushing plant go into operation manufacturing the vital concrete aggregate. September 13 was a red-letter day when the first concrete pour was made for the radar tower footings. This was followed the next day by a pour for the composite building.

From that point, the work was stepped up until the progress curve showed 56.6% completion when the project had to shut down on November 23 until spring due to the wild wintry williwaw weather.

For the government, the Cape Sarichef project, along with the other Aleutian Chain jobs, is under the supervision of the U. S. Army Engineer District Residency at Cold Bay, staffed by James McNamara, acting resident engineer; Capt. A. J. Rabogliatti, assistant resident engineer; Paul Collier, mechanical; and Joe Hurley, soils. On the job William C. Phillips was project engineer with Walter Muchow, chief inspector. Bill Phillips has been employed by the Corps of Engineers in Alaska since 1944 having worked at Shemya, Ladd and Eielson air bases, and Sitkinak AC&W and White Alice station.

Manson-Osberg's staff included Clyde Hovik, project manager for both the Sarichef and Cold Bay contracts; Wayne Stowe, superintendent; George Burnell, project engineer, Chauncey Carpenter, carpenter superintendent; Tom Jones, carpenter foreman; and Dan Burks, office manager. The sub-contractors had the following supervisory personnel on the job: Pat Patterson, mechanical superintendent for Lent's, Incorporated; and Homer Lemon, electrical superintendent for Grasle Electrical Co.

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Slip-form paver that inserts mesh

Colorado contractors extending use of modern machine for laying concrete pavement and recent field experiment adds an attachment to place reinforcing fabric at specified depth.

By WILLIAM J. WALSH
Staff Construction Engineer
Colorado State Highway Department
Denver, Colorado

COLORADO'S fundamental policy of not writing construction methods into specifications, while still requiring top-notch end results, has apparently done much for evolutionary changes of the slip-form paver.

Since 1955 the Colorado Highway Department has seen the slip-form paver used on six projects, five on the Interstate System. With the completion of a current 12.9-mi. project on U. S. 6 between Wiggins and Roggen at a figure of $2,052,448, Colorado will have 53.2 mi. of concrete highway on which the slip-form paver was used. The Wiggins-Roggen project is a joint effort of the Roberts Construction Co. of Lincoln, Nebr., and Western Paving Construction Co. of Denver, who completed a 15.3-mi. project in June on U. S. 87 between Denver and Castle Rock. Cost of that project was $1,016,154.

Results specified

It was on the Denver-Castle Rock project the highway department policy of not specifying construction methods paid off with a definite step forward in the evolution of the slip-form paver. The construction firms were handed the job of incorporating four test sections in the project. One of these experimental sections was described as follows:

"One mile of concrete pavement with welded wire fabric reinforcement. One-half mile of this section is to include style 6x12 ¼ fabric with sawn joints spaced at 61½-ft. centers as presently specified in the plans. The other half-mile is to include welded wire fabric reinforcement, style 6x12-00/4 with sawn joints spaced at 106½-ft. centers. The spacing is based on 16-ft. long mats with 12-in. overlap and 3-in. unreinforced space to each joint." The reinforcement was to be placed 2 in. from the surface of the 8-in. concrete slab.

As soon as the contract was awarded, there was speculation on how the experimental sections were to be laid with the slip-form which can't back up to permit the laying of a second layer of concrete after the reinforcing steel has been placed. The highway department specifications left the solution of this problem strictly to the contractors.

The construction firms quickly laid the three other test sections: One mile of typical section, ½ mi. of 10-in. thickness of concrete on 4-in. cement-treated base, and ½ mi. of experimental section con-

First use of a slip-form paver for concrete highway in Colorado was during the 1955 season and the operation was described in WESTERN CONSTRUCTION, **June 1956. The field test was authorized by the Colorado Highway Department for a 2,800-ft. length on U. S. 85 near Greeley and consisted of laying two 24-ft. unreinforced slabs 8 in. deep. This work was carried out as part of a $377,000 contract by Gardner Construction Co. in November 1955. During the following season a slip-form paver was used on three contracts. In 1957 a contract was let which included the extensive field experiments described in this article and concluded during the current season. EDITOR**

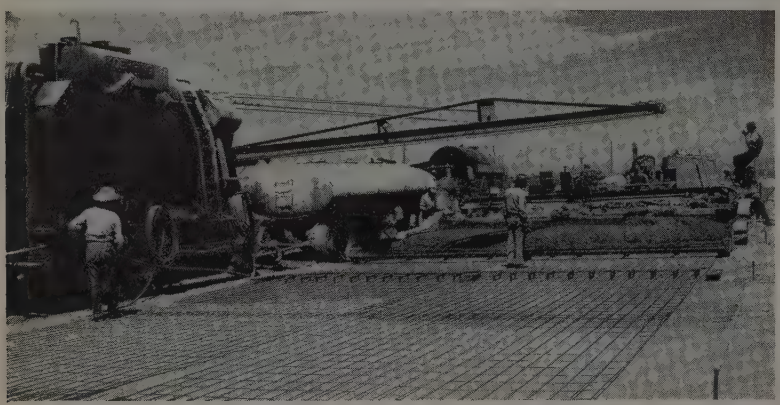

FIG. 1 — Spread out in front of slip-form paver is the 6 x 12-in. welded wire fabric with provision for sawn joints at 106 ft. 6-in. spacing.

FIG. 2 — Pushed in front of the paver was the U-shaped frame with the front edge riding on wheels, as shown. The fabric rides up over the frame, and center tie bars are being placed to hold parallel mats together.

sisting of an 8-in. concrete paving placed on a 20-in. cement-treated base.

The 4-in. cement-treated base was first laid for the reinforced concrete test section, and the contractors then brought forth a Rube Goldberg type of gadget to be attached to the front of the slip-form paver to handle the wire mesh. The "sled" was in the form of a large U, with outside members of 6-in. steel box girders. The rear ends of these girders were attached to the forward arms of the paver by a 1-in. bolt and were on ball and socket joints.

Front edge moves on wheels

The front end, welded to the box girders, consisted of a 6-in. I-beam. Wheels were attached under the forward corners and two wheels were placed under the center of the I-beam to facilitate forward movement as the sled was pushed ahead by the paver. A 3-in. pipe was placed across the full length of the top of the I-beam, and a 1-in. pipe was added later to aid in the easy movement of the wire mesh over the front edge.

Extending back between the box girders, and attached to the I-beam in front by hinged joints were eight runners, (see Fig. 2 and 3). These were 6x¼-in. steel, set upright, with a width of ¾ in. on the bottom. Each was 10 ft. long, and they were simply dragged along as the extending arms of the paver pushed the sled forward. These runners were spaced at intervals, left to right, of 34-, 36-, 21-, 30-, 21-, 36- and 36 in., with 34 in. between the last runner and the side girder.

After numerous on-job modifications, the slip-form paver was able to handle the steel fabric, sandwiching it between two layers of concrete in one continuous forward operation.

Rate of output

Resident engineer Paul R. Morley of the Colorado Highway Department noted that the contractors made an average of 2,000 ft. a day with non-reinforced concrete, and an average of 1,650 ft. a day with the reinforced roadway. Morley said if the work had continued, the speed of the process would soon have equaled that maintained by the paver for non-reinforced concrete. District engineer George N. Miles said the sled and the slip-form paver turned out a highly credible job.

Other Colorado jobs—not including the use of the reinforcing sled—on which the slip-form paver has performed well include:

U. S. 85 — 0.77 mi. between Greeley and La Salle, by Gardner Construction Co. at $377,053; U. S. 6—8.397 mi. between Fort Morgan and Wiggins, by Western Paving & Robert Construction Co. at $746,-210; U. S. 87 — 11.8 mi. between Castle Rock and Colorado Springs by Bushman Construction Co. at $713,771; U. S. 85—3.9 mi. south of La Salle, by Harrison Engineering Co. at $493,146.

Estimate of savings

The Colorado Highway Department does not keep detailed cost records of contractors' expenditures on work done by contract, and contractors are reluctant to disclose their actual costs. But the contractors are free and open in their expression of opinion regarding comparative costs of operations with the slip-form and conventional form methods. These opinions are varied. The conservative estimate of savings is 25¢ per sq. yd. and the more enthusiastic contractors' figure reaches a maximum of 50¢ per sq. yd.

We believe competition will take care of the situation with any saving in cost eventually accruing to the benefit of the state. When one realizes the cost of the machines is two-thirds to three-fourths that of a standard paving train, no money tied up in forms and the saving in machine operators and form handlers, it is not difficult to see a considerable saving in labor and plant investment should result.

We believe we are getting results equal to or better than obtained with the conventional methods. Riding surfaces certainly compare favorably with those obtained on projects where conventional forms were used.

FIG. 3 — Feature of the attachment is the runners extending from the front of the sled back into the concrete. The fabric rides down these rails and into the concrete at the specified depth 2 in. below the surface. The timbers under the corner wheel are to lift the front edge of sled to pass over the dowel bars.

FIG. 4 — Appearance of finished slabs (note the edge) showing the foot-bridges for finishers that are pulled along as part of train.

One of the eight Mack four-wheel dumpers with 22½ ton capacity operated by Goodfellow Bros., Inc., of Wenatchee, Washington. The Macks have proved so valuable that Goodfellow Bros. have four more on order. These heavy-duty haulers are taking on a . . .

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Even in temperatures ranging from —15° to 110°, through mud, extreme dust, snow and ice, and on grades of up to 23%—Goodfellow Bros. know that their Macks will perform efficiently, dependably . . . and profitably.

Under such grueling operating conditions, their Mack dumpers showed their capability on the 3,000,000-yard Rocky Reach Dam earth-moving project on the Columbia River. Then they doub proved it on the Snoqualmie Pass highway constr tion in Washington's rough mountain country.

Besides providing maximum payloads at minim hauling costs, the Macks are particularly well cepted by Goodfellow Bros' drivers and shop pers nel because of their handling ease, short turn radius and easy accessibility for servicing.

Dumping rock on a road-widening operation on Highway #10 in Washington's Cascade Mountains. Prior to this road job, Goodfellow's 22½ ton Macks were used in the 3,000,000 yd. excavation and backfill for the Rocky Reach Dam near Wenatchee, Washington.

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A desert reservoir with problems

Material of fluvial fan at foot of Nevada mountain range requires special treatment for consolidation. Bottom and slopes of 50,000,000-gal. reservoir require reconstruction with special fill covered with asphaltic membrane.

By **W. HENRY ENCE**
Head, Soils Branch
District Public Works Office
Twelfth Naval District
San Bruno, Calif.

TO ASSURE a supply of water for the Naval Ammunition Depot at Hawthorne, Nevada, a 50,000,000-gal. reservoir was dedicated in July 1957 by Captain J. A. McHenry (CEC), District Public Works Officer, 12th Naval District. Located on the fluvial fan at the foot of a desert mountain range, the project involved unusual problems in design, construction and subsequent changes which extended its construction period from 1951 to 1957. With an area of 500 x 600 ft. and a 50-ft. depth of water, the reservoir was built with a combination of cut and fill section. It was the nature of the native soils and the formations encountered which created the problems. The sand and gravel materials used for the rolled earth embankment and the bottom of the reservoir were obtained locally and these presented the challenge to the Navy engineers. The Depot, which surrounds the little town of Hawthorne, stretches across one of the many fluvial fans at the foot of the Wassuk Mountains. The specific location of the reservoir is on the fan created by Dry Cat Creek.

Geologically the Dry Cat Creek fan is a mixture of granite boulders 20 ft. in diameter and smaller in size, and other materials grading downward to sands and silts. The fan is a site of deep-seated bedrock fractures and fault lines which are overlain by approximately 200 ft. of the porous fluvial deposits. The area is annually subjected to freezing and thawing conditions. Seasonal thunder storms cause torrential rains and mud flows down the barren mountain slopes and dry creeks. Earthquakes periodically rumble through the area.

The 50,000,000-gal. reservoir was constructed in 1951-1952 by George Miller Construction Co. The maximum height of the embankment on the fill side of the reservoir is about 38 ft. A 3-in. asphaltic pavement-type concrete lining for controlling possible seepage losses was placed over the bottom and on the inner slopes of the structure.

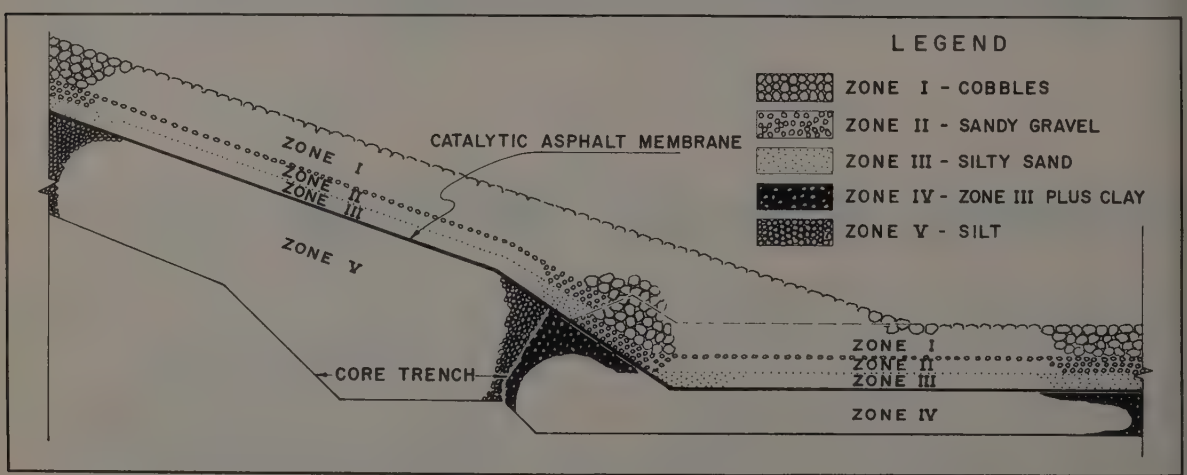
The reservoir was partly filled with water on May 3, 1952, and soon afterward, due to subsidence, cracking occurred near the outlet works near the east embankment. The water had seeped through cracks in the asphaltic concrete and into the porous materials underneath the reservoir lining. Also, the water permeated throughout the sand and gravel materials of the enbankments. This condition eventually started a series of settlement cracks in the embankments and bottom of the reservoir. Continued wetting of the subsoils initiated local subsidence of the fluvial fan and settlement of the embankments.

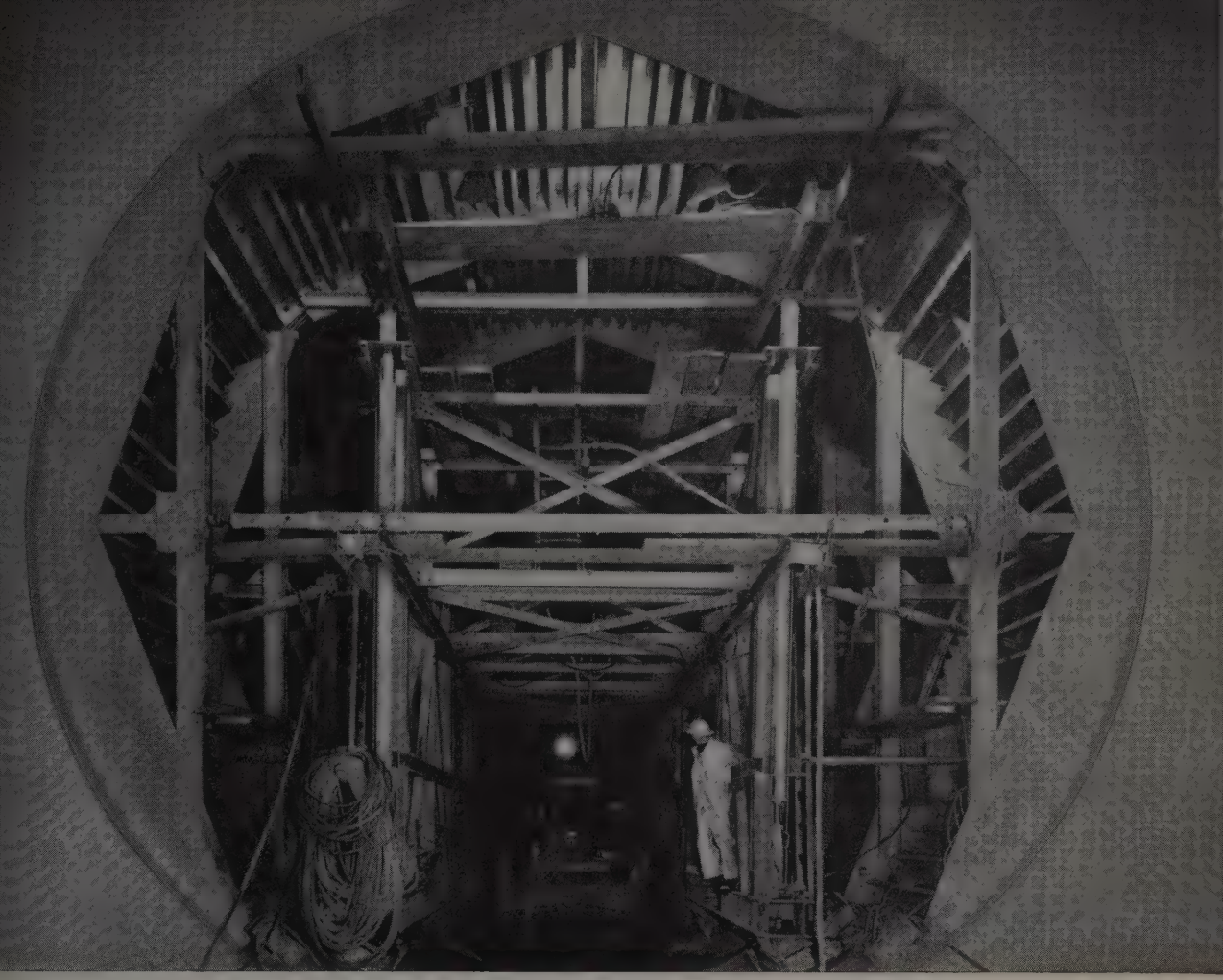
Following a complete field survey of the reservoir conditions which had developed, the Navy engineers submitted their findings to the District Public Works Officer. Subsequently, L. A. Palmer, consultant for the Bureau of Yards and Docks, Washington, D. C., met with the District engineers and assisted in setting up a foundation exploration program for identifying the subsurface materials and recommending corrective action.

An investigation was made of the embankments and bottom of the reservoir. Fifteen shallow test holes and a vertical test shaft, 4 x 6 ft. and 50 ft. deep were dug in the bottom of the reservoir. Soil samples taken from this shaft, along with geological examinations of the materials as the digging progressed, were used to identify the deep-seated fluvial materials below the reservoir. Subsequent laboratory tests of the foundation and embankment materials classified the materials as well-graded sandy gravel with excess silt. The materials contained an average of about 43% gravel, 38% sand and 19% silt and clay. The fraction finer than the No. 40 sieve was of low plasticity with a liquid limit of 20% and with a plasticity index of 4%. The soluble salt content, although low, acted as a binder agent.

Repair of the reservoir required the following steps: (1) Compac-

DETAILS OF FINAL DESIGN FOR BOTTOM AND EMBANKMENT SHOWING ZONES OF FILL AND MEMBRANE





Design of traveler permits vehicular operation through tunnel while form is in place. In addition Blaw-Knox developed and built a concave screed for the tunnel invert.

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The Blaw-Knox Forms can be set, stripped, and reset without disassembling any of its components. Each set of wheels is equipped with a ratchet device to permit steering of the traveler around horizontal curves. Despite its weight, the form is moved by two men operating hand winches. Elevation is controlled by a series of hydraulic jacks, and sidewall adjustments are made with steamboat ratchets. Telescoping pipe spreaders support sidewalls during pouring.

With these specially designed units, Trinity Dam Contractors poured every day, alternating between forms, allowing 16 hours set-up time. Using other methods, a maximum of only two pours a week would be possible. Guy F. Atkinson Company is sponsor of the $49,000,000 joint venture. Other joint venturers are: M. J. Bevanda Co., Inc., Chas L. Harney, Inc., Ostrander Construction Company, A. Teichert & Son, Inc. and Trepte Construction Co.

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FOUNDATION materials and conditions were explored, prior to final design, with the aid of a 50-ft. shaft driven in the bottom of the 500 x 600-ft. reservoir floor.

tion with water of the porous materials around and below the outside perimeter of the existing embankments, (2) removal of the existing asphaltic concrete lining and about 7 ft. of porous materials from the bottom of the reservoir, (3) replace the bottom materials with a 3-ft. compacted zone or layer of silty clay material, (4) blanket the exposed surface of the silty clay with a catalytically blown asphalt and provide over the asphalt a three-zoned multi-layered, inverted filter of selected sands, gravels and cobbles, (5) soak with water for a limited time the newly installed multi-layered bottom, (6) using native silty materials, construct an impervious layered core trench 10 ft. deep by 10 ft. wide located around the inner toe of the slopes and with the same material continue up the inside slopes with a 6-ft. thick layer, (7) blanket the surface of the core trench material and the new impervious layer of the inner sloping surfaces of the reservoir with a catalytically blown asphalt membrane, and (8) cover the membrane with the three-zoned inverted filter for slope protection from wave action (see drawing).

For stabilizing the foundation materials underneath the embankments, a series of soaking ponds were constructed around the outside of the reservoir by Navy personnel and equipment. These ponds varied in size but were about 100 ft. long by 50 ft. wide and 2 ft. deep. They were diked with small levees of compacted mixtures of silt and clay. Water was introduced into the ponds and reservoir and held at a safe level.

As planned the huge seepage losses into the foundation materials caused the embankments to settle and crack. The greatest settlement, recorded April 1955, was 8.7% of the original height of fill, or a total of 3.3 ft. The purpose of the soaking period, which lasted for about 1½ years, was to compact or densify the materials by settling the foundation materials with water. Later the cracks were sealed by washing and grouting the openings with a thin silt slurry.

After removal of the original asphaltic concrete lining and excavation of 7 ft. of unsuitable native materials from the bottom of the reservoir, the bottom area was soaked by flooding with water for eight consecutive days. The Utah Construction Co. performed this work, and following the drying and compaction of the exposed surface, the contractor began construction of the new multi-layer bottom. (See drawing.) The lower section of the bottom (Zone IV material) was a selected blend of silty-sand and clay soil. All material was deposited in 6-in. horizontal lifts and compacted by rolling to 90% optimum unit dry weight of the blend; this section has a total finished thickness of 3 ft.

The next operation sealed the surface of Zone IV with a blanket of catalytically blown asphalt. The construction continued with the installation of three additional zones of other material for a filter of graded sand, gravel and cobbles over the asphalt; Zone III is a 12-in. layer of silty sand placed directly on the asphalt membrane; Zone II contains sandy gravel material about 12 in. thick; Zone I, a 2-ft. thick layer, is cobbles with 100% of the material passing a 9-in. screen.

The sieve analyses for the important Zone III and Zone IV material follow:

ZONE III

Passing	Percentage
½-in. screen	100
#4 screen	70-100
#50 screen	30-70
#100 screen	20-35

ZONE IV
Blend of Clay and Zone III

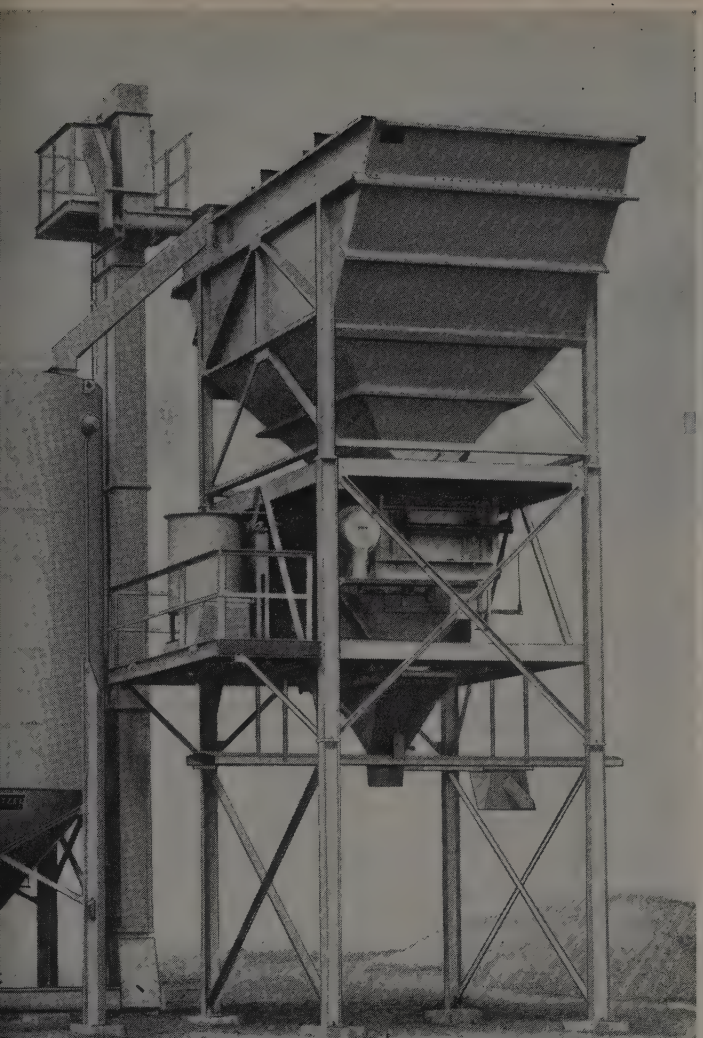
Passing	Percentage
½-in. screen	100

17% to 25% clay and 75% to 83% of Zone III material
Clay: Min. Liquid Limit 100
Min. Plastic Index 60
Min. 60% Passing 0.005 mm screen size

Following installation of the new bottom, water was admitted to the reservoir in controlled amounts and maintained at a specified depth while a holding test program was performed to measure the effectiveness of the new multi-layer bottom. The test data obtained from the moisture reading instruments embedded throughout the reservoir indicated that the multi-layered bottom was a complete success in stopping water from seeping downward below the asphalt membrane. The holding test was done by Navy forces.

The next step in construction of the reservoir was the award of a contract July 1956 to Thayne Construction Co. for placing a new multi-layered lining of sand, gravel and cobbles on the inside sloping surfaces of the reservoir. (See drawing.) The work included removing the balance of the original asphaltic concrete lining on the slopes, removing portions of zones materials at the toe of the slopes, and removing portions of the original

(Continued on page 50)



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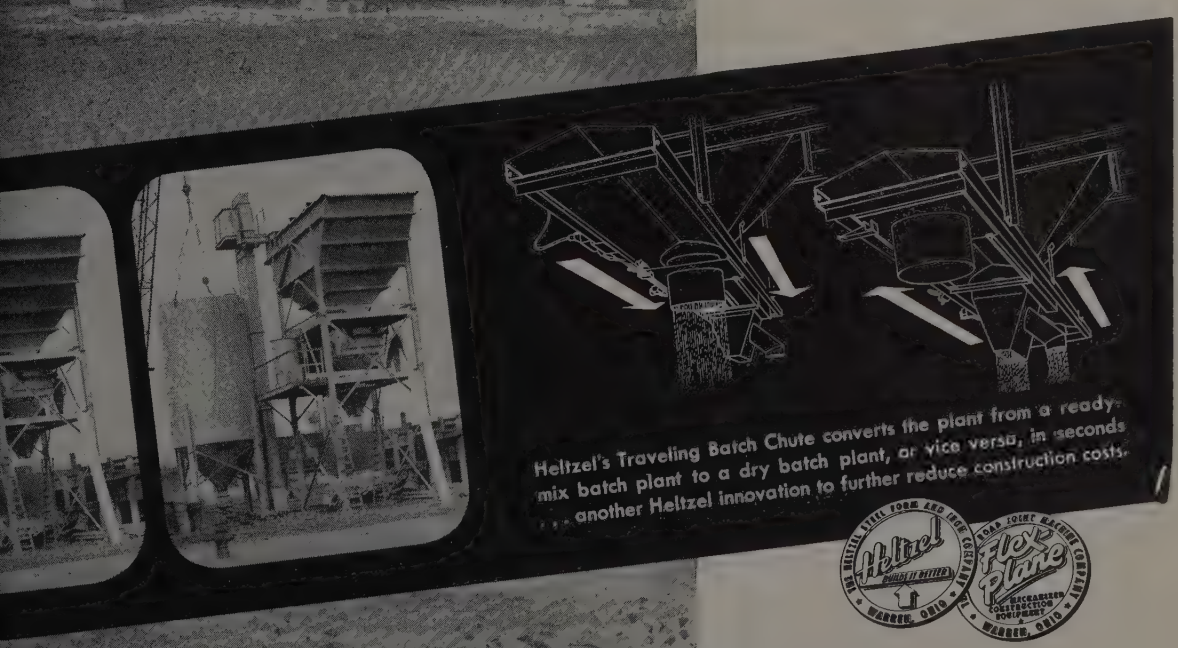
What's more, this is a Heltzel plant in every way. At no point in its design or construction did the engineers sacrifice Heltzel quality. In fact, because scales, batchers, etc., are factory assembled, it's exactingly accurate and extremely fast—the finest engineered portable batching equipment developed to date. Make sure you have all the information on this time-saving packaged plant before you buy your next unit.



HELTZEL STEEL FORM AND IRON CO. WARREN, OHIO

. . . for more details, circle No. 26 on Reader Service Postcard

NAVY FORCES developed this system for screening clay to minus ½ in. Powered by air a regular concrete vibrator was mounted on the sloping screen which was fastened to the truck. Loads were tail-gate spread on the floor of the test ponds.

embankments and the native undisturbed materials on the hillside of the reservoir. Excavation of these porous materials was preparatory to the construction of an impervious core trench located around the inner toe of the slopes, the extension up the slopes of the catalytically blown asphalt, and placement of the multi-layer filter on the slopes.

Silty material used for backfilling the core trench excavation replaced portions of the existing zones with an impervious soil section and also replaced the porous materials encountered on the inner slopes.

In all, 36,000 cu. yd. of silt were required. This material was obtained from a borrow pit located on Navy property about 12 mi. from the job. The fineness characteristics of the dry silt required careful transportation handling; at the job site where the material was stockpiled, quantities were lost due to strong winds.

Since the contract specifications directed that the screening and blending of the silt with water must be accomplished at a location other than at the excavated core trench site or on the inner slopes, the contractor constructed a special screening rig. The equipment was located on top of the reservoir embankment. The stockpiled silt was bulldozed into hoppers located above the screens; they removed any rocks, silt lumps or vegetable matter. Immediately after passing through the vibratory screens, the falling silt was wetted with water emitted from spray nozzles. The moist material accumulated on a moving inclined conveyor belt which extended downward to the excavated core trench. At the end of the belt assembly a large box was constructed for the purpose of temporarily holding the silt as it was deposited from the moving conveyor.

The Zone V material was transported and spread in the trench by scrapers. The scrapers were loaded at the conveyor box and then driven around the perimeter of the trench bottom spreading the silty material as specified. A road grader mixed and maintained each lift thickness.

Compaction of this silty material was obtained by using four sheepsfoot rollers pulled by a D-8 tractor. In addition the other equipment, traveling in a train-like position, increased the degree of compaction. Field density tests for controlling the compaction effort were usually made during equipment maintenance periods and at noon. At least one field density test for each 1,000 sq. yd. of each lift, and a minimum of one sample of the silt per each 1,600 sq. yd. of each lift was taken. Many additional tests were made for the trench. With the completion of the installation of the impervious Zone V material, its surface was rolled for preparation of the application of the asphalt membrane.

The catalytically blown asphalt membrane was applied on the surfaces of Zone IV and V in two applications. The first application was placed at a rate of about 1 gal. per sq. yd. and the second coat at 0.7 gal., with the finished sheet not less than ⅛ in. thick. The asphalt was trucked directly from a refinery near Los Angeles on a critical time schedule to arrive at the site with the temperature suitable for application. Subsequent to the application of the membrane it was checked with the customary "holiday" detector.

Zone III, referred to as the transitional material of the inverted filter, is a 12-in. layer of silty sand. This sand was carefully placed over the membrane. The next layer, Zone II, is 12 in. of sandy gravel material. And the final Zone I material, gravel and cobbles, covers the bottom and the inner slopes.

Zone IV material, which is a uniform blend of clay, and Zone III, was dry mixed with a road grader on a level area adjacent to the reservoir. Prior to its transportation and placement sufficient water was added to bring the moisture content to 1½%, or more, above optimum for the greatest degree of compaction. Zone IV material was compacted to 90% of the relative maximum density. Each layer of the Zone III material was compacted to 95%. The degree of compaction of the Zone II material was 95%. The top cover of cobbles was placed over the reservoir in one lift and compacted in two coverages with an empty roller with approximately 15,000 lb. per wheel.

Quantities of material required to replace and complete the reservoir are: 36,000 cu. yd. of Zone V, 7,400 cu. yd. of Zone III, 9,500 cu. yd. of Zone II, and 36,000 cu. yd. of Zone I. The reservoir required 168 tons of cat-blown asphalt.

It required 45 days to fill the reservoir and the water was successfully held for 120 calendar days. During this time surveys were run to check all bench marks and note any subsidence of the native fluvial materials. There was none. It was then emptied and again checked for stability throughout its floor and embankments. Today, the reservoir, generally referred to as "Black Beauty", is filled and functioning as planned; the achievement of Navy engineers, their contractors, and advisory agents of the government.

George Miller and the Miller Construction Co., and the following general superintendents, R. J. Laird for Utah Construction Co., and Noel E. Gold for Thayne Construction Co. directed the construction work.

Construction of the reservoir at the Naval Ammunition Depot, Hawthorne, was under the field supervision of Commander C. F. Mobley, Resident Officer in Charge of Construction, and Dan Hanify, Supervisory Construction Management Engineer.

THIRTY-FOOT wall of digester in the background was formed with Symons panels, using small filler strips to secure circular pattern.

Inside form set without bracing allows reinforcing steel to be placed at fast pace. Outside form was then set and ties quickly placed.

Fast forming speeds sewage plant

Ease of form handling for 30-ft. high walls of digester is key to job at Phoenix. Only 16 days required to complete all concrete work on two largest units.

ONE OF the speediest sewage treatment plant projects ever undertaken in the Southwest is nearing completion near Phoenix, Ariz., with the aid of a lightweight plastic-coated concrete forming system. F. H. Antrim Construction Co. of Phoenix favorably surprised City officials and consulting engineers by breezing through the digester and trickling-filter concrete in only 16 working days. And the 91st Avenue Sewage Treatment Plant is not a small affair. Its capacity is rated at 5 mgd. It has a 700,000-gal. digester.

F. H. Antrim, president of the company, credits the performance partly to experienced men, and partly to the forming system. "One of the best things about our forms is their ability to be set in place without trouble, stripped the same way, and moved over to the next pour without having to fight the panels. They gave no difficulty whatever."

When Antrim landed the $528,000 treatment-plant contract, he studied merits of several forming systems, and also considered the cost of building his own forms with a carpenter gang. Building with his own force was ruled out, because of its greater cost, and Antrim also explained an intangible factor that was important to him.

