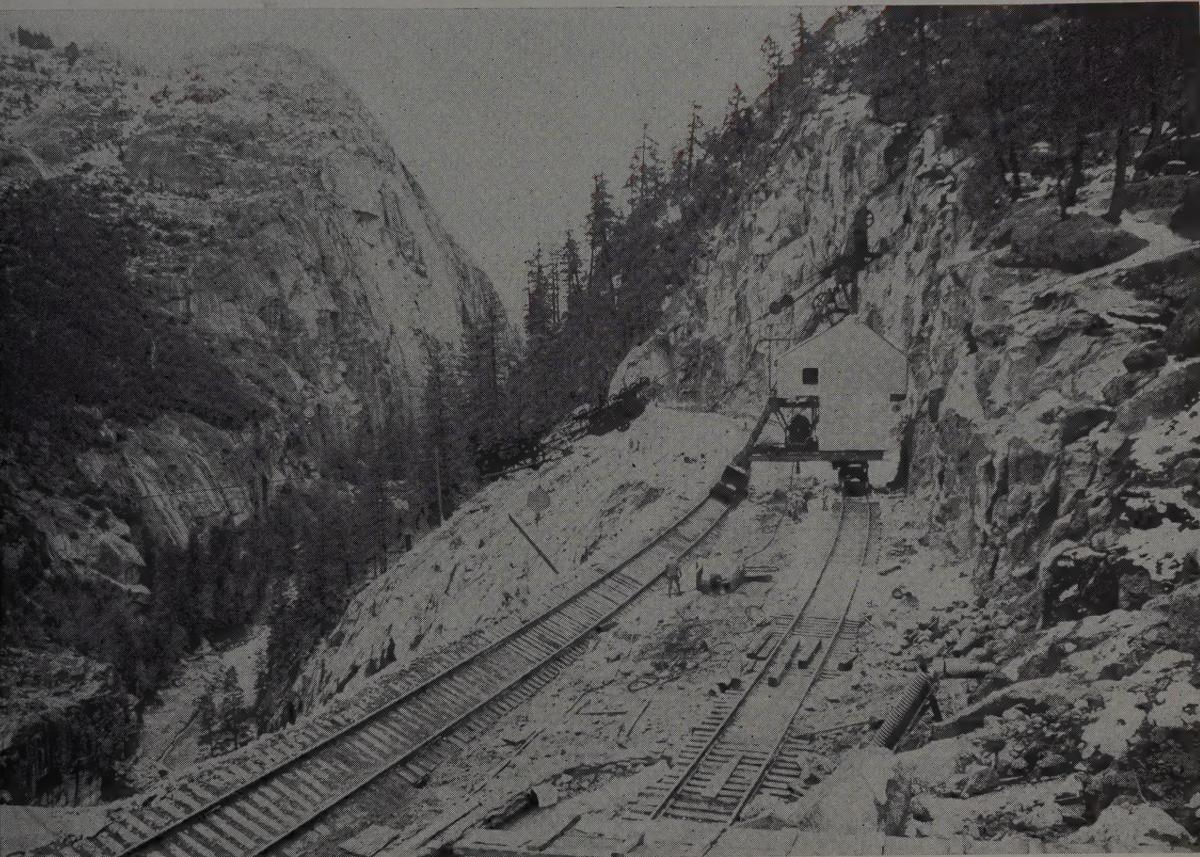


JULY



PANNING THE CANYON of the Stanislaus River at the Donnells site this 1,100-ft. cableway will handle concrete and materials for the concrete arch. The dam will be 475 ft. high above foundation rock.

Space for construction plant was a serious problem, but gravity flow at the aggregate plant is a compensation. In the extreme lower left the stream is shown turning into the diversion tunnel.

Donnells leads off at Tri-Dam

A THREE RING CIRCUS"—that's what construction men are calling the Tri-Dam Project on the Stanislaus River above Sonora, Calif. That's not a bad description considering that three different types of dams are going ahead at a fast pace. The \$52,000,000 irrigation and hydro development is being built by the Oakdale and the South San Joaquin Irrigation Districts financed completely by power sales. The Irrigation Districts will secure valuable storage and important supplemental supplies of late-season irrigating water, paid for by the power developed at the three sites.

M-K pushes work at fast pace after blasting a \$500,000 access road out of solid granite. Foundation excavation goes 200 ft. below streambed.

Most spectacular of the three dams is Donnells—a concrete arch 288 ft. high above streambed and 477 ft. above bedrock built between towering granite cliffs. Of the constant angle arch type, it will have a crest thickness of 10 ft. and a length of 760 ft. along the arch. It is located in an almost inaccessible section of the middle fork of the Stanislaus and the 8 mi. of access road from an existing

state highway cost almost \$500,000. The nearest railroad is about 50 highway miles from the site and all materials and supplies, including 2,000 truck loads of cement, must be hauled this distance up to the 5,000-ft. elevation. Construction access problems and progress on Donnells Dam form the subject of this article.

Overall project

Readers of **Western Construction** have been kept informed on the general features of the Tri-Dam Project and its difficult financial history through articles extending back to 1952. A review of this history is con-

tained in a separate statement appearing with this article.

Briefly the lowest unit of the project is the Tulloch Dam located on the main river about 16 mi. east of Oakdale. This will be a gravity section concrete dam about 200 ft. high and 1,940 ft. long. It will have a reservoir storing 68,400 ac. ft. and a powerhouse at the base of the dam will have an installed capacity of 17,000 kw.

About 45 mi. upstream from Tulloch on the middle fork, and above the veteran Stanislaus plant of the Pacific Gas & Electric Co., is Beardsley Dam, located about 45 mi. by highway above Sonora. This will be an earth and rock-fill type of structure about 280 ft. high above streambed with a crest length of 820 ft. exclusive of a gated spillway located at the right abutment. Storage capacity is 97,500 ac. ft., covering 720 acres, and a power plant located immediately below the dam will have an installed capacity of 10,000 kw. A small after-bay dam, which will store 250 ac. ft., will be constructed about 1 mi. downstream from the power plant to provide uniform stream flow from the power plant releases.

The key power producing unit of the Tri-Dam Project is at Donnells

where the stream flow and 64,500 ac. ft. of storage can be diverted into a 7.2-mi. tunnel that will provide 1,200-ft. head for a powerhouse with a 54,000-kw. capacity. This plant is located approximately at the upper end of the Beardsley reservoir.

Construction operations on Beardsley Dam and Tulloch Dam will be reviewed in later articles.