"We're a new company . . . only four years old. We like to push a job fast if it's possible to speed it up at all. If you save a month or two in construction time, it lets you bid on something else that much sooner. It's hard to calculate an advantage like that in dollars and cents but it's very real, just the same."

After considering several types, Antrim selected 15,500 sq. ft. of Symons lightweight plastic-coated Steel-Ply panels. Weighing 5 lb. per sq. ft., these panels consist of plastic-sealed, high-grade plywood, fastened to steel stiffening members. One of the factors in the decision was the ability of the forms to be erected on one side of the circular tanks without installing ties immediately.

It was a decidedly important factor in the digester construction, for example. Reinforcing-steel workers had a clear and unimpeded opportunity to place their material without walking on, or tying their steel, to the form ties. Only after the outer wall forms had been put up were the ties installed. And, since the form panel holes were clear of steel reinforcement, this was a trouble-free operation.

Designed by John A. Carollo, consulting engineer of Phoenix, the modern plant has provisions for future expansion when the area it serves increases in size. The plant consists of a digester and integrally constructed pumphouse, primary and secondary sedimentation tanks, a trickling filter, sludge beds, plant piping and influent-effluent concrete pipe construction. Chlorinated, clear effluent water is to be piped to a nearby stream for ground water recharging.

The 66-ft. diameter digester has 30-ft. walls 18 in. thick. Since it was desirable to construct the wall monolithically without construction joints—a digester is a sealed pressure vessel — it was necessary for Antrim to form and pour 365 cu. yd. in one run on this unit. The 125-ft. diameter trickling filter, 5 ft. tall, also had some fairly sizable concrete work.

In ordering the forms, Antrim had specified 2-ft. wide panels in 4, 5 and 6-ft. lengths. They were bought through Border Products of Phoenix, headed by John A. Van Der Werf, Symons form and hardware distributor. The material was shipped by rail from the Chicago plant to a point 1½ mi. from the plant site. It arrived on exact schedule which was important because Antrim had decided to push concrete work as fast as possible, and a target day had been set.

There was only minor grading of easy-to-dig material, carried out by two DW10's. Finegrading was done by a dozer and tractor shovel. The floor slab for the digester then was formed, steel set, and the slab placed direct from truck mixers, or by 1-yd. transfer bucket handled by a Michigan T-24 truck crane.

The digester floor slab was finished with a formed construction

(Continued on page 56)

A SURE-FIRE SUCCESS FORMULA!

The Cunningham Construction Company is proud of its reputation for high-production earth moving. Says Don Cunningham: "The combination of Allis-Chalmers' productive machines and a first-rate operating crew, teamed with the excellent service our dealer provides, amounts to *an unbeatable formula for sure profits in this industry.*"

The equipment spread includes four Allis-Chalmers motor scrapers—two TS-360's and two TS-260's—plus five turbocharged HD-21 crawler tractors. Two of the tractors are used as pushers, one as a dozer. Another HD-21 tows a four-gang sheepsfoot roller and the fifth pulls an 18-yd scraper. An Allis-Chalmers FORTY FIVE motor grader levels fill, keeps haul routes smooth for high-speed scraper cycles.

The flood control job consists of building two dams and diversion dikes, moving an estimated 325,000 cu yd in the Dona Ana area north of Las Cruces, New Mexico. Working a 54-hour week, the 10-man crew moved nearly 200,000 yd in the first 4½ weeks. This impressive volume brought construction people from all over Texas and New Mexico to see the spread in action.

Don Cunningham, veteran of more than 30 years in earth moving, points out that such performance is a powerful factor in bringing in more construction jobs.

They cut flood control jo

with Allis-Chalmers construction machine

Don Cunningham Construction Co.—with a crack crew a fleet of Allis-Chalmers construction machines—have set an standing record on a New Mexico soil conservation job. T completed a flood control project scheduled for 180 days in It involved 325,000 yd of earth fill.

Don Cunningham gives major credit to his Allis-Chalm fleet—motor scrapers, crawler tractors and motor grader. convinced that top machine availability and extreme eas handling are the big reasons why men and equipment were to maintain the record pace. Cunningham estimates profi this contract will be 20 percent greater than figured in original bid—a hefty bonus on any job!

ARIZONA
Neil B. McGinnis Equipment Company—Phoenix

NORTHERN CALIFORNIA
Industrial Tractor Sales—North Sacramento
Shasta Truck & Equipment Sales—Redding
West Coast Engine & Equipment Company—Berkeley, Branch: San Jose
Trinity Tractor Company—Eureka

SOUTHERN CALIFORNIA
Construction Machinery Co.—San Diego
San Joaquin Tractor Co.—Bakersfield
Shaw Sales & Service Co.—Los Angeles

IDAHO
Southern Idaho Equipment Co.—Idaho Falls and Twin Falls
Southern Idaho Equipment Co. of Boise, Inc.—Boise

MONTANA
Mountain Tractor Company—Missoula and Kalispell
Seitz Machinery Company, Inc.—Billings and Great Falls

NEVADA
A D Machinery Company, Inc.—Elko and Las Vegas
Reno Equipment Sales Co.—Reno

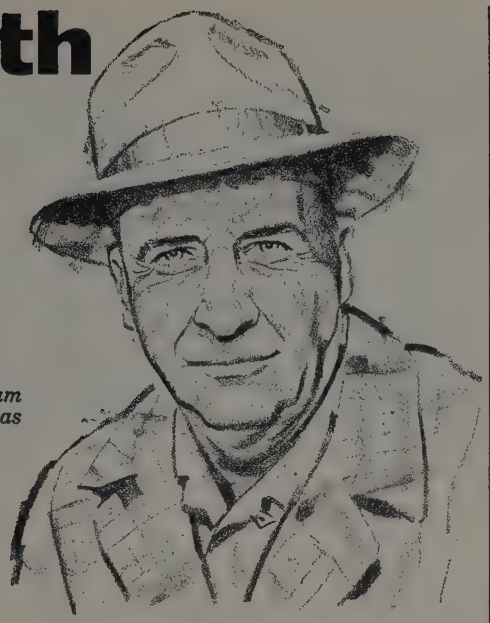
OREGON
Haupert Tractor Company—Medford
Wood Tractor Company—Portland
Timber Tractor Company—Springfield

UTAH
Cate Equipment Company, Inc.—Salt Lake

WASHINGTON
Pacific Hoist & Derrick Company—Seattle &
American Machine Company—Spokane

WYOMING
Studer Tractor & Equipment Company—Cas

6-month to 2½



Don Cunningham
El Paso, Texas

Four Allis-Chalmers motor scrapers, push-loaded by 225-horsepower turbo-charged, torque converter-equipped HD-21's, moved nearly a quarter of a million yards the first month, helped boost profits 20 percent for the whole job.

PREVENTIVE MAINTENANCE PAYS OFF AGAIN!

Chief mechanic, "Snuffy" Oliver, and his assistant have an effective preventive maintenance program, including daily inspection of tracks, fan belts, blowers, turbochargers, cables, clutches.

This regular maintenance keeps Cunningham's Allis-Chalmers fleet in first-class condition. Daily lubrication, servicing and inspection requires about 20 minutes a day for each machine. No other time was lost during the nine-hour working shift.

Compacting scraper-hauled fill, big HD-21 crawler tractor tows four-gang sheepsfoot roller.

The easy-service design of Allis-Chalmers crawler tractors, motor scrapers and motor graders speeds the preventive maintenance routine. For example, truck wheels, idlers and support rollers need lubrication only once every 1,000 operating hours. Time-saving convenience like this keeps every machine ready for action.

Whether your operations call for one unit or a fleet, you can get high production like this. Your Allis-Chalmers dealer will recommend the right equipment for your jobs—from a complete line of up-to-the-minute construction machinery. See him now and ask for a demonstration on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee, Wisconsin.

Look ahead...*move ahead*...and stay ahead with ALLIS-CHALMERS

. . . for more details, circle No. 29 on Reader Service Postcard

(Continued from page 53)

keyway, a copper water-stop to form a continuous seal between floor and walls, and 7/8-in. dowel reinforcement sticking up at 4-in. centers. The floor slab work was handled by only two carpenters.

The contractor immediately hired six more men to reach his carpenter peak of eight. The form panels quickly began to go into place. The digester was planned for three 4-ft. form lifts, and three 6-ft. lifts to form the digester's entire 30-ft. height.

The inside circular wall was set up first with continuous panels, whose flanges were snugged against small filler strips which developed the desired circular pattern. When the steel men had finished setting the reinforcement, the carpenters concentrated on erecting the outer wall panels, using the same system and the same size forms.

Every fourth panel was left out of the exterior walls to form pouring doors. When concrete levels reached these doors, the panels were set in and secured.

The form panels were fastened together with form ties and wedges. And, after they had been completed, Symons steel ties on 2-ft. centers held the forms together from spreading either way. These ties are good for working loads of 3,000 lb. each, adequate for heavier than average pours if concrete is handled with any degree of care.

Ten days from the time wall forming began, the digester had been completed.

The digester pour was made with bracing on only one side of the wall forms. A bracing tower was constructed and set in the digester's center point. A double 2x4 vertical stud was placed around the form panels on 10-ft. centers. Single 2x4 kicker braces then led from the forms back to the bracing tower, bearing on the tower at elevations calculated to equalize the load. Three rows of kicker braces were used, one near the top of the forms, one at the base, and one about halfway up. It was fully adequate, and the high pour was made monolithically without any wall deflection. Scaffold braces, an integral part of this forming system, interfered not at all with the internal bracing.

The large scale digester pour took only 10 hr. of actual placing time, loading the structure evenly with 3-ft. lifts, continuously placed around the perimeter. Antrim's new Michigan crane and a rented Lorain MotoCrane both used 1-yd Gar-Bro transfer buckets to place the upper portion of the structure. The lower 6 ft. was placed direct from the truck mixer chutes, which were hauled from the plant of Union Sand & Rock Co.

Vibro-Plus and Mall vibrators were used through the doors to give the concrete proper consolidation. After the forms were stripped, there was not a single rock pocket.

While the digester was being formed, two men moved over to form and pour the filter slab. Then just as soon as the digester pour was finished and cured, the digester forms were stripped and moved over to form the filter walls. In only 16 working days from the time concrete work began, everything in the two largest units was done so far as concrete work was concerned. Work continued at a speed that finished all concrete work ahead of Antrim's own ambitious schedule.

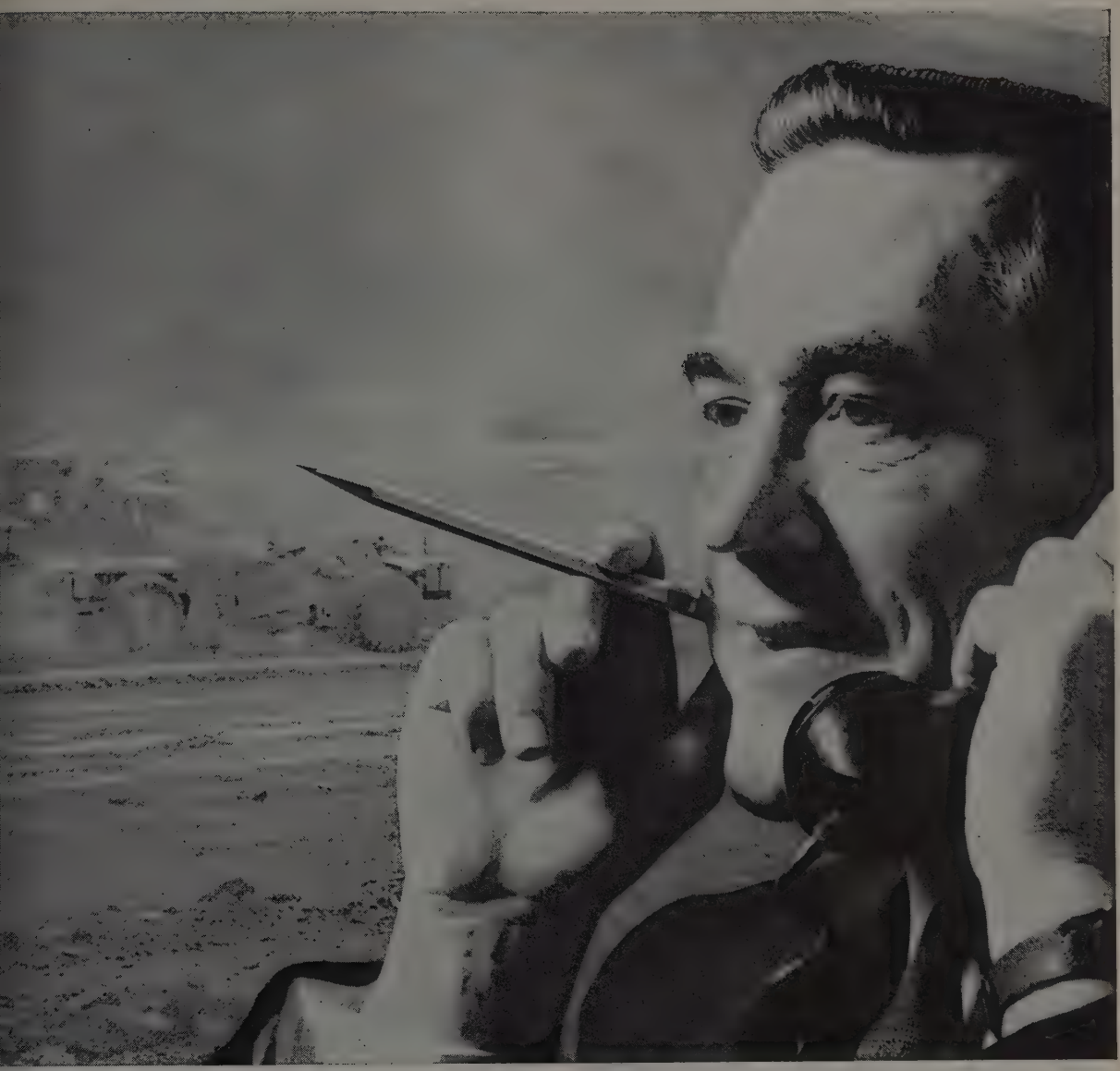
Antrim, who had contracted for the forms on a rental basis with an option for purchase, added up all the advantages when the job was nearing completion and purchased 14,000 sq. ft. of the panels. These forms are now in use on the football stadium at Arizona State College at Tempe, where battered curved walls 6 ft. higher than the digester pours will outline a playing field for a 30,000-capacity stadium. Antrim expects to get at least 100 uses before the plywood facing will be turned or replaced.

F. H. Antrim personally headed up all operations for his company assisted by Ed Shaifer as project manager. J. R. Hazelwood was in charge of field work at the treatment plant.

SAME FORMS used for the circular structures are now being set for other units of the plan Panels in 2-ft. widths provided flexibility in forming all structural units.

DIRECTING THE operations on the job were (l. to r.): Ollie Shullenbarger, superintendent; F. H. Antrim, president of F. H. Antrim Construction Co. of Phoenix; Kenneth Carlson, concrete foreman; Wayne Holland, carpenter foreman; and Ed Shaifer, project manager.

The man with the sharp pencil picks Firestone!



SHOCK-FORTIFIED TIRES MADE WITH FIRESTONE RUBBER-X REDUCE DOWNTIME LOSSES!

On earthmoving equipment from scrapers and belly-dumps to hauling trucks of all kinds, Firestone Off-the-Highway tires are delivering new lows in tire cost-per-hour! The two big reasons are Firestone Rubber-X and Firestone S/F (Shock-Fortified) Nylon cord! Combined with Firestone S/F Nylon, Firestone Rubber-X puts extra stamina and strength into every Firestone tire! Tough Firestone treads and sidewalls defy cuts in the roughest going. Firestone S/F Nylon bodies shrug off bruising shock and impacts. Count on Firestone Off-the-Highway tires to turn downtime losses into worktime profits! Call your Firestone Dealer or Store for tires or tire service.

Super Rock Grip Rock Grip Excavator® Rock Grip Excavator® W.B.

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WHEN ORDERING NEW EQUIPMENT ALWAYS SPECIFY FIRESTONE TIRES.

Enjoy the Voice of Firestone every Monday evening on ABC television

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UNDERWATER TV— Modern construction tool

By JOSEPH GRANVILLE
Underwater Surveys
San Diego, California

UNDERWATER TELEVISION, a relatively new working tool for engineers and contractors, provides the distinct advantage of permitting first-hand observations of subsurface conditions and problems. Previously, all of this information had to be relayed to the engineer from divers, and this represented a weak link for engineers and supervisory personnel. A further important advantage compared to the restricted working time necessary for divers is the continuous observations that can be made by television. One of our underwater televising systems operating from a ship at sea in 356 ft. of water was in use without a stop for 9 weeks.

Present underwater television cameras are as rugged as they are versatile in operation. For example, a camera can be fitted onto a clamshell bucket or 8 ft. above magnets for recovery of scrap from the ocean, or can be sent down a divers shot-rope for inspecting the bottom. Different types of frames have been designed for tows to overcome the problem caused by suspended material in the water. Adjustment of the relationship between light and the optical axis of the camera results in picture improvements.

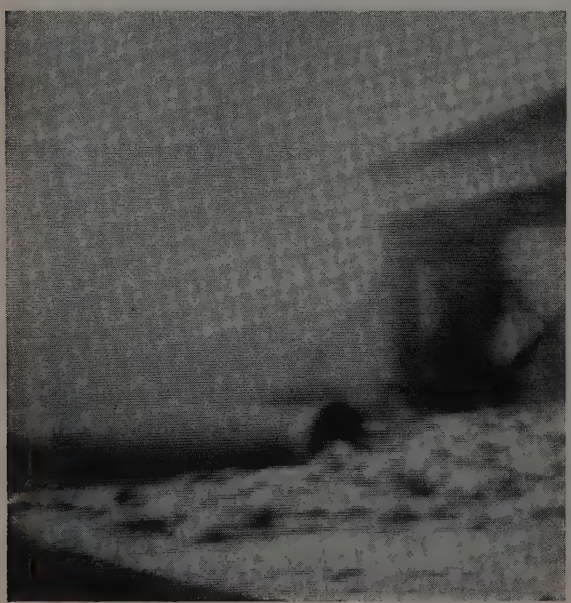
In a recent job a television camera was used effectively during construction of a missile base at sea. First use of the camera was to assist in the survey of the ocean floor to select the best site. With a good underwater television system, and resulting sharp picture details, a geologist can identify rock outcroppings. The two required conditions in securing such important information are clear water and a lack of marine growth. The 3,000,000 candle power underwater light which has been developed by the company has been a great help in such work.

During construction the engineer in charge was able to secure a true picture of the condition of the ocean floor. This was possible by the skill which has been developed in using the proper angles between light and camera.

Details of construction during the foundation work could be observed as they progressed. The grout injected into the rock on the inside of the caisson could be observed as it began to fill the openings. As each opening was filled to the top it was possible to observe the grout rising slowly like a tenuous cloud. Such observations made it possible to determine when a satisfactory fill had been completed. The injection pipe had its outlet 9 ft. deep into the rock.

On this particular job many divers were employed during the assembling of the various parts of the missile base on the floor of the ocean. The underwater television camera proved most helpful to the head diver in anticipating the materials to be required. This saved considerable diver time and provided smoother operations during foundation work.

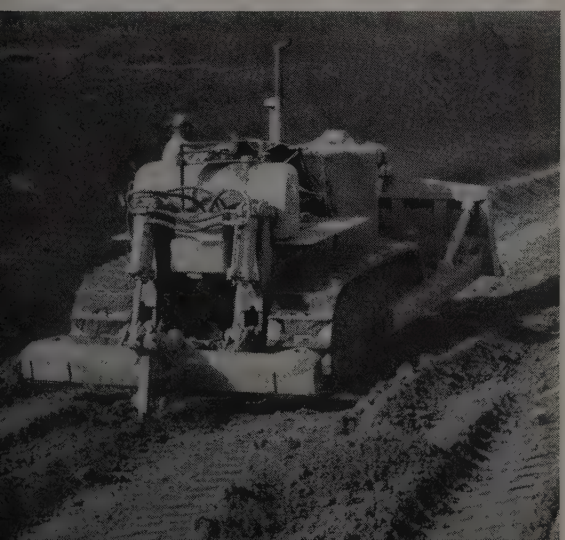
Probably the more important factor was that the supervising engineers and the Navy were particularly pleased to have their eyes give them first hand information on what was going on. Otherwise it would have been necessary to have reports of the work relayed to them from the divers. Men with long experience in underwater work are particularly pleased with this modern procedure, feeling for the first time that they have accurate information which is first hand. These engineers are now permitted actual inspection which gives them a variety of information including the extent of marine growth, rock contours, deposits of loose material, inspection of the work as it progresses, detailed views of critical points, the degree of deterioration in a structure and other factors. Such direct information has the further advantage in making it easier to reach agreement between contracting parties as to work required or results obtained.



PHOTOGRAPHS of a TV picture taken inside caisson showing: (left) tubular guide for cable and (right) foundation material with black hose used to inject cement grout.

FAST CYCLE TIME *depends on swift, sure loading. Here a Cat D8 Tractor push-loads a DW15-No. 428 Tractor-Scraper combination. LOW-BOWL design assures a full load at every pass.*

REAKING UP ROCK *is this D8, equipped with No. 8S Bulldozer and No. 8 Ripper. The high-speed haul roads sed by the tractor-scrapers are maintained by a Cat Jo. 12 Motor Grader.*



"CATERPILLAR EQUIPMENT *gives us low-cost operation and low maintenance," says owner Noland Smith. "Add to this easy loading and speed in hauling and you have top production."*

WESTERN CONSTRUCTION NEWS

California distributes record funds to cities

A RECORD total of $30,427,652 in California gas tax revenues has been apportioned to 351 cities in the state for city street work and engineering during the current fiscal year. This is more than $1,000,000 over last year's record of $29,219,479.

This gas-tax distributed to cities for street work is the revenue from 5/8¢ per gal. out of the state gasoline taxes paid by highway users. It is apportioned by the Division of Highways according to law on a population basis.

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 to a maximum of $20,000 for cities with more than half a million people.

As in previous years, Los Angeles tops the list in the amount of money received with a total of $6,747,957. Amador, the smallest city in the state, is again at the bottom with a total apportionment of $1,452.

This money allocated to cities is in addition to the funds spent on state highways within cities and included in the state highway budget. Under certain conditions, however, the city may, in cooperation with the state, spend portions of these funds on a state highway. State law requires cities to spend at least 60% of the gas-tax apportionment for construction on streets included in their major street system.

U. S. Forest roads funds allotted to Western states

FUNDS for highway improvement in the U. S. National Forests have been allocated by the Department of Commerce for the fiscal year which begins July 1, 1959. These funds were authorized in the Federal Aid Highway Act of 1958 and they will be administered by the Bureau of Public Roads under the direction of the federal highway administrator.

Apportionment among the states, under the law, is the same as for the 1958 fiscal funds which were in proportion to the area and value of the land owned by the Federal Government within the National Forests of each state.

Funds apportioned for the Western states are:

State	*Apportioned*
Arizona	$1,857,456
California	4,726,004
Colorado	2,369,837
Idaho	3,359,886
Montana	2,630,481
Nevada	591,970
New Mexico	1,322,331
Oregon	4,545,904
Utah	1,095,914
Washington	2,293,608
Wyoming	1,407,712
Alaska	2,876,474

Wanapum Dam project advanced

THE WANAPUM DAM on the Columbia River, to be built by the Grant County Public Utility District, has moved another step towards active construction with Harza Engineering Co., authorized to prepare detailed plans. The same PUD is at present building the Priest Rapids project. Bids for the Wanapum Dam may be called later this year, and plans call for the job to be let in a single contract which would include power generating equipment as well as construction.

Washington highway contracts running 52% ahead of 1957

DURING the first half of 1958 contract awards by the Washington State Highway Commission exceeded $41,000,000 which was a new high for this period of time. The figure was 52% higher than the volume of contracts awarded during the same period in 1957.

By the close of 1958, according to William A. Bugge, director of highways, contract awards are expected to total about $85,000,000 for the year.

The Bureau of Public Roads has commended Washington on its progress in expediting the program.

R. F. Blanks dies at 57—noted concrete authority

R. F. BLANKS, one of the best known concrete technicians of the Nation and vice president and general manager of Great Western Aggregates in Denver, died at his Denver home, July 14, following a heart attack, at the age of 57. At the time of his death Bob Blanks was the operating head of Great Western Aggregates, a subsidiary of Ideal Cement Co., and also acted as a research consultant for the cement company. His connection with Ideal started 1951.

Prior to that date he had been with the U. S. Bureau of Reclamation for about 20 years, concluding this service in the position of Chief of the Research and Geology Division. During these years he had initiated and directed extensive research into all phases of cement and concrete technology, with emphasis on low-heat cements and the placing of mass concrete, which were essential elements in the design and construction of Hoover, Grand Coulee and Shasta dams.

Blanks held memberships and was active in many technical organizations, having served as national president of the American Concrete Institute and as president of the Colorado Society of Engineers. He was a member of the American committee on the International Commission on Large Dams. He contributed technical articles to many engineering publications including WESTERN CONSTRUCTION.

1565 CFM OF 110 LB. AIR FOR BRIDGE CLEANING: Runnels Industries used these 3 Jaeger rotary compressors (two 600's and a 365), connected to a 3″ air line, to supply twelve 5/16″ sandblasting nozzles spread out over a mile along Tacoma Narrows Bridge, Washington. They operated 10 hours a day at 110 lbs. pressure. Under such full loads, the 100-150 rpm slower speed of Jaeger compressors saves fuel and wear and tear on engines every day you work.

3 COST-SAVING IDEAS ON ONE JOB: This job, by Rambore, Inc., drilling specialists, was 280,000 cu. yds. of rock, mostly granite, in depths to 40′, on Massachusetts' Southeast Expressway. One of their good ideas was to hook up their drills and compressors through 1500′ of easily portable 5″ aluminum pipe. This saved frequent moving of compressors over rough terrain. Secondly, they used 4″ drills with 12-edged bits made to their special design for hard rock. Their third good idea was to power these 7 drills with 3 Jaeger Model 600 compressors, which deliver the same air at 1650 rpm that others produce at 1800 rpm, at a very substantial saving in fuel.

Using the same engine, Jaeger gives you 600 cfm of air at 150 rpm slower speed

You buy few items of equipment in which the superiority is so easily measured as in a Jaeger rotary compressor. For example: There are six 600 cfm rotary compressors on the market powered with the same GM 6-71 diesel engine. Five of these operate at 1800 rpm to produce rated volume. The sixth, the Jaeger, delivers the same volume at only 1650 rpm.

In one 8-hour shift this difference amounts to miles less engine piston travel, as much as 72,000 fewer compressor revolutions and a substantial saving of fuel. Jaeger 125, 250 and 365 cfm units, with 1700 rpm full load speed, are comparably efficient.

This explains why Jaeger users enjoy such low engine maintenance costs, and why many Jaeger rotaries have logged more than 8000 hours without a single vane replacement. Ask your Jaeger distributor for full data and demonstration . . . or send for Catalog.

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J. D. COGGINS & CO. . . . . Albuquerque
CASHMAN 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. 33 on Reader Service Postcard

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

PRECIOUS AUTUMN DAYS—Construction crews in the North are taking advantage of these precious autumn days which precede the season of ice, snow—and inactivity. Fewer hours of daylight, another talisman of approaching winter, tend to restrict construction activity. So it's full speed ahead in Alaska's Indian summer, characterized this year by an ample supply of rain in virtually all areas of Alaska.

SO LITTLE TIME—With so little time left for pushing forward Alaskan construction projects before the dead of winter, a union dispute is threatening to slow the wheels of progress—which must move smoothly and rapidly to meet the winter deadline. In the Fairbanks area, plumbers and contractors were deadlocked in a dispute over wages and hours. Federal labor mediator Albin L. Peterson is in Fairbanks at this writing attempting to iron out the differences—without results so far.

UNION'S DEMANDS—The union is asking a 35¢ an hour wage increase which would bring the wage of a journeyman plumber or steamfitter to $5.10 an hour. The union is also asking a 40-hour week and double-time for Saturday work. Gale Bennett, union business agent, said the request for 40 hours a week and double time was not meant for the purpose of improving conditions and pay, but to discourage overtime and thus employ more men. Bennett said that 196 out of the 316 members of the Plumbers and Steamfitters Local were unemployed before the strike started. Plumbing contractors say they cannot offer an increase of more than 15¢ per hour and are firmly against raising Saturday pay from the current time-and-a-half or lowering the 48-hour week. As each construction day grows shorter, Alaskans are watching the deadlocked union dispute which leaves the plumbers facing a winter of unemployment without the wages of summer to tide them over.

DAM SURVEYS BEGIN—No such difficulties as the above are holding up first surveys on the Cooper Lake hydroelectric project, a $12,000,000 power dam located 60 air miles southwest of Anchorage. Five surveyors started surveys in mid-July on the new project which will supply 15,000 kw. of power initially. Clyde Ardin, manager of the Chugach Electric Association, the cooperative which is building the project, says bids on the project will be called for soon.

TUNNEL JOB—One part of the Cooper Lake project calls for drilling of a 6,000-ft. tunnel from Cooper to Kenai Lake, which is 700 ft. lower. The powerhouse site will be on Kenai Lake. Engineering on the job is being carried out by the Portland and Anchorage firm of North Pacific Consultants for which Donald Hirschberger is an associate. Norman W. Haner is project engineer and Ivan Bloch heads the firm. It is expected that the project will be energized during the winter of 1960-61.

BUILDING BOOM — Typical of the boom in commercial construction in the nation's newest state is the new shopping center going up in the Anchorage suburb of Spenard. The $1,100,000 project is being built by Walter J. Hickel, young Alaska builder who became a millionaire during the post-war Alaska housing construction boom. A new branch for Alaska's largest bank—the First National Bank of Anchorage—also is planned as part of the center. Edwin B. Crittenden and Associates of Anchorage are architects on the new building.

NEW HOUSING—A number of new housing projects are mushrooming in Alaska, reflecting a continuing demand for new accommodations as population continues to grow. A typical housing project in the Anchorage area is the City View and Park South Addition project being financed by the National Bank of Alaska. Many of the homes have three bedrooms, fireplaces and basement recreation rooms. Prices range from $31,000 to $45,000. This project, incidentally, is the first housing enterprise of this scope to be financed by private Alaskan capital.

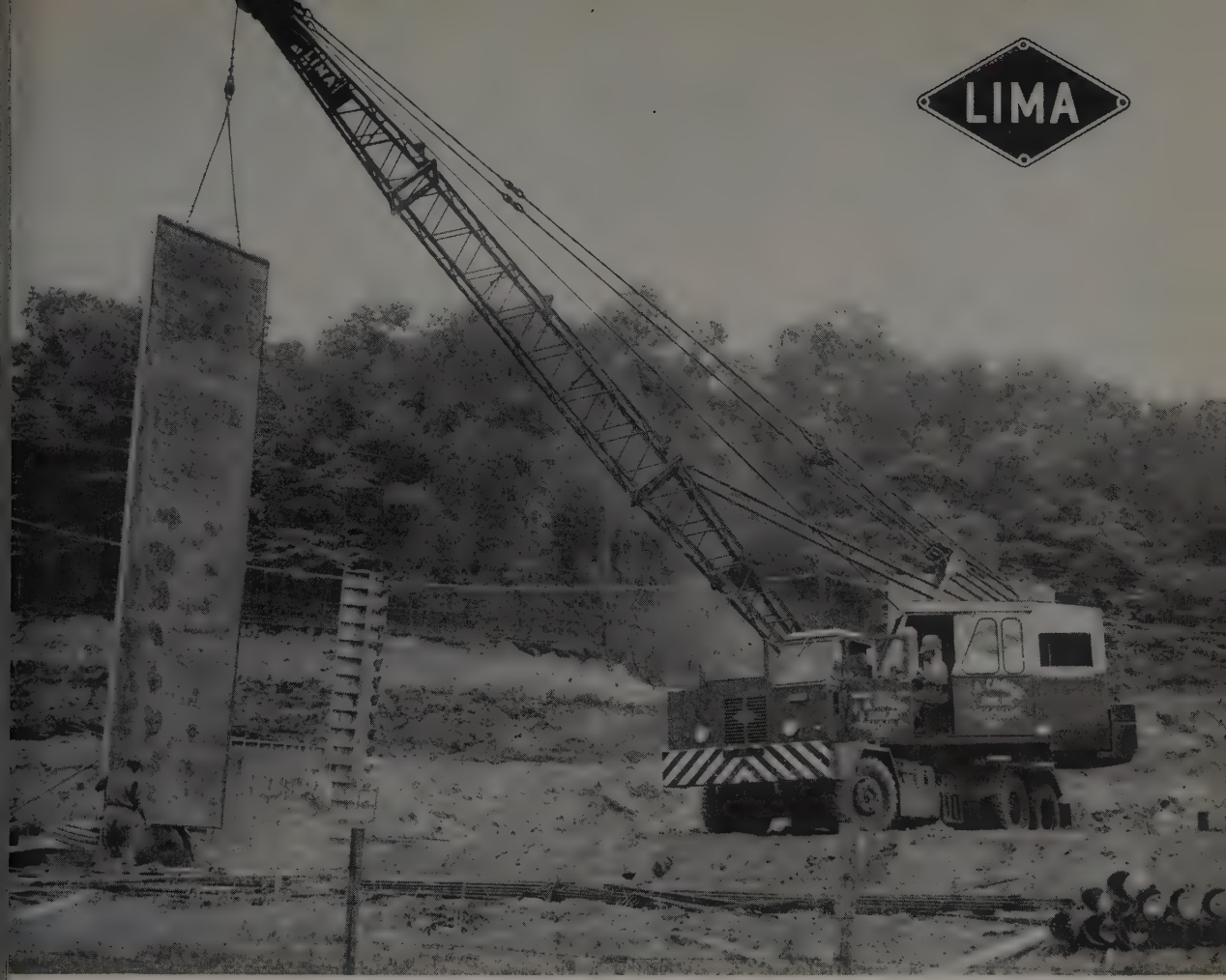
EMPLOYMENT REPORT—Only a mild increase was recorded in Alaskan employment over the past month according to the Territorial employment office. At the peak of summer construction, there were still 5,700 unemployed persons in Alaska. An index of the job picture this year as compared with last is the report from the Employment Service that although unemployment showed some drop this summer, in June it was still listed as 59% greater than June of 1957.

BIG SHEMYA PROJECT — Although exact details on the project still are hush-hush, the Alaskan Air Command has confirmed that a multi-million dollar Air Force project is scheduled at the Aleutian Island of Shemya. The project was described as being an "experimental air defense radar to be constructed in the area of the Dew Line." Newspaper reports to the effect that 600 men would be employed on the job still have not been confirmed. One published report stated that Bowen, Egge, Cummings and Koon and McLaughlin Associates had been engaged as the "preliminary contractor."

LABOR SURPLUS—Despite glowing reports of new government defense and missile projects, at least three major Alaskan cities remain concerned with the unemployment problem. The U. S. Department of Labor has classified Anchorage, Fairbanks and Ketchikan as "labor surplus" areas. The official designation was made because of the high rate of unemployment in these areas. When a city receives such a designation, business firms within the area become eligible for preferential treatment in bidding on government procurement orders.

AIRPORT CONSTRUCTION—A brisk program of construction is under way at 13 Alaskan airports, according to Eugene G. Roguszka, director of aeronautics for the Alaska Department of Aviation. The work is being done at Bethel, Dillingham, Hood Bay, Port Alexander, Port Althorp, Hydaburg, Haines, Hughes, Red Devil, Akiak, Kalskag, Tuluksak and Mekoryuk. Building or improving these airports will be covered by federal grants plus Territorial funds received from the three-cent-per-gallon tax on aviation fuels.

. . . for more details, adv. opp. pg., circle No. 34 on Reader Service Postcard



Lima Type 44-T Truck Crane setting concrete forms for overpass at Fort Washington Interchange of Pennsylvania Turnpike. Machine is owned and operated by F. A. Canuso & Sons, Philadelphia, Pa.

The LIMA Type 44-T... "a quality crane in every respect"

says F. A. Canuso & Sons, Inc.

"I've always had a high regard for Limas," says Julian Canuso of F. A. Canuso & Sons, Philadelphia contractors, "because of their fine design and rugged construction. We've had our Lima Type 44-T Truck Crane for 2 years now, and it has proved to be a quality crane in every respect. It's been kept busy during the past few months on this Turnpike job, mostly working on soft terrain, and we like the way it can get around and handle the heavy loads. Our experience with a real 'old-timer' will give you an idea why we think Limas have what it takes. About 5 years ago we bought a Lima Type 601 that had been working in the hard coal region for 10 years. To bring it up to date, we installed a new diesel engine, and we expect to get many more years of service from it. You just don't seem to be able to wear it out."

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HAWAII Report

By ALAN GOODFADER, Honolulu, Hawaii

STATEHOOD WHEN?—Hawaii's enthusiastic acclaim of the recent granting of statehood to Alaska has pretty well quieted here with the hopes of similar action on Hawaii's statehood petition apparently stalled for this year. Hopes are now pinned on promises of speedy congressional action next year to make Hawaii the 50th state. Although the Territory's construction industry is booming along at a capacity clip, there are those that say statehood could bring even more activity here. For instance, the Territorial Highway Department says local motorists send $2,000,000 in fuel taxes to the Mainland a year for federally aided defense road building. If Hawaii had voting representatives in Congress, at least some of that money might be spent at home, it is said.

BOOM OR BOOMERANG? — Construction men were warned here recently to beware of "overproduction." The warning came from James H. Shoemaker, Bank of Hawaii economist. He believes that the present construction boom will continue through 1959. But he also warns that the industry should be careful to "gear plans to the growth" of the Territory.

LABOR SUPPLY—Meanwhile, the industry continues to use just about every man it can get. The return of 1,000 construction workers from Midway, where they have completed a two-year Hawaiian Dredging & Construction job for the Navy caused hardly a ripple in the local labor pool. By fall or early winter all will be back to work, the Territorial employment service says. Many of the men are on vacations. At present, an estimated 11,000 workers are employed on Oahu projects, some 1,200 more than at this time last year and more than at any time since World War II. Although labor shortage predictions haven't come true yet, the Cassandras still are crying that the possibility exists.

VOLUME DOUBLES — Construction volume in the Islands for the first half of 1958 was more than double that of the same period last year, according to the General Contractors Assn. The association says the volume reached $125,800,000, compared with $60,900,000. Neither the 126-day sugar strike here nor the recession on the Mainland appeared to have any effect on the boom. Some $92,100,000 represented public works and armed services construction. Another $33,700,000 was the sum of building permits issued on Oahu. Not included in the total was $400,000 worth of Civil Aeronautics Commission work on Wake Island.

ACTION REQUESTED — Contractors on all Islands have asked the Territorial Contractors Licensing Board to curtail the activities of "weekend contractors" who allegedly are taking work away from lawfully licensed builders.

MISSILES COMING — The announcement here that Nike Missiles will be used by the Hawaii National Guard has clarified confusion here about some "secret" construction going on in the Islands. Location of the bases has not been made public.

AID FOR THE NEIGHBORS— William M. Wachter, Territorial highway engineer, has said it would be appropriate to use some of Oahu's regular fuel tax funds to build neighbor island roads if a proposed 120-mi. defense highway system is approved by Congress for Oahu. That way, the defense system would benefit all of the Territory, he said.

APPROPRIATION SLASHED — The House Appropriations Committee has slashed $5,000,000 in military construction for Hawaii but approved more than $4,000,000 in a bill now going through Congress. Cut from Defense Department requests were: some $2,800,000 asked for warehouse, engineering and shop facilities at Ft. Shafter; $2,600,000 for Ft. Shafter family quarters; $400,000 for Hickam Air Force Base officers' quarters and $85,000 from a $240,000 request for LST facilities at Kawaihae harbor. Included in the funds approved were: $1,300,000 for Schofield Barracks housing; $1,300,000 for docking facilities at Fort Island in Pearl Harbor; $839,000 for Midway Island construction; $515,000 for a Naval Reserve Unit structure for Honolulu; $371,000 for three National Guard armories including one each at Honolulu, Hilo and Lihue, and other miscellaneous projects.

CAPEHART CONTINUES — As the first families move into a recently completed $21,000,000 Capehart housing project at Schofield Barracks, work is to begin on $9,000,000 worth of Capehart housing at Hickam Air Force Base. Pacific Construction Co. is to build 600 units. More than 1,000 workers will be used on the job.

JET AGE ARRIVING—President Eisenhower's signature has given the green light for $14,000,000 worth of jet age construction at Honolulu International Airport. Work may start by October 1. Eisenhower signed a bill authorizing the borrowing of $14,000,000 by the Hawaii Aeronautics Commission. The work, scheduled for completion in 1961, will include a $7,000,000 terminal building, taxiways, ramps and other facilities. The Territory is already drawing specifications. The work will be in three phases: site improvement, more site improvement and the start of construction of buildings, and completion of the buildings and ground improvement.

TURNER GETS THE JOB— George J. Turner, project manager of the Hawaiian Dredging-Pomeroy-Kostner joint venture on Guam, will be project manager of the $18,000,000 Suez Canal widening project for Hawaiian Dredging, Standard Dredging of New York and Atlantic, Gulf and Pacific Co. Turner came here in 1950 from Morrison-Knudsen's West Coast operations. Pomeroy will participate fifty-fifty on Hawaiian Dredging's share of the job.

SEWERS NEEDED—The City of Honolulu should double its expenditures for sewer facility construction, according to Yoshio Kunimoto, City chief engineer. He wants the City to spend $5,000,000 a year for the next six years to prevent Oahu from "becoming overwhelmed by the rising tide of defective cesspools." Total cost of sewage jobs called for by Kunimoto is $42,000,000, with the rest of the money coming from federal aid and assessments.

This Cedarapids PORTABLE PRIMARY

12 YEARS ON THE JOB and still producing over 240 TPH with 60% to 70% crushing

THIS Cedarapids 2540 Portable Primary has shrugged off 12 years of rugged service in hard Wisconsin gravel and is still going strong. Last year, with a Cedarapids Master Tandem, it crushed around 205,000 tons, averaging 243 tons of ¾″ minus per hour, with 60% to 70% crushing. After a Cedarapids Vibrating Grizzly was installed, over 200,000 tons went through the crusher without the jaws being turned.

Performance like this proves why aggregate producers *expect more* from Cedarapids — *they get it*, in greater production, longer life, higher profits. And this is especially true of Cedarapids Portable Primaries which must handle the heaviest crushing loads.

A Cedarapids Portable Primary gives you so many other profit-advantages... you can crush 100% of pit run material; operate in pits considered exhausted or unworkable. You can turn your Cedarapids portable gravel plant, or any good make secondary, into a high capacity rock plant; work closer to the job to cut hauling costs. With a Cedarapids Portable Primary, you get the capacity and flexibility to handle a wider range of contracts.

In the complete Cedarapids line there are 17 sizes and types of Portable Primaries to meet every condition. Cedarapids Vibrating Grizzlies, Scalping Screens, and heavy-duty feeders like the Ground-Level Feeder shown above, are available to increase production and profit still more.

Your Cedarapids Dealer can help you choose the Portable Primary you need. See him today.

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Cedar Rapids, Iowa, U.S.A.

Jacobs Associates opens office in Australia

JACOBS ASSOCIATES, a Sa Francisco consulting firm speciali ing in work for construction organ zations, has recently established a office in Sidney, Australia, havin been awarded a contract for eng neering services in connection wit a water development program b ing carried out by the governmen of Australia.

J. Donovan Jacobs organized th present consulting firm severa years ago following many years o engineering work with large cor tractors in the West and other par of the country. The organizatio has been developed to specializ exclusively in the field of heav construction with facilities to carr out the design of special construc tion plants, cost estimating an other services for contractors. Th Jacobs group is also available fo assisting government agencies i the preparation of plans and spec fications in the interest of securin advantageous bids. Offices are a 503 Market St., San Francisco.

Kaiser and group get big contract in Australia dam

A $40,000,000 contract has bee awarded to a group headed by th Henry J. Kaiser Co., for additiona work on the Snowy Mountain hydro-electric project in Australia The project is located in Ne South Wales and is being carrie out under the direction of the Au tralian Snowy Mountains Hydr Electric Authority, which is some what similar to the U. S. Bureau o Reclamation. The work to be don will include a diversion dam 150 f high, 7 mi. of tunnel, and under ground power station with acces tunnels and appurtenant works.

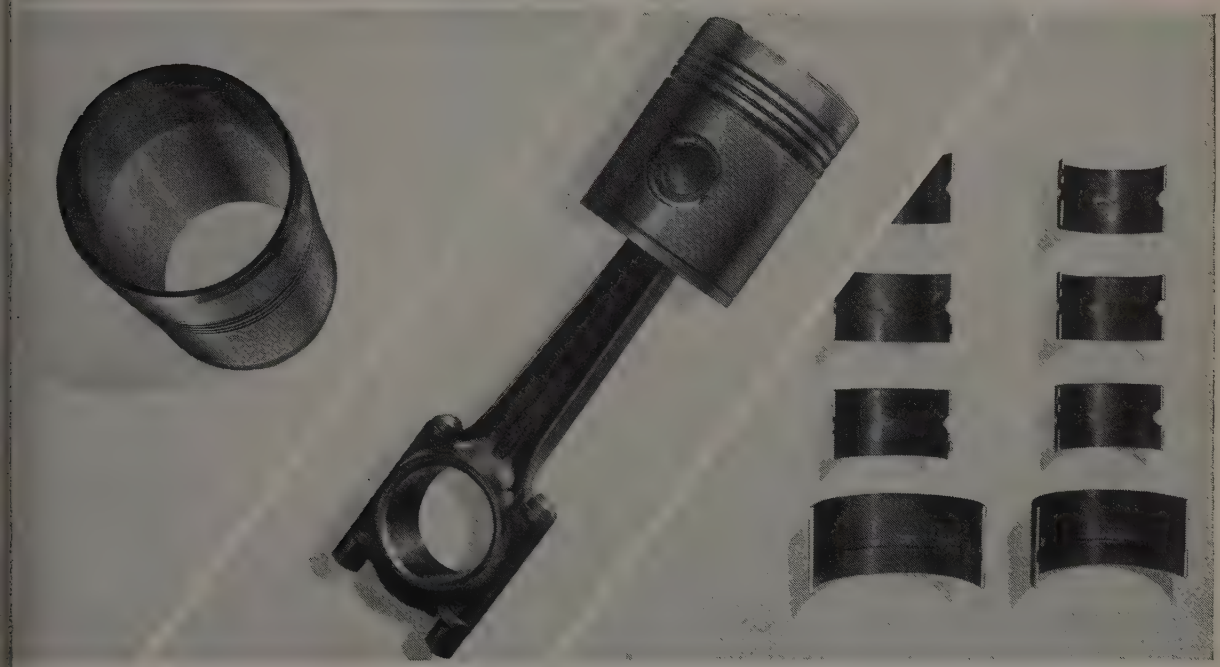
When completed the Snow Mountains development will mak available nearly 2,000,000 ac. ft. c water annually for irrigation, an provide approximately 3,000,00 kw. of hydroelectric power, whic will exceed the total generatin capacity in all of Australia today.

The joint venture group for th present contract includes in add tion to the Henry J. Kaiser Co Perini Corp., Morrison-Knudsen c Australia, R. C. P. Constructio Co., and Bates & Rogers Con struction Corp. The Kaiser Co sponsored a joint venture group i 1954 to carry out the first section of this development.

Standard Engineer's Field Report

CASE HISTORY
LUBRICANT RPM Delo Oils
FIRM Progressive Transportation Co., Compton, California

RPM DELO holds piston wear to .001" after 201,253 miles of on-and-off highway hauling



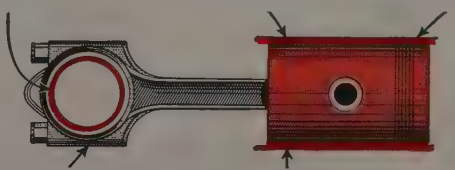
LUBRICATED WITH RPM DELO Oil, these engine parts were pulled from a Cummins HR diesel after 201,253 miles. A portion of this mileage was put on during four months of rugged service spotting loads of heavy pipe in the Arizona desert. When the engine was taken down, after two years of this on- and off-highway hauling, Progressive Transportation Co. found RPM DELO Oil had kept lacquer, gum, sludge, and deposits from forming...rod bearing wear varied between .0005 and .001 inch and pistons showed maximum wear of only .001". No wear at all evident on main bearings. Progressive Transportation uses RPM DELO Oils in all its large fleet of tractors—some of which have traveled well over 200,000 miles without overhaul.

Why RPM DELO Oils prolong engine life

Special compounds stop corrosion

Anti-oxidant resists lacquer formation

Detergent keeps all parts clean



Metal-adhesion qualities keep oil on parts in running or idle engines—inhibitor resists foaming

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For Expert Help . . . on lubrication or fuel problems . . . call your Standard Fuel and Lubricant Engineer or Representative, or write to 225 Bush Street, San Francisco, California.

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Colley lost in Iraq—Bechtel executive

GEORGE COLLEY, JR., senior vice president of Bechtel Corp. and responsible for many of its overseas operations, has been missing and reported killed in Baghdad during the fighting in that city July 14. Efforts to locate him continued through government channels and personal connections, but no news has been received at the Bechtel headquarters indicating that he survived. He had arrived in the capital of Iraq on July 14 while on one of his frequent trips to foreign countries inspecting Bechtel projects and interests. On that evening he was one of a small group taken into custody by soldiers who were believed to have been seeking officials of the former Iraq government. The strict censorship in Baghdad during the next few days hindered the search.

Arizona highway record

ARIZONA reports, about the 1st of August, that 34 Interstate Highway projects had been either completed or were under construction in the state. These projects represented a total of 187.65 mi. at a contract cost of $24,451,138.

During the fiscal year which ended June 30, 22 Interstate projects totaling 113 mi. were placed under contracts aggregating $18,554,343. This compares to six Interstate projects totaling 32.4 mi. at a contract cost of $3,521,298 which were awarded during the preceding fiscal year, which was the first under the Federal Aid Highway Act of 1956.

Montana hits all-time high

MONTANA set an all-time high for highway work to be awarded in any one month when it let $8,135,110 in contracts on July 23. Including four previous lettings in earlier months of 1958, the total for the year has been $22,740,000 of highway contracts awarded which is more than the total amount let during the entire year of 1957. Another record was established when a bid of $2,456,634 was submitted as a joint venture by Bud King of Missoula and J. McLaughlin of Great Falls, to build 9.6 mi. of the Interstate System east of Drummond. The bid was accepted.

DeCosta named to head East Bay MUD

JOSEPH D. DeCOSTA has been appointed chief engineer of the East Bay Municipal Utility District. DeCosta will succeed R. C. Kennedy, who has resigned to enter private consulting practice. Kennedy's first client will be the District, the EBMUD board having authorized his retention as a consultant for the balance of the year.

Donald G. Larkin, EBMUD supervising sanitary engineer, has been appointed to fill the spot vacated by DeCosta as manager of water production and distribution.

DeCosta began his career with the East Bay Water Co., predecessor of the District, in 1924 after graduating with honors from the University of California as a civil engineer, majoring in sanitary engineering. In 1927 he was appointed East Bay Water Co.'s supervising sanitary engineer, and, continued in this capacity when the system was taken over by the District in 1928. In 1934 he was appointed manager of the EBMUD Water Distribution Division.

World War II interrupted his civilian career when DeCosta was commissioned a major in the Corps of Engineers. As a lieutenant colonel, he was the commanding officer of the engineer unit which restored all public works in the Netherlands during 1944 and 1945. Returning to the district in 1946, he resumed the managership of the distribution system. The responsibility of this job was increased in 1957 with jurisdiction of the Mokelumne Division and its Pardee Dam, Mokelumne aqueducts, and pumping plants.

His successor as manager of Water Production and Distribution division, Donald G. Larkin, graduated in civil engineering in 1941 from Manhattan College in New York. Following World War II and four years with the Navy, he joined the District as assistant sanitary engineer. In 1954 he was appointed sanitary engineer in charge of what is now known as the sanitary and distribution section.

Colorado price index up

DURING the second quarter of '58 the Colorado Highway Construction Price Index moved up to a figure of 1.104. This compares to a corresponding figure of 1.010 for the first quarter and an average

LOOK AT THE No. 977 LOAD OVER 18 TONS IN 4 MINUTES— ALL DAY LONG!

This is a road construction job between Durham and Chapel Hill, N. C. Loading sand for Nello L. Teer Co. is this Caterpillar No. 977 Traxcavator, averaging 18.4 tons per load. Its load time per truck is 4 minutes, timed right on the job. Supt. R. G. Moore states flatly: "Best truck loader there is."

A few reasons: the No. 977's track roller frames are extended for better stability; its 2¼ cu. yd. bucket tilts back 40 degrees at ground level, giving leverage at the cutting edge and preventing spillage; operator sits high and comfortable, out of the dust, with all controls conveniently at hand.

New with the No. 977: a Side Dump Bucket attachment (2¼ cu. yd.) that dumps to the left as well as forward and is directly interchangeable (same pins, bolts, nuts) with the standard bucket.

But don't just look at pictures—look at the dirt fly on your own job when a Cat No. 977 Traxcavator digs in. Call your Caterpillar Dealer right now and set up an eye-opening, truck-filling demonstration.

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

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1957 figure of 1.049. These index figures are based on the year 1956 as 1.000.

The index includes representative costs of about 12 items, common to most highway construction jobs and in amounts representing the average required for building 1 mi. of highway.

National Forest highway funds are alloted

FEDERAL Highway funds have now been apportioned to the states for the 1960 fiscal year that begins July 1, 1959. The apportionment announced by the Bureau of Public Roads is being made eleven months in advance of the beginning of the fiscal year to provide ample time for states to carry out adequate planning and to insure further acceleration in the National Highway Program.

These Federal Aid Highway funds, which include federal money not only for the Interstate System but also the primary, secondary and urban highways within the states, total as follows for the fiscal year 1960 in the West:

State	*Total*
Arizona	$ 44,936,966
California	302,020,852
Colorado	33,318,908
Idaho	25,955,953
Montana	42,464,331
Nevada	21,626,105
New Mexico	41,404,463
Oregon	56,455,389
Utah	31,818,582
Washington	59,679,978
Wyoming	34,533,165
Alaska	13,829,881

U.S. 40 four laning advanced by big award

AS A FURTHER step in the modernizing of U. S. 40 on the Interstate System between Sacramento and Reno, the California Division of Highways has awarded a contract of $6,946,992 to A. Teichert & Son, Inc., of Sacramento for grading and paving 11.5 mi. of 4-lane divided freeway. The project also includes the building of 12 bridges. The job extends from near Roseville to 1 mi. east of Newcastle. This project is on a new alignment for U. S. 40 south of the present highway and will provide much needed bypasses for the towns of Rocklin and Loomis. Interchange and access connections will be provided to both towns.

Priest Rapids Dam is half completed

PRIEST RAPIDS Dam has been under construction for two years, with results shown in the accompanying general view. Contract for $91,880,625 was officially awarded Merritt-Chapman & Scott on July 9, 1956.

Today, the dam is more than 50% complete and construction is 16 months ahead of schedule. The initially planned eight generators with a total nameplate rating of 630,800 kw. have been expanded to ten with a total capacity of 788,500 kw. The two extra generators were added when it was found that the contingency fund was larger than necessary, and that the two generating units could be installed without having to increase the bond issue. The addition of the two units increased the construction cost to approximately $98,000,000.

The dam is being built on the Columbia River, about 24 mi. below Vantage, for the Public Utility District of Grant County. Harza Engineering Co. of Chicago is the designing and consulting engineering firm for the project. Twelve Northwest electric utilities have purchased 63.5% of the power, with the Grant County PUD reserving 36.5% for its own use. It is expected that some low head power will be available late in 1959, with commercial power available in the summer of 1960.

The dam is a concrete and earthfill structure, 10,138 ft. long. The powerhouse is 1,025 ft. long, the spillway is 1,142 ft. with 22 tainter gates, each 40 x 50 ft. in size. A gravity dam section on the right bank makes up the remainder of the total of 2,427 ft. of concrete structure, with earthen embankments on either bank totaling 7,711 ft. in length.

Fish ladders are being built on each bank for the passage of migratory fish. Provision has been made for the installation of future navigation locks to be built by the U. S. Corps of Engineers, when monies are appropriated by Congress. No tax money is used in the construction of Priest Rapids Dam, its construction being financed through the sale of 49-year power revenue bonds.

At present, the earthen embankments are well along toward completion; the powerhouse is rapidly taking form, some generating equipment has arrived and is being installed and the piers for the first 11 bays of the spillway section have been erected. After high water recedes this summer another cofferdam will be built out from the right bank and the next 11 spillways bays, complete with aprons and gates will be constructed.

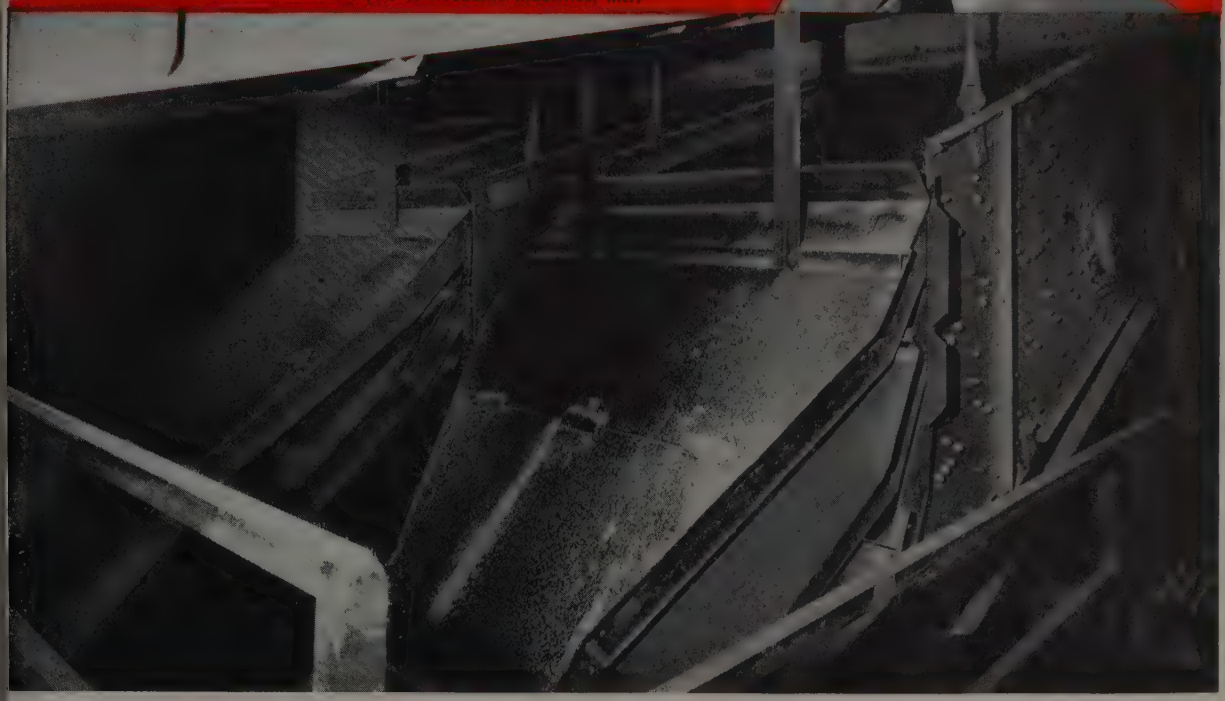
Changes in personnel

On August 2, the Grant County PUD Commissioners presented resolutions appointing E. B. Gibbons as manager of the PUD, and R. R. Ries, supervisor of production, which includes construction of Priest Rapids and Wanapum dams. Gibbons had been acting manager of the distribution system and Ries, acting manager of the production system since July 28, when Glenn Smothers requested that his resignation be accepted as PUD manager. Smothers had served as manager since 1945. The commissioners passed a motion directing Ries to proceed with the construction of the Wanapum development.

The changes came as a result of statements by Nat Washington, former legal counsel, who alleged that Smothers was conducting some PUD business is an irregular manner. A full-scale investigation of PUD affairs has been asked, and on July 29 the court called a grand jury to look into the affairs of the Grant County PUD.

"OVER 1,000,000 TONS without a whimper from our SECO *Twin-Bearing* SCREENS"

Says Jules Koczot, Buffalo Crushed Stone Corporation's Plant Engineer
(A Unit of Houdaille Industries, Inc.)



"We've screened 8 sizes of aggregate for 1½ years without a minute of downtime"

"We installed our first 2 SECO TWIN-BEARING SCREENS 1½ years ago and during this time we have run almost around the clock. We have been so pleased with their performance and dependability that we now have a total of 7 in operation in our crushed stone and black top plants."

Yes, Mr. Koczot knows his vibrating screens, and his remarks are typical of the growing list of producers who are switching to Seco Twin-Bearing Screens. Only Seco's "Advanced Engineering" could bring to 2 bearing screens the rugged dependability and smoothness of operation that result in accurately sized materials. No matter how tough the specifications may be . . . you'll meet them with year in and year out consistency . . . with SECO TWIN-BEARING SCREENS on-the-job.

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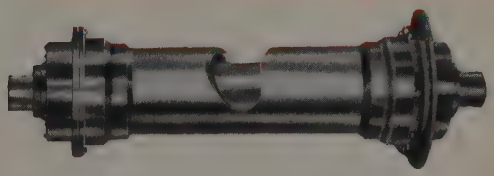

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Low bids and contract awards

ARIZONA

Copper State Construction Co. of Mesa submitted a low bid of $991,538 for 4.5 mi. of grading and surfacing on the Cordes Jct.-Flagstaff highway south of Flagstaff in Coconino County. **T. M. K. Construction Co., Inc.**, Phoenix, submitted two low bids for roadwork in Maricopa County: a $582,337 contract for 5 mi. of grading and surfacing on the Yuma-Casa Grande highway 8 mi. southeast of Gila Bend, and $536,822 for grading, surfacing, and road connections on the Yuma-Casa Grande highway, 2 mi. southeast of Gila Bend. **L & M Construction & Engineering Co., Inc.**, Tucson, submitted a low bid of $513,984 for grading and surfacing north of Cameron on U. S. Rte. 89 and 189 in Coconino County. A low bid of $318,302 was submitted by **Tanner Bros. Contracting Co., Inc.** of Phoenix for 1.7 mi. of grading, draining, and surfacing on the Superior-Winkelman highway, southeast of Ray on Rte. 177 in Pinal County. **Martin Construction Co.**, Tucson, submitted a low bid of $266,936 for 2.4 mi. of grading, surfacing, and construction of a three-span girder bridge on the Marana road in Pima County. A low bid of $171,941 was submitted by **Tom L. Mulcaire**, Cottonwood, for 3.8 mi. of grading and surfacing, Saguaro Lake road in Maricopa County. **Mohamed Earthmoving Contractor**, Phoenix, submitted a low bid of $133,732 for 2¾ mi. of grading and surfacing northwest of Phoenix city limits in Maricopa County. **Palmer Contracting Co.** of Phoenix submitted a low bid of $113,051 for 1.7 mi. of grading and surfacing on the Ajo-Gila Bend highway south of Gila Bend in Maricopa County. **Fisher Contracting Co.**, Phoenix, submitted a low bid of $394,305 for 9 mi. of grading and surfacing on Clint's Well-East in the Coconino National Forest, Coconino County.

CALIFORNIA

A. Teichert & Son, Inc., Sacramento, received a $842,621 contract for constructing three bridges, grading and surfacing on U.S. 99, south of Stockton in San Joaquin County and submitted two low bids for highway work in Sacramento and Placer counties: a low bid of $6,946,992 to construct 12 bridges, 11.5 mi. of grading and surfacing to provide a 4-lane divided highway east of Roseville in Placer County, and a low bid of $461,561 for 13 mi. of grading and surfacing between Ben Ali and near Roseville in Sacramento and Placer counties. **Utah Construction Co.** of San Francisco, **Paul Hardeman, Inc.** of Los Angeles, and **Manhattan Construction Co.** of Muskegee, Okla. (joint venture) received a $5,985,231 contract for construction of a second group of Atlas launchers at Cooke Air Force Base. A $3,759,042 contract was received by **E. L. Yeager Co., E. L. Yeager Construction Co., Inc., Bert C. Altfillisch, Altfillisch Construction Co.** & **Lowe and Watson** of La Habra for 4.3 mi. of grading and surfacing on a 4-lane divided freeway and 11 structures on the Riverside Freeway near Colton in Riverside and San Bernardino counties. **Peter Kiewit Sons' Co.** of Arcadia received two contracts from the Eleventh Naval District, San Clemente Island, and Marine Corps Air Station, El Toro, Santa Ana: a $5,565,125 contract for Second Increment Construction to provide concrete pavement runway, parallel taxiway and cross taxiways, parking apron, arming and de-arming pads and missile launching pads, also utilities, roads, and related work at San Clemente Island, and a $2,068,091 contract for construction of Tactical Area III. The work includes buildings, utilities, roads and other related work at the Marine Corps Air Station, El Toro, Santa Ana. A $2,804,458 contract was received by **J. C. Boespflug Construction Co.** and **J. L. McLaughlin,** Los Angeles, to construct 1.2 mi. of 8-lane freeway on the Golden State Freeway and construction of six bridges and one pedestrian overcrossing and one pumping plant, Los Angeles County. **Gordon H. Ball, Inc.** and **Ball & Simpson,** Berkeley, received three contracts for Contra Costa County, Naval Air Missile Test Center, Point Mugu and Marine Corps Air Station, El Toro, Santa Ana: a $3,662,946 contract for grading and surfacing 2 mi. of 6-lane freeway west of Lafayette in Contra Costa County, a $2,076,876 contract for aproach lighting, optical landing system, extension of taxiways, reservoir, pumping station and related work at the Marine Corps Air Station, El Toro, and a $2,273,500 contract for widening runway, relocation of roads, and seeding of runway and taxiway shoulders at the Naval Air Missile Test Center, Point Mugu, San Nicolas Island. **Harris Construction Co., Inc.** Fresno, received a $2,615,000 contract for the general work to construct six 3-story residence halls and site development work at California State Polytechnic College, San Luis Obispo. **John Delphia** and **Fred J. Early, Jr., Co., Inc.**, Patterson, received a $1,438,427 contract to construct two bridges, one pumping plant and grading and surfacing 5.8 mi. of 4-lane divided highway north of Soledad in Monterey County. A $1,376,816 contract was received by **Webb and White** of Los Angeles for the realignment of U. S. Highway 101 (Pacific Coast Highway), around the Pacific Palisades slide west of Santa Monica in Los Angeles County. **M. W. Brown** of Redding submitted a low bid of $1,203,553 for 5.3 mi. of grading and surfacing a 2-lane highway with connections to be graded, west of Burney in Shasta County. **Dan Caputo Co.** and **M. J. B. Construction Co., Inc.** of Stockton received a $1,150,930 contract to construct 1.9 mi. of freeway with ramps, frontage roads and an interchange on the Bayshore Highway, Mountain View-Alviso road in Sunnyvale, Santa Clara County. **Lew Jones Construction Co.** and **Brighton Sand and Gravel Co.**, San Jose, received a $1,954,023 contract for bridge structure on U. S. 50/99, in city and county of Sacramento. **Dan Caputo Co., Dan Caputo,** Cambrian Gateway, San Jose, received a $1,792,059 contract for construction of three bridges, grading and surfacing 1.1 mi. of freeway together with frontage roads, connections and interchanges north of Greenbrae in Marin County. **Diversified Builders, Inc.**, Paramount, received a $1,935,000 contract for construction of additional training facilities at the Marine Corps Base, Twentynine Palms. **Guy F. Atkinson Co.**, South San Francisco, received a $1,647,722 contract for construction of two bridges, grading and surfacing on 4.9 mi. of freeway adjacent to Healdsburg in Sonoma County. **Fred J. Early Co.**, Torrance, received a $1,525,600 contract for construction of improvements to fuel storage and distribution system, Naval Air Station, North Island, San Diego. A $1,362,409 contract was received by **Wells Benz, Inc.**, Phoenix, Arizona, for construction of Enlisted Men's Barracks, (Second Increment) at the

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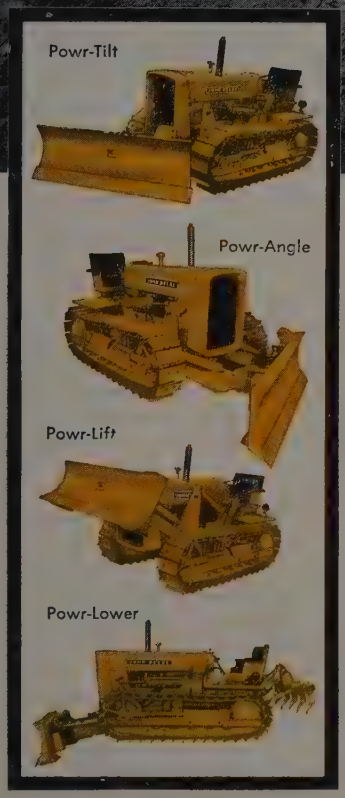

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Combined with the outstanding economy and performance of the John Deere "440" Crawler, the 64 is a unit that will appeal to any earth-moving contractor, large or small. See your nearest John Deere industrial dealer.

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Marine Corps Air Station, El Toro, Santa Ana. **J. E. Haddock, Ltd.,** Pasadena, received a $956,453 contract for widening 3.5 mi. from 4-lane to 6-lanes near Norwalk, Los Angeles and Orange counties. A $829,310 contract was received by **Brighton Sand and Gravel Co.,** Sacramento, for widening the Badger Creek and Cosumnes River bridges and replacing two bridges over the Cosumnes River overflow in Sacramento County.