Getting into the site

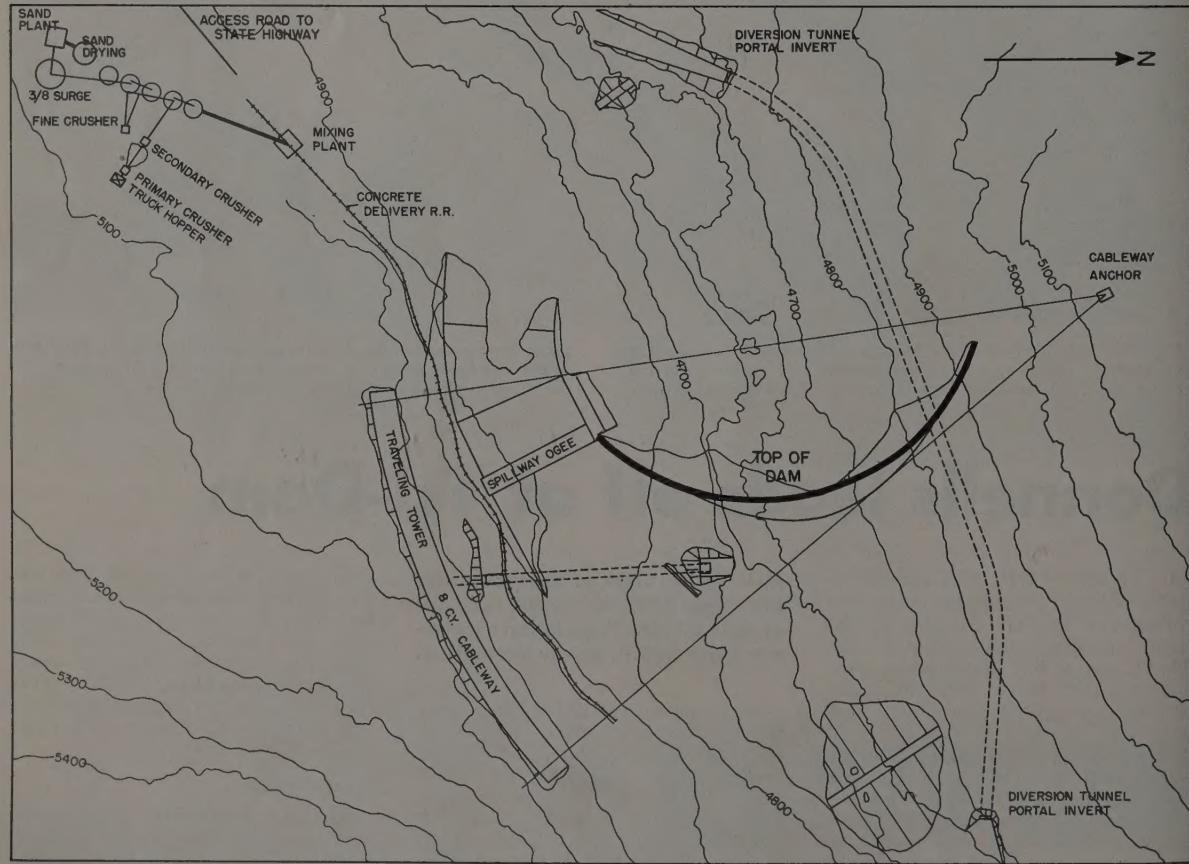
The first problem on the Donnells Dam, including the tunnel and powerhouse, was to provide an adequate access road. The successful bidder was a joint venture sponsored by Morrison-Knudsen Co., Inc., and including Peter Kiewit Sons' Co., Macco Corp., and Stolte, Inc., operating under the name of Tri-Dam Constructors.

Existing roads extending from state highway toward the river canyon consisted of a narrow U. S. Forest Service road, known as the Hell's Half-acre road, which descended to the river about $\frac{1}{4}$ mi. from the powerhouse site, and a District-built road at a higher elevation which extended from Highway 108 to within about 1 mi. of the dam site. The contract required completion and im-

provement of the access road to the damsite and the Forest Service road required extensive improvement prior to hauling in heavy powerhouse equipment. The upper access road to the damsite was completed to the river in order to obtain early access to the diversion tunnel and the dam foundation excavation. Little was done to improve existing sections of this access road and it was abandoned early in the winter.

The lower road had a reasonable location and was improved to a location for a central construction camp which the contractor established to service Donnells Dam, tunnel, and powerhouse. The Beardsley project has a separate camp and office. From this headquarters camp the contractor elected to push a road 8 mi. up the rugged granite canyon to the Donnells Dam site, following closely the 4,700-ft. elevation contour, connecting all three tunnel adits.

Decision to construct this access road was a major feature of the construction attack because it represented an expenditure of nearly \$500,000 and took almost five months of work. Much of the way it is benched out of solid granite for its width of 24 ft. of roadway. Drainage and slides present problems of main-



MAIN FEATURES of the construction plant and their relation to the dam and diversion tunnel are shown on this layout map. Aggregate, including sand, will be made from the granite rock of the canyon wall.

Shuttle railroad will deliver 4-yd. buckets of concrete to the cableway. Anchor for the cableway is a balled-out tunnel driven into the granite cliff. Permanent outlet, shown, delivers water into 7.2-mi. tunnel.



DOWN IN THE BOTTOM of the hole this I-R rig is drilling for excavating to solid rock in the side of the canyon. Aluminum pipe delivers compressed air over the job.



LOOKING DOWN in the foundation area, showing face of upstream cofferdam (see front cover) and the Manitowoc crane used to load out material. From 100 to 150 gpm. of water is handled by pumps mounted on tripods and handled by crane.

tenance through the winter season.

At one location when the road crews were cutting across the base of one of the numerous granite cliffs a huge slab containing an estimated several thousand cubic yards of rock was dislodged and plunged hundreds of feet to the river bed below.

The importance of this expensive access road results from the rush nature of the project, with its bonus for early completion and penalty for delay. Only a road that would permit relatively fast and uninterrupted hauling and could be kept open during the winter would allow the tight time schedule to be maintained. Saving in hauling time and expense will pay off the cost of this important road. During the heavy hauling season the road will be maintained and sprinkled.

A further but indirect value attaches to the same access road because it passes near the two adit locations for the power tunnel. This provided automatic access to these sites of construction activity, which would otherwise have required separate roads at additional cost. The road also served as a route for a power line and made possible the use of a central concrete plant for the dam, tunnel, and powerhouse.

Camp and transportation

The headquarters camp has dormitories for 250 men and large areas for house trailers. Each of the dormitories has 16 rooms with two men to the room. The mess hall seats 175. The contractor's job office and main warehouse is at this location; shops and warehouses are located at the dam site.

Transportation is provided by the contractor with buses operating between the main camp and the dam site. This transportation is without cost, but men are permitted to drive their cars directly to the dam site.

Morrison-Knudsen, acting as sponsor on the two jobs, handles the Donnells part of the contract out of the home office in Boise, Idaho, while the Beardsley Dam is handled through the Los Angeles office of the firm. Hiring of personnel and labor relations is about the only function being carried out jointly for both projects.

Stream diversion

Engineering plans for the construction of Donnells Dam called for a 1,200-ft. diversion tunnel 18 x 20 ft. in section. This tunnel will be plugged after its use for diversion during the construction.

At the site the canyon is a sharp V with the bottom filled to a 200-ft. depth with stream deposited sand and gravel including granite boulders of all sizes. In fact, the excavation of this notch to bedrock during the relatively short construction season was considered to be one of the contracting hazards for this part of the project. This same debris-filled canyon was also an important consideration in design studies which might have favored a rockfill except for the need of excavating this extreme depth for a long distance up and down stream.

The river flows through the canyon over the top of this debris, varying from a low flow of about 100 sec. ft. during early fall to an average annual spring peak of 8,000 sec. ft.

The diversion tunnel was driven entirely from the lower end on a slope that would bring it out of the solid granite cliff well below the surface of the existing stream flow.

Geology of the site

The entire canyon in this vicinity is composed of granitic rocks. In recent geologic times this area was glaciated and remnants of glacial moraines still exist in the upper

reaches of the watershed. The canyon-cutting action has been quite active in the gorge and the frost action has attacked the joints in the rock causing large blocks of massive granite to fall off the steep slopes into the channel section.

The rock at Donnells is a typical granite, composed of about 50% quartz, 50% orthoclase feldspar, with traces of dark biotite mica and hornblende. The rock is generally sound but is traversed by the usual 3 or 4 systems of jointing. Where the joint planes are exposed at the surface they are susceptible to severe attack by weathering agents.

For dam construction the rock is hard and sound and affords excellent foundation for any type of loading.

FACE of the upstream cofferdam is maintained at a $\frac{1}{2}$ to 1 slope. At the lower levels, as shown, logs and cables were used. This timbering will be left in place as concrete rises.



History of the Tri-Dam Project

With construction activity booming at all three sites, the Tri-Dam Project has moved into its first full season of field operations, following several frustrating years required to solve intricate financing problems. The project, and all that it stands for as an example of coordination between public-agency and private-utility, will be a monument to those who carried through the years of struggle to secure a workable program of finance.

The \$52,000,000 water storage and hydro project being built by the Oakdale and South San Joaquin Irrigation Districts without federal or state money is almost unprecedented. A power-purchase contract needed to finance the project with all the complications of predicted run-off, rates, and regulations was another worthwhile accomplishment. Lastly, construction contracts that include provisions for bonus or penalties based on starting dates for water storage and power output were another requirement in solving the financial puzzle. It all adds up to a major step in the long history of Western water development.