COLORADO

Amis Construction Co., Oklahoma City, Okla., submitted a low bid of $1,724,326 for 4.7 mi. of grading and structures between Steamboat Springs and the summit of Rabbit Kara Pass in Routt County. A low bid of $706,833 was submitted by **H. E. Lowdermilk Co.,** Englewood, for grading, structures and surfacing on 5.3 mi. between the Wyoming Line, south of Virginia Dale in Larimer County. **C. L. Hubner Co.,** Denver, submitted a low bid of $511,882 for 11.6 mi. of grading, structures and surfacing, east and west of Eckley in Yuma County. **Schmidt Construction, Inc.** of Arvada received a $470,000 contract for grading and surfacing on 4.8 mi. of the Marvine-Phippsburg route in the Routt National Forest, Rio Blanco County. **Domenic Leone** of Trinidad submitted a low bid of $380,052 for 2.5 mi. of grading, structures and surfacing near Penrose in Fremont County. A low bid of $363,510 was submitted by **Gardner Construction Co.** of Glenwood Springs for 3.7 mi. of grading, surfacing and structures near Colorado Springs, El Paso County. **Carl V. Hill** of Greeley submitted a low bid of $302,000 for 2.4 mi. of grading and surfacing on the High Drive entrance road in the Rocky Mountain National Park in Larimer County. **Lawrence Construction Co.,** Littleton, submitted a low bid of $295,981 for structures and approaches on S. H. No. 185 in Weld County. A low bid of $285,725 was submitted by **Pioneer Construction Co.,** Pueblo, for 10.7 mi. of grading and surfacing on S. H. No. 10 near Walsenburg in Las Animas and Pueblo counties. **J. P. Elliott and Son,** Pueblo, submitted a low bid of $242,435 for grading, structures and surfacing on 4.9 mi. east of Silver Cliff in Custer County and received a $127,000 contract for 6.6 mi. of grading and surfacing the South Fork-Lake City Rte.

IDAHO

Lewis Hopkins Co. & A. R. Sime, Pasco, Wash., submitted a low bid of $1,093,945 for Little Wood River Dam enlargement, Little Wood River Project. **Cherf Bros., Inc. & Sandkay Contractors, Inc.** of Ephrata, Wash. received a $989,883 contract for constructing 4-lane divided highway, two overpasses and two underpasses on U. S. Nos. 91 and 191 in Bannock County. A $600,161 contract was received by **Marion J. Hess,** Malad, for 8.8 mi. of grading, surfacing and construction of one bridge on State Highway No. 17 in Ada and Gem counties. **Carbon Bros.** of Spokane, Wash,. received two contracts for roadwork in Latah County: a $384,527 contract for 2.1 mi. of grading and surfacing Bear Ridge-Deary, State Highway No. 7, and $158,703 for grading and surfacing on 7.7 mi. of State Highway No. 43, Bovill North. A $168,499 contract was received by **Western Construction Co.,** Pocatello, for structures and 3.9 mi. of grading and surfacing on State Highway No. 22 in Clark and Jefferson counties. **C. H. Elle Construction Co.,** Pocatello, received a $383,028 contract for grading and surfacing the Ketchum-Clayton Highway, Sawtooth and Challis National Forest.

MONTANA

Stanley H. Arkwright, Inc., Billings, received a $1,685,369 contract for 11.5 mi. of grading, surfacing and draining on the Crow Agency-Hardin Highway in Big Horn County. **Norgaard and Hilling** of Williston, North Dakota, received a $430,359 contract for 7.8 mi. of grading and surfacing on the Culbertson-Plentywood and Culbertson-Sidney Highway in city of Culbertson, Roosevelt County. A $392,756 contract was received by **Northwestern Engineering Co.,** Rapid City, South Dakota, for grading and surfacing on 14.9 mi. of the Grass Range-Malta Highway in Phillips County. **Curtis Construction Co.** of Spokane, Wash. received a $332,336 contract for 10.9 mi. of grading and surfacing the Whitefish-Stryker Highway in Flathead County. **Roth Construction Co.** of Rapid City, South Dakota, received a $314,025 contract for 12.9 mi. of grading and surfacing the Grass Range-Malta Highway in Fergus County. **Bud King Construction Co. & McLaughlin, Inc.** of Missoula, received a $2,456,634 contract for 9.6 mi. of grading, surfacing and draining on the Bearmouth-Deer Lodge Highway in Granite and Powell counties. **Nilson-Smith Construction Co.** of Great Falls received a $1,042,632 contract for 4.9 mi. of grading, surfacing and draining on the Tarkio-Missoula road in Missoula County. A $301,568 contract was received by **Kiely Construction Co.,** Butte, for 11.9 mi. of grading and surfacing on the Philipsburg-Anaconda Highway in Deer Lodge County. A $205,803 contract was received by **S. Birch, Inc.** and **S. Birch & Sons Co.,** Great Falls, for 9.1 mi. of grading and surfacing on the Hilger-Winifred-Big Sandy Highway in Chouteau County. **Union Construction Co.,** Missoula, received a $197,789 contract for grading and surfacing on 1.7 mi. and one structure on the Northwest of Frenchtown Wye-Westerly Highway in Missoula County.

NEVADA

Isbell Construction Co. of Reno received two contracts for roadwork in Washoe County: a $279,376 contract for construction of 7.6 mi. of U. S. Highway 40, west of Reno and $257,567 for 2.4 mi. of grading and surfacing the State Highway System in and near Reno. **Wells-Stewart Construction Co., Inc.** of Las Vegas received a $259,529 contract for 12 mi. of grading and surfacing on U. S. 95 in Lyon County. **Hoops Construction Co.** of Elko received a $217,567 contract for 5.8 mi. of grading and surfacing on U. S. Highway 50 and 93, near East Ely in White Pine County.

NEW MEXICO

O. D. Cowart of Albuquerque received a $989,388 contract for 5 mi. of grading and surfacing west of Valencia-Bernalillo County Line-West in Valencia County. **Henry Thygesen & Co.** of Albuquerque received two contracts for road work in McKinley and Lea counties: a $623,405 contract for 15.9 mi. of grading and surfacing Jct. U. S. 66 west to Arizona-New Mexico State Line in McKinley, and $387,076 for 7.4 mi. of grading, structures and surfacing on the Jal-South road in Lea County. A $232,414 contract was received by **J. W. Jones Construction Co.,** Albuquerque, to extend San Matio Blvd. North to Jct. 1-25 in Bernalillo County. **Shufflebarger and**

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Ton-for-ton and yard-for-yard, the road-building Cage Brothers, San Antonio, Texas, compared International Payhauler production with competitive off-highway rigs. Result: They trebled their "65" Payhauler fleet within a year!

Let Superintendent E. A. Rice give you the details:

"First we bought three Payhaulers and three competitive haulers. When we found it took two of them to equal one Payhauler, we got three more Internationals. Now (with more hauling) we have added another three, to give us nine Payhaulers.

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International Payhauler models give you fast getaway with a bonus of turbo-charged diesel power. They have a gear choice to match every load and road. And they provide the power-cushioning leverage of full-floating planetary drive axles, to minimize the slam-bang shock of off-road full-load hauling!

Try Payhauler "pick-up truck" spotting ease—assured by "zip-around" power steering and exclusive high reverse. Prove full-load ramp-climbing "muscle"—and up to 25% faster haul speeds. See how 7½-second dumping and Payhauler operating ease and safety figure sharply in out-hauling other makes, up to 2-to-1! See your International Construction Equipment Distributor for a demonstration.

With extra-large air brakes, air-assisted clutch, and integral hydraulic steering, the "65" Payhauler gives fingertip operating ease—even when hauling 18-ton loads over rough terrain. This pair is stockpiling aggregate for Cage Brothers.

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Associates, Inc. of Albuquerque submitted two low bids for work on the Middle Rio Grande Project: $149,189 for earthwork, clearing and structures for rehabilitation of Belen Unit 9 and $145,581 for earthwork, clearing and structures for Belen Unit 11. **Adams Construction Co.** of Santa Fe received three contracts for roadwork in Los Alamos, Sandoval, Santa Fe and Rio Arriba counties: a $176,620 contract for 7.1 mi. of grading and surfacing the Los Alamos-La Cueva road in Los Alamos and Sandoval counties, $169,666 for 2.9 mi. of grading and surfacing on the Hyde Park road in Santa Fe County, and $121,632 for grading and surfacing portions of highway in Rio Arriba County. **Armstrong Construction Co., Inc.,** Roswell, received three contracts for roadwork in McKinley, Mora, Luna and Dona Ana counties: a $334,753 contract for 10.2 mi. of grading, structures and surfacing east of Ocate-Easterly in Mora County, $153,128 for 8 mi. of grading and surfacing on the Ambrosia Lake Road in McKinley County, and $148,143 for grading and surfacing portions of highway in Luna and Dona Ana counties. **Allison & Haney, Inc.,** Albuquerque, received a $188,205 contract for 12 mi. of grading and surfacing north of Cuba-Northwest in Sandoval County.

OREGON

Morrison-Knudsen Co., Inc. of Boise, Idaho, submitted a low bid of $1,416,815 for grading, structures and surfacing, Glover-Perry section of the Old Oregon Trail Highway in Union County. **Rogers Construction Co.,** Portland, submitted a low bid of $685,158 for grading and paving on the Klamath Falls section of The Dalles-Calif. highway in Klamath County. **Roy L. Houck & Sons** and **Roy L. Houck Sons' Corp.,** Salem, submitted two low bids for roadwork in Multnomah and Malheur counties: a $890,440 bid for grading and paving the Harbor Drive-Lowell Street Unit of the Pacific Highway in Multnomah County, and $652,075 for grading the Ontario-Idaho Line section of the Old Oregon Trail Highway in Malheur County. **Earl L. McNutt Co.** of Eugene submitted a low bid of $436,491 for grading the Twin Buttes-Belts Road section of the Pacific Highway in Linn County. A low bid of $349,305 was submitted by **Peter Kiewit Sons' Co.** of Vancouver, Wash. to construct Rogue River bridge, Pacific Highway in Josephine County. **F. L. Somers,** Medford, received a $360,000 contract for repair of the Jetty "A" at the mouth of the Columbia River on the Washington side. **Warren Northwest, Inc.** of Portland, submitted two low bids for work in Multnomah and Polk counties: $865,349 for 1.6 mi. of grading, paving and three bridges on the Airport-Alberta Street section of the Cascade Highway in Multnomah, and a $325,161 low bid for grading and paving the Valley Junction-Wallace Bridge Unit of the Salmon River Highway in Polk County. **Tom Lillebo,** Reedsport, submitted a low bid of $280,856 for undercrossings on the 19th Ave. and Multnomah Blvd., Pacific Highway in Multnomah County. A low bid of $468,830 was submitted by **Fred H. Slate Co.** and **E. C. Hall Co.** of Portland for grading and paving on the Wauna-Westport section of the Columbia River Highway in Clatsop County. **Central Paving Co.** of Independence submitted a low bid of $441,916 for structures, grading and paving the Jonesboro-Tunnel on the Central Oregon Highway in Malheur County. A low bid of $308,899 was submitted by **Kuckenberg Construction Co.,** Portland, for structures, grading and paving on the Harbor Drive-Washington County Line section of the Pacific Highway in Multnomah County. **George E. Blaisdell & Son** of Portland submitted a low bid of $267,357 for grading and oiling the Bullards Bridge-Bandon section of the Oregon Coast Highway in Coos County. A low bid of $247,870 was submitted by **Tuss Bros. Construction Co.,** Woodburn, for grading and paving the Middle Unit, Crescent Lake Jct., and The Dalles-Calif. Jct. on the Willamette Highway in Klamath County. **Floyd R. Grubb,** Salem, submitted a low bid of $236,694 for earthwork, structures and clearing, Talent Div. Rogue River Basin Project. **S & D Construction Co.,** Portland, submitted two low bids for roadwork in Linn County: a $211,221 bid for bridges on the North Albany Interchange, on the Pacific Highway, and $176,461 for South Santiam Interchange undercrossing on the Pacific Highway. A low bid of $206,245 was submitted by **Durbin Bros.** of Eugene for grading, paving and structure on the Trail Creek Bridge section of the Crater Lake Highway in Jackson County.

UTAH

George A. Whitmeyer & Son, Ogden, submitted a low bid of $1,565,500 for construction of Chronic Disease Hospital in Roy. A low bid of $943,459 was submitted by **V. C. Mendenhall Co.,** Las Vegas, Nevada, for 4 mi. of grading, structures and surfacing on Highway No. 15, south of Ash Creek in Washington and Iron counties. **Enoch Smith Sons Co.,** Salt Lake City, submitted a low bid of $454,440 for 6.5 mi. of grading and surfacing on Highway No. 68, Salt Lake County. **LeGrand Johnson Construction Co.,** Logan, submitted a low bid of $491,243 for grading and surfacing on 2.6 mi. of U.S. Highway 89 in city of Logan, Cache County. A low bid of $433,730 was submitted by **Union Construction Co.,** Murray, for 4.4 mi. of grading and surfacing on State Road 260 Greendale Junction-Flaming Gorge Dam in Daggett County. **Wheelwright Construction Co.** of Ogden submitted a low bid of $409,312 for 7.2 mi. of grading, structure and surfacing on State Road No. 242 in Cache County. **W. W. Clyde & Co.,** Springville, submitted two low bids for roadwork in Carbon and Utah counties: a low bid of $313,207 for 5.9 mi. of grading and surfacing Scofield-Clearcreek road, State Highway No. 96 in Carbon County, and $238,693 for 3.7 mi. of grading and surfacing on U. S. Highway 91, city of Orem, Utah County. **Gibbons & Reed Co.,** Salt Lake City, submitted two low bids for roadwork in Salt Lake and Weber counties: a low bid of $302,768 for 1.2 mi. of grading and surfacing U. S. Highway No. 40, city and county of Salt Lake, and $96,913 for 2.8 mi. of grading and surfacing on State Road 235, North Ogden in Weber County. A low bid of $291,924 was submitted by **Nelson Bros.** and **D. W. Brimhall Construction Co.,** Salt Lake City, for 7.2 mi. of grading and surfacing U. S. 89 in Sanpete County. **Germer, Abbott, & Waldron,** Tremonton, submitted a low bid of $268,081 for 5.3 mi. of grading and surfacing on U. S. 160, from Crescent Junction southerly in Grand County. **Thorn Construction Co.,** Springville, submitted a low bid of $152,000 for 5.8 mi. of grading and surfacing U. S. 30-S, west of Snowville westerly in Box Elder County.

(Contract award summaries continue on page 120)

SEVERE DIGGING CONDITIONS EXPERIENCED

Shovel operators and mechanics, veterans in all types of rock excavation, say they have never experienced such severe digging conditions as the high silica content quartz being quarried by Morrison-Knudsen Company for the 13-mile long Great Salt Lake railroad crossing of the Southern Pacific Railroad.

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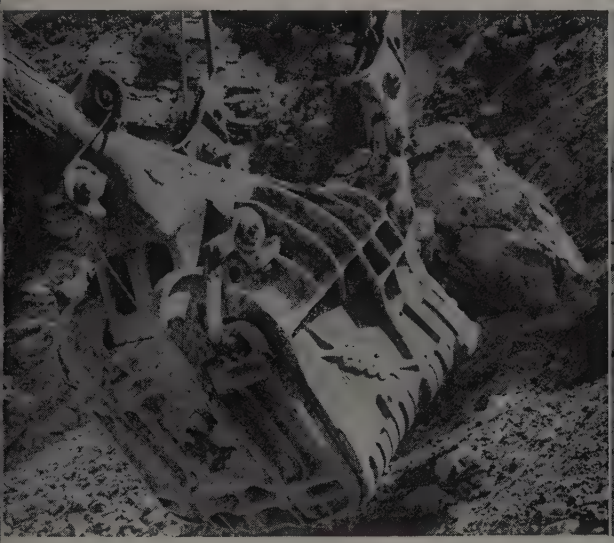

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ENGINEERS and CONTRACTORS

Pacific Bridge Co. of Alameda, Calif., has announced the appointment of **S. Clifford Doughty** to the post of chief engineer. He replaces **Mac Silvert** who has established a consulting practice in San Francisco. Doughty formerly was acting chief engineer, and, prior to that,

S. Clifford Doughty

estimator for Pacific Bridge, a firm which specializes largely in marine heavy construction. Before joining Pacific Bridge five years ago, Doughty was with the Guy F. Atkinson Co. on Pine Flat Dam and Folsom Dam Powerhouse. He also worked for a number of years with Merritt-Chapman & Scott in the East.

* * *

James M. Sumsion, 85, prominent Utah contractor, died at his home in Springville, Utah, in July. Jim Sumsion was a dean of contractors and during his long career was a principal in several construction firms. His sons, James and Richard are both active in the firm of J. M. Sumsion & Sons, which their father headed.

* * *

Appointment of **Walter C. Oram** as paving engineer of the Rocky Mountain Regional Office of the Portland Cement Association in Denver is announced by **E. W. Thorson,** regional manager. Oram joined PCA in 1952, and since 1955 he has served as general field engineer at the Seattle district office. He is a member of the American Society of Civil Engineers, the Associated General Contractors, and the National Reclamation Association.

* * *

Charles H. Reagan, civil engineer in the Engineering Division of the Corps of Engineers, Portland District, recently retired, following 20 years service.

* * *

Henry M. Lees has accepted appointment from Seattle City Light to the position of Skagit Project resident engineer to succeed **Robert E. Brown** who resigned to join the Harza Engineering Co. Lees brings to his new position experience gained on such projects as Ross

Lees

Brown

Dam, Gorge Powerhouse expansion, Gorge diversion dam, Diablo Dam improvement and the Ross Powerhouse. He started on the second step of Ross Dam in 1945, and has been assistant resident engineer on Skagit since October 1954.

HERBERT B. ELDER, resident engineer at The Dalles Dam since January 1952, and throughout all of its construction stages, has been named resident engineer for construction of John Day Dam under supervision of the Portland district engineer, Corps of Engineers. Elder will shortly open his project office on the Washington shore at the dam site, with a staff approximating twenty engineers, inspectors and assistants.

CALENDAR

Oct. 13-17—American Society of Civil Engineers, annual convention, Hotel Statler, New York.

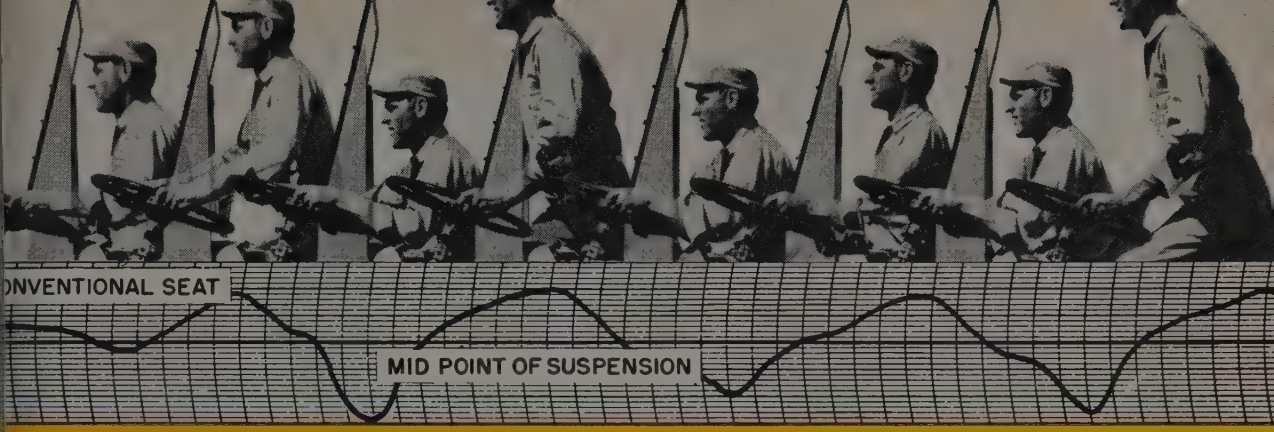
Dec. 1-5—American Association of State Highway Officials, annual meeting, Sheraton-Palace Hotel, San Francisco, Calif.

1959

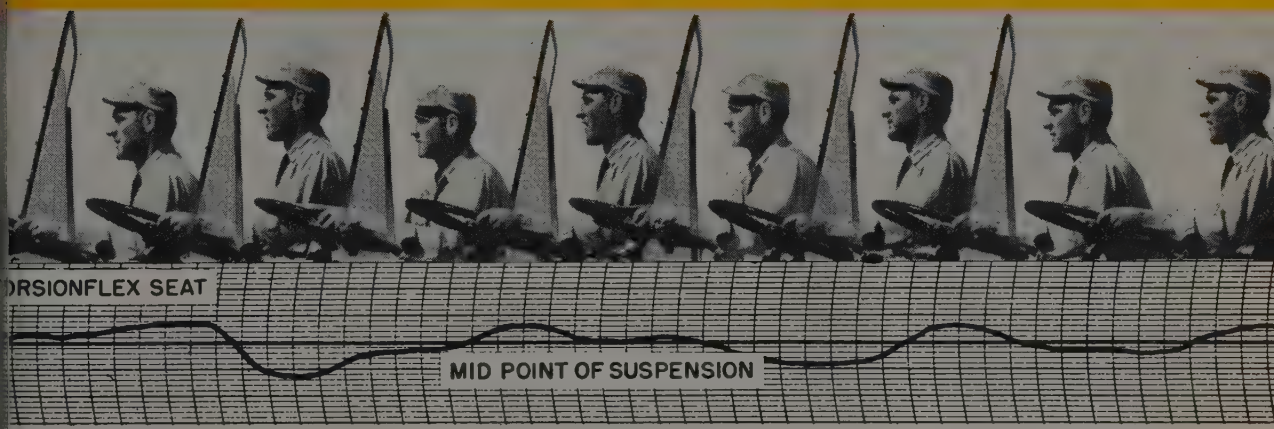
Jan. 14-15—The Beavers, fourth annual awards dinner, Los Angeles, Calif.

Jan. 25-29—Associated Equipment Distributors, annual meeting, Conrad Hilton Hotel, Chicago, Ill.

Jan. 28-30—The Institute of Transportation and Traffic Engineering, annual California Street and Highway Conference, Berkeley campus of the University of California.



Operator efficiency increases with . . . the new Caterpillar Torsionflex Seat



New Torsionflex Seat for Caterpillar wheel Tractors increases operator efficiency and comfort—provides a "highway" ride in off-highway conditions. Note the difference between the ride in the Torsionflex Seat and the conventional seat, as illustrated by this graph made over the same rough test course.

The Torsionflex Seat is just one of many new features introduced by Caterpillar to help increase earthmoving production!

Over the years Caterpillar has been the leader in improving earthmoving equipment with one aim in mind: *to move more dirt faster at lower cost.* No advance, from strengthening a 7-pound piston to redesigning a 30-ton rig, has been overlooked to increase the efficiency of Caterpillar-built machines, as well as the efficiency, comfort and safety of the men who operate them!

Now, in the new Torsionflex Seat, Caterpillar introduces a new concept in wheel tractor seat suspension—to give the operator maximum comfort over the roughest terrain. The new seat conserves his energy, lessens his fatigue, enables him to do more work per shift.

Test course proves superiority of Torsionflex Seat

The graph here shows the improved ride made possible by the Torsionflex Seat. Two rubber-tired machines, one with this new seat and the other with the conventional seat, were run over the same rough test course at the same speed. The lines in the graph were plotted by instruments attached to the operator. The horizontal component of the lines represents forward travel by the operator, while the vertical component represents his up and down motion. Note the big difference in the ride!

The new seat is just one of many improvements, large and small, being made constantly by Caterpillar throughout its line—tractors, scrapers, motor graders, other earthmovers. For modern, heavy-duty equipment that will increase your production and lower your costs, see your Caterpillar Dealer!

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

CATERPILLAR

LEADER IN FEATURES THAT INCREASE PRODUCTION AND LOWER COSTS

SUPERVISING the jobs

Ray Lynch, bridge superintendent for Imperial Paving Co., is in charge of construction of Blanco bridge and approaches on S. R. 17 in San Juan County, N. Mex. The $224,248 structure, which will soon be finished, is a 482-ft. continuous I-beam on concrete piers, of 28-ft. clear roadway width, and involves 0.8 mi. of grading and approach paving.

* * *

R. W. Richardson is supervising construction of Salmon Creek bridge in Clark County, Wash., for John E. Alexander, Inc., who received the contract from the Washington State Highway Department on a low bid of $324,982. Foreman on piles is **R. E. Harrington,** and carpenter foreman is **George Milton.** Resident for the State is **Jack Norelius.** The project is described as 360-ft. long twin bridges with 140-ft. steel plate girder center span, flat slab with cylindrical voids at one end, and box girder span, other end. The job started in May and according to Alexander will be finished next January.

* * *

W. R. Allington, head of Allington Construction Co., reports his road construction job in Gem County, Idaho, is now nearing completion. Foreman on this $107,666 contract, which is for grading and structures on 2.5 mi. of the Montour-Ola road, is **John H. Fleck,** while **Harry M. McCaulou** and **Donald W. Leisy** are operating the cats. The job has been going since last May.

* * *

Paul McCollum is job superintendent on a $1,824,700 recent award to Gordon H. Ball, Inc. for extension of runway, approach lighting and optical landing systems at the Naval Air Station at Miramar, Calif. Chief surveyor for the contractor here is **Ed Case.** Work has been under way since June and will probably be finished June 1959.

* * *

Eugene Vojacek and **Jim Garrison,** foremen for Frank E. Olson, are in charge of 9 mi. of grade and surface on the Circle-Sidney highway in Dawson County, Mont. Vojacek supervises on the morning shift, Garrison the afternoon. Pipe foreman is **Emmitt J. Cope.** Contractor Olson's office manager, **C. A. "Freddie" Fredrickson,** reports the job started in July and they have now finished the dirt work on the $653,237 project.

* * *

Fisher Contracting Co. will construct the new American Cement Plant facilities at Clarkdale, Ariz. This plant will eventually supply the cement to be used on the Glen Canyon Dam project. **W. R. Heinke** is project manager; **C. R. "Chuck" Kramer,** project superintendent; **Tom Bosley,** office manager; **Ed Pound,** project engineer; **Guy**

Bosley *Kramer*

Webb, general foreman; **Ed Metz,** excavation foreman; and **D. V. Roush,** equipment foreman. The company has recently completed the latest Western expansion of the General Tire & Rubber Co. facilities at the City of Industry in Los Angeles County.

* * *

Bob Miller, general foreman, **Lee Larson,** office engineer, **Steve Miarecki,** paving foreman, and **Bill Bagel,** pit superintendent, all key men for Isbell Construction Co., are working on an asphalt paving and seal job on S. R. 33 in the city of Reno, Nev. A $257,567 job, Isbell started here in July and will finish the work sometime in November.

* * *

Arnold Blair is in the superintendent spot on a different Isbell contract, this one involving grading, gravel, asphalt, plant-mix surfacing and concrete structures on state highway stretch from junction with S. R. 33 near Reno, northerly to Sun Valley, Nev. **Lee Larson** is doing the office engineering here too. **"Buck" Piretto** is grading foreman, and **Dan Collins** is pipe and labor foreman. Job started in July and will probably come to an end in November. Contract price $253,634.

* * *

Fred Dohle, project manager, **Bob Dillulo,** superintendent, and **Bart Moss,** foreman, are the chief contractor men on a $368,588 job being done by J. H. Trisdale, Inc.,

KEY MEN in the direction of the Mammoth Pool Project (see article on page 25) include (l. to r.): *Wayne Johnson,* powerhouse superintendent; *G. W. Saul,* project superintendent; *T. W. Grover,* construction engineer; *Homer Castonia,* tunnel engineer; and *Neville Long,* resident engineer. In the foreground is *Donald Long,* field marshall. The $50,000,000 hydro project is being built for Southern California Edison Co. by Bechtel Corp.

New Kenworth 803-B rear dump truck with Fuller 4-speed Transmission hauls 64-ton payloads.

KENWORTH'S *new mountain movers feature* FULLER *Transmissions*

Probably the largest rear-dump semi being built today, Kenworth's 42′ 2½″ rock and ore mover is equipped with a Fuller heavy duty 4-speed Transmission.

The 228,000 lb. gvw Kenworth 803-B is designed to haul top payloads profitably over varied terrain. It is powered by a single 12-cylinder diesel engine, offered in either the 400 or 600 hp range. In the 400 hp version, illustrated, a Fuller 4-speed 4-MS-1440 Transmission with CO-11,500 Twin Disc Torque Converter delivers power efficiently and effectively from the powerful Cummins NHV series engine. These heavy-duty Fuller Transmissions provide the right gear ratios to apply the power profitably.

More than 100 different transmission models are available for rubber-tired equipment from 100 to 600 hp, 330 to 1550 cubic inch engines. Check with your truck manufacturer or write Fuller for the right transmission for *your* job.

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FULLER MANUFACTURING CO. Transmission Division • Kalamazoo, Mich.
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. . . for more details, circle No. 46 on Reader Service Postcard

covering 1.6 mi. of grading and surfacing north of Oak Run Creek in Shasta County, Calif. Scheduled for November completion, the work has been under way since July.

* * *

James W. Rea, site supervisor, and **Earl M. Seese,** assistant supervisor, have charge of construction of underground turnaround room and other modifications at the Aircraft Nuclear Propulsion Project, NRTS, Idaho. This is a $316,019 contract which was awarded the Watkins Construction Co. Watkins started work in May and is now in the final construction stage.

* * *

George Borovich, superintendent for Thomas Construction Co., has been in charge of a $178,521 contract for 1.8 mi. of grading and surfacing on Route 887 near Bakersfield, Calif.

* * *

J. D. Sheehan, general manager, **William Tarrell,** grading superintendent, and **William Mead,** office manager, are J. H. Beckman Construction Co.'s key men on a nearly completed contract covering grading, structures and surfacing on the Wheatland-Cheyenne highway in Laramie County, Wyo. Beckman's bid was $296,759.

* * *

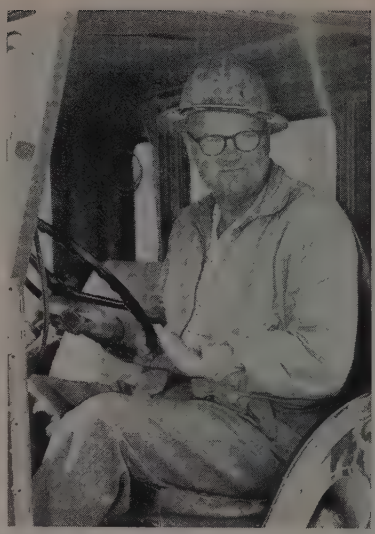
Arthur W. Rogers, general superintendent, with **Evans Tanner** superintending the job, is in charge of contract for grading and surfacing 22.7 mi. of Route 9, Tonto National Forest in Gila County, Ariz. Field office manager is **Jess Metcalf,** while **G. S. Tanner** is equipment manager, on this $256,398 project which will be finished Sept. 1.

* * *

Lyle Ewing, superintendent for Hoffman Construction Co., has charge of construction of an addition to the Benson Hotel in Portland, Ore. Other principal supervisors on this 100x100, 14-story addition are **E. L. Drake,** carpenter foreman, and **Al Guyll,** labor foreman. Awarded the contract at $1,844,000, Hoffman started work in May and hopes to have the job complete by August 1959.

* * *

E. G. Gronquist is superintending a $2,000,000 contract under way by Hoffman Construction Co. for a plywood plant at Coos Bay, Ore. Owner of the mill is Georgia Pacific Corp. Scheduled for completion next January, the job has been going since May.



AUGUST H. (Gus) STEINER, project manager, who is directing operations at Trinity Dam. This $49,000,000 joint venture project in Northern California is sponsored by Guy F. Atkinson Co. It is a Bureau of Reclamation project.

James Thomas is superintending Brannan Sand & Gravel Co.'s recent award for street improvement work in Denver, Colo. Asphalt superintendent on the $219,817 project is **William Pankovich.**

* * *

Walter Gott is supervising O. D. Cowart's contract covering 5 mi. of grading and surfacing on the El Cerro road in Valencia County, N. Mex., a job which went to Cowart on a low bid of $157,817. Grade foreman is **Tex Raley,** and field office man is **George Cowart.** Under way since May, the job is expected to be finished this September.

* * *

Guy Scott, superintendent for Peter Kiewit Sons' Co., is in charge of a $1,318,441 grading and surfacing project on the Burnt Hill-Hoosekamaden Creek section of the Oregon Coast Highway in Curry County. **Eddie Thiel** is master mechanic, and **Frank Merley** is oiler foreman. The office is in charge of **Bill Allen.** Work started in June and involves 3.6 mi. of grading and 1,700,000 cu. yd. of excavating. Kiewit expects the job to be finished the end of next year.

* * *

O'Neil Jones, project manager, **A. M. Stolzenburg,** excavation superintendent, and **Carl Lowry,** gravel superintendent, are the key men working for Albert Lalonde Co. on this contractor's job to grade and surface 4 mi. of the Livingston-Big Timber highway in Park County, Mont. This is a $1,537,336 project. The same three men are supervising another $805,256 award to Lalonde for grading, surfacing and construction of a bridge on another stretch of the same highway in southern Montana.

Under Project Manager Jones and Superintendent Lowry, another of Lalonde's jobs is drawing near completion. With **Eldo Ulshafer** acting as foreman, this job consists of 9 mi. of grading and surfacing west of Wolf Point in Roosevelt County, Mont., and was awarded to Lalonde on a low bid of $483,938.

* * *

R. J. Hansen, general superintendent, **William T. Triplett,** general foreman, and **James R. Day,** labor foreman, comprise Burgess Construction Co.'s top supervisors on construction of a composite building for the University of Alaska. Project engineer for Alaska Public Works is **Jack Perry.** Scheduled for completion about October 1959, the $2,217,230 job started last April.

* * *

Leon C. Sorensen, acting as superintendent for Sorensen Construction Co., is in charge of a grading and surfacing job in Summit County, Utah, a recent award to the Sorensen firm on a low bid of $153,429. **David Warnick** is foreman. With last June the starting date, the job will be finished in October.

* * *

William C. Smith, superintendent, with the assistance of **Bob Westphal** as foreman, and **Newell Dayton,** master mechanic, is directing the reconstruction of 7.5 mi. of the Santa Rosa road in Santa Barbara County, Calif., for Jesse J. Harrison and San Ardo Construction, Inc., the successful bidder. The $438,536 project got under way last May and will be finished in September.

* * *

E. F. Shaifer, project manager, and **Huso Festich,** superintendent, are top men for F. H. Antrim Construction Co., successful bidder at $125,729 on 5 mi. of grading and surfacing on the Perkinsville-Williams highway in Coconino County, Ariz. Other important personnel on the job are **Marvin McDonald,** grade foreman, **E. D. Antrim,** office engineer, and **Bob Milliron,** timekeeper. Scheduled for September completion, work started in June.