After years of engineering study the first announcement on completed plans for storage and power development on the Stanislaus River in central California was reviewed in **Western Construction**, November 1952. At that time working plans were practically complete and the bid call was scheduled for early in 1953.

A satisfactory contract for the sale of power from the three plants having been negotiated successfully with the Pacific Gas & Electric Co., the bid call was made as planned. Sale of the revenue bonds, based on the construction cost determined by the bids, was the key to the financing and the month before (May 1953) a law was enacted by the legislature authorizing savings banks to invest in these bonds, which was considered a step that would insure financial success. Unit bids (complete and occupying seven pages) were published in **Western Construction**, June 1953.

Soon after bids were opened an unfortunate change in the bond market changed the financial picture. In spite of the fact that the construction bids were below the engineers' estimates, the proceeds from the bond sale would not provide funds which would have made the undertaking financially

feasible. As a result the Oakdale and South San Joaquin Irrigation Districts were forced to reject the bids.

There followed almost a year of study and frustrating efforts to make up the relatively small financial deficiency which would have permitted the project to move forward. These efforts finally resulted in a bill introduced into the U. S. Congress which would have provided for a reserve loan from the Federal Government, and, if required, was to be paid back by ultimate power revenues and also for consideration of a direct grant based on the flood control provided by the storage works. The financial and legislative picture was reviewed in considerable detail in **Western Construction**, February 1954.

Early in 1955 a change in the overall program was made to provide for stage construction. The upper two dams represent 78.7% of the project cost but develop 86.3% of the power revenues. Therefore it was feasible to get these two started with the hopes that the new bids and changes in the bond market would make it possible to undertake the third dam a little later. This lowest dam of the three provides the most benefits in the irrigation supplies to the two districts although being relatively lower in the power-revenue to cost ratio. Some other changes were made in the specifications, designed primarily to make the plan more interesting for bidders. Details of the program, with information for bidders, was brought to date in **Western Construction**, February 1955.

Finally, bids received on the upper two dams were satisfactory and the award made to a combination consisting of Morrison-Knudsen Co., Inc., Macco Corp., Peter Kiewit Sons' Co., and Stoltz, Inc.

During these years much of the negotiating and planning had been carried out under the immediate direction of B. W. Goodenough who had early been appointed construction engineer in charge of the entire project by the Oakdale and South San Joaquin Irrigation Districts. Subsequently an arrangement was made with Tudor Engineering and the Tri-Dam Project is now moving forward under the general supervision of Tudor-Goodenough Engineers, who coordinate all the agencies involved and inspect the construction work.

Bedrock is at about elev. 4,440 and the stream flows at 4,640. The invert of the diversion tunnel at the upstream end is 4,605. It was advanced with a truck-mounted 8-drill jumbo, an Eimco 105 mucker and Koehring dumpers until it was within 10 ft. of holing through into the gravel under a 35-ft. water head. When seepage was noticed through the 11-ft. drill holes, the remainder of the holes were shortened to keep them in the dry, and packed with oversized charges. With all men and equipment out of the tunnel, the final shot removed the last section of granite. Ground water began eroding streambed material into and through the tunnel until finally the river had worn a complete channel to the mouth of the tunnel.

During the winter floods at the end of last year, the flow increased from about 500 sec. ft. to 20,000 sec. ft. Considerable material was washed through the tunnel and the streambed was lowered from 4,640 to 4,620 by the water. All of this flow went through the diversion tunnel and the erosion created a small reservoir and a natural cofferdam. The cofferdam was raised with material from the excavation for the dam foundation and was built up to an elevation of about 4,655 from the original 4,640. Although this material is permeable, the embankment is thick enough to be satisfactory.

In the summer of 1957 when the flow is down to about 400 sec. ft. and it is time to close the diversion tunnel, the water will be flumed into the top part of the tunnel while a concrete gate structure is built below it. When the bottom half of the structure is completed the flow will be directed through it while the top half is built. After the gate is dropped, stopping the flow through the tunnel, a 40-ft. conventional concrete plug will be placed under the arch dam.

The arch section of the dam rests on a concrete plug 80 ft. long filling the channel to bedrock about 200 ft. below streambed. Excavation for this plug section will total about 300,000 cu. yd. most of which is being wasted downstream. A 5-yd. Manitowoc working alternately as a dragline and clamshell loads into Euclid end-dump. The excavation is 90 ft. long at elev. 4,450 and the width varies as the canyon walls converge (maximum 120 ft. at the top). The haul road up the downstream cofferdam has a maximum slope of 17%.

The upstream face of the excavation is held to a $\frac{1}{2}$ to 1 slope by means of timber bulkheads arranged in steps (see front cover picture). The bulkheads consist generally of 4 x 12 vertical sheeting backed by 8 x 8 walers. These are held in place by cables anchored into the canyon walls by $1\frac{1}{4}$ -in. reinforcing bars set into drilled holes. Near the bottom of the excavation available timber logs

were substituted for the sheeting and walers held in place by vertical posts in turn supported by the cables.

One feature of the construction plant is the large amount of aluminum pipe for carrying water and air. About \$250,000 worth, totaling 110,000 lin. ft., was supplied by Major Aluminum Company of Canada. There is about 50,000 ft. of 6-in. diameter, 10,000 ft. of 4-in. and 50,000 ft. of 3-in. In general, aluminum pipe is more expensive and more fragile than other types but is so light that long sections can be easily handled by one man. This is the consideration which made its use economical on this job. The terrain is so rugged that the labor costs would have been very high for the installation of a conventional piping system.

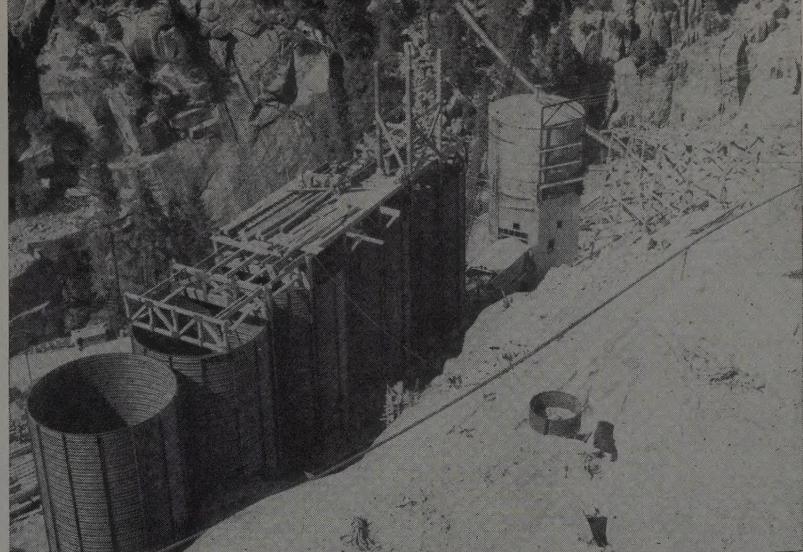
At elev. 5,200, near the equipment maintenance and steel sharpening shops, is a stationary compressor house, which has two PRE2 Ingersoll-Rand 2700 CFM compressors, supplying air to the entire dam site and into one adit of the power tunnel.

Aggregate and concrete

Concrete for the plug and arch will be placed by a Lidgerwood cableway system with a span of about 1,100 ft. The movable, self-propelled head tower moves on 700 ft. of curved banked rails so that the entire site can be covered. This head tower used to be a tail tower at Shasta and Hungry Horse dams. The main line cable is 3 in. in diameter and the hoist operates on a 3-part, $\frac{3}{4}$ -in. rigging. This cableway will handle 30-ton loads. Concrete will be handled in 4-yd. buckets picked up from a railroad flatcar which will move between mixing plant and cableway pick-up on a track about 1,200 ft. long.