* * *

Warren G. Briggs, superintend-

or Hoops Construction Co., arge of a $375,138 job consist- 11.1 mi. of grading, gravel, d structures near Welcome on Highway 40 in Elko County, Other key men here are **H. B.** , grade foreman, **Clyde Wenz**, nic, and **Oz Reese**, timekeep- esident engineer for the Ne- Department of Highways is uza. The job is now nearing etion, having been under way May.

* * *

sley Moore, project manager, Bert Candelent and Herbert superintendents, are key men ng at the San Diego State Col- n San Diego, Calif., on erec- f five residence halls. Cory & worth was low bidder at $1,- 0; started work in June, and ts to have it finished about 959.

* * *

n A. Carpenter, structures an, and **Bruce Holladay**, grad- reman, are key men under F. Bailey, president of Shore- Construction Co., who is in e of operations on the firm's 25 contract for 1.2 mi. of g, surfacing and structures in ty of Trinidad, Colo. Shore- started construction at the May and has set next Octo- the finish date.

* * *

). Hart, general superintend- Gene Fuller, engineer, and Davis, equipment superintend- omprise the top men appoint- handle a large job awarded by avy to Dale Benz, Inc., J. W. and B. H. Oates, for build- utilities, roads and miscel- us construction at Barstow, The $5,634,596 contract got way in June, and according rry Thompson, vice president, be completed by the end of 960.

* * *

n J. Siegrist, supervisor, aided e Roth and **Fred Brewer**, fore- has charge of a $465,239 award egrist Construction Co. for g, surfacing and structures on . of Montrose-east highway in rose County, Colo. Job started e and will be finished in Sep- r.

* * *

Harris and **E. G. Matz**, both intendents for L. M. White acting Co., are handling a 17 project under way in Gra- County, Ariz., consisting of mi. of grading and surfac- he Douglas-Safford highway.

Scheduled for completion Oct. 3 work started here in May.

* * *

Edwin V. Harris, project ma ager, and **Art Vitus**, superintenden head the personnel now working o a school and auditorium under co struction at the Naval Amphibiou Base, Coronado, Calif. M. H. Gol en Construction Co. has the co tract at $1,594,000. Other key me are **Harry C. Johnson**, timekeepe and the foremen, **Harry Schmok** and **Curtis A. Knudsen.** Under wa since May, the job will probably b finished by July next year.

* * *

Ben Elmendorf and **Maynar Lange**, superintendent and job for man respectively for Acme Co struction Co., are key supervisors o grading and paving 2.6 mi. of ne highway addition to State Highwa 2-A in King County, Wash. Set fo October finish, the $247,941 jo started in June.

* * *

Walt Drexler, superintendent fo C. H. Strong Engineering & Co struction Co., is in charge of a re cent award to this contractor fo work at Wasco Dam, an earth-fi dam with concrete outlet structure which is part of the Juniper Div sion of the Wapinitia Project i Oregon. This contract from th Bureau of Reclamation started i June and will probably end Oc 1959.

* * *

Jack Budd, general superintend ent, and **Joe Baker**, job superin tendent, are in charge of a $1,037 844 recent award to R. A. Heint Construction Co. The job is in Lin County, Ore., and is for grading an surfacing Saddle Butte-Twin Butte section of Pacific Highway south o Albany. Job will be finished i October.

* * *

Phillip A. Treat, general super intendent in the employ of Boes pflug Construction Co., is in overal charge of construction of a hospita at Long Beach, Calif., on whic **Charles Callard** is project manager **Charles Rutherford**, general fore man, and **R. T. Mayer**, office man ager. Boespflug won the award on a low bid of $6,320,000, started con struction May 21, and figures t have the project finished by Jan 21, 1960.

* * *

Brad Lockwood is supervising a $1,587,482 recent award to Pete Kiewit Sons' Co. for construction o 6.7 mi. of 4-lane expressway, west

of Sears Point in Marin and Sonoma counties, Calif. Other important men on the project are: **Al Ashley**, office manager; **Ed Bilsborrough**, structures superintendent; **Mel Walker**, master mechanic; **John Kaufman**, **Earl Tepner** and **Robert Lloyd**, excavation foreman; **Elmo Boyd**, general carpenter foreman, and **Don Oakley**, labor foreman. Under construction for the California Division of Highways, this job started in May and will probably run until June 1959.

* * *

A. G. "Bo" Raisch, Jr., is serving as project manager for A. J. Raisch Paving Co. which successfully bid a 4-lane divided highway on State Route 9 in Sunnyvale, Calif., at $1,051,034. Other key men on the year-long job are **Norman Gates**, foreman, **Joe Ray**, plant superintendent, and **Earl Dingwall**, shop supertendent.

* * *

Orville Ennis and **Edwin Ennis**, superintendent and foreman respectively, are in charge of a bridge construction over the Green River and about 3 mi. of road in Sublette County, Wyo., for Charles M. Smith, successful bidder at $161,261. Smith started work June 1 and will be finished Oct. 1.

* * *

Carson Frazzini is acting as project manager for Pyramid Construction Co.'s grading and surfacing job near the California-Nevada state line in Douglas County, Nev. **Duane Kearn** is superintending the job, and **Ross Rogers** is timekeeper-bookkeeper. The job has been under way since June and Frazzini figures to have it finished in October.

* * *

Alvin F. Connerley was named by W. R. Cahoon Construction Co. to superintend current construction of two concrete bridges over the Snake River on Interstate Highway 82 in Idaho. According to Cahoon, the $435,811 project should be finished this September.

* * *

Thomas N. Beall, project manager for Arrington Construction Co., Inc., has charge of a $466,380 award to the contractor to construct Process Improvement Facility at the NRTS in Idaho. Superintendent on this job is **Robert D. Taylor**. Mechanical foreman is **Earl D. Harris**, and electrical foreman is **Russell Morton**. Under way since May 20, work will probably end January 1959.

(Continued on page 124)

Cooling System Tips

By V. A. WOODLING
Manager
Service Training
Caterpillar Tractor Co.
Peoria, Ill.

THE COOLING systems of the diesel engines of most earthmoving machines are similar in design. Additional items such as an oil cooler, a torque converter, or cab heater vary the basic system only slightly. The small amount of time required to properly care for this system will result in better machine performance, longer engine life and less down-time.

Two schematic diagrams, Figures 1 and 2, show the basic cooling system found on most crawler tractors. In Figure 1 the cooling system is operating with the temperature regulators closed—a normal condition when the temperature of the collant is less than approximately 170 deg. F. With the temperature regulators closed, coolant is circulated by the pump only through the cylinder head, block and regulator housing. A by-pass in the regulator housing returns the coolant to the pump inlet.

The second diagram, Figure 2, shows the cooling system operating above 170 deg. F. with the temperature regulators open. Here the coolant is allowed to flow into the radiator permitting the maximum cooling capacity of the system to be used. These two diagrams illustrate the function of temperature regulators—the "watchdogs" of the cooling system.

Too often, however, regulators are unjustly accused of causing an engine to overheat. Usually the first thought is to remove and discard them at the first sign of overheating. Don't jump to this conclusion. Actually, overheating can result from a number of defects and incorrect operating procedures.

Before removing and discarding temperature regulators, a systematic check of the cooling system should be made. Ordinarily, the first indication of overheating is noted on the temperature gauge. It should not be assumed that the temperature gauge is always correct. First, remove the radiator cap (caution should be exercised when doing this on a pressurized system), and insert a reliable thermometer into the coolant. This should be done with the engine running since coolant temperatures in the top rank rise immediately after shutting down an engine. If the thermometer indicates that th engine is overheating, a systemat check should be made to determi the cause. Begin with an inspectio of the radiator core by looking fo signs of scale, dirt or other cloggin agents. Using soft water and a ru inhibitor recommended by the m chine's manufacturer will great reduce scale and rust deposits i the system.

A free flow of air through th radiator fins and around the engin is equally essential to adequat cooling. Inspect the radiator co fins to see if they are damage or bent or simply plugged wit mud or trash. A loose fan belt d bent fan blades are also a commo

(Continued on page 93)

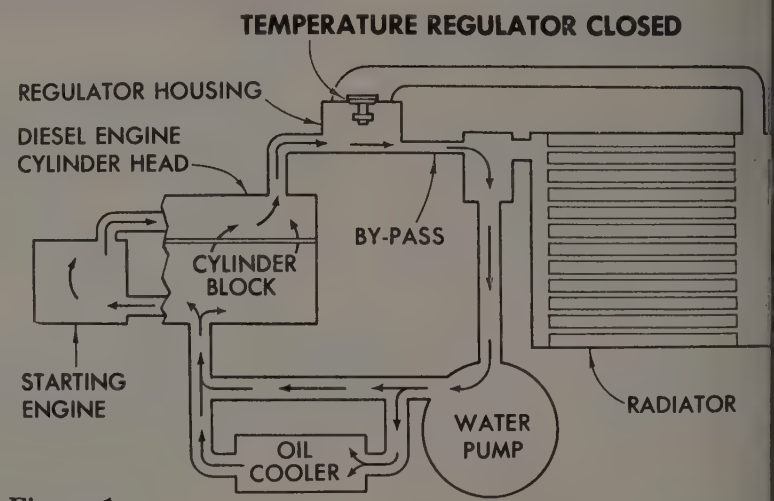


Figure 1

BASIC COOLING SYSTEM on most crawler tractors is shown in this schematic drawing. The coolant circulation is shown with the regulator closed, as it is with the temperatur below 170 deg.

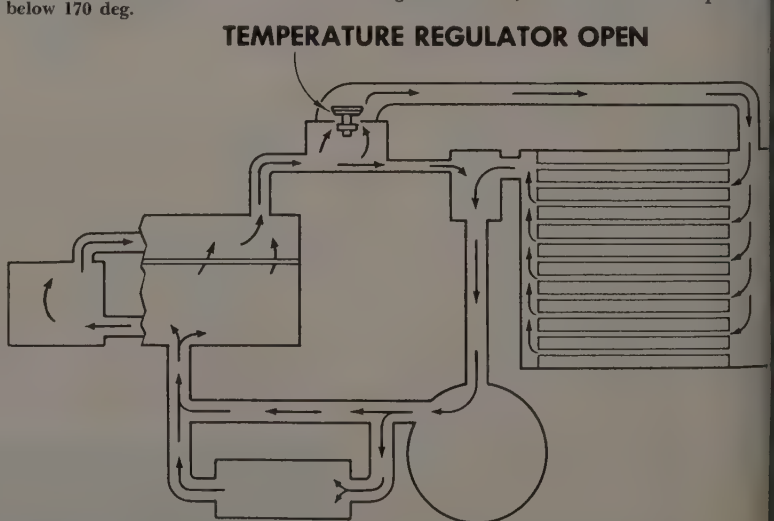


Figure 2

REGULATOR OPENS when temperature rises above 170 deg. and permits coolant t flow through radiator. Overheating is not always the fault of the regulator and re moving them is risky.

6 YARDS PER MINUTE WITH A 105 EXCAVATOR

Constructing a dam spillway involves a considerable amount of earth moving. It also presents loading problems because of extremely tight working quarters.

At a dam project, they had been moving earth, consisting mainly of decomposed shale, with ¾ yd. shovels loading from stockpiles pushed up by a bulldozer. In addition, the bulldozer had to rip the earth before dozing. This meant three separate operations — extra equipment tied up — an extremely costly, time-consuming job.

A versatile EIMCO 105 Excavator moved in — flying earth was all that could be seen from then on. The 105 overhead loader walked into the narrow spillway channel, started loading out 6-yard dumptors at the rate of one every 40 seconds — total time lapse for dumptor to move in, be loaded, move out: ONE MINUTE. The bulldozing and ripping operations were completely eliminated — production costs, equipment required, and time consumed were reduced to an absolute minimum.

EIMCO also manufactures a 105 Front End Loader with the same rugged construction and high production rates as the 105 Excavator. Write The EIMCO Corporation for detailed information on EIMCO high production, cost-saving 105 Loaders.

Eimco 105 Front End Loader.

THE EIMCO CORPORATION

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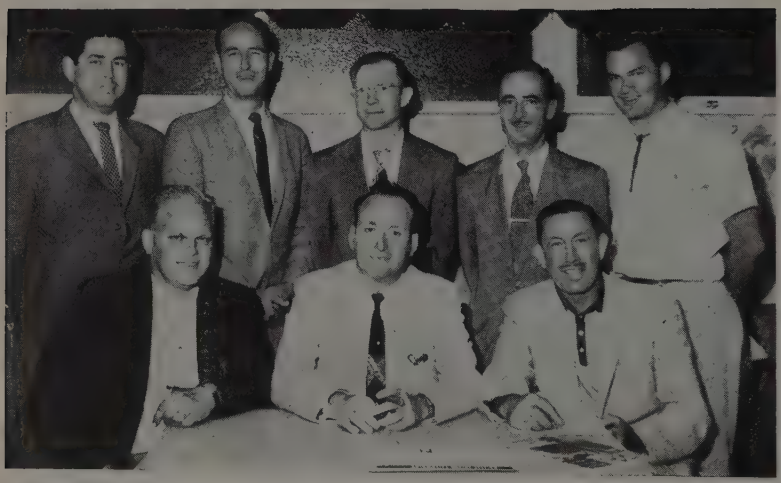
EMSA chapter news



OFFICERS and committee members for 1958 of the Equipment Maintenance Supervisors Association, San Diego Chapter, are (front row, l. to r.): *Ed Johnson*, Cameron Bros. Construction Co., Secretary; *Keith Robertson*, Construction Machinery Co., President; *Fred Cody*, Griffith Co., 1st Vice-president. Standing are (l. to r.): *Melvin E. Chase*, Western Metal Supply; *Ron Hitchcock*, John R. Roebling's Sons Corp.; *Winnard Davis*, Cameron Bros. Const. Co.; *Wesley Miller*, Allen Riggs Co.; *Ted Arthur*, Shell Oil.

A GOOD crowd turned up for the latest meeting of the San Diego Chapter of the Equipment Maintenance Supervisors Association to hear J. T. Hanafin and C. E. Painter, both of General Petroleum Corp., discuss preventive maintenance. The speakers described a 5 point program and illustrated their remarks with a film.

As is standard for each meeting the members discussed some of their own particular maintenance problems. Proper leading of a wire rope socket and the use of multiple viscosity oils were some of the subjects brought up.

The San Diego Chapter has enjoyed tremendous growth since its inception a year ago. The Chapter meets on the last Tuesday of each month at the Haynes Streamliner restaurant.

The Third Annual EMSA dinner-dance will be held September 6 at the California Country Club on Workman Hill Road near Shepherd Machinery Co. in Whittier. Over 100 members and wives attended last year.

Dry-type air cleaner

A DRY-TYPE engine air cleaner which provides two-stage air filtration is described in a 4-page folder published by the manufacturer, **Farr Co.** The unit consists of a centrifugal cleaner with a pleated

trainer after-filter. The first stage s self-cleaning and requires no scheduled attention. Failure to periodically replace the cleaning element in the second stage will not cause engine wear, it will only result in a shortage of air to the engine.

The folder gives the specifications and operating characteristics of the unit and describes its advantages over bath-type filters.

COOLING TIPS

(Continued from page 90)

cause of overheating. Operating a diesel engine at continuous overload is another.

If, after checking these items, the cause of overheating is not found, remove the temperature regulators. If the engine still overheats with the regulators removed, they are not the cause of the trouble and should be reinstalled immediately. Should the engine run at normal operating temperatures with the regulators removed, it is evident that they are at fault and new regulators should be installed. Do not operate the engine any longer than necessary with the regulators removed.

Air in the cooling system is another common cause of engine overheating. Air can enter the system in several ways. The most probable causes are a low coolant level, a loose or damaged precombustion chamber gasket or loose head stud nuts.

Air in the cooling system can result in cracked cylinder heads or other serious engine damage. If not quickly exhausted from the cooling system after completely filling the radiator, air will displace water from the cylinder head, allowing the normally hot parts to operate at even higher temperatures.

A simple check, sometimes called the "bottle test" (see drawing), will indicate if air is present in the system. The equipment required to perform this check consists of a bucket of water, a length of hose which will fit over the radiator overflow tube and a quart bottle.

To begin the test, fill the cooling system and operate the engine at high idle for at least five minutes after the engine reaches operating temperature. Shut the engine down, make sure that the radiator cap is tight and place the rubber hose over the end of the overflow tube. Fill the bottle with water, insert the loose end of the hose into the bottle and invert the bottle in the bucket filled with water. Start the engine and operate it at high idle. The following water displacement rates are considered maximum: Four-and six-cylinder engines—1 pint per min.; eight-cylinder engines—1 pint per 40 sec.; twelve-cylinder engines—1 quart per min. If the water is expelled from the bottle in less time, air or gas leakage into the system is excessive and the source must be located and corrected. Continued operation with excessive air or gas flow into the system may result in serious engine damage.

Further possible causes of overheating may be in the water pump, or from restrictions in the water jacket, lines or hoses. One cause of overheating which should not be overlooked when trouble shooting crawler tractor cooling systems is a clogged crankcase guard. Dust, mud and other debris are good insulating materials which may cause the temperature of crankcase oil or torque converter fluid to be raised to such an extent that overheating in the cooling system occurs. Frequent inspections of the guard can prevent this problem.

Overheating of track-type tractor's diesel engine equipped with torque converter may result from several reasons other than those previously listed, since torque converter cooling is usually a function of the basic cooling system.

A torque converter, like most units transmitting torque, operates more efficiently through a certain range. The most efficient point of operation is when output shaft speed is equal to approximately one-half input shaft speed. However, satisfactory operation can be obtained when output shaft speed is as low as one-third or as high as three-fourths of input shaft speed. When the output shaft operates for extended periods of time at speeds that are lower or higher than the recommended speed range, the torque converter may overheat. Operation in the zero to one-third range indicates too great a load, while operation in the three-fourths and above range indicates too light a load is being applied to the torque converter. In either case, heat is generated by the rapid circulation of fluid. This heat must be absorbed by the cooling system.

In no case should the engine be allowed to operate at or near high idle speed with the torque converter input shaft coupled to the engine and no load on the output shaft. Overheating will probably occur in a matter of minutes. Also, with the engine operating at low idle speed and the torque converter coupled to the engine, overheating will occur, but after a much longer period of time. If the torque converter is equipped with a clutch, the clutch should always be disengaged when the engine is idled. If the torque converter is not equipped with a clutch, experience will determine how long the engine may be safely idled at low speed before overheating of the torque converter will result.

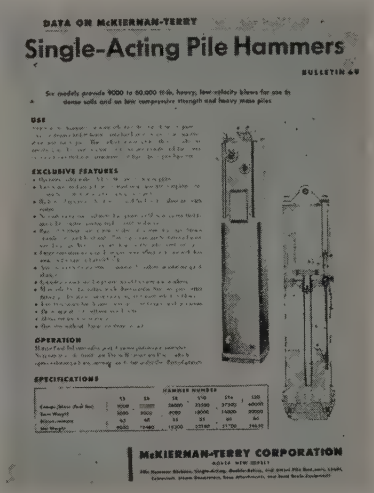
In most cases, overheating of this type can be prevented by observing the torque converter temperature gauge and, when necessary, shifting gears or readjusting the load or engine speed to operate within the recommended limits.

In summary, remember these important points. Most cooling systems for earthmoving machinery are basically the same. If overheating is evident, make a systematic check to determine the cause of overheating. Do not remove and discard temperature regulators—they are the "watchdogs" of the cooling system. Use clean, soft water and rust inhibitor.

NEW LITERATURE

McKiernan-Terry offers pile hammer data

The **McKiernan-Terry Corp.** of Dover, New Jersey, has just published their Bulletin No. 69, a 6-page, 2-color brochure containing physical specifications and performance data on their complete line of single-acting pile hammers. The


DATA ON McKIERNAN-TERRY

Single-Acting Pile Hammers

BULLETIN 69

USE

EXCLUSIVE FEATURES

OPERATION

SPECIFICATIONS

McKIERNAN-TERRY CORPORATION

free brochure features photographs and sectional drawings of the low velocity steam air hammers, and includes sectional drawings of various drive caps available for use with these hammers. Also featured is an illustrated explanation of single-acting hammer operating principles, along with pile static load bearing curves for the entire McKiernan-Terry single-acting pile hammer line. . . . *Circle No. 155*

Barber-Greene ditcher booklet

A 16-page, 2-color folder has just been issued, describing in detail **Barber-Greene Co.'s** new Model 774 wheel-type ditcher. Ten features of the Model 774 are described in detail in the folder. These include dual-range hydracrowd or hydraulic crowding control; flexible drawbar; a new digging wheel drive, eliminating long, wrap-around chains and assuring equal contact on both sides of the wheel; an all-hydraulic spoil conveyor drive; special, trouble-free crawler design; automatic electric overload protection; hydraulic boom hoist and other use of hydraulics in controls. The final feature is the rapid convertability of the Model 774 wheel ditcher to the Model 784 vertical boom ditcher. Special accessories for operation in rocky ground or in "gumbo" are also described. Several pages of the folder are devoted to on-the-job illustration showing the 774 at work under a wide range of job conditions. . . . *Circle No. 156*

Atlas cost chart helps blasting cost analysis

The Atlas Blasting Cost Chart has been published to help the user of explosives compute and analyze his true excavating costs. To assist the explosives user in applying the chart to his particular operation, **Atlas Powder Co.** has also published two booklets on the analysis of blasting costs. Printed in file folder form so as to be useful as a permanent record, this 4-page chart provides space on the first page for recording all pertinent data about the blasting operations being analyzed. Specific cost entries and calculations are made on the inner two pages. The fourth page contains space for pertinent remarks as well as a check list of efficient blasting practices. One of the two accompanying booklets, the "Blasting Cost Control Manual" discusses the techniques of computing and controlling excavating costs. The second pamphlet gives detailed instructions for using the chart and is titled "How to Use the Atlas Blasting Cost Chart." . . . *Circle No. 157*

Prestressed cylinder piles described

Design, construction and installation of prestressed concrete cylinder piles are described in a 26-page catalog available from **Raymond International, Inc.** The literature points out that more than 300 structures have been built in recent years on Raymond prestressed cylinder piles and the more significant structures are described and illustrated. Cylinder piles are manufactured by casting 16-ft. long sections, placing them end to end and stringing together with high-strength cables. After all cables in

E. L. Yeager Co.

RIVERSIDE, CALIFORNIA

reports on the

MC-530W Moto-Crane

their

7th LORAIN

E. L. Yeager Co., Riverside, California, is a seven Lorain owner. Here, the company's 35-ton Lorain MC-530W Moto-Crane, mounted on an 8 x 4 carrier, with 45-ft. boom and a 1-yd. clamshell bucket, is being used to pull up and transplant palm trees.

A few of the many MC-530W features that appeal to E. L. Yeager Co. include the free-swinging "Shear-Ball" turntable mounting that eliminates all adjustment, maintenance and lubrication problems; smooth, easy, 2-lever, "Joy-Stick" air power controls; and the lighter, longer, stronger square tubular-chord crane boom.

Ask your Thew-Lorain Distributor about its other features —and about his on-the-spot Lorain parts and service facilities that have such an important plus value when you buy Lorain.

THE THEW SHOVEL CO., LORAIN, OHIO

ANDREWS EQUIPMENT SERVICE
Spokane, Wash.

ATLAS EQUIPMENT COMPANY
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CENTRAL MACHINERY CO.
reat Falls, Havre and Lewistown, Mont.

COAST EQUIPMENT CO.
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GENERAL EQUIPMENT CO.
Reno, Nevada

INTERSTATE TRACTOR & EQUIPMENT CO.
Portland and Eugene, Ore.

MOUNTAIN TRACTOR CO.
Missoula and Kalispell, Mont.

NASH-DAVIS MACHINERY CO.
ings and Bozeman, Mont.; Greybull, Wyo.

NEW MEXICO EQUIP. CO.
Albuquerque, New Mexico

LEE REDMAN EQUIP. CO.
Phoenix, Arizona

SANTA FE EQUIPMENT CO., INC.
Los Angeles and San Bernardino, Calif.

SOUTHERN IDAHO EQUIPMENT CO.
Idaho Falls, Boise and Twin Falls, Idaho

TRACTOR & EQUIPMENT CO.
Sidney, Miles City and Glasgow, Mont.

WORTHAM MACHINERY COMPANY
Cheyenne, Casper, Sheridan and Rock Springs, Wyo.

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the pile have been tensioned by means of jacks, the ends of the cables are anchored temporarily with metal locking cones. Cement grout is pumped into the cable holes under pressure, and after the grout has hardened the locking cones are removed.

. . . Circle No. 158

Multi-wheel drive trucks for on- and off-highway work

A 16-page book on the design features and advantages of multi-wheel drive trucks for both on- and off-highway applications in construction, road maintenance, transport, and ready-mix, now may be obtained from the **Four Wheel Drive Auto Co.** The 9x12 pages of the new FWD book show comparative design of conventional trucks and four and six-wheel-drive vehicles. Through photos and diagrams, the book also details ways in which multi-wheel drive trucks are engineered for on-highway as well as off-highway performance. The book is called "Plain Facts About the Advantages of Multi-Wheel Drive." *. . . Circle No. 159*

Specification bulletins describe four Trojan tractor shovels

Specification bulletins just released on four Trojan tractor shovel models show the user how to obtain maximum production at fast, economical operation. Issued by the Contractors Machinery Division of **The Yale & Towne Manufacturing Co.**, the four bulletins give the specifications of the following Trojan tractor shovels: Model LHM-75, 1-cu. yd. capacity; Model 104, 1½-cu. yd. capacity; Model 154, 2-cu. yd. capacity; Model 404, 4-cu. yd. capacity. The colorful 2-page bulletins list the standard and optional equipment for each model. *. . . Circle No. 160*

Case offers 8 new publications

Trenching, loading, and dozing machines, complete ready-for-work units mounted on Case 34 and 42-hp. Utility tractors, are concisely described and illustrated in 8 new publications now available from **J. I. Case Co.** A 6-page leaflet shows the company's line of wheel and cawler tractors, companion Case-built backhoes, front-end loaders and dozer blades, plus a large selection of specialized attachments. In addition, 6 new 2-page specification sheets spotlight major operating features and mechanical details of

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. . . for more details, circle No. 56 on Reader Service Postcard

individual tractor-equipment combinations. A seventh 2-pager describes a 5-ton tilt-trailer. All literature free upon request.

... Circle No. 161

For dependable lifting

Coffing Hoist, a division of **Duff-Norton Co.,** describes their complete line of Quik lift coil chain electric hoists with push-button control, in a 13-page 3-color bulletin. Designed to bring heavy-duty hoist efficiency and durability to the portable hoist field while keeping weight to a minimum, Quik lifts are available in capacities of ¼ to 2 tons. The new hoist has a strong but lightweight die-cast aluminum frame and housing for easy portability. Push-button controls are mechanically interlocked, and operate on 115 volts, regardless of motor voltage. Cutaway drawings, specifications, illustrations of accessories and a list of features give a thorough run-down on the product. *... Circle No. 162*

More power with large crawlers

A comprehensive discussion of the capabilities of large crawler tractors is given in "Increase Power, Production, Profit", a new 12-page booklet released by **Caterpillar Tractor Co.** Printed in two colors, the booklet points up the uses of the D8 and D9 tractors in construction, pipelining and other applications. Brief specifications are given for both machines. Photographs and drawings emphasize the features of torque converters, the oil clutch and the constant "live shaft" power for hydraulic and cable controls, steering clutches and brake boosters. *... Circle No. 163*

Complete run-down on Eagle washers and classifiers

A fact-packed, 40-page booklet on Eagle washing and classifying equipment for sand, gravel, crushed stone and ore, is now available from **Eagle Iron Works.** Included in this useful volume is a flow chart explaining the types of function of Eagle's various equipment which will help readers relate these to their individual needs. Extensive photographs, cut-away drawings, and diagrams cover the company's water scalping-classifying tanks, fine material washer-classifier dehydrators, washing and classifying sections for aggregate plants, and

portable units, to mention a few. Specifications are included with each item in this information-packed booklet. Free on request.
. . . Circle No. 164

Literature Briefs

TRACTORS — Photographs, case histories, and job studies to help you choose the right piece of tractor equipment for your job are featured in this 8-page booklet by **Caterpillar Tractor Co.**
. . . Circle No. 165

ELECTRIC PLANTS — What to consider in selecting an electric generating plant is covered in a 4-pager offered by **D. W. Onan & Sons, Inc.** *. . . Circle No. 166*

WIRE ROPE LUBRICANT—The Whitmore Mfg. Co. describes their product, which is used to minimize friction and eliminate corrosion in wire rope. *. . . Circle No. 167*

ELECTRIC MELTING POT — for melting asphalts, tars, pitches, resins, mastics, etc. is detailed in a descriptive bulletin put out by **Glas-Col Apparatus Co.**
. . . Circle No. 168

TWO-WAY RADIO — A 4-page brochure on **Kaar Engineering Corp.'s** answer to the problems of low-cost, two-way radio communication. *. . . Circle No. 169*

TAIL-GATE SPREADER—A bulletin from **Highway Equipment Co., Inc.** gives specifications and features on several models of Hiway spreaders. *. . . Circle No. 170*

HYDRO-SPREADER—Ice control and seal coating operations as performed by **Central Engineering Co.'s** Hydro-Spreader are explained in a bulletin from that company. *. . . Circle No. 171*

SEAMAN GUNNISON—Specifications for **Seaman Gunnison Corp.'s** Duo-pactors, utility scraper, bituminous distributors, and Hydro-jet street flushers are given in a 2-color folder. *. . . Circle No. 172*

FINISHER — The operation features of the Rex finisher are put forth in a **Chain Belt Co.** bulletin. Well illustrated. *. . . Circle No. 173*

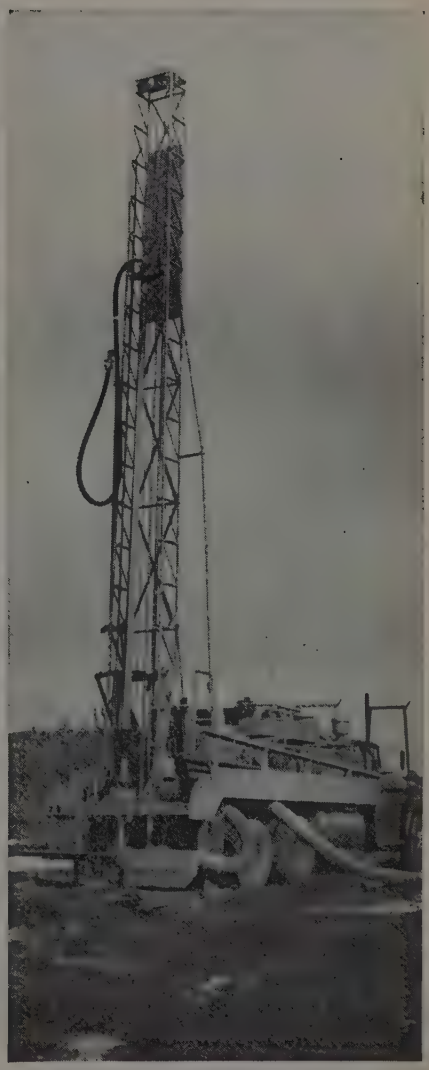
SPEED...POWER...
GARDNER-DENVER

A 5½" hammer wallop. Here's deep hole drilling power in a class by itself. Gardner-Denver DH143 fills the rock drill gap between wagon drill and rotary rig.

DEEP HOLE PUNCH BLAST HOLE DRILLS

New mobility in an old quarry favorite. This new deluxe model of "Air Trac"® provides complete power positioning for all vertical, horizontal and flat lifter holes from centralized controls.

Lightweight combination. Easily handled drilling power for fast, clean holes with Gardner-Denver FL48 and FL58 air feed leg drills.



In-the-hole power for rotary rigs. New, hard-hitting Gardner-Denver "Mole-Dril"* rides with bit through rock, delivers more foot-pounds of energy to the bit than any other drill of its size.

*Trade-Mark

Air power for all drills. And plenty of it when you put water-cooled, all-weather Gardner-Denver rotary portables on the job. Five models from 125 to 900 cfm.

Long-life drill steel. Gardner-Denver sectional rods, couplings, ring seal shank . . . cut drilling costs . . . reduce steel breakage. Carburizing produces hard case . . . soft, tough core structure. Shot-peening increases fatigue resistance.

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NEW EQUIPMENT

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

½-yd. shovel introduced by Bucyrus-Erie

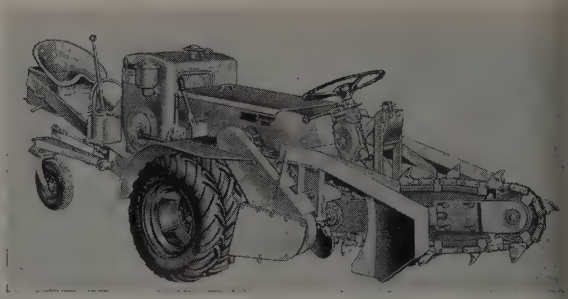
An all-hydraulic combination hoe-shovel has been introduced by **Bucyrus-Erie Co.** It is the ½-cu. yd. Hydrohoe-Hydroshovel, new companion to the H-5 Hydrocrane. Like the Hydrocrane, the H-5 Hydrohoe-Hydroshovel mounts on any new or used suitable commercial motor truck. The H-5 can be taken to jobs at speeds ranging up to 50 mph. The new unit is available as "hoe only," without basic crane or

hoist machinery, or it can be made so as to follow quick field conversion to crane or clamshell work. Among the features of the new unit are: Three hydraulic circuits, each supplied by a separate pump, provide 90-hydraulic hp. for production work. Response from the hydraulic controls is instant and positive. Load shock is thwarted by automatic relief valves. A total of 189,000 lb. of ram force is provided by the combination of crowd-down, dig and wrist action rams. The double-acting rams permit dippers to be reversed from Hydrohoe to Hydroshovel for backfilling, loading and shovel-type digging. Complete information available on request.

. . . Circle No. 174

Barber-Greene announces rubber-tired ditcher

Barber-Greene Co. has announced their new Model 702-A rubber tired ditcher, a highly mobile unit designed for narrow trenching in the fields of underground placement of utility and communication lines systems. Designed to dig a maximum of 40 in. deep; the 702-A may be equipped with either a chisel tooth bucket line digging either 3 or 5 in. wide; or a hook tooth line digging 3½ or 5 in. wide. This choice of bucket lines makes the machine readily adaptable to a wide variety of underground soil conditions. Maintenance costs promise to be reduced with the installation of special headshaft and boom support

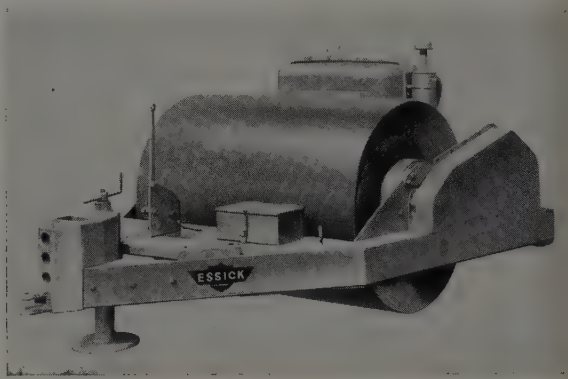


bearings; a new large radius boom foot end with an optional foot-sprocket for extremely tough digging. A new positive boom hoist lock makes for more positive maintenance of grade at any selected digging depth. Also, the boom take-up for adjusting the slack in the bucket line has been made more readily accessible. Complete information and specifications are available on request.

. . . Circle No. 175

Largest vibrating roller in production

An 8,100-lb. heavy-duty vibrating roller for big projects is now available from **Essick Manufacturing Co.** Model VR-72-T has been extensively tested over the past year on projects such as the Scattergood steam generating plant at El Segundo, Calif., the steam plant in San Diego, Calif. and several storm drain projects in Southern California. Traveling at a speed of from 1 to 4 mph., depending on material



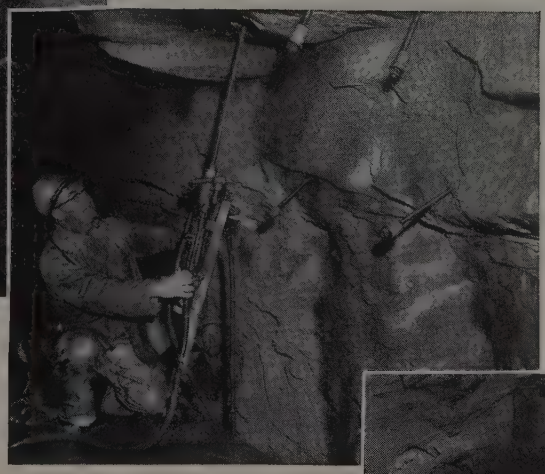
to be compacted, the 72-in. roller (51 in. in diameter) produces a compaction force of 580 tons per second. This tremendous force is achieved through a constant vibrating speed of 2,320 rpm. The new model is 12 ft. 4 in. in overall length; 7 ft. 5 in. in width; and 5 ft. 6 in. in height. Power is supplied by a Model F-226 Continental engine which develops 59 hp. at 1,800 rpm. Pulling power equivalent to a D4 Caterpillar is required. A standard pin hitch is used.

. . . Circle No. 176

SMALL CAPITAL INVESTMENT
DOES A MAN-SIZE JOB

Dyberry Dam Tunnel finished ahead of schedule with ALL I-R EQUIPMENT

of the Ingersoll-Rand JR-38B Universal rills at work on the tunnel face. Each took 2 to 3 hours, and from 50 to 60 of rock were removed at each blast.



Roof-bolting holes were drilled with an assembly consisting of a JR-38B drill mounted on an I-R Jackleg. Investment in drilling equipment was thus kept to the minimum.

Working from a rubber-tired drill jumbo, operator tightens roof bolts with a powerful but light weight Ingersoll-Rand 308 Rotary Impactool.

This 600 cfm Gyro-Flo portable rotary compressor supplied ample air power for all operations—including the blowing of the noon whistle. Air was piped to both portals and drilling was done at one heading while mucking at the other.

Dyberry Dam diversion tunnel is a small but vitally important part e Lackawaxen River Flood Control Project. Under normal condi-, Dyberry Dam will be dry—river flow being by-passed through the t diversion tunnel. But under flood conditions, excess water will be unded in a large reservoir, preventing damage to downstream nunities.

Hunkin-Conkey Construction Co. of Cleveland, Ohio, contractor of whole dam project, has completed the tunnel... months ahead of dule with the Ingersoll-Rand equipment shown here. Using a burn ole pattern, JR-38B Jackdrills and Series 113—1½" Carset bits. foot drilled holes advanced tunnel 7 to 8 feet per blast! Holes for bolting were drilled by Ingersoll-Rand JR-38B mounted on a Jack- nd roof bolts were set with I-R rotary Impactools. Air power for headings was supplied by a 600 cfm Gyro-Flo portable compressor.

rge jobs or small, I-R equipment can meet every drilling require- —and help you meet contract dates at lowest overall cost. Ask your epresentative for any information you may need.

Ingersoll-Rand

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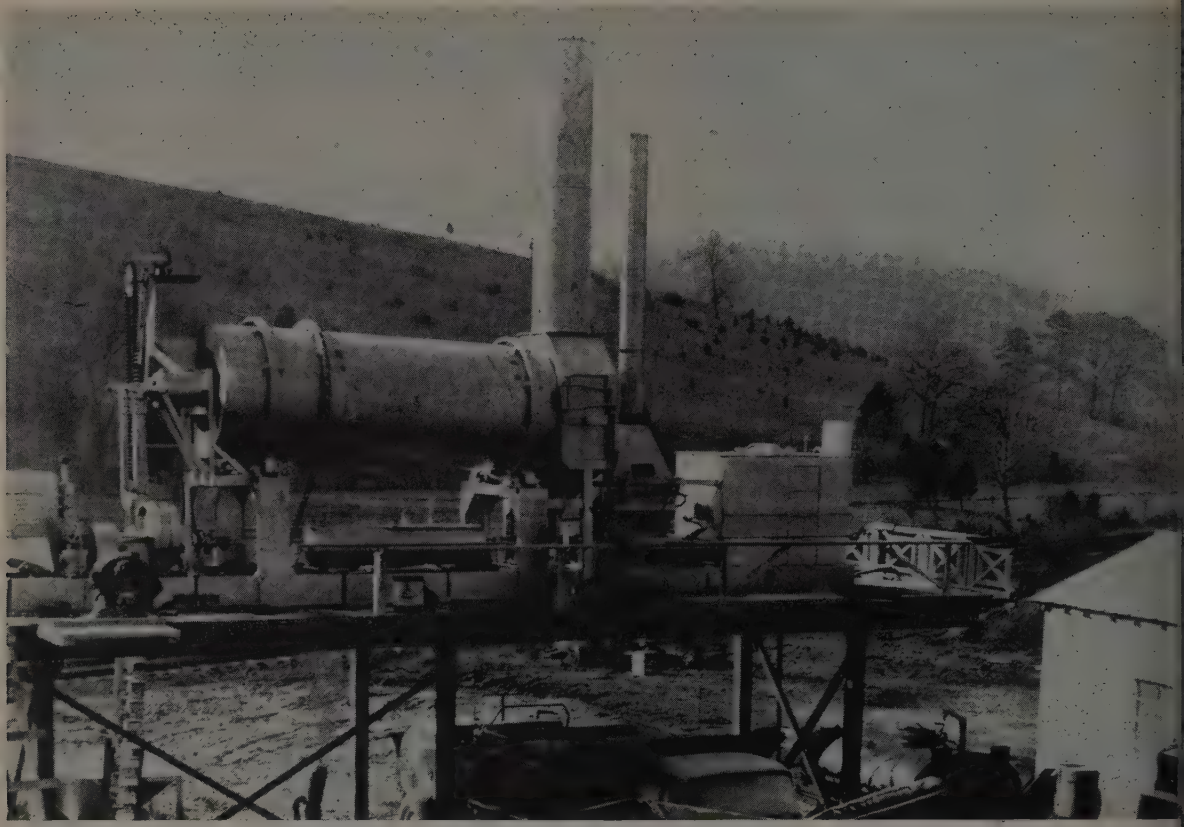
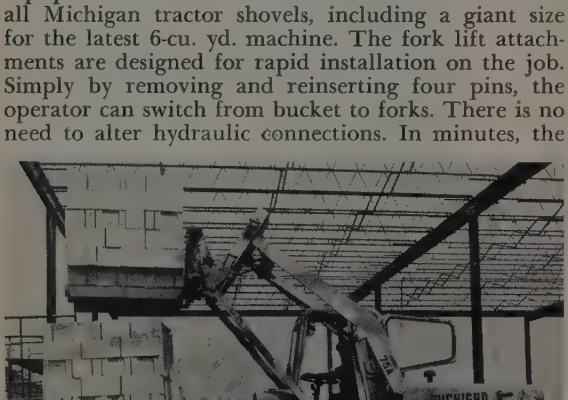
A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK



AN IMPROVED 20 to 25-ton-per-hr. portable asphalt plant, Model L-20, is announced by *White Manufacturing Co.* An extra large dryer, 52 in. by 12 ft. and an over-sized blower-burner combination insures high production of hot-mix asphalt, even with wet aggregate. The entire plant, except the feeder bin, is mounted on one frame for easy portability and is available without wheels for stationary installation. All o the control gates are air-operated and the entire plant i powered by one engine for a minimum of maintenance an simplicity of operation. Model L-20 is equipped with eithe twin or single axle pug-mixer with option of weigh scales fo aggregate and bitumen. . . . *Circle No. 17*

Fork lifts for Michigan

The Construction Machinery Division of **Clark Equipment Co.** now offers fork lift attachments for all Michigan tractor shovels, including a giant size for the latest 6-cu. yd. machine. The fork lift attachments are designed for rapid installation on the job. Simply by removing and reinserting four pins, the operator can switch from bucket to forks. There is no need to alter hydraulic connections. In minutes, the bulk handler is transformed into an effective handle of palletized loads, logs, pipe and similar materials Forks can be hand-spaced to suit load characteristics Fork positioning and locking is accomplished with out bolting. Two double-acting tilt cylinders on th Michigan tip back the forks for safe load control Forks are heat-treated steel with a one-piece forge tine. The fork carrier is structural steel—one-piec submerged-arc welded. Capacities vary from 4,000 lb at 24 in. from heel of fork on the 1¼-yd. Model 75A tractor shovel to 15,000 lb. on the 6-yd. Model 375A . . . *Circle No. 17*



Heavy-duty ripper for Case TerraTracs

A heavy-duty ripper, built to match the pullin power of torque converter-equipped Case TerraTra Model 800 and 1000 crawler tractors under extremel tough conditions, is announced by **J. I. Case Co** Designed to provide maximum strength and pene tration in hard-packed soils, the new ripper digs t a depth of 20 in. Removable hardened steel teeth are 1½ in. thick and have replaceable drive-on tips Three teeth are standard, but extra slots are pro vided so that five can be used for lighter digging A single tooth can also be used for sub-soiling ripping old pavement, etc. The ripper is raised an

HENSLEY .... A COMPLETE LINE OF

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- ☑ Rips Frozen Ground
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FRESNO
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NEVADA CITY
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OROVILLE
Oroville Auto Parts
REDDING
Cascade Industrial Supply Co.
Lowry Equipment Co., Inc.
NORTH SACRAMENTO
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WEST SACRAMENTO
Wescott Machinery Co.
SAN DIEGO
San Diego Spring & Brake Co.
SAN LUIS OBISPO
Farmers Hardware & Equipment
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Stevenson Equipment Co., Inc.
STOCKTON
Stockton Iron Works
SUN VALLEY
Audrey & Co.
UKIAH
Fred E. Barnett Co.
Holz Company
WILLOWS
Westside Tractor & Equipment Co.
YREKA
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Complete Auto & Home Supply Company
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COLORADO

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Track Service Company
GRAND JUNCTION
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Colorado Road Machine Co.

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WYOMING

CHEYENNE
Keremi Tractor & Equipment Co.

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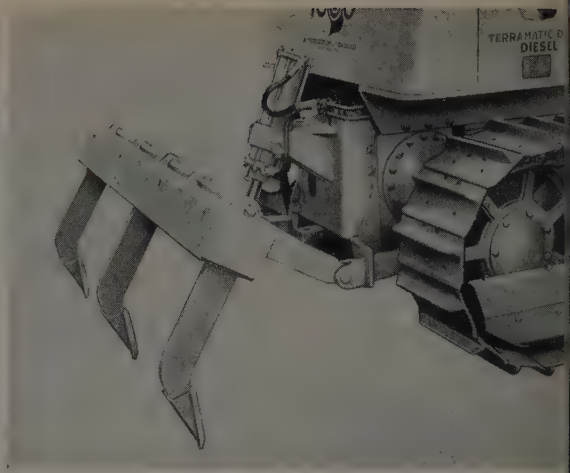
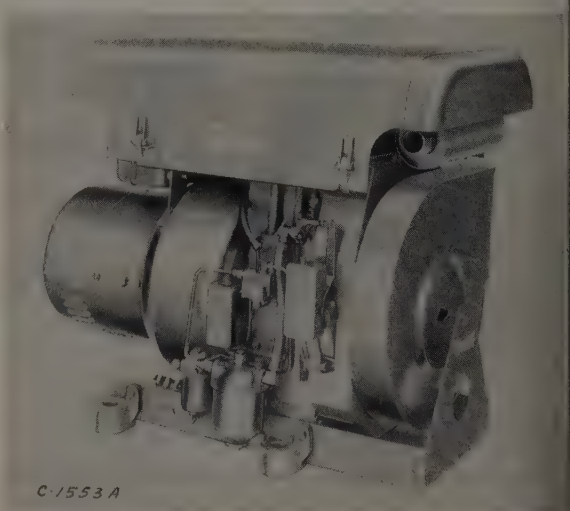


lowered by a large trunnion-mounted hydraulic cylinder controlled from the operator's seat. Weight of the ripper on dozer-equipped tractors is 985 lb. On tractor-shovel models, 1,740-lb. ballast weights are added. The tractor models for which the new ripper is designed are capable of developing up to 20,000 and 24,000-lb. drawbar pull respectively.

. . . Circle No. 179

Onan plant has unique cooling system

A 3,000-watt air-cooled diesel electric generating plant is announced by **D. W. Onan & Sons Inc.** The new plant, Model 3DSL, features the company's vacuum cooling system, Vacu-flo, which employs a powerful centrifugal blower that pulls cooling air through the generator and over the heated engine parts, then expels the heated air through a duct to



the outside. This enables the unit to be installed in completely enclosed compartments, in a space just slightly larger than the unit and its accessories, with allowances for an air-intake and exhaust outlet. Because of the cooling system, the plant automatically ventilates the compartment or room where it is installed. In addition to the standard voltages (115 V., 115/230 V., 230 V., 60-cycle) the DSL plants can be obtained in 24-30 V., 32-40 V., and 110-140 V. battery charging models.

. . . Circle No. 180

. . . for more details, adv. opp. pg., circle No. 64 on Reader Service Postcard→

Greater power

New and more powerful engines, both gasoline and diesel, give you reliable power and plenty of reserve power. Diesel engines are available in either 2 or 4 cycle types.

More traction

New, better weight distribution with 1500 pounds more weight on the rear wheels provides more useable traction at all times — gives more push for greater digging power, better climbing ability and surer footing on mud, snow and ice.

Stronger throughout

Many components have been made stronger than ever, including main frame, boom arms and bucket linkage. The new front axle assembly is 40% stronger and the rear (steering) axle assembly is 80% stronger. These axles are wider and increase the side stability of the model H-70. They also include larger main shafts and heavy duty planetary final drives in the wheel hubs.

Greater protection

To assure fullest protection of the engine when operating in dusty conditions, the H-70 uses a triple air cleaner system consisting of a precleaner and two oil-bath air cleaners. A cartridge-type oil filter is built into the hydraulic reservoir. Similar filters also protect the engine oil and the transmission-torque converter oil. The front service brakes are sealed to keep out dust and dirt.

Larger, more efficient torque-converter

The torque-converter in the model H-70 is larger with ample capacity for the job and closely matched to the engine and transmission characteristics. It is the efficient two-phase type with a high torque-multiplication factor (stall ratio) of 2.72 to 1.

"Paylomatic" power-shift transmission

The model H-70 has the same Hough-built "Paylomatic" full power-shift transmission that has demonstrated its superiority on the model HH. With 3 speeds in each direction, it provides low powerful digging speeds plus high forward and reverse travel speeds up to 26 mph. Finger-tip shifting up or down in either direction without "clutching" or stopping for a range shift, speeds operating cycles on any job.

Power-transfer differentials

The use of power-transfer differentials as standard equipment on both front and rear axle assemblies continues with this model H-70. These special differentials insure reliable traction on mud, ice and similar conditions by transferring more power to the drive wheels with the best footing when slippage is encountered.

What about rated capacity?

This model H-70 like all other "PAYLOADER" models is rated, not by "Bucket Size" or "Lifting Capacity", but by *Carry Capacity* — the pounds of material that can actually be carried in the bucket at speeds up to 4 miles per hour. The Carry Capacity of this "PAYLOADER" is 7,000 lbs. and you will note that the "70" in the model H-70 designation indicates it's 7,000 lb. Carry Capacity.

Knowing the Carry Capacity is 7,000 lb., you can select the bucket you need from the many sizes available (from 1 cu. yd. to 2¾ cu. yd.) depending on the specific weight of the heaviest material you want to handle.

For example, a 2 cu. yd. bucket for handling materials weighing up to 3,500 lbs. per cu. yd. (2 x 3,500 = 7,000 lb.). Insist on knowing the Carry Capacity of the tractor-shovel you buy. "Lifting Capacity" — what it will lift standing still — and "Bucket Capacity" are not enough.

Powerful pry-out bucket action

The model H-70 has the famous pry-out bucket action that distinguishes "PAYLOADER" units from all other tractor-shovels in both looks and performance. Your Hough Distributor would like you to prove to yourself that the model H-70 will out-produce any tractor-shovel near its size. Ask him for a demonstration, and you be the judge. The Frank G. Hough Co., 707 Sunnyside Ave., Libertyville, Ill.

Modern Materials Handling Equipment

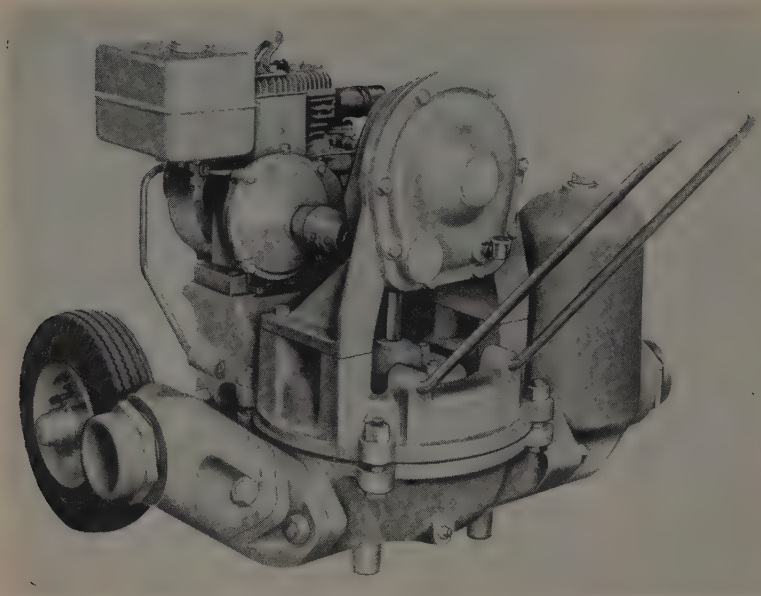
THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

SAY "HUFF"

. . . for more details, circle No. 65 on Reader Service Postcard



A WHEEL-MOUNTED diaphragm pump with 3-in. hose connections has been added to the *Midland Products Co.* line of pumps. With a capacity of 4,300 gal. per hour these pumps are suited for all types of utility and construction dewatering work. They handle sludges and solids that would normally clog centrifugal pumps. Constructed of aluminum alloy for lightness, with shafts and gears of special material to withstand wear, they can be wheeled about on a job or easily carried by two men. *. . . Circle No. 181*

MADE OF special steel to withstand severe use, the Asphalt Cutter attachment is approved by most cities where specifications call for a concrete saw. Mounted on Timken bearings and attached to the moldboard of a grader, the cutting action of the wheel is such that it will not disturb the remaining surface. The wheel cuts to a depth of 5 in. with one or more passes in warm weather. It will fit most graders in the medium to heavy class having a moldboard depth of 18 to 24 in. The unit (Model M-160) is $590 F.O.B. *The Asphalt Cutter & Machinery Co.* *. . . Circle No. 182*

79,000-lb. crane will lift 90,000 lb.

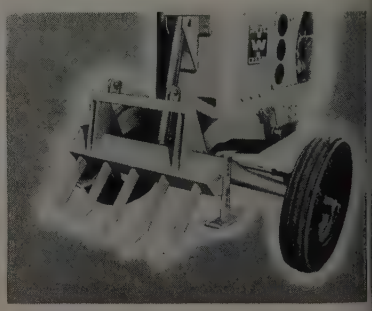
Capacity to lift 90,000 lb. with a 40-ft. boom, 11,000 lb. more than its own working weight, is one of the important features of the new crawler-mounted **Koehring Division** 545 Sprawler. Pivoting outriggers, used when making heavy lifts, are quickly swung into position and pedestals attached. When moving, the outriggers can be folded back to an out-of-the-way position alongside the crawlers, or can be removed completely. The 545 can "walk"

with 61,500 lb. when the outriggers are not used. Overall length of standard crawlers is 14 ft. 3 in. Equipped with 30-in. shoes, overall width of crawlers is 11 ft. 2 in.

. . . Circle No. 183

Scarifier attachment for Huber-Warco unit

The **Huber-Warco Co.** announces a completey new five-tooth scarifier attachment for the Huber-Warco Maintainer. The new unit has been engineered for maximum efficiency in medium and light-duty scarifying of blacktop, stone, gravel, dirt and other materials. It has a swath of 33 in. and a scarifier pressure of 2,400 lb. It can be quickly attached



The tougher the hauling jobs,

the more you save with Autocar!

Here's how Western haulers have found it: *for more payload per trip, more trips per day, less down time for repair and lower operating costs* . . . for *all* these advantages — Go Autocar!

Then when the really tough jobs come along — the jobs that let you best evaluate the truck's performance — you'll find that Autocar enables you to save even more!

The facts bear out...as hauling requirements become more and more demanding, as ordinary trucks become less and less able to meet these demands, this *extra*ordinary Autocar comes through for you with reserve earning power to spare.

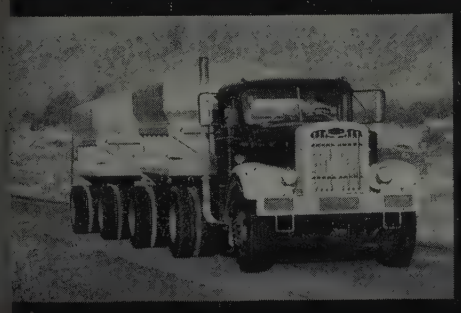
The reason? Autocar's rugged special features: nuts and bolts construction; alloy-steel, heat-treated frame; rugged rear axles and low-cost renewable bushings . . . *engineered to last longer and earn more!*

Let Autocar help you save more on your hauling jobs . . . call your local Autocar Representative today.

Sales & Service Facilities Everywhere

Autocar

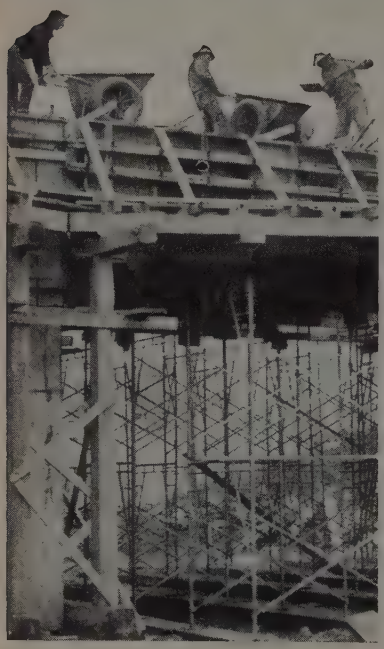
AUTOCAR DIVISION
THE WHITE MOTOR CO., EXTON, PA.



When Autocar takes over the hauling job TRANSPORTATION COSTS DROP!

. . . for more details, circle No. 66 on Reader Service Postcard

Bridge Forming

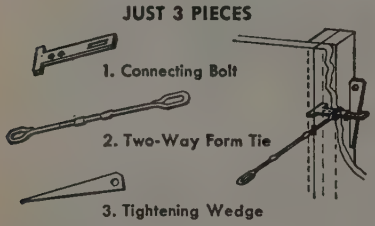


Symons Forms Cut 100 Days Off Bridge Forming Job

Ease of Erecting and Stripping Reduces Pouring Time

Contractor Lee Hoffman, Beaverton, Oregon, was given 320 days to pour 4,000 cubic yards of concrete for a bridge over Myrtle Creek in Oregon. Job was complete in 220 days or only ⅔ the time allotted.

Harry Pajutte, Chief Engineer for Hoffman, credits the ease of erecting and stripping Symons Standard High Strength Forms with contributing substantially to cutting pouring time, reducing number of men required on job, and providing greater mobility for the pouring equipment. Only



3,144 square feet of panels were required for the 160,000 square feet of forming.

Symons Forms, Shores and Column Clamps can be rented with purchase option. Facts on Symons products and engineering service available upon request.

Symons

SYMONS CLAMP & MFG. CO.

634 Williams Street, San Leandro, California
Phone: LOckhaven 9-9159

. . . for more details, circle No. 67

to the same hydraulic-controlled lifting unit as the bulldozer and snow plow attachments.

The Maintainer, in addition to a basic 9-ft. grading blade, can be equipped with hydraulic-controlled attachments for service as a bulldozer, broom, side dozer, lift loader, snow plow, patch roller, berm leveler, and scarifier.

. . . Circle No. 184

Truck crane features Magnetorque swing

Combining heavy-duty capacity with a 200-ft. lift and a high degree of mobility, the all new 70-ton P&H 775 truck crane announced by **Harnischfeger Corp.** features Magnetorque swing, a frictionless clutch mechanism for safer, smoother swing motion. Direct action hydraulic controls assure accurate spotting of 70 tons at a 15-ft. radius. Removable front and rear outriggers and counterweights provide maximum weight reduction for fast job-to-job moves. Both carrier and upper frames are of all welded construction for greater rigidity. The 70-ton truck is either gasoline or diesel powered and mounted on an 8-wheel, 4-wheel drive, P&H diesel powered crane carrier. Dimensions of the carrier are 33 ft. long, 11 ft. ¾ in. wide, and 13 ft. 4⅛ in. high to the top of the cab. When working with a standard boom the complete unit weighs 133,800 lb.

. . . Circle No. 185

Hose and cable bridge

A practical item recently developed by **Calumet Steel Castings Corp.**, is described as a flexible, interlocking hose and cable bridge, for use in guarding against damage

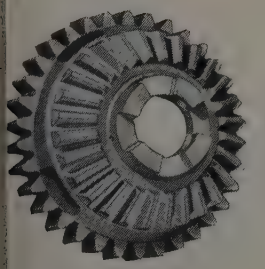
from heavy wheel traffic. Produced as a steel casting, the device weighs about 32 lb. per unit. Each unit has integrally cast interlocking joints at each end to facilitate as-

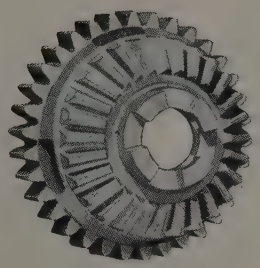
Compactor wheels added to Michigan tractor dozer

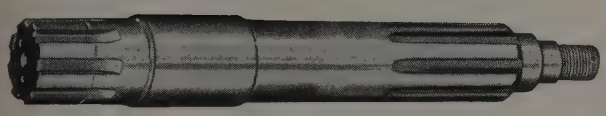
The Construction Machinery Division of Clark Equipment Co. now offers open-face steel compactor wheels as standard attachments for the Michigan Model 180 Tractor Dozer. The quick-change attachments replace the rubber-tired wheels; no other modification is necessary. The contractor now can pull a Tractor Dozer off spreading or dozing operations and put it to work compacting the fill. With the dozer blade ahead of the compactor wheels, the Michigan can spread materials as it compacts, thus eliminating one dozer on the fill. The 60-in. diameter wheels are 22 in. wide on the front axle and 26 in. wide on the rear. They develop 810 lb. of compression per in. of roll face. With fenders, the machine weighs 36,000 lb.

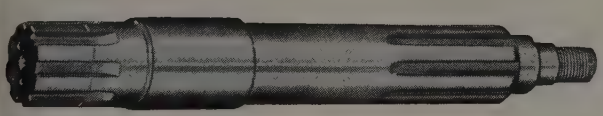
. . . Circle No. 186

WHICH TWINS ARE THE PHONIES?









Look-alike parts can cost you thousands of dollars should breakdowns occur on key jobs!

Metallurgical makeup of steels and alloys used in Bucyrus-Erie parts — and the heat treatments and flame-hardening processes — are impossible to detect at a glance.

Yet these are among important reasons why Bucyrus-Erie parts, made to original equipment specifications, last longer, perform better.

You gamble with your livelihood when you accept "will fit" parts from unchecked sources. They LOOK alike, but they don't perform alike!

Your Bucyrus-Erie distributor has a complete stock of original equipment parts for your machine. Call him today and have his factory-trained servicemen give your machine a thorough check-up. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

3M58

SEE US FOR COMPLETE INFORMATION

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.
West Coast Engine & Equipment Company . Berkeley, Calif.
Clyde Equipment Company . . . . . Portland, Ore.; Seattle, Wash.
Crook Company . . . . . Los Angeles and Bakersfield, Calif.
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 and Kalispell, Mont.
Road Machinery Company . . . . . Phoenix, Ariz.
Intermountain Equipment Company Boise and Pocatello, Idaho; Spokane, Wash.
Sanford Tractor & Equipment Co. . . . . Reno, Nevada

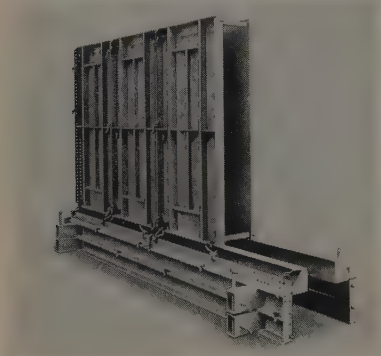
A Familiar Sign . . . BUCYRUS ERIE *. . . at Scenes of Progress*

. . . for more details, circle No. 68 on Reader Service Postcard

sembly of any number of units as needed without use of tools. This hose and cable bridge should prove useful in areas where electric cables, water or air hoses must be traversed by trucks, cranes, or other vehicles. . . . *Circle No. 187*

Wall footing, sidewalk forms poured at once

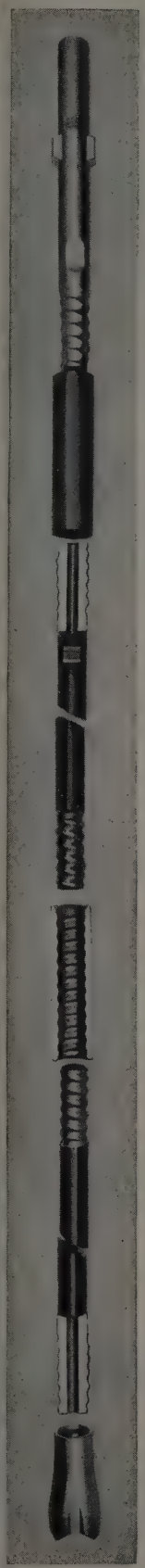
Concrete footings and foundation walls may be poured at the same time through the use of the new **Economy Forms Corp.** wall footing and sidewalk forms combined with regular EFCO form equipment. This results in important savings in time and labor, and permits construction speed-up by eliminating the need of waiting for footings to harden before pouring walls. Where a concrete footing has already been poured, these forms may be used as a base for wall forms. In addition to the above uses, the forms are designed for use as sidewalk forms or as slab edge forms. Multiple sections may be clamped together horizontally with this company's regular plate clamps to obtain thicknesses greater than 4 in. where desired. Forms are all steel. Standard height is 4 in.; lengths are 96, 48, 24 and 12 in. Literature describing and picturing various uses for these forms and giving complete information will be sent on request. . . . *Circle No. 188*



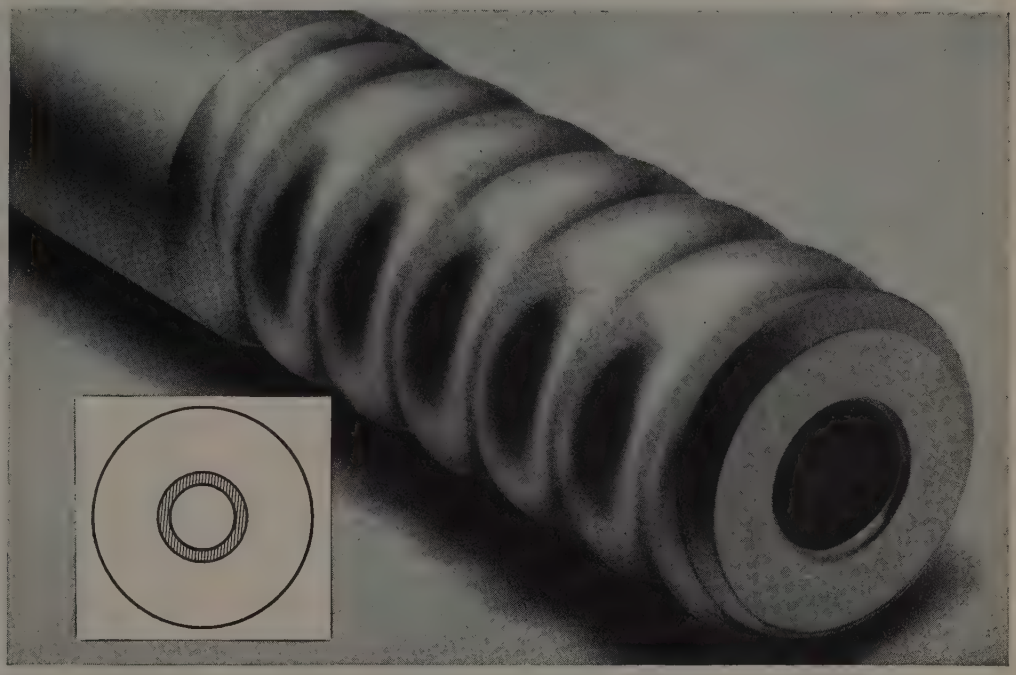
Road form locks without hammering

An improved highway-airport concrete paving form with circular, sliding lock has been designed to eliminate sledging and provide a more rigid joint between rails. This new **Super Form Co.** design assures longer life of forms by eliminating splitting, brooming and bending of the rails and their parts caused by heavy hammering. The

Joy Stick locking device is of simple, trouble-free design. Heavy sleeves are welded into the ¼-in. triangular plates which brace the ends of the forms. By placing an ordinary form stake in the welded socket, and levering forward, the lock pipe is instantly slid into locking position. An auxiliary locking pin in the lower right corner is tapped into place to prevent forms from tilting under any conditions. Supports of heavy channel, are welded to base and top rail. The



NEW ROPE THREAD MAKES UNCOUPLING EASY WITH SANDVIK COROMANT EXTENSION STEELS



Rope-Type Threads Afford No Starting Points for Fractures

Connections used in extension drill-steel must be easy to assemble and uncouple, and connections must not become weak links during the actual drilling. Sandvik Coromant's new patented rope thread makes it easy to join and uncouple the equipment . . . yet gives a solid and positive connection. The gently rounded form of this thread means trouble-free performance—eliminates common thread and coupling failures found in "saw-tooth" threads.