The aggregate production and handling setup is one of the major features of the project. One of the bid items was "Concrete plant for dam" on which M-K bid \$1,500,000. The dam will take about 220,000 cu. yd. of concrete and it must be available at rates up to 120 cu. yd. per hour. M-K bid the 141,000 cu. yd. of Class B concrete for the arch section of the dam at \$15.00 per cu. yd.

Because of the steep slope of the canyon site it is possible to take full advantage of gravity by having the general flow of materials move downward from the source. The quarry is at the highest elevation, just above the crushing system. The primary crusher is a 42- by 48-in. Universal overhead eccentric jaw crusher. From here the material will drop down to a surge pile where it will be picked up by a 36-in. belt conveyor and carried to a triple-deck Tyler screen. Material over 6 in. will feed by a recirculating system into a 16B Telsmith gyratory crusher. The undersize material goes over a double-deck Tyler screen from which



AGGREGATE AND MIXING plant is located high on the steep canyon wall, taking maximum advantage of gravity flow. Four sizes of coarse aggregate and sand will be stored in these bins which are provided with cold-air cooling. Mixing plant is at the end of the row, and houses two 4-yd. Koehring mixers.

any oversize can be sent to a 4-ft. Symons gyratory cone crusher. Four sizes are separated out, No. 4 to $\frac{3}{4}$, $\frac{3}{4}$ to $1\frac{1}{2}$, $1\frac{1}{2}$ to 3, and 3 to 6. Before these sizes are put into storage they go over separate Symons dewatering screens.

The minus $\frac{1}{4}$ -in. material goes into a connecting hopper and then to a rod mill. The output is pumped by Wemco sand pumps up to another single Tyler screen, which takes the oversize back through a pipe to the rod mill. The product goes to a Telsmith classifier which dewateres and deslimes the particles and deposits them in a drying pile, from which the made-sand is dozed into a conveyor which carries it to the storage bin. The five aggregate storage tanks are 28 ft. in diameter and 44 ft. high. Details on the operation of the aggregate production, batching, and concrete mixing will be covered in a later article.

Several different temperature speci-

fications must be met, the lowest of which is 45 deg. Cold air from a refrigeration plant will be circulated through the stored aggregate. The mix water taken from the mountain streams is already cold, but will be further refrigerated for mixing with the concrete. Aggregates will be batched by weight and carried to the Johnson automatic mixing plant, with two 4-yd. mixers. Concrete will be dumped into 4-yd. buckets resting on a railroad flatcar for transportation to the cableway.

Forming the concrete arch will be done with Blaw-Knox steel panels which are adjustable to varying slopes by a screw jack which bears against the lift just completed. The dam, designed by George E. Goodall, is a thin arch with slight overhang, varying from 45 ft. thick at the base to 10 ft. thick at the crest.

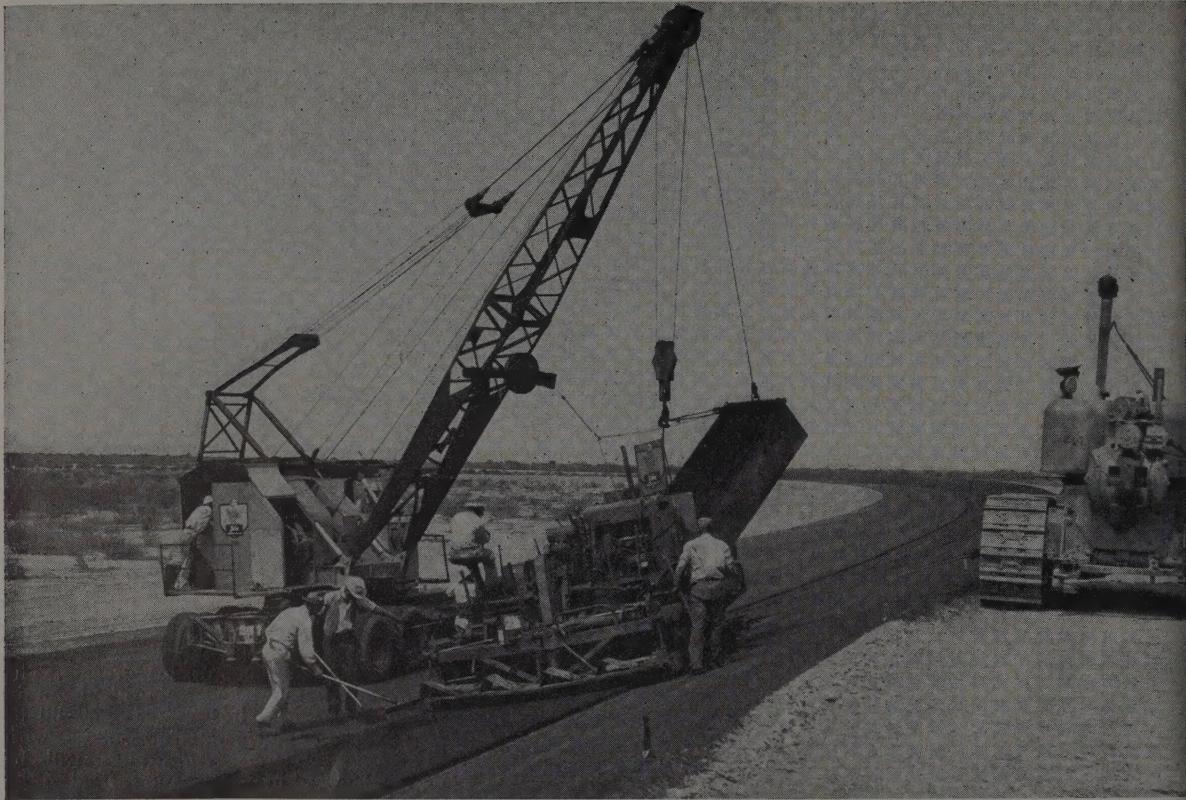
Personnel

For the M-K sponsored Tri-Dam Constructors: Ed Shipp, administrator; Si Piedmont, project manager. General tunnel superintendent is Palmer Lee, and J. L. Wixson is powerhouse superintendent. Stan Stearns is project engineer. D. M. Drugan is office manager. Jim Trauba is office engineer. Jim Whitelaw, materials engineer; Rich Chittenden, cost engineer. Other key personnel are listed on page 102.

For Tudor-Goodenough Engineers on the entire Tri-Dam project, B. W. Goodenough is project engineer; Ray Overholser, assistant project engineer, and Vern Glascock, office engineer. On Donnells, T. W. Grover is resident engineer; R. K. Deming, chief inspector. Office engineer is Dick Purley. Inspectors at present are: Ed Young, excavation; Ray Leverett, forms, and Pat Cline, tunnel, Ray Conyers, batch plant, and Gil Patrick, concrete.

MAJOR UNITS OF EQUIPMENT

- 8 Ford buses
- 21 Ford pickups
- 6 Ford 2-ton flatrack trucks
- 3 5-cu. yd. Koehring dumpers
- 1 10-cu. yd. Euclid end-dump
- 8 17-cu. yd. Euclid end-dumps
- 8 Ingersoll-Rand wagon drills
- 1 $\frac{3}{4}$ -yd. Koehring shovel
- 2 Bucyrus-Erie $2\frac{1}{2}$ -cu. yd. shovels
- 1 Manitowoc 5-cu. yd. crane
- 2 P & H $\frac{3}{4}$ -yd. truck cranes
- 2 PRE 2 Ingersoll-Rand 2700 CFM stationary compressors
- 6 Rex 5-cu. yd. transit-mix units on White trucks
- 1 Bucyrus-Erie $1\frac{1}{2}$ -yd. shovel
- 3 125 CFM Ingersoll-Rand mobile compressors
- 1 315 CFM IR mobile compressor
- 1 500 CFM IR compressor
- 3 600 CFM IR mobile compressors
- 2 Caterpillar No. 12 graders
- 7 Caterpillar D8 tractors



Arizona test track requires unusual methods for—

Laying asphalt on parabolic slope

FISHER CONTRACTING Co. of Phoenix, Ariz., is probably the nation's foremost authority on the construction of automobile test tracks—they've built three in the last four years. They've developed a crew of trained operators, some unusual field methods, and several pieces of modified equipment to carry out this specialized type of construction.

In 1952 Fisher built a circular test track 5 mi. in circumference for General Motors Corporation near Mesa, Ariz. Last year they built a track in northern Arizona for the Ford Motor Company. Now, Fisher is enlarging the GM track to permit cars to be tested at speeds up to 140 mph. If cars are driven at the highest part of the track, without leaving the usual 5-ft. safety lane, a speed of 160 mph. could be reached at perfect equilibrium. The top foot of the track approaches a slope of 44%.

In traveling around the circular track steering is almost unnecessary. The car finds its own equilibrium point and stays there. If you increase the speed the car climbs higher on the slope.

The track is part of the Desert Proving Ground which enables GM

to test its products in rigorous desert conditions. The width of the asphaltic concrete roadway is about 46 ft., measured along the parabolic surface. Fisher started the job in November of 1955 and finished up in May of this year.

The job involves about 180,000 cu. yd. of embankment, 60,000 tons of stabilized base course. A Cedarapids hot plant set up at the site supplied 25,000 tons of asphaltic concrete.

The embankment was built up in 6-in. lifts and compacted to 95 to 100% maximum density at optimum moisture content, using sheep's foot and 50-ton pneumatic rollers.

First the embankment was built up about one foot over the finished grade, and then carved out to grade using a Caterpillar No. 12 motor grader with specially curved blades. Several bits at different curvatures were available for the blade to fit at various parts of the super elevation. When traveling on the steepest parts of the track the grader was tied by cables to a crawler moving parallel to it at the top of the track and pulled by a crawler moving ahead of it.

The stabilized base course also was built up about 2 in. above its finish

grade and compacted using the 50-ton Supercompactor pulled by a Euclid tractor, then the base course was cut to grade, again using the motor grader with the curved blades. The base course was then finished by rolling with tandem rollers; one of the rollers was modified to roll a curved surface of 60-ft. radius and was used on the top 20 ft.; another was modified to roll a 120-ft. radius and was used on the next 15 ft., and a flat roller was used on the lowest 10 ft. Sprinkling was done with two modified Euclid bottom dumps capable of carrying about 4,500 gal. Equipment moving on the top of the slope was supported by counterweighted crawlers moving along the top, as shown in the accompanying pictures. It was possible to vary the effective lever arm of the counterweight in order to balance the force between the two machines, this was watched closely when rolling as the resultant force had to be perpendicular to the surface being rolled. When using the 50-ton pneumatic roller at the top of the track, it was necessary to support it and the Euclid tractor with three crawlers: two Allis-Chalmers HD-20 and a Caterpillar D-8 moving

parallel to roller on top shoulder. The way the asphalt was handled and laid down affords an example of how ingenuity pays off. Several interchangeable screeds were provided for the Barber-Greene paver to fit the various slopes. The operator's seat was inclined so that it was upright when on the slope, and the platform at the rear of the paver was provided with steps to enable operators to quickly move from one side to the other. It was also necessary to change the machine's lubrication system from a gravity to pressure.

EQUIPMENT LIST

- 2—Allis-Chalmers HD-20 tractors
- 3—Caterpillar D-8 crawler tractors
- 1—Barber-Greene asphalt paver
- 1—Barber-Greene paver (modified)
- 1—50-ton pneumatic Southwest roller
- 1—50-ton super pneumatic compactor
- 1—Buffalo-Springfield 3-axle tandem roller (modified)
- 1—Galion tandem roller (modified)
- 6—dump trucks
- 5—Euclid scrapers
- 1—Cedarapids continuous hot plant
- 2—converted Euclid sprinklers
- 5—Caterpillar No. 12 motor patrols
- 1—Galion tandem roller (modified)
- 1—Link-Belt Speeder crane
- 1—converted Euclid tractor
- 2—double drum sheepfoot rollers
- 1—single drum sheepfoot roller

A further modification had to be applied to the paver to enable it to pave its full width when operating at steep angles. A steel plate divider was placed in the middle of the receiving hopper, and all material was dumped to the high side. It was not necessary to stop the paver when loading the hopper with asphalt. Loading was done from a specially-built box of the right size handled by a Link-Belt Speeder. The pictures best show the arrangement of cables used for manipulating the box. The material was brought to the crane from the hot plant by six ten-wheel rear dumps. The truck loads were divided into batches by five partitions.

The Barber-Greene modifications and paving methods were similar to the ones first used by General Motors in the paving of its test track at Milford, Mich., early in 1952.

Del Fisher, president, and Jack Moylan, equipment manager, supervised the equipment modifications, which were carried out in Fisher's maintenance shops in Phoenix.

Page Thiers is general superintendent, Ed Pound is project engineer, and B. H. Montgomery is field office manager. Paving superintendent is D. M. South, hot plant foreman is John Gkorvich. Earl Riggs is master mechanic, and grade foreman is Chris Hulls.

For General Motors, M. J. Muzzy is manager of the Desert Proving Ground, assisted by C. J. Brady. W. A. Arscott is plant engineer.



GRADING was handled by Caterpillar No. 12 motor patrols with special blades curved to fit the curved slope. The embankment was built one foot over, then cut back to finished grade.



ROLLING on the upper section of the track required rollers with curved drums. The counterweight on the crawler could be varied to keep connecting cable force constant.



PAVING with modified Barber-Greene pavers went smoothly. Several screeds were used, each with a different radius. Slope required change of lubrication system from gravity to pressure.



A FLEET of new Allis-Chalmers equipment costing \$750,000 was purchased by Paul Hooper, Inc., to handle 4,000,000 cu. yd. of earthmoving in the cadet-academic area. Hooper is doing the work for T. F.

Scholes, Inc., holder of a \$2,373,000 general contract. Hooper mu average 20,000 cu. yd. per day to finish by December. Four vibrato rollers are handling compaction on the fill.

Fast start at Air Force Academy

Earthmoving for access roads and building foundations is under way at Air Force Academy site 10 mi. north of Colorado Springs, Colorado. Compaction by vibration is meeting with success—scaffolding for retaining walls is mounted on wheels.

CONSTRUCTION ACTIVITY at the United States Air Force Academy in Colorado is increasing fast. There are ten general contractors already on the site, some with as many as six major sub-contractors, and more contracts are being awarded every month—as fast as designs are completed and approved. Next scheduled bid openings are on July 10 for the sewage treatment plant; on July 24 for foundation caissons for the academic building and cadet quarters; and on July 31 for buildings and utilities in the service and supply area.

Despite the great number of contractors and sub-contractors the work is progressing efficiently and smoothly under the close supervision of the Air Force Academy Construction Agency, and the Architect-Engineer on the project, Skidmore, Owings and Merrill of Chicago. Although dealing with a large number of relatively small contracts has complicated administrative problems, the arrangement has greatly speeded construction on the project. Present

plans call for completion of necessary facilities in 1958 in time for graduation of the first class now quartered at Lowry Air Force Base at Denver.

The biggest jobs now in progress are the construction of roads in the site by Nowers Construction Company and by Jack Adams and Haake Construction Company, the two contracts totaling over \$1,000,000, the relocation of U. S. Highway 85-87, a \$1,177,000 contract being carried out by Mountain States Construction Company, and a \$2,373,000 contract held by T. F. Scholes, Inc., which includes the grading and drainage of the Cadet-Academic Area, parade and drill fields, athletic fields, and retaining walls.

At present, the most significant aspect of the field techniques is the extensive use of vibratory compactors. Nowers Construction Company, the first contractor on the site, tried out a unit made by Vibro-Plus Products Inc. The soil in this area is sandy, consisting of decomposed shale and decomposed granite—perfect for vibratory compaction. Now-

ers got such good results that subsequent contractors also used the Vibro-Plus machine with success. At the present there are probably dozen in use over the site. Paul Hooper, Inc., of Camden, Ark., handling a 4,000,000-yd. earth moving job on a sub-contract from Scholes in the Cadet-Academic Area, is using four of the vibrating rigs. Hooper reports that one or two passes give 90% of maximum density at optimum moisture content and three passes give 95%, at 12-in. lifts.