The complete equipment—bit, rod, coupling sleeve and shank adapter—are all dependable Sandvik Coromant parts made of world-renowned Sandvik alloy steel. A further advantage to the user is that the steel can be re-threaded. Atlas Copco has special literature on Sandvik Coromant extension steel and long-hole drilling, available to you with no obligation. We suggest you write today!

Atlas Copco

610 Industrial Ave.
Paramus, New Jersey

930 Brittan Ave.
San Carlos, Calif.

Distributors of COMPRESSORS, ROCK DRILLS, PNEUMATIC EQUIPMENT, SANDVIK COROMANT DRILL STEEL and CARBIDE BITS

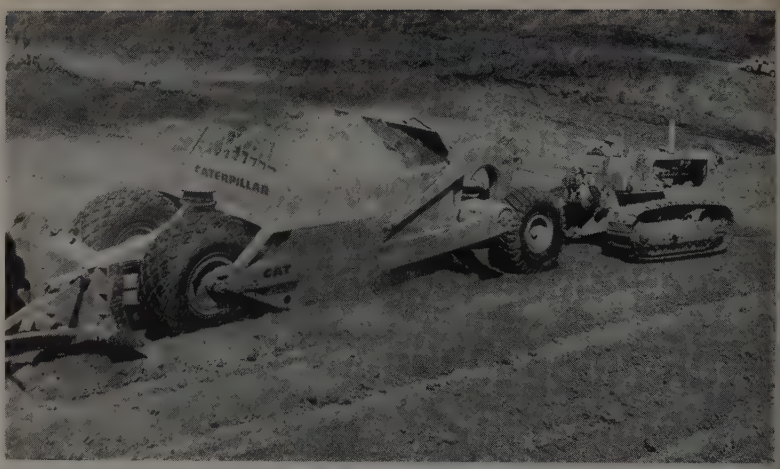
. . . for more details, circle No. 70 on Reader Service Postcard

outer flange of the rail is set in slots in these supports to prevent bending. . . . *Circle No. 189*

New form tie developed

Gates & Sons, Inc., have announced the development of a break-back form tie. Named the PlastiCone, the new tie is designed to produce a positive break-off 1 in.

or 1½ in. back from the surface of the finish concrete. The new product incorporates a molded polyethylene cone which is inserted in each end of the form tie. It envelopes the tie from the point of break-off, out to the surface of the wall, thus preventing excess bleed at the tie-slot. PlastiCone can be removed, with practically no spalling, immediately after stripping. . . . *Circle No. 190*



FOR HIGH production with tractor-drawn scrapers, *Shepherd Machinery Co.* has produced this 45-yd. capacity earthmover by special modification of a Caterpillar No. 491 scraper. Shepherd modification includes extending the bowl 36 in. and the height of sides 4 in. with reinforcing throughout, giving a capacity of 35.7 yd. struck and 45 yd. heaped. . . . *Circle No. 191*

GE headlamps for earthmovers

Three new PAR-46 headlamps, for use on earth-moving equipment, have been introduced by General Electric's Miniature Lamp Dept. Designated as CIM (Construction-Industrial Machinery) headlamps, they were developed to meet operational requirements for scrapers and other fast-moving vehicles. For those vehicles and operations requiring a broad flood of light, the existing CIM floodlamps, numbers 4078, 4478, and 4578 may be used. This makes a complete line of floodlamps and headlamps for 6, 12, and 24-volt electrical systems available from GE. The new headlamps will direct light far ahead while loads are being hauled at high speed to the dumping point. In addition, they are especially constructed to withstand extreme shock and vibration when used in appropriate lamp housings. Lamps are equipped with "fog" shields which reduce the upward stray light which dust reflects into the operator's eyes.

They are currently available through automotive and farm equipment distributors. The 6-volt lamp has a suggested retail price of $3.65 and the 12 and 24-volt lamps are $3.95, federal excise tax included. . . . *Circle No. 192*

Blue Brute announced by Worthington

A new heavy-duty 4-in. Blue Brute Drifter Drill with standard, neutral and reverse rotation has been announced by **Worthington Corp.** While retaining the basic features of Worthington's current drilling units, the new drill is interchangeable with drills now in service, including the company's wagon drills, Port-A-Tracs and hydraulic booms on tractors and trucks. This interchangeability results in economical conversion of existing equipment for rock drilling with sectional coupled steels.

. . . Circle No. 193

Field structures—of steel

The **Childers Manufacturing Co.** has entered the construction picture with temporary field structures in steel. The construction units are produced as a do-it-yourself package of prefabricated, fully galvanized steel parts so simple to erect that even the most unskilled laborer can put them up quickly and easily single-handed. The precut, pre-punched members fit like a toy model and it's merely a matter of bolting them, with only ordinary handtools required. Every piece is small and light enough for one man to handle easily, yet it goes up into a temporary structure with the permanence of steel. It disassembles just as readily, breaking down into members convenient for loading and transport. The buildings are produced in two widths — 10 and 20 ft. — and in lengths of 6 ft. and multiples thereof. Windows and doors can be located wherever needed.

. . . Circle No. 194

Low bids and contract awards

(Continued from page 78)

WASHINGTON

Northwest Construction Co., Seattle, received a $1,281,938 contract for 11.2 mi. of grading and surfacing, Portage Creek to Conway Jct. in Snohomish and Skagit counties. **Woodworth and Co., Inc.,** Tacoma, received a $1,279,507 contract for adding two lanes to State Highway 1, U. S. 99, from Fort Lewis northwest to Ponders Corner in Pierce County. **Max J. Kuney Co.,** Spokane, received a $687,058 contract for 3.7 mi. of grading and surfacing and a new connection for highways 3 and 18 in Steptoe, Whitman County. **N. Fiorito Co., Inc.,** Seattle, received a $545,563 contract for 2.1 mi. of grading and surfacing, Johnsons Landing north in Pacific County. **Wilder Construction Co., Inc.,** Bellingham, received a $535,322 contract for clearing, grading and construction of two bridges on the Bellingham Freeway in Whatcom County. **Grant Construction Co.,** Coeur d'Alene, Idaho, received two contracts for roadwork in Adams and Stevens counties: $472,885 for grading and paving 5.3 mi. of State Highway 11, from Hendrick-Coleman road north to Hatton Coulee in Adams County, and $149,871 for grading and surfacing portions of Loon Lake-Deer Lake road in Stevens County. **James Crick and Sons** and **McAtee and Heath, Inc.** of Yardley, received a $449,874 contract for widening, grading and surfacing State Highway 3 in Benton County. A $434,078 contract was received by **Fred H. Slate Co.** & **E. C. Hall Co.,** Portland, Oregon, for 2.6 mi. of grading, surfacing and structures, Knappton to Bean Creek in Pacific County. **Alton V. Phillips Co.,** Seattle, received two contracts for roadwork in Douglas, Chelan and Thurston counties. A $428,530 award for construction of Columbia River Bridge at Beebe Piers Nos. 2 & 3, Douglas and Chelan counties, and $212,958 for 6.4 mi. of grading and surfacing Trosper Road to Martin Way in Thurston County. A $485,552 contract was received by **S. D. Spencer & Son,** Vancouver, for constructing interchanges on PSH No. 1 in Lewis County. **Natt McDougall Co.,** Portland, Oregon, received a $379,912 contract for clearing and paving new alignment for State Highway 8, frontage roads and connections in Camas, Clark County. **Quigg Bros., McDonald, Inc.** of Hoquiam received a $393,079 contract for construction of Yakima River Bridge and Easton Undercrossing in Kittitas County. **C. E. Oneal, Inc.,** Ellensburg, received two contracts for roadwork in Okanogan and Stevens counties: a $334,824 contract for grading and surfacing 8 mi. of new roadway from Riverside north to Janis, and $323,597 for 5.9 mi. of grading and surfacing Grouse Creek to Cottonwood Creek Road in Stevens County. **Associated Sand & Gravel Co.,** Everett, received a $339,240 contract for surfacing and paving 7.6 mi. south of Arlington in Snohomish County. **Anderson & Stoen** of Seattle received a $333,207 contract for 1.5 mi. of grading and surfacing from Summit to Berne in Chelan County. A $265,798 contract was awarded to **Carbon Bros.** and **United Paving Co., Inc.,** Spokane, for grading and paving State Highway 6 from Penrith northeast to Newport in Pend Oreille County. **Troy T. Burnham Co.,** Seattle, received a $240,878 award for 1.3 mi. of grading and paving, Cora Bridge to Burton Creek in Lewis County. A $189,687 contract was received by **Western General Construction Co.,** Seattle, for reconstructing 1.7 mi. of State Highway 21 near Gorst in Kitsap County. **Maurice Gredvig,** Yakima, received a $181,970 contract for grading and surfacing from Parker to Wapato in Yakima County.

WYOMING

Read Construction Co., Cheyenne, received two contracts for roadwork in Lincoln and Carbon counties: $827,273 for grading and surfacing on 4.2 mi. and construction of 3 culverts on the Ken Merer-Granger Jct. road in Lincoln County, and $330,484 for 4 mi. of grading and surfacing on the Rawlins-Sinclair road in Carbon County. **Knisely-Moore Co.,** Douglas, received a $544,574 contract for grading and surfacing on portions of the Douglas-Gillette road in Campbell County. A $517,826 contract was received by **Gerald M. Ryan,** Worland, for grading and surfacing on portions of the Rawlins north road in Carbon County. A $242,794 contract was received by **Husman Bros., Inc.,** of Sheridan for grading, structures and surfacing on the Buffalo-Gillette road from Buffalo East in Johnson County. **Gilpatrick Construction Co., Inc.** of Riverton, received two contracts for roadwork in Fremont and Albany counties: a $163,710 contract for 8.4 mi. of grading and surfacing the Stephens-Mission road in Fremont County, and $96,868 for grading and surfacing portions of the Herrick Lane road in Albany County. **Etlin E. Peterson,** Casper, received a $144,460 contract for structures on the Moorcroft-Sundance road in Crook County. **Platte Valley Construction Co.,** Grand Island, Nebr. received three contracts for roadwork in Johnson, Crook and Laramie counties: a $729,088 contract for 7.3 mi. of grading and surfacing on the Kaycee-Midwest road in Johnson County, $424,611 for 1.9 mi. of grading and surfacing on two-lane county road, parallel to Moorcroft-Sundance road in Crook County, and $130,007 for structures and misc. work on the F. E. Warren Air Force Base road in Laramie County. **Cop Construction Corp.,** Billings, Mont., received a $424,000 contract for bridge construction, Upper Gibbon River in Yellowstone National Park in Teton County.

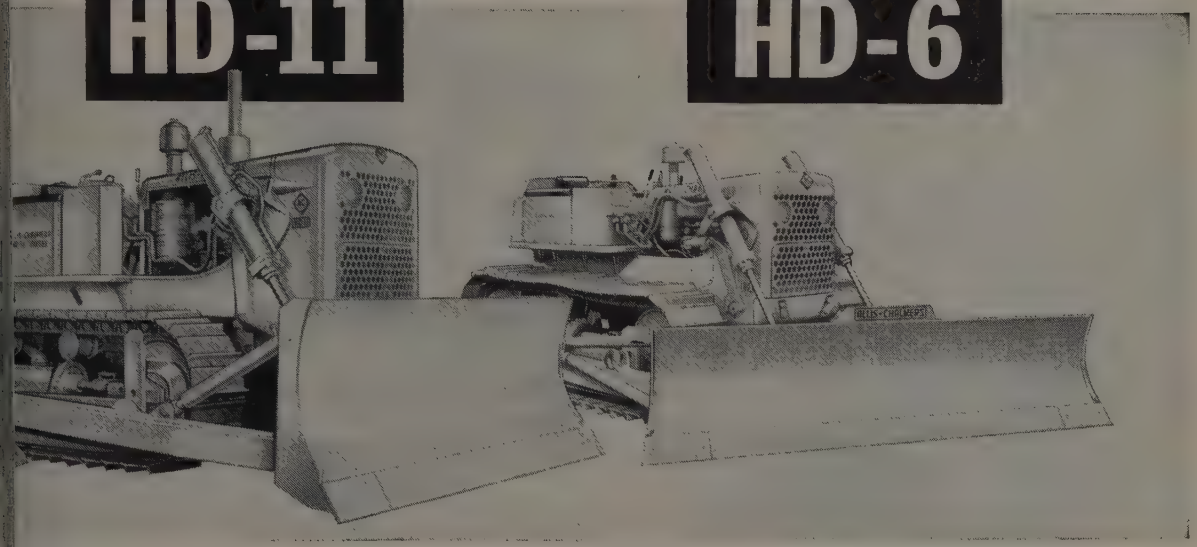
ALASKA

S. S. Mullen, Inc., Seattle, Wash. received a $1,866,010 contract for extensive rehabilitation of the runway and POL system at King Salmon Airport. **F & W Construction Co.,** Anchorage, received a $56,925 contract for relocation of the TACAN building at Fort Yukon and installation of generator sets. **Chris Berg, Inc.** of Seattle, Wash. received a $296,000 contract for construction of additional AC&W facilities at Murphy Dome. **Gaasland Co., Inc.** of Bellingham, Wash. received a $369,000 contract for work at Fire Island. **DeLong Corp.** of New York City was awarded a $5,083,607 contract for dredging and construction of port facilities for the Port of Anchorage. The port facilities project includes construction of a concrete deck, 600-ft. pier, railroad trestle and highway approaches, dredging and installation of 4 level-luffing cranes.

more tough jobs

ALLIS-CHALMERS HD-11

ALLIS-CHALMERS HD-6



94 belt hp

25,960 lb (approx. as shown)

he HD-11 is setting new standards in its size range . offers you dozens of work-boosting advantages, in- uding the industry's easiest shift pattern. A single ift takes it from any forward speed to any reverse— ts short-cycle jobs done faster, easier.

D-11B illustrated—Two other models available

63 belt hp

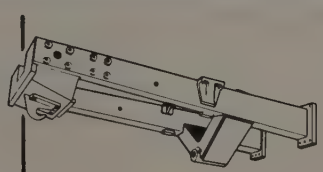
16,470 lb (approx. as shown)

Here's up to 15,500 lb drawbar pull. The HD-6 is the only tractor near its size with big-tractor design advantages—for example, All-Steel Box-A main frame and engine-mounted dozer with direct-lift cylinders for improved weight distribution, accurate dozing and long life.

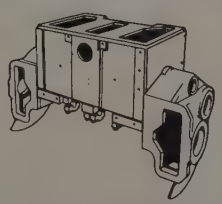
HD-6E illustrated—Three other models available

T GIVES YOU ALL THESE ADVANTAGES IN EVERY SIZE

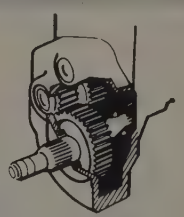
-Dimension Track



All-Steel Box-A Main Frame



One-Piece Steering Clutch and Final Drive Housing



Straddle Mounting of All Final Drive Gears

GON
ert Tractor Company—Medford
d Tractor Company—Portland
er Tractor Company—Springfield

TANA
ntain Tractor Company—Missoula and Kalispell
Machinery Company, Inc.—Billings and Great Falls

THERN CALIFORNIA
truction Machinery Co.—San Diego
Joaquin Tractor Co.—Bakersfield
Sales & Service Co.—Los Angeles

IDAHO
Southern Idaho Equipment Co.—Idaho Falls & Twin Falls
Southern Idaho Equipment Co. of Boise, Inc.—Boise

UTAH
Cate Equipment Company, Inc.—Salt Lake City

WASHINGTON
Pacific Hoist & Derrick Company—Seattle and Puyallup
American Machine Company—Spokane

WYOMING
Studer Tractor & Equipment Company—Casper

. . . for more details, circle No. 75 on Reader Service Postcard

SUPERVISING

(Continued from page 89)

Zelmo Mullican, superintendent, **Bob Davick**, assistant, and **Bob Winkler**, job engineer, comprise the chief personnel on Peter Kiewit Sons' Co.'s $3,410,310 plate girder and concrete deck bridge project over the Los Angeles River on Santa Monica Freeway in East Los Angeles, Calif. Work here started in May and will probably be complete next June.

* * *

Willard "Red" Thomas, job superintendent, assisted by **Dan McKluskey**, is in charge of construction of a high school in Anchorage, Alaska. Contract includes 14 ac. of clearing for building site, 100,000 cu. yd. excavation, and a concrete, steel and masonry building. Contractor J. B. Warrack got the award on a low bid of $2,093,000. Work commenced last May, and **Leonard Thomas**, the general superintendent, reports he expects to have it finished about September 1959.

* * *

Frank Fleshman is superintendent of construction of a heavy support shop for NIKE installations at Fairbanks, Alaska, for Industrial Commercial Construction Co. Other superintendents on the $390,156 undertaking are **W. M. Regan**, steel; **Charles White**, mechanical; **Jerry Evans**, electrical. Excavation and backfill are subcontracted to Wright Truck & Tractor Co. **W. G. Vehmeier**, project manager for the contracting firm, has the job scheduled for September finish.

* * *

J. Gamble and **Thomas Pulakis**, superintendents working for Ramstad Construction Co., are in charge of radar tower modifications at Cape Newenham and at Cape Ramonzof, Alaska. Pulakis is at Newenham, and Gamble is supervising at Romanzof where a water supply system also is being installed. The $1,243,000 contract, which has been under way since June, will be finished this November.

* * *

Ernest Kissee, superintendent, and **Ray Michlig**, assistant superintendent, are in charge of construction of heavy support shop for NIKE installations at Fort Richardson, Alaska. Office manager for the $324,699 project is **Bill Neve**. Lease Company, Inc., was the winner of the award and started work in April.

News of DISTRIBUTORS

Peterson named Caterpillar dealer for north-central California

Peterson Tractor Co. is now serving contractors in north-central California in addition to contractors in the San Francisco Bay area, according to Howard Peterson, president of the San Leandro firm. A Caterpillar dealer in the Bay area for 21 years, Peterson's expanded operations include stores at Redding and Chico. The Chico store is managed by Bill Doyle, formerly light industrial sales manager at San Leandro, and the Redding store is managed by Grant Thompson, who has had many years' experience with the former Caterpillar dealer here.

Kaiser Gypsum distributes metal lathe in West

Kaiser Gypsum Co., Oakland, Calif., is appointed distributor in the 11 Western states for the full line of metal lath products of National Gypsum Co., Buffalo, N. Y.

Oregon distributor appointed

Lippmann Engineering Works, Inc., Milwaukee, Wis., recently signed distributor agreements for areas in Oregon with the Cramer Machinery Co., with offices at Portland and Eugene. Cramer is assigned the counties of Wakiakum, Cowlitz, Clark, Skamania, Klickitat and a portion of Pacific County.

Salt Lake distributor appoints sales engineer

Jack Holland of Holland Equipment Co., Salt Lake City, Utah, announces the appointment of William "Bill" Pierce as sales engineer for the northern Utah and Wyoming territories. Pierce was formerly with U. S. Steel and Bearing Engineering Co. in Utah.

Jerry Guthrie forms new company

C. J. "Jerry" Guthrie announces the formation of Guthrie Machinery Co. at 5816 N. E. Lombard (Portland Highway), Portland, Ore. Headed by Guthrie, owner and manager, the new distributorship plans to handle many lines of equipment previously receiving little attention in the Northwest area, and also proposes to promote the sales of used contractors equipment throughout Oregon and Washington. Some of the lines currently handled by Guthrie include Clary Manufacturing Co. strike-off screeds, Concut concrete saws, Murphy welding steel truck scales, Caldweld magnesium rakes and lutes, the products of American Push Broom Co., and others.

Salt Lake firm adds to sales force; takes on new line

Foulger Equipment Co., Salt Lake City, Utah, plans extensive demonstrations of new Michigan dozers and therefore has added to its sales staff. The new demonstrator is George Swan who has been associated with construction for the past four years. Also announced is the acquisition of the HECO excavator crane and backhoe manufactured by Hadwicke-Etter Co., Sherman, Tex.

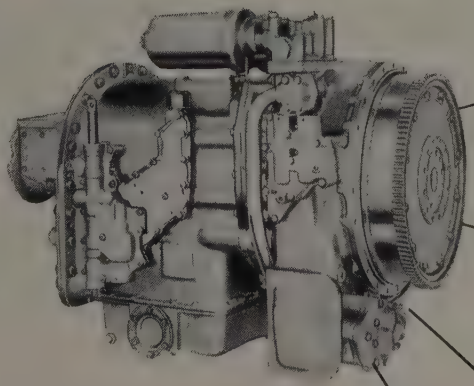
Cramer adds Jaeger and Thor

The Cramer Machinery Co. of Portland announces its appointment to the distributorship of the products of Jaeger Machinery Co. of Columbus, Ohio, and the Thor Power Tool Co. of Aurora, Ill., according to A. B. Bruschke, sales manager for Cramer. The Cramer company will distribute these two related lines of construction equipment throughout its territory.

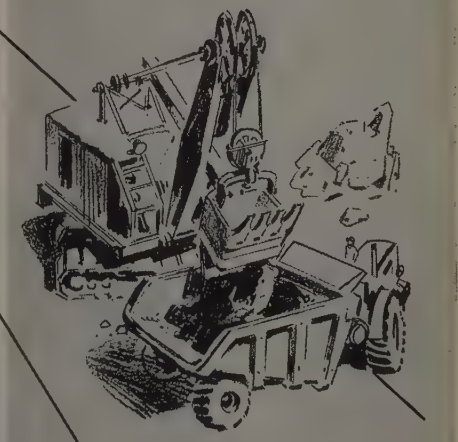
Feenaughty changes and additions

Feenaughty Machinery Co., Spokane, Wash., announces the following personnel changes and additions at the Boise branch office: Mitchell "Mitch" King, well known in southern Idaho construction machinery circles, is appointed Boise manager. Theron "Pete" Roundy, sales representative covering southeastern Idaho, is a recent addition to the Boise sales office, and Bob Klingelhofer recently took over the job of office and parts manager, coming to the Boise branch from Spokane.

On a tough haul – it beats them all



THE NEW TORQMATIC 4-SPEED TRANSMISSION BY ALLISON



WHEREVER there's a tough job to be done—in logging, mining, highway building or dam construction—you can depend on TORQMATIC to do it better—in *less time*.

Take the TORQMATIC CBT-5640, for instance. Its converter automatically adjusts the speed and torque in any gear range—its 4 speeds forward and 2 reverse in the transmission give you an even wider range of speed and torque.

In the rough and rugged routine of mine operations—you get full-power shifts with a finger flick. The flow of power to the driving wheels is never interrupted for gearshifts.

In the deep woods, logs load out faster and safer – thanks to the TORQMATIC brake. The same oil that drives the wheels keeps them under a safe checkrein, too.

But it's in the brutal, bear-down, day-after-day grind of big construction jobs that TORQMATIC really struts its stuff. Round trips are faster because there's never an interruption of power flow while gears are shifted. And vehicles are working longer without stops in the shop, because TORQMATIC eliminates engine lugging and clutch overhauls – and the TORQMATIC brake more than doubles the life of service brakes.

Result: longer life for engine and drive-line components with less maintenance for both.

For detailed specifications on the Allison TORQMATIC CBT-5640 or other models, see your equipment dealer or write:

ALLISON DIVISION OF GENERAL MOTORS, Indianapolis 6, Indiana

Allison TORQMATIC® DRIVES

TORQMATIC

. . . for more details, circle No. 76 on Reader Service Postcard

West Coast sales rep named

Shultz Steel Co., South Gate, Calif., has been appointed West Coast sales representative for the Amballoy line of special steels manufactured by A. M. Byers Co., Pittsburgh, Pa. These steels are used in earth-moving, mining and other industries where applications demand specialty steels.

Doerschlag joins Coggins Co.

Announcement is made by J. D. Coggins, president, of the appointment of Donald J. Doerschlag as vice president and general manager of the J. D. Coggins Co. of Albuquerque, N. Mex. Doerschlag joins the Coggins organization following some fourteen years with International Harvester Co., where he served in various capacities throughout several regions of the United States. His most recent position was that of district representative, Construction Equipment Division, in west Texas, Arizona, and New Mexico, and as a special representative of IH on the Glen Canyon project in Arizona.

Changes in top level management

Archie M. Kennedy was recently appointed president of Modern Machinery Co., Spokane, Wash. Les C. Bro was made vice president and general manager, and Elva Lowry was named secretary-treasurer. Kennedy has been manager of rental equipment for the past seven years, and Bro has been manager of the company since it was started in 1944, while Miss Lowry has been company secretary since 1947. Joe Barlow will continue as sales manager, Henry Rautio as parts manager, Bob Anderson as credit manager, and John Guimond as service manager.

Inland appoints sales manager; adds accounts

Joe C. Barlow, sales manager for Modern Machinery Co. of Spokane, Wash., for the past eight years, has accepted the position of sales manager for Inland Diesel & Machinery Co. in Spokane, according to O. P. Martin, Inland's general manager. Barlow's background also includes several years in the construction field prior to his association with Modern Machinery. Recent accounts taken on by the Spokane distributor are Yale & Towne's Trojan loaders and the Economobile manufactured by American Road Equipment Co.

Don Johnson resigns; Al Anderson takes over

Ronald Ries, president of Wymont Tractor & Equipment Co., Billings, Mont., announces that Al Anderson has been assigned the position of parts manager for the firm. He succeeds Don Johnson who left to accept a position with Tractor-Equipment Distributors, Los Angeles Ford tractor distributor in Southern California.

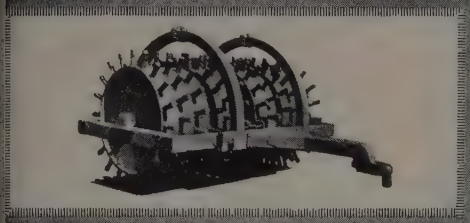
W. Grant Evans elected Lang officer

H. A. Christiansen, president and general manager of Lang Construction Equipment Co. of Salt Lake City, Utah, and Idaho Falls, Idaho, announces the election of W. Grant Evans as secretary and treasurer of the firm. He assumes the duties of W. A. Lang who resigned the office but continues on the Board of Directors.

Diesel Control Corp. named So. Calif. distributor

Farris Pickering Governor Co., Palisades Park, N. Y., has expanded its sales and service organization in the southern half of California by appointing Diesel Control Corp., Wilmington, as exclusive distributor.

Southwest Compaction equipment for every earthmoving job

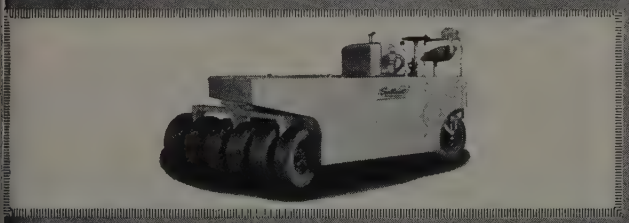


HEAVY DUTY SHEEPSFOOT ROLLERS

SOUTHWEST heavy duty, ARCH TYPE full oscillating Sheepsfoot Tamping Rollers meet U.S. Engineers', Bureau of Reclamation and State Highway compaction requirements. Two models are available—10 to 25 tons. Arch type frame unitizes front tongue and rear cross frame to remove pulling strains from oscillating pins. Equipped with the new FORGED, Southwest two piece feet with replaceable tips, or solid wedge-type feet. Timken bearings throughout. 1" drum shells. 60" drum diameters.

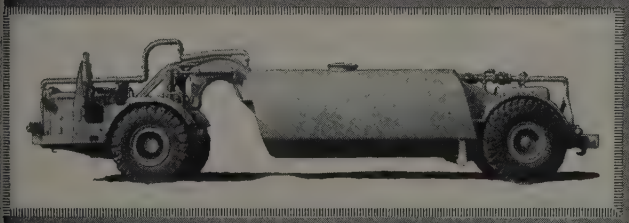
MULTIPLE BOX COMPACTION ROLLERS

SOUTHWEST multiple box, Pneumatic Compaction Rollers provide INDIVIDUAL VERTICAL OSCILLATION of wheels and weight boxes to assure uniform compaction regardless of soft spots, stones or boulders in the fill. No bridging or shifting of load from tire to tire because weight boxes oscillate independently. Contractors report TIRES LAST OVER 3 TIMES LONGER with multiple box type as compared to conventional single box design. Available in five models from 10 to 100 tons. Adaptable to any tractor.



VERTICAL-PAK SELF-PROPELLED ROLLERS

SOUTHWEST Vertical-Pak provides INDIVIDUAL VERTICAL OSCILLATION of rear wheels for the first time in self-propelled machines. Exclusive design affords uniform compaction on uneven surfaces, and new compaction efficiency. Seating arrangement and REVERSE-O-MATIC transmission place operator in a position to see both forward and rear operations. All five rear wheels powered through SELF-LOCKING differential chain drives.



SEMI-TRAILER SPRINKLER TANKS

SOUTHWEST Sprinkler Tanks are available in two models—5,000 and 6,000 gallon capacities—and may be adapted to any make two or four wheel tractor. Equipped with front and rear spray bars, plus gravity bar, these units provide a spray width up to 55 feet. The 6" self-priming centrifugal pump, with in-seat air-actuated controls, has a 1500 gpm capacity. Powered by 6-cyl. gasoline engine. Pressure bar nozzles are adjustable. Large tires assure adequate floatation.

HEAVY DUTY CABLE-OPERATED RIPPERS

SOUTHWEST heavy-duty Rippers are available in four sizes, from 5,000 to 25,000 pounds. Structural features, such as box beam sections of special design, are constructed to withstand the most severe job conditions. Predetermined and set angle of the three ripper shanks assure quick, positive penetration up to 48 inches. Special center shanks can be furnished for 60 inch penetration. Shanks are of special heat treated steel. Points are hardfaced and replaceable. Wheels are drum type, Timken bearing mounted. COMPACTION IS BEST WHEN YOU USE SOUTHWEST.

Southwest PRODUCTS ARE SOLD AND SERVICED BY YOUR CATERPILLAR® DEALER

CONSTRUCTION MACHINERY DIVISION
Southwest Welding & Manufacturing Co.
ALHAMBRA CALIFORNIA

. . . for more details, circle No. 79 on Reader Service Postcard

Cramer sales additions and new lines

Two new sales representatives have joined the staff of Cramer Machinery Co. of Portland and Eugene, Ore., according to A. B. Bruschke, sales manager in Portland. Robert Kaufman is with the Portland sales staff covering Multnomah, Clackamas and Marion counties. He is well known in the equipment field in the Northwest, having been for the past 5 years in the Seattle area with another heavy equipment distribuotr. Richard Greene has joined the Cramer staff in the Eugene office and will cover the southeast half of Oregon. Greene also is well experienced in the equipment field and has been in that business in the Eugene area for many years. Bruschke also announced that Richard Shore has been appointed as the new service manager for the company. His duties will be the handling and directing of all service between the Portland and Eugene operations. Shore was formerly in the distributor business in Seattle.

Six appointed

Appointment of six Western distributors for the Gradall and Hoptto lines of earth-moving equipment is announced by I. T. White, manager of construction equipment sales for the Gradall and Badger division of The Warner & Swasey Co., Cleveland, Ohio. They include: Columbia Equipment Co. of Portland, Ore., and Seattle and Spokane, Wash.; Western Construction Equipment Co., Billings and Great Falls, Mont.; Liberty Trucks & Parts Co., Denver, Colo.; Arnold Machinery Co., Salt Lake City, Utah, and Boise, Idaho; Calweld, Inc., Los Angeles; and West Coast Engine & Equipment Co., Berkeley, Calif.

Northern California distributor

Tilley Manufacturing Co. of San Francisco has been selected as Northern California distributor for Boston Woven Hose & Rubber Co., Boston, Mass. The Boston firm manufactures a full line of hose, belting, v-belts, etc. Tilley is the producer of gaskets and other items under the trade name of "Timco" Products.

New address of L.A. distributor

Larson Equipment Co. has a new address: 3838 Santa Fe Ave., Los Angeles 58, Calif.

CIT opens Seattle office

CIT Corporation has formed a new division to handle business in Washington, Montana, and Alaska and has opened offices in the Northern Life Tower in Seattle under the management of F. L. Conrad.

Cramer gets new head

Cramer Machinery Co., heavy machinery dealer and Oregon distributor for Clark Equipment Co., Construction Machinery Division, elected George Groom to its presidency, effecitve August 1, succeeding James Schriver. Groom has been with Cramer Machinery as manager of the company's Eugene branch. As Groom now headquarters in the company's main office in Portland, the Eugene operation will be headed by Rollin Beck.

Distributor appointed for Heltzel

Brown-Bevis Industrial Equipment Co., Los Angeles, has been appointed exclusive distributor for Southern California for Heltzel Steel Form & Iron Co. construction products, including portable batching plants, bins, forms, conveyors and elevators. Besides selling and servicing the complete Heltzel line, Brown-Bevis is equipped to render prompt field service. Ken Simpson is the California district manager for Heltzel.

Western Traction named Hi-Lectric distributor

Western Traction Co., San Francisco, with branch office in Sacramento, Calif., has been appointed a distributor for Maginniss Hi-Lectric concrete vibrators, generators, paving machine attachments and Powr-Pactor vibratory back-fill tampers.

Straub appoints Northern California distributor

Announcement is made by Straub Manufacturing Co., Oakland, Calif., of the appointment of West Coast Engine & Equipment Co., Berkeley, Calif., as Northern California distributor for Kue-Ken jaw and gyratory crushers. From their convenient location, minutes away from the factory, West Coast Engine can furnish a crusher or a complete crushing plant promptly and can assure prompt solution for any crushing problem.

HOW MUCH PROFIT IN THIS BUCKET?

Here's profit staring you right in the face . . . the heaped bucket of a Trojan tractor shovel . . . But it's the machine behind the bucket that *keeps* profits at their highest peak . . . All five Trojan models, from 18 cu. ft. to 4 cu. yds., are packed with a tremendous production potential, packed with longer working life and with features that keep maintenance at a bare minimum . . . Trojan operating features include low-load carrying position, reverse curve safety arms, straight line horizontal thrust, independent bucket action, non-stop shifting and Detroit Timken high traction differential and planetary axles . . . No other tractor shovel offers all these operating benefits, and that is why no other tractor shovel can match Trojan! For the name of nearest distributor, who will arrange a demonstration, in the Western area contact Dept. JB at San Leandro, Cal. In the East, contact Dept. RA at Batavia, N. Y.

Complete, detailed brochures are now available on the Trojan line. For your material write to Department F9, Contractors Machinery Div., The Yale & Towne Mfg. Co., Batavia, N. Y. or San Leandro, Cal.

TROJAN* TRACTOR SHOVELS

*REG. U. S. PAT. OFF.

YALE & TOWNE

2 & 4 Wheel Drive Front End Loaders

TROJAN DIVISION, THE YALE & TOWNE MANUFACTURING COMPANY, BATAVIA, NEW YORK, SAN LEANDRO, CALIFORNIA

. . . for more details, circle No. 81 on Reader Service Postcard

MANUFACTURERS

Horn names new vice president

Announcement is made of the appointment of Stanford R. Horn as a vice president of A. C. Horn Companies. Horn was appointed sales manager of the Pacific Coast operation in 1947 and has been general manager since 1955. He makes his headquarters at the Western Division offices in San Francisco and covers the eleven Western states and Hawaii.