The machine weighs only 3.3 ton and consists of a roller 48 in. in diameter and 58 in. wide, with an independent vibrating exciter driven by 25-hp. diesel Waukesha motor which adds a vibrating force to the roller with a frequency of 1,400-1,600 rpm. Hooper is pulling them across the fill at 2 to 3 mph. with light Allis-Chalmers farm tractors with double rear wheels for additional traction. In some cases it is necessary to pull disc harrow in front of the vibrator but the total expense required to obtain a given compaction is still less than the conventional method. The December 1955 issue of this magazine carried a discussion of the principles of vibratory compaction plus review of available equipment. Another move Hooper made to make sure he averages the required 20,000 cu. yd. per day is the purchase of \$750,000 fleet of new Allis-Chalmers equipment.

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1957

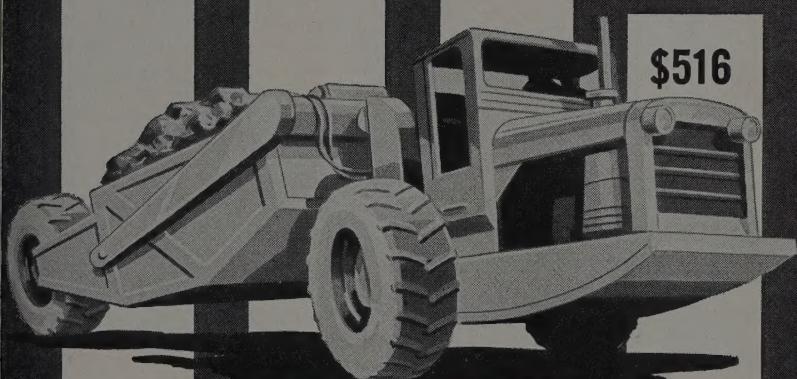
1958

1959

1960

1961

Monthly Payments,
Including Financing Cost,
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\$43,000 Unpaid Balance



The bar chart shows the purchase payments on a motor scraper financed on a 6-year C.I.T. Corporation PAY-AS-YOU-DEPRECIATE PLAN. Note how the monthly payments drop in relation to depreciation allowances. In effect, the scraper pays for itself by means of its own depreciation.

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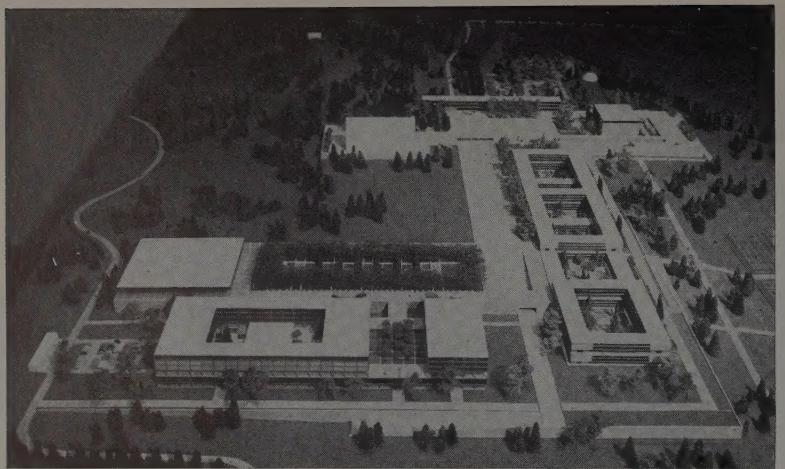
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MODEL of cadet-academic area gives general layout even though parts of the design are not yet approved. At the right are the cadet quarters and in the left foreground is the academic building.



WORKMEN unload \$750,000 worth of Allis-Chalmers equipment at siding near the site. The buyer, Paul Hooper, Inc., must move an average of 20,000 cu. yd. per day for six months.



VIBRATORY COMPACTION is being used with excellent results by many of the contractors. Shown is a Vibro-Plus roller pulled by an Allis-Chalmers farm tractor.

Background

The first step toward the creation of another service academy was taken in 1949 when Secretary of Defense James Forrestal, formed a Service Academy Board to study the needs for such an institution. Board members included General Dwight D. Eisenhower, then President of Columbia University, who acted as vice-chairman. The committee strongly recommended that a third academy be built and in 1954, Eisenhower, as President of the U. S., signed an authorization for its construction. The Air Force formed a committee to select the site and screened some 400 locations, reducing the number to three possibilities: Alton, Ill.; Lake Geneva, Wis.; and Colorado Springs, Colo. In June of 1954 a site ten miles north of Colorado Springs was chosen.

The tract selected contains about 17,500 acres of varying topography. The 4 x 8 mi. site is divided by four ridge-like mesas running generally east and west. It was not necessary to have a great level area since this is not an air base. Cadets will be sent to pilot school after graduation. The Academy, however, will have a single strip air field, located on the southeast corner of the site.

Immediately to the west of the air-strip is the Supply and Services Area. On the southern mesa will be located the Community Center and Support Personnel Housing for single airmen. The valleys on each side of this mesa will contain family housing for officers and support personnel. The next valley to the north will provide a location for a proposed golf course that would be built with non-appropriated funds.

On the mesa furthest north is located the Cadet-Academic Area. It includes academic, recreational, athletic and training areas. The buildings here have been so placed so as to permit any required physical expansion without additional site modifications. A broad valley at the north edge of the site will be used for maneuvers.

The big contracts for the buildings in the Cadet-Academic Area are expected to be awarded within six months. A \$2,000,000 contract for furnishing and erecting steel for the Academic Building has been awarded to Capitol Steel and Iron Co. of Oklahoma City.

Construction now being done in the Cadet-Academic Area consists of grading, drainage, and retaining walls. General contractor T. F. Scholes has portions of this work subbed out. Paul Hooper, Incorporated, is handling the 4,000,000 yd. of earth work with his new fleet of Allis-Chalmers equipment. Hooper's deepest cut is 47 ft. and highest fill is 80 ft. The fill in the Parade Ground will total about 1,700,000 yd. Some of the excavation is going into the con-

(Continued on page 40)

this **TS-18 "Euc"**
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DIRECTING the work in the cadet-academic area are (l. to r.): 1st row: V. O. Purvis, Jr., Proj. Mgr. of T. F. Scholes; J. E. Crawford, Colo. Mgr. of Long Const. Co.; P. Hooper, Pres. of Hooper Const. Co.; S. G. Hardiman, Owner-Mgr. of Hardiman Const. Co. 2nd row: Lt. J. S. MacKenzie, Oper. Div. AFACA; G. Viles, Const. Engr. of Skidmore-Owings-Merrill; M. Ludwig, Oper. Div. AFACA; A. Murdock, Senior Inspector of Skidmore-Owings-Merrill. 3rd row: J. L. Phillips, Supt. of Hooper Const. Co.; A. Gaunt, Supt. of Long Const. Co.; W. D. Henry, Engr. of T. F. Scholes, Inc.

struction of a small zone-type earthfill dam which will impound irrigation water. Hooper is also using his vibratory rollers for compaction in the dam.

The fleet of A-C equipment includes ten scrapers, five HD21 crawler tractors, one HD5 front end loader, two HD45 motor graders, and five HD45 farm tractors.

Hardiman Construction Company, of Denver, is handling over 5 mi. of pipelines with a Bucyrus-Erie 22B backhoe. This contract includes 3,000 ft. of 54-in. and 60-in. lockjoint concrete pipe.