American Hoist promotes Bradley

Patrick Bradley has been named manager of distributor sales of American Hoist & Derrick Co., St. Paul, Minn. Following his discharge from the U. S. Army Engineers at the close of World War II, Bradley joined Harron-Ricard-McCone in Los Angeles as a salesman. He became associated with American Hoist in 1951.

Austin Thomas joins Blaw-Knox

Austin K. Thomas recently joined Blaw-Knox Co., Pittsburgh, Pa., as general manager of the construction equipment division. A civil engineer, Thomas has devoted his entire business career to the field of construction and related equipment. For the past 18 years he has been in sales and management capacities with a construction equipment manufacturer.

Frank Strnad made chief engineer

Harold F. Allen, chief engineer of Link-Belt Speeder Corp., recently retired and was succeeded by Frank J. Strnad. Widely known in the shovel-crane industry, one of Allen's many important contributions was the hydraulic control system which the company describes as the outstanding development in the crane and shovel operating mechanism on their equipment. Strnad has been with the parent organization, Link-Belt Co., since 1934, and with the subsidiary since 1945, the last eight years as assistant chief engineer.

Koehring acquires Ka-Mo Tools

Koehring Company, Milwaukee, Wis., manufacturer of heavy construction equipment, has purchased Ka-Mo Tools, Inc., a pioneer producer of special earth drilling and boring equipment. The Ka-Mo business now becomes a department of Kwik-Mix Co., a division of Koehring.

J. J. Garrity named to Yale post in San Francisco territory

John J. Garrity has been named hoist district sales manager for Northern California, the northern part of Nevada, Utah, and Hawaii, by Fred E. Rau, hoisting equipment sales manager, Yale Materials Handling Division, The Yale & Towne Manufacturing Co. The new district manager has been employed in Yale hoist sales since 1951. His new headquarters will be at the Yale manufacturing plant at San Leandro, Calif.

Will C. Hall heads Moffett Engineering

Moffett Engineering Inc., Albany, Calif., manufacturer of overhead cranes, announces the election of Will C. Hall as president and general manager. Hall was formerly president of Pacific Coast Engineering, Alameda, Calif.

G. H. Maass joins Schield Bantam

Newly appointed assistant general sales manager for Schield Bantam Co., Waverly, Iowa, is George H. Maass, a veteran in the construction equipment industry who comes to Schield Bantam from Le-Tourneau-Westinghouse.

Dick Davis joins Brunner & Lay

Dick Davis has joined the Brunner & Lay organization as Pacific Northwest manager, making his headquarters at the firm's new Seattle warehouse, 2600 First Ave., where complete stocks of Rok-Bits, drill steel and air accessory tools are maintained.

E. A. Frazier made Seattle district sales manager

Earl A. Frazier has been appointed Seattle district sales manager for the Wire Rope and Aircord Division of John A. Roebling's Sons Corp., replacing the late Arthur R. Robinson. Frazier has been associated with Roebling since 1938. He is well known in the construction industry, having been Roebling's national field representative for several years, and most recently he has been in charge of sales in the New York-New England area. His new territory includes Oregon, Washington, Idaho, and most of Montana.

UNIT PRICES

Selected abstracts for Western projects

DAM—Flaming Gorge Dam and powerplant

Utah—Northeastern part of state—Bureau of Reclamation—A $29,602,497 contract has been awarded to The Arch Dam Constructors for dam and powerplant, Flaming Gorge Unit, Utah-Wyoming, Green Division, Colorado River Storage Project.

(1) The Arch Dam Constructors.....$29,602,497
(Peter Kiewit Sons' Co., Morrison-Knudsen Co., Inc., Mid-Valley Utilities Co., and Coker Construction Co.)

(2) Guy F. Atkinson Co.
American Pipe & Construction Co.
The Arundel Corp.
L. E. Dixon Co.
The Hunkin-Conkey Construction Co..... 31,754,911

Henry J. Kaiser Co.
Raymond International, Inc.
Macco Corp.
Del E. Webb Construction Co., The Shea Co. (joint venture) 33,590,929

PART A

		(1)	(2)
Lump sum	Div. & care of river during const. & unwater. found..	$598,047.00	$985,000.00
Lump sum	Clearing reservoir area	35,000.00	21,000.00
7,000 cu. yd.	Removal of unstable boulders from canyon walls	20.00	5.00
106,000 cu. yd.	Excav., common, in open cut, for dam, powerplant, and appurtenant works	5.50	3.50
100,000 cu. yd.	Excav., rock, in open cut, for dam, powerplant, and appurtenant works, first 100,000 cu. yd.	5.50	11.80
90,000 cu.yd.	Excav., rock, in open cut, for dam, powerplant and appurtenant works over 100,000 cu. yd.	5.50	3.50
12,500 cu. yd.	Excav., all classes, in open cut, for diversion tunnel	4.00	4.00
750 cu. yd.	Excav., all classes, for tunnels in shale seams	50.00	25.00
48,000 cu. yd.	Excav., all classes, for switchyard	4.00	1.10
21,000 lin. ft.	Drill line holes for rock excav.	1.00	0.85
23,500 cu. yd.	Excav., all classes, in diversion tunnel	17.00	32.00
11,500 cu. yd.	Excav., all classes, in spillway tunnel	23.00	30.00
540 cu. yd.	Excav., all classes, in control-cable tunnel	32.00	61.50
790,000 lb.	Furn. & placing permanent struc.-steel tunnel supports	0.15	0.32
4,500 lin. ft.	Furn. & installing tunnel roof support bolts	2.75	4.00
800 sq. yd.	Furn. & install. chain-link fabric for tunnel roof support....	3.25	3.00
14 Mbm	Furn. & install. timber lagging in diversion tunnel	300.00	250.00
4,500 cu. yd.	Backfill	2.80	3.50
7,000 cu. yd.	Compacted backfill	3.00	3.75
1,850 cu. yd.	Riprap	4.00	5.00
260 cu. yd.	Sand & gravel or crushed-rock bedding for riprap....	3.00	7.00
38,000 cu. yd.	Comp. switchyard embank. ..	0.30	0.22
60 cu. yd.	Excav., all classes, for trenches for water-supply line and sewer line.....	20.00	15.00
60 cu. yd.	Backfill in trenches for water-supply line & sewer line..	7.00	4.00
60 cu. yd.	Compact. backfill in trenches for water-supply line and sewer line	0.50	5.00
250 lin. ft.	Core drilling NX holes in stages between 0 ft. and 50 ft.	8.80	6.00
250 lin. ft.	Core drilling NX holes in stages between depths of 50 ft. and 100 ft.	9.40	6.00
500 lin. ft.	Core drilling NX holes in stages between depths of 100 ft. and 200 ft.....	10.50	6.00
200 lin. ft.	Core drilling 5 and ½-in. diam. holes not more than 50 ft. deep	13.50	38.00
20,500 lin. ft.	Drilling grout holes in stage between depth of 0 ft. and 30 ft.	1.65	2.25
11,500 lin. ft.	Drilling grout holes in stage between depths of 30 ft. and 60 ft.	1.75	2.25
12,000 lin. ft.	Drilling grout holes in stage between depths of 60 ft. and 110 ft.	1.85	2.25
6,500 lin. ft.	Drilling grout holes in stage between depths of 110 ft. and 160 ft.	2.00	2.25
1,050 lin. ft.	Drilling grout holes in stage between depths of 160 ft. and 210 ft.	2.10	2.25
100 lin. ft.	Drilling grout holes in stage between depths of 210 ft. and 260 ft.	2.20	2.25
46,000 lb.	Furn. & placing metal pipe and fittings for foundation grouting and drainage	1.00	0.55
800 hk.-ups	Hook-ups to foundation and tunnel grout holes	16.50	12.00
52,000 sacks	Pressure grouting foundations and tunnels	2.75	2.00
126,000 lb.	Furn. & install. metal tubing and fittings for grouting contraction joints	1.25	0.90
300 hk.-ups	Hook-ups to contraction joint grouting systems	25.00	50.00
8,500 sacks	Pressure grouting contraction joints & cooling systems..	3.75	7.00
4,500 lin. ft.	Drilling drainage holes in stage between depths of 0 ft. and 25 ft.	4.40	6.00
4,350 lin. ft.	Drilling drainage holes in stage between depths of 25 ft. and 50 ft.	4.60	6.00
3,500 lin. ft.	Drilling drainage holes in stage between depths of 50 ft. and 75 ft.	5.00	6.00
1,600 lin. ft.	Drilling drainage holes in stage between depths of 75 ft. and 100 ft.	5.25	6.00
400 lin. ft.	Drilling drainage holes in stage between depths of 100 ft. and 150 ft.	5.50	7.00
210 lin. ft.	Const. 8-in. diam. sewer-pipe drains with open joints...	4.00	3.20
80 lin. ft.	Furn. & laying 8-in. diam. sewer-pipe with clkd joints	3.25	9.50
125 lin. ft.	Const. split sewer-pipe drains with cemented joints	4.40	2.20
5,300 lin. ft.	Drilling holes for anchor bars and grouting bars in place.	1.50	2.20
600,000 bbl.	Furn. & handling cement for dam & appurtenant works	4.75	4.80
52,000 sacks	Furn. & handling sacked cement for foundation grouting ..	1.25	1.40
8,500 sacks	Furn. & handling special cement for grouting contr. joints..	1.25	2.00
42,000 ton	Furn. & handling pozzolan..	13.00	4.52
630 sq. yd.	Spec. fin. of conc. surfaces..	20.00	18.00
4,400,000 lb.	Furn. & placing reinf. bars..	0.18	0.16$
500,000 cu. yd.	Concrete in dam, first 500,000 cu. yd.....	14.50	22.05
422,000 cu. yd.	Concrete in dam, over 500,000 cu. yd.	14.50	14.04
750 cu. yd.	Concrete in cut-offs in shale seams	30.00	12.00
900 cu. yd.	Concrete in crane siding and parking area	60.00	46.00
400 cu. yd.	Conc. in sidewalks & parapets	80.00	80.00
1,500 cu. yd.	Conc. in roadway cant.....	50.00	50.00
360 cu. yd.	Conc. in elevator tower....	200.00	150.00
30 cu. yd.	Conc. in gate hoist and stem storage platform	100.00	90.00
3,400 cu. yd.	Conc. in trashrack and gate-hoist structures	110.00	120.00
130 cu. yd.	Second-stage conc. in ring-follower gate chamber	65.00	30.00
560 cu. yd.	Concrete in blockouts	300.00	140.00
75 cu. yd.	Conc. in spillway bridge....	160.00	92.00
4,300 cu. yd.	Conc. in spillway-intake struc.	36.00	40.00
1,000 cu. yd.	Conc. in spillway-outlet struc.	50.00	34.00
820 cu. yd.	Conc. in diversion tunnel closure structure	65.00	65.00
5,900 cu. yd.	Concrete in lining of diversion tunnel	40.00	38.00
3,500 cu. yd.	Concrete in lining of spillway tunnel	75.00	65.00
235 cu. yd.	Concrete in lining of control-cable tunnel ..	80.00	135.00
1,200 cu. yd.	Conc. in diver. tunnel plug..	25.00	26.00
2,200 cu. yd.	Conc. around river-outlet pipes and in valve structure....	25.00	22.00
4,500 cu. yd.	Conc. in gravity-type walls..	30.00	22.00
1,750 cu. yd.	Mass conc. for pwrplant struc.	30.00	20.00
5,000 cu. yd.	First-stage concrete in powerplant substructure ..	30.00	26.00
4,100 cu. yd.	First-stage concrete in powerplant intermediate structure	100.00	70.00
1,300 cu. yd.	First-stage concrete in powerplant superstructure and outlet-gate structure	175.00	120.00
110 cu. yd.	Concrete in powerplant structure cover slabs	100.00	40.00
922,000 cu. yd.	Cooling concrete	0.50	0.32
715,000 lin. ft.	Furn. & placing metal pipe or tubing and fittings for concrete cooling systems ..	0.36	0.37
160 lin. ft.	Drilling 10-in. diam. core specimens in concrete....	50.00	80.00
520 lin. ft.	Const. type A control joints	1.85	2.40
820 sq. ft.	Furn. & placing asbestos sheet packing in joints....	1.00	1.20
350 sq. ft.	Furn. & placing building paper in joints	0.20	0.12
3,300 sq. ft.	Furn. & placing 1-in. corkboard joint filler	2.00	1.35
440 sq. ft.	Furn. & placing ½-in. sponge rubber joint filler	2.40	1.80
8,120 sq. ft.	Furn. & placing 1-in. sponge rubber joint filler	3.20	2.20
100 lin. ft.	Furn. & installing rubber joint strips with metal straps..	3.40	3.50
500 lin. ft.	Furn. & placing type D rubber waterstops	3.10	2.80
1,470 lin. ft.	Furn. & placing type E rubber waterstops	4.10	3.30
590 lin. ft.	Furn. & placing type F rubber waterstops	2.60	2.80
34,300 lin. ft.	Furn. & placing metal seals in dam	3.75	3.00
1,600 lin. ft.	Furn. & placing type N2 metal seals in pwrplant..	2.20	3.40

8,300 lin. ft.	Furn. & placing metal grout groove covers	1.10	1.50
425 lin. ft.	Const. asphalt seals	11.00	16.00
2,700 sq. yd.	Furn. & applying concrete floor hardener	0.80	0.55
6,100 sq. ft.	Furn. & placing membrane waterproofing	1.00	0.75
11,000 sq. ft.	Furn. & installing precast-concrete roof slabs	1.10	1.25
16,000 sq. ft.	Furn. & placing insulation on roofs	1.25	1.40
4,200 sq. ft.	Furn. & installing insulation on underside of trans. deck	1.75	0.95
16,500 sq. ft.	Furn. & placing 4-ply, asphalt-saturated felt built-up rfng.	0.50	1.00
850,000 lb.	Furn. & erecting steel for powerplant superstructure	0.30	0.22
890 sq. ft.	Furn. & installing metal rolling doors	10.00	12.00
555 sq. ft.	Furn. & installing aluminum windows	6.20	10.00
30 sq. ft.	Furn. & installing fixed stormproof louvers	18.00	22.00
20 sq. ft.	Furn. & installing automatic louvers	30.00	30.00
56,000 lb.	Erecting structural steel for spillway bridge	0.10	0.05
49,000 lb.	Furn. & installing cast-iron soil pipe and fittings	0.50	0.40
33,000 lb.	Furn. & installing cast-iron bell-and-spigot and flanged pipe, wall pipes, & fittings	0.75	0.40
6,000 lb.	Furn. & installing galv. wrought-iron pipe & fittings, 4-in. and larger in nominal diam.	0.50	0.90
13,000 lb.	Furn. & installing steel pipe and fittings 2-in. and smaller in nominal diameter	1.30	1.00
14,600 lb.	Furn. & installing steel pipe and fittings larger than 2-in. and less than 6-in. in nom. diam.	1.00	0.85
68,500 lb.	Furn. & installing steel pipe and fittings 6-in. and larger in nominal diameter	0.70	0.65
500 lb.	Furn & installing valves less than 6-in. in nominal diam.	2.00	1.90
10,900 lb.	Furn. & installing valves 6-in. and larger in nominal diam.	1.00	1.30
3 valves	Furn. & installing draft-tube drain valves	700.00	600.00
18,000 lb.	Install. ice prev. air system.	1.00	1.80
Lump sum	Furn. & installing four oil-storage tanks	10,000.00	6,000.00
17,500 lb.	Furn. & installing anchor bolts	0.70	0.65
116,000 lb.	Install. stairways in dam	0.70	0.28
48,000 lb.	Installing pipe handrails for powerplant service yard area and dam	0.70	0.40
65,000 lb.	Installing track for 65-ton gantry crane	0.15	0.20
6 gratings	Furn. & installing cast-iron gratings for draft-tube piers	350.00	220.00
90,000 lb.	Installing nonembedded metalwork furn. by Govt.	0.40	0.09
24,600 lb.	Installing embedded metal-work furn. by Govt.	0.60	0.20
59,300 lb.	Furn. & installing misc. metalwork	1.10	0.56
Lump sum	Installing cranes	22,600.00	28,000.00
Lump sum	Testing cranes	10,000.00	6,000.00
Lump sum	Furn. & installing and testing 10-ton crane, inc. cable reel	35,000.00	25,000.00
Lump sum	Furn. & installing penstock pipes	460,000.00	510,000.00
Lump sum	Furn. & installing outlet pipes	170,000.00	250,000.00
Lump sum	Installing two bellmouths on inlet end of outlet pipes	2,000.00	1,500.00
274,500 lb.	Installing seats and guides for stop logs and drafttube bulkhead gates	0.15	0.19
Lump sum	Installing 3 lifting frames	1,000.00	600.00
Lump sum	Installing & storing stop logs	20,000.00	9,000.00
518,000 lb.	Installing trashracks and slot closures	0.12	0.027
Lump sum	Installing 3 penstock fixed-wheel gate frames	12,000.00	15,000.00
Lump sum	Installing two spillway fixed-wheel gate frames	6,000.00	7,000.00
Lump sum	Installing two outlet-works bulkhead gate frames	11,000.00	14,000.00
Lump sum	Installing two 66-in. ring-follower gates, complete	5,000.00	11,000.00
Lump sum	Installing six bulkhead gates at draft-tube outlet	4,000.00	3,200.00
Lump sum	Installing bulkhead gate for outlet-works intake	1,000.00	1,500.00
Lump sum	Installing three fixed-wheel gates in penstock intakes	32,000.00	14,000.00
Lump sum	Installing two fixed-wheel gates in spillway tunnel intake	25,000.00	12,500.00
Lump sum	Installing two hoists for fixed-wheel spillway gates	3,000.00	6,000.00
Lump sum	Installing three hoists for fixed-wheel penstock gates	5,000.00	14,000.00
Lump sum	Furn. & installing 5 ton hoist for draft-tube bulkhead gates	5,000.00	3,600.00
Lump sum	Installing gate hoist structure at spillway tunnel intakes	9,000.00	5,200.00
Lump sum	Installing two 66-in. hollow-jet valves	3,000.00	6,200.00
Lump sum	Installing six control systems for hollow-jet valves, ring-follower gates, and fixed-wheel gates.	7,000.00	30,000.00

Lump sum	Installing high-pressure gate and hydraulic hoist in diversion tunnel closure structure	1,500.00	1,000.00
Lump sum	Furn. & installing control equip. & piping for high-pressure gate & hydraulic hoist in diversion tunnel closure structure	7,500.00	18,000.00
9,500 lb.	Furn. & installing grounding systems	3.00	2.10
200 lin. ft.	Furn. & installing embedded elec. rigid metal conduit ½-in. in diameter	1.85	1.75
11,000 lin. ft.	Furn. & installing embedded elec. rigid metal conduit ¾-in. in diameter	2.00	2.00
7,000 lin. ft.	Furn. and installing embedded elec. rigid metal conduit 1-in. in diameter	2.20	2.20
4,500 lin. ft.	Furn. and installing embedded elec. rigid metal conduit, 1 and ½-in. in diameter	3.10	2.55
3,800 lin. ft.	Furn. and installing embedded elec. rigid metal conduit, 2-in. in diameter	3.75	3.20
900 lin. ft.	Furn. and installing embedded elec. rigid metal conduit, 2 and ½-in. in diameter	4.50	4.00
3,200 lin. ft.	Furn. and installing embedded elec. rigid metal conduit, 3-in. in diameter	5.50	4.65
2,500 lin. ft.	Furn. and installing embedded elec. rigid metal conduit, 3 and ½-in. in diameter	6.50	5.50
1,900 lin. ft.	Furn. and installing embedded elec. rigid metal conduit, 4-in. in diameter	7.50	6.00
100 lin. ft.	Furn. and installing embedded elec. rigid metal conduit, 5-in. in diameter	9.50	8.00
210 boxes	Furn. and installing No. 1 cast outlet boxes.....	12.00	14.00
190 boxes	Furn. and installing No. 2 cast outlet boxes	12.50	16.00
6 boxes	Furn. and installing type FD boxes	12.00	7.00
35 fixtures	Installing embedded parts of parapet lighting fixtures..	17.00	18.00
9 recep.	Furn. & installing 440-volt, 60-ampere power receptacles, complete with enclosures and matching plugs	75.00	58.00
3 recep.	Furn. & installing 440-volt, 100-ampere power receptacles, complete with enclosures and matching plugs	120.00	70.00
3,000 lb.	Furn. & installing crane power conductors	1.00	1.20
6 sets	Install. sets of therm.....	200.00	70.00
115 groups	Install. groups of instruments	350.00	80.00
	PART B		
Lump sum	Clearing right-of-way	15,000.00	22,000.00
11,600 cu. yd.	Exc. for access rwdy. Station sta. 814-|-40 to sta. 844-|-00	3.00	1.60
106,100 cu. yd.	Exc. for access rwdy. Station sta. 844-|-00 to sta. 900-|-00	4.00	1.35
16,000 cu. yd.	Exc. for access rwdy. Station sta. 9 00-|-00 to sta. 915-|-00	3.00	0.95
130,000 cu. yd.	Exc. for access rwdy. Station sta. 915-|-00 to sta. 940-|-25	4.00	1.75
177,000 cu. yd.	Exc. for powerplant rwdy....	4.00	1.60
9,300 M gal.	Watering	2.50	2.00
2,500 rlr hr.	Rolling embankment	14.00	18.00
19,000 mi. cu yd.	Overhaul of exc. for rdwy....	0.25	0.35
700 cu. yd.	Exc. for rdwy structures ...	14.00	5.00
850 cu. yd.	Compacted backfill	3.00	3.00
596 lin. ft.	Furn. and laying 24-in. diam., No. 16-ga. cor.-metal pipe.	7.00	7.00
418 lin. ft.	Furn. and laying 24-in. diam., No. 14 ga. cor.-metal pipe.	8.50	8.00
156 lin. ft.	Furn. and laying 30-in. diam., No. 14-ga. cor.-metal pipe.	10.00	10.00
166 lin. ft.	Furn. and laying 48-in. diam., No. 12-pa. cor.-metal pipe.	20.00	20.00
126 lin. ft.	Furn. and laying 48-in. diam., No. 8-ga. cor.-metal pipe..	30.00	28.00
600 sq. ft.	Furn. and const., metal, bin-type, ret. walls, 5-ft., 6-in. base width	8.50	7.50
400 sq. ft.	Furn. and const., metal, bin-type, ret. walls, 7-ft., 9-in. base width	10.00	9.00
200 sq. ft.	Furn. and const., metal, bin-type, ret. walls, 9-ft., 10-in. base width	11.00	11.00
8,200 lin. ft.	Furn. and erecting beam-type guardrail	3.20	3.50
58 sec.	Furn. and attaching guardrail and sections	10.00	4.00
25 posts	Furn. and setting guide posts	12.00	14.00
10,000 cu. yd.	Selected material subbase ...	3.00	1.65
9,700 ton	Crushed-rock base	3.00	1.75
2,100 ton	Cover-coat material	5.00	5.00
70 ton	Liquid asphalt MC-2	65.00	60.00
85 ton	Liquid asphalt MC-4	65.00	60.00
	PART C		
59,000 cu. yd.	Exc. for roadway and parking area	3.50	1.40
840 M gal.	Watering	2.50	3.00
220 rlr. hr.	Rolling embankments	14.00	20.00
40 cu. yd.	Exc. for rdwy. structures ...	14.00	8.00
35 cu. yd.	Compacted backfill	3.00	5.00
36 lin. ft.	Furn. and laying 18-in. diam., No. 16-ga. cor.-metal pipe.	5.00	6.00

CLASSIFIED

Rates are $15.50 a column inch. Copy should be sent in by the 15th of month preceding publication date.

FOR RENT OR SALE

Space is sold as advertisers' inches. All advertisements in this section are ⅛ in. short of contracted space to allow for borders and composition

108 lin. ft.	Furn. and laying 24-in. diam., No. 14-ga. cor.-metal pipe.	7.00	8.00
650 lin. ft.	Furn. and erecting beam-type guardrail	3.20	3.70
4 sec.	Furn. and attaching guardrail end sections	10.00	4.00
2,250 cu. yd.	Selected material subbase	3.00	2.10
2,500 ton	Crushed-rock base	3.00	2.85
490 ton	Cover-coat material	5.00	5.60
15 ton	Liquid asphalt MC-2	65.00	60.00
20 ton	Liquid asphalt MC-4	65.00	60.00
	PART D		
22,000 ton	Crushed-rock base	1.00	1.00
460 M gal.	Watering	3.50	3.10
4,690 ton	Cover-coat material	4.50	4.10
150 ton	Liquid asphalt MC-2	50.00	43.00
180 ton	Liquid asphalt MC-4	50.00	43.00
10 Mbm	Furn. and placing runway planks on bridge	250.00	210.00
	PART E		
7,900 cu. yd.	Exc. for roadway and parking area	3.50	2.20
70 M gal.	Watering	2.50	6.00
60 rlr. hr.	Rolling embankments	14.00	25.00
25 cu. yd.	Exc. for rdwy. structures	14.00	8.00
25 cu. yd.	Compacted backfill	3.00	5.00
40 lin. ft.	Furn. and laying 18-in. diam., No. 16-ga. cor.-metal pipe.	5.00	6.00
76 lin. ft.	Furn. and laying 24-in. diam., No. 14-ga. cor.-metal pipe.	7.00	8.00
800 lin. ft.	Furn. and erecting beam-type guardrail	3.20	3.70
8 sec.	Furn. and attaching guardrail and sections	10.00	4.00
160 lin. ft.	Furnishing and erecting timber bumper	2.60	6.00
1,000 cu. yd.	Selected material subbase	3.00	2.20
810 ton	Crushed-rock base	3.00	2.50
210 ton	Cover-coat material	5.00	6.00
7 ton	Liquid asphalt MC-2	65.00	70.00
8 ton	Liquid asphalt MC-4	65.00	70.00

HIGHWAY—Construction of 9 mi. in Nevada

Nevada—Lander & Eureka counties—State. Dodge Construction, Inc. has been awarded a $298,437 contract for construction of 9 mi. of road.

(1) Dodge Construction, Inc.	$298,437
(2) Silver Construction Co.	306,849
Isbell Construction Co.	364,516
Hoops Construction Co.	378,133

		(1)	(2)
Lump sum	Signs	$ 1,000.00	$ 500.00
3,000 hr.	Flagman	3.00	2.50
120 hr.	Pilot car	5.00	3.00
Force account	Maintain base	5,000.00	5,000.00
1,358 lin. ft.	Remove culvert pipe	1.50	1.00
61 ea.	Remove headwalls	20.00	20.00
150,035 cu. yd.	Roadway excavation	0.22	0.22
156 cu. yd.	Drainage excavation	0.50	0.28
20,492 cu. yd.	Channel excavation	0.27	0.21
160 sta.	V-type ditches	5.00	5.00
458,355 yd. sta.	Overhaul, yd. sta.	0.015	0.015
8,646 yd. mi.	Overhaul, yd. mile	0.15	0.10
502 cu. yd.	Structure excavation	1.50	2.50
1,041 cu. yd.	Backfill	1.50	1.50
12,000 M gal.	Water	0.25	1.00
Lump sum	Furnish water equipment	12,000.00	10,000.00
126 hr.	Power roller	8.00	7.00
7,397 ft. hr.	Tamp. or pneumatic-tired roller	0.60	0.50
45,215 ton	Type 1 gravel base	0.42	0.65
29,169 ton	Type 2 gravel base	0.65	0.75
35 ton	Emulsified asphalt, Type MS-1 (diluted)	45.00	40.00
333 ton	Liquid asphalt, Type MC-1	45.00	40.00
235 ton	Sand blotter	2.00	2.00
23 ton	Emul. asphalt, Type RS-2	45.00	40.00
427 ton	Screenings, one-half inch	4.00	3.00
1,463 ton	Asphalt cement, 120-150 penetration	38.50	37.00
21,266 ton	Plantmix surface aggregate	2.25	2.30
3,139 ton	Open graded plantmix surface aggregate	5.00	5.00
132 cu. yd.	Class AA concrete	95.00	85.00
13,300 lb.	Reinforcing steel	0.20	0.17
1,340 lin. ft.	24 in. corr. metal pipe (dipped)	7.00	6.00
188 lin. ft.	30 in. corr. metal pipe (dipped)	8.25	8.00
198 lin. ft.	36 in. corr. metal pipe (dipped)	12.00	10.00
170 ea.	Culvert markers & guide psts.	6.00	6.00
40 ea.	Right of way markers	6.00	6.00
40 ea.	Reference monuments	10.00	10.00
20 ton	Liquid asphalt, Type SC-2 or SC-3	45.00	40.00
380 ton	Premixed bituminous patching material	1.50	2.00

BRIDGE—Railroad separation structure in Wyoming

Wyoming—Laramie County. A $305,666 contract has been awarded to Riedesel-Lowe Co. for construction of one railroad separation structure consisting of twin three continuous steel plate girder spans over the UP railroad and miscellaneous work on four-lane divided highway.

(1) Riedesel-Lowe Co.	$305,666
(2) Eagle Construction Corp.	312,602
Kniseley-Moore Co.	318,569
Garton and Garton	326,921

		(1)	(2)
129,000 cu. yd.	Excavation	$ .28	$ .26
200 hr.	Mechanical tamping	6.00	6.00
3,360 M gal.	Watering	1.00	1.00
10 cu. yd.	Excav. for pipe culverts	3.50	3.00
460 cu. yd.	Dry excav. for bridges	2.50	2.50
18,300 cu. yd.	Cu. yd. mi. haul	.20	.25
240 hr.	Sheeps foot roller operation	12.00	14.00
150 hr.	Pneumatic tired roll oper., type VII	14.00	15.00
960 cu. yd.	Class "B" concrete	54.30	52.00
585,000 lb.	Structural steel	.19	.20
170,150 lb.	Reinforcing steel	.13	.14
9,040 lin. ft.	CIP conc. piles 12 in.	6.50	7.00
20 ea.	Pile shell splice welds	15.00	10.00
2,100 lin. ft.	Preboring holes for piles	1.48	1.25
1,000 lin. ft.	Jetting holes for piles	.50	.75
92 lin. ft.	24-in. standard RCP	5.50	7.50
202 lin. ft.	24-in. extra strength RCP	7.20	8.50
130 lin. ft.	8-in. CMP	2.95	3.00
120 lin. ft.	4-in. OD welded steel pipe	4.15	3.80
474 lin. ft.	6-in. hel. corrugated pipe	3.50	4.50
10 cu. yd.	Grouted riprap	25.00	15.00

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BACKFILL, uncompacted

Think before you eat

Next time you sit down at the camp mess hall and fill your plate with food, take a drink of Kool Aid, cut your meat into bite-sized chunks, stick your fork in one and carry it toward your mouth, stop for a moment and reflect upon how that meat got to the job. Most of it is laboriously brought in by refrigerator trucks although, of course, an occasional stray weasel or buzzard wanders within range of the cook's cleaver.

Reflect further and in particular on the case of Gus Sundborg, meat dealer from Oakdale, Calif. Gus trucks meat to a number of remote resorts and construction projects in the Northren California region, including Cherry Valley Dam and the Kings River Project. He returns with waste fat for which he gets a few pennies at the tallow works.

Last March Gus was driving through a blinding snowstorm on a mountain road. He had made his delivery to the Kings River camp and was on his way back to Oakdale. With the cold wind howling and the swirling snow cutting visibility to zero, Gus was cruising along at about 1 or 2 mph. As darkness closed in his clutch burned out.

When it became obvious that the truck was stuck for the night his first thought was to stay in the cab with the engine running and the heater on. A plow would come along in the morning because trucks would have to get through to Wishon Dam. But the clutch was jammed in a way that made it impossible to turn the engine over. So he had no heater. And it doesn't help to get in the back of a refrigerator truck.

What would you have done? Hike back up the road toward the Wishon camp? Pretty foolish in a snowstorm, when you might get off the road and be unable to find it again. No, I'm afraid you would make a lousy meat truck driver.

Gus took two crates of fat from the rear of the truck and set them on the road about 10 ft. apart. He broke apart a third cardboard box and spread it out between the other two. Then he lit the fat with a match. It burns fairly well and soon two pillars of smokey flame were rising into the night. Gus lay down on the piece of cardboard and relaxed, watching the little rivers of flaming grease run 10 or 15 ft. down the hill from each fire. It was very cozy in between and Gus spent the night there, rising only to put more fat on the fires.

In the morning a tractor bulldozed its way down the road followed by Mike Krumpotic in a pickup truck. Mike has been a construction superintendent for years and thought he had seen everything. Now he has seen everything.

Your handy translator — part II

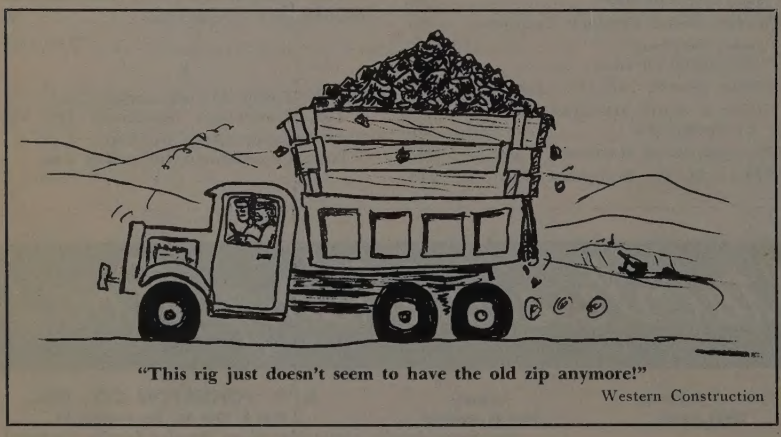
In the April issue we graciously printed on this page a table which translated into English a few of the standard statements made by engineers. As a result, contractors are now able to understand engineers without resorting to old-fashioned hit-or-miss methods. One superintendent reports that he now can figure out what the resident means in half the time and can spend an extra hour a day sitting in his pickup.

The importance of this increased understanding among the members of the construction team is illustrated by this statement made recently by an impeachable government source: "Partly because of the construction industry, the nation's economy is becoming hopeless at a slower rate."

But still more can be done. Contractors, too, sometimes lapse into incomprehensibility, with costly consequences. With a sense of urgency, we present here for the benefit of resident engineers and inspectors a translation of phrases used by construction superintendents.

What the superintendent says:	What he means:
"Let's go have coffee."	"Get lost for a few minutes."
"Forget it, it's nothing."	"Our lawyers are preparing a surprise for you."
"We'll do it right away."	"Are you kidding?"
"Good morning! Nice day!"	"Give us a break."
"This material makes a much better fill."	"It's closer."
"But, we know by experience that our method will give better results."	"Specs? What specs?"
"You won't be able to tell the difference."	"If you fall for this we'll all be rich."
It's a shame you won't accept gifts."	"It's in your car."

Down-time . . . . . By Domagalski



"This rig just doesn't seem to have the old zip anymore!"
Western Construction