The retaining wall sub-contract is being done by Long Construction Co., and involves about 10,000 lin. ft. of retaining walls varying from 2 to 34 ft. in height. To handle the 550,000 sq. ft. of forming, Long has purchased 25,000 sq. ft. of Symons forms which are plastic coated plywood with metal bands. An unusual way to erect and dismantle the forms has been developed by Long with the co-operation of the Universal Company in Denver, a distributor for the Universal Manufacturing Corporation. The forms will be handled from a 4-level mobile work wagon pulled by an Econmobile. Each platform will be 9 ft. by 20 ft. and the platforms will be separated by 8 ft. Long has three Econmobiles and with appropriate attachments will use them not only to pull the wagons but to erect reinforcing steel, place the forms, and pour the concrete. Long will also use a 17-ton Lorain crane.

Concrete for most of the contractors on the job is being supplied by General Concrete Company of Colorado Springs which has set up two plants in the field, one at each end of

Major construction contracts

Nowers Construction Co. of Pueblo, Colo., received a \$461,707 contract on June 1955 for completion in April 1956.

The job: Construction of 9.3 mi. of internal arterial roads, including all work except for paving and base course. In April 1956, the contractor was given a 45-day extension due to severe winter weather conditions which slowed progress.

Wade Lahar Construction Co. of Tulsa, Okla., received a \$399,235 contract on August 19, 1955, for completion in June 1956.

The job: Construction of water system, including 390-ft. tunnel and 38,000 ft. of pipeline; 16, 12, and 8-in. steel water pipe and 12-in. case iron pipe will be utilized. Eleven bidders tried for the contract.

Matelish and Benson, Inc. of Englewood, Colo., received a \$193,224 contract September 1955 for completion in July 1956.

The job: Construction of three 800,000-gal. reservoirs on the Academy site. One will serve the academic area, one the community and housing areas, and one the service and supply area. This was the third construction contract awarded. Seventeen firms submitted bids.

J. S. Brown and E. F. Olds Plumbing & Heating Corp. of Albuquerque, N. Mex., received a \$264,857 contract on November 4, 1955, for completion in August 1956.

The job: Construction of approximately 50,000 ft. of sanitary sewer lines. Included are 18-in., 15-in., 12-in., 10-in., and 8-in. lines. Rock excavation totaling an estimated 3,000 cu. yd. is involved. Twenty-three firms submitted bids.

Jack Adams and Haake Construction Co. of Santa Fe, N. Mex., a joint venture, received a \$598,090 contract on March 1, 1956, for completion September 1957.

The job: Construction of approximately 15.5 mi. of primary road system, second increment.

Mountain States Construction Co. of Denver, Colo., received a \$1,177,377 contract on March 13, 1956, for completion in December 1956.

The job: Relocation of about 3 mi. of U. S. Highway 85-87 so that it will not interfere with the proposed airstrip.

Burkhardt Steel Co. of Denver, Colo., received a \$327,660 contract on March 20, 1956, for completion September 15, 1956.

The job: Furnishing, fabrication, and erection of structural steel for the service and supply area. It is anticipated 1,120 tons of steel will be used.

T. F. Scholes, Inc. of Reading, Pa., received a \$2,373,568 contract on March 28, 1956, for completion in December 1956.

The job: Grading of cadet-academic fields; and construction of retaining walls in cadet-academic area. Subcontractors are Long Construction Co., Inc., of Denver and Paul Hooper, Inc., Colorado Springs, Colo.

Nowers Construction Co. of Colorado Springs and Pueblo, Colo., received a \$149,205 contract on April 20, 1956, for completion in December 1956. Time allowed is 210 days.

The job: Constructing a 2.3-mi. primary road.

Salina Manufacturing Co., Inc. of Salina, Kan., received a \$568,934 contract on April 23, 1956.

The job: Furnishing, fabrication, and erection of structural steel for cadet headquarters.

Capitol Steel & Iron Co. of Oklahoma City, Okla., received a \$2,059,922 contract on May 9, 1956, for completion in February 1957.

The job: Furnishing, fabricating and erecting structural steel for the academic building in an estimated amount of approximately 6,500 tons, of which 16 tons are sleeves and bolts for base plates.

Colorado Constructors, Inc. of Denver, Colo., submitted a low bid of \$319,413.

The job: Service and supply area, grading, roads, and parking.

the site. The plants have capacities of 115 yd. per hour and 125 yd. per hour. About 12 transit trucks are required.

For T. F. Scholes, Inc., V. O. Purvis, Jr., formerly a resident engineer for Skidmore, Owings and Merrill, Architect-Engineers, is project engineer and Inez McLaughlin is of-

fice manager. Sub-contractor Paul Hooper, Inc., has Paul Hooper, president, J. L. Phillips, general superintendent, Jack Wycoff, field engineer, Cecil Duckworth, master mechanic. Earl Wooten is cut foreman, Fred A. Fite is fill foreman, Robert E. Shumaker is fill foreman, and Walter Sainske is cut foreman. For the Long



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Construction Co., Joe E. Crawford is Colorado manager, and Arnold Gaunt is project superintendent.

Carroll L. Tyler is general manager and Ed Merrill is engineer director of the Air Academy project for the architect-engineer, Skidmore, Owings and Merrill.

For the Air Force Academy Construction Agency, Colonel Albert E. Stoltz is director, John P. Huebsch is deputy director, Lt. Col. E. W. Scott, Jr., is executive officer and Col. Ben A. Scarbrough is chief of the engineering division. William Crawford is deputy chief of the engineering division, Col. James A. Barnett is chief of the operations division with James A. Blaser as deputy chief. The maintenance division is headed up by Lt. Col. Richard J. Coffee. Harold E. Poch is deputy chief. Major T. E. Correll is the contracting officer in charge of the Legal and Contracting Division of the A.F.A.C.A.



CRAWLER-SCRAPER combination heaps up a load in the excavation for the cadet quarters building. Deepest cut is 47 ft., highest fill, in the parade grounds, is 80 ft.

Seattle progresses with Gorge High Dam

SEATTLE CITY LIGHT'S Gorge High Dam is now under construction at its Skagit Hydroelectric Project. The dam, located on the Skagit River two miles above the Gorge Powerhouse, will be a concrete structure approximately 670 ft. long and 285 ft. high.

It is being built by Merritt-Chapman & Scott Corp. of New York, and The Savin Construction Corp., East Hartford, Conn., a joint venture who obtained the contract on their low bid of \$14,731,107.

The dam is scheduled for completion in early 1959. Purpose of the dam is to replace the present Gorge Division Dam and provide an 88 ft. higher head of water, thereby increasing the present 108,000-kw. capacity of the Gorge Powerhouse to 155,000 kw.

The dam will run straight across the gorge from the left bank (looking downstream) for about 220 ft. and

swing on a curve to a point about 200 ft. downstream on the right bank. The 220-ft. gravity section of the dam will be about 170 ft. thick at the base. The arched portion, requiring less bulk, will be about 70 ft. thick at the base. The dam will have a 16-ft. width at the crest.

Two gates, each 47 ft. long and 50.5 ft. high, will control the flow over the spillway, located in the gravity section of the dam. Two 8.75-x-8.75-ft. conduits will provide sluiceways to the right of the spillway and about 120 ft. below the top of the dam.

A unique feature in the construction is the freezing of an ice barrier in the river-fill material down to bedrock to keep upstream ground water from flowing into the excavation. The ice wall will be approximately 4 ft. thick and reach a depth of about 240 ft. At the end of March, first stage cofferdam freeze holes were nearly complete and freeze

point piping was being assembled in preparation for the operation.

Six 42-ton refrigeration units were installed on the job site. A grout curtain upstream of the freeze holes was 70% complete to act as a ground water barrier during freezing.

Roads include three unlined vehicular tunnels, totaling 1,130 ft., a 250-ft. bridge at Gorge Creek, and four short span bridges totaling 220 ft. At this writing, about 50% of the highway work is complete and the first tunnel had been excavated for 550 ft. of 650 ft. total length.

Here are other developments:

The right bank diversion channel is nearly complete. Bottom and sides of the channel are lined with riprap and consolidated in places with concrete.

The construction area has been cleared and preliminary excavation has been completed. Excavation will be resumed when the ice cofferdam is complete.

Pre-excavation grouting for the intake is completed and the intake area is ready for excavation.

The contractor has moved in and assembled his aggregate plant, and has received, but not assembled, the concrete plant and highline.

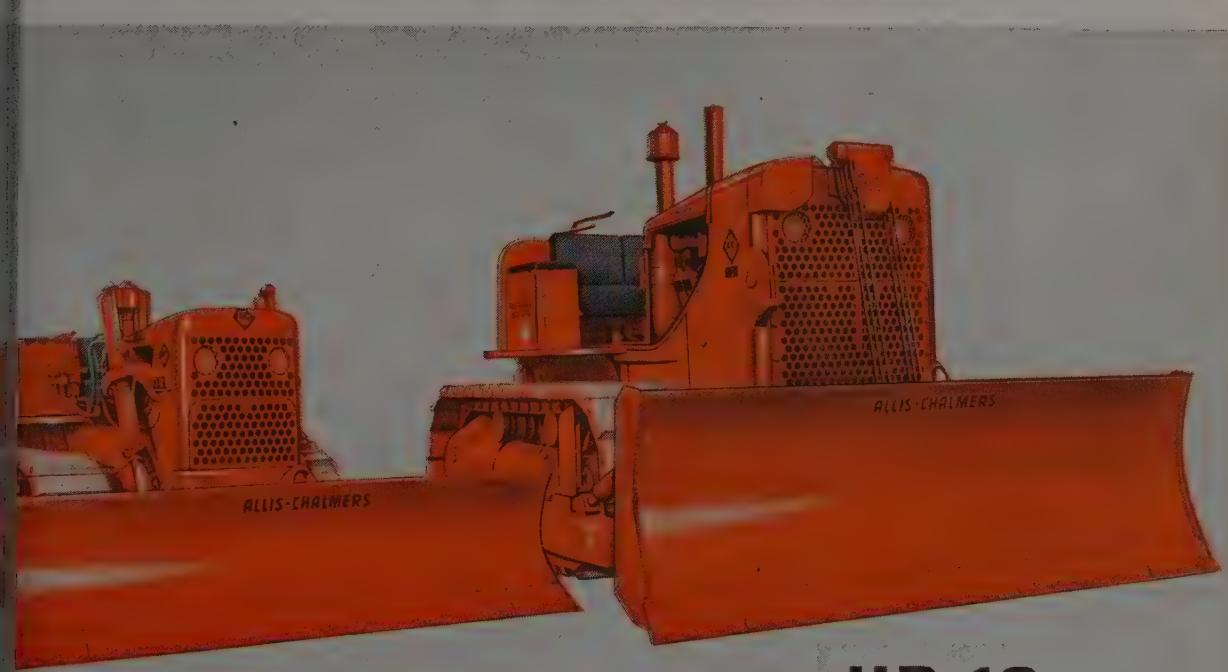
Plans for the project were prepared by Dr. J. L. Savage, consulting engineer of Denver, Colo., under the supervision of City Light chief engineer Herbert V. Strandberg and project engineer Charles E. Shevling.

Other key engineers on the project are: C. R. Hoidal and E. R. Schindler, design engineers; Robert E. Brown, resident engineer; H. M. Lees, assistant resident engineer; Don Graham, concrete engineer; E. J. Drobak and A. L. Gustanoff, assistant design engineers; and Ray Halvorsen, field office engineer.

Artist's conception of completed structure



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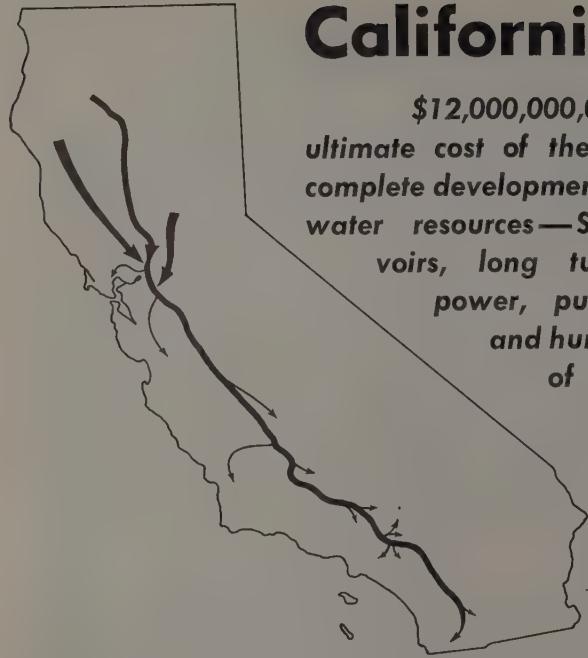
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California Water Plan

\$12,000,000,000 will be the ultimate cost of the program for complete development of the state's water resources—Storage reservoirs, long tunnels, hydro power, pumping plants and hundreds of miles of aqueduct will be required.



SURPLUS WATER from the rivers of Northern California must be delivered to southern areas if the future development of the state is to be realized. The north coastal and Sacramento river areas produce 73% of all the runoff. About 70% of the runoff occurs north of an east-west line drawn through Sacramento, while 80% of the ultimate consumptive demand will be south of that line. The required aqueduct system, and points of delivery are shown by the diagram.

OUTSTANDING characteristic of California's water supply is its geographic maldistribution. Major sources of water are in the northern part of the state where they can conveniently waste into the ocean unused. On the other hand, the great productive land areas are located in the central and southern regions where water supplies are insufficient. The picture is complicated by intervening mountain ranges. Well over 70% of the stream flow occurs north of a line drawn roughly through Sacramento. In contrast, an estimated 77% of the present consumptive water requirement and 80% of the forecast ultimate are found south of the same line.

The estimated mean seasonal natural runoff of all California streams is about 71,000,000 ac. ft. The greatest contributions come from streams of the North Coastal Area, which furnish about 41% of the total for the state, and from streams of the Sacramento River Basin, which furnish about 32%. Most of the remainder of the natural water supplies, some 16% of the state's total, is in the San Joaquin Valley. The San Francisco Bay, Central, and South Coastal areas, and the desert areas receive insignificant portions of the state's vital water resources.

What about growth requirements for water? The continuing population growth is a prime factor in accentuating the historic water prob-

lem. Forecasts based generally on the capability of the land to support a balanced economy, indicate that the present population of about 13,000,000 may increase to more than 40,000,000 under conditions of complete development.

Along with much greater domestic and municipal needs for water, the future population growth will bring increased demands for water for industries, including the processing of agricultural products, ores, chemicals, petroleum, steel, and timber. It is anticipated that the total use of water for all urban and related purposes will increase about five-fold from present to ultimate—from about 1,600,000 ac. ft. per season to about 8,400,000. Estimates of "present" values actually represent conditions of about 1950.

The largest use of water in California is for agriculture, a condition that will continue. Present consumption of water for irrigation is estimated to be 90% of the total for all beneficial purposes, and will decrease only to about 80% ultimately. Actual requirement for water for irrigated agriculture, at present about 19,000,000 ac. ft. per season, should more than double under conditions of complete development, to more than 41,000,000 ac. ft. per season.

The total requirement for water in California for all consumptive purposes in 1950 was about 21,000,000 ac. ft. per season. It is forecast that

this will eventually increase nearly two and one-half times, to some 50,000,000 ac. ft. per season.

Problem of regulation

Another outstanding characteristic of the water resource of California is the sporadic timing of its occurrence. Throughout the state the bulk of precipitation occurs in a few winter months, while the summers are almost always long and dry. Although runoff from the higher mountain ranges is regulated to a considerable extent by the effect of the mountain snow packs, most of the stream flow in California closely follows the pattern of precipitation, and comes during the winter and early spring months—frequently in the form of damaging floods of high intensity and short duration. The economically important part of the stream flow that is delayed until the late spring and early summer snowmelt period is insufficient to provide for the large demands for water in the summer and fall.

In addition to the characteristic variation in its natural water supply within the year, California is subject to extended wet and dry periods. In the late 20's and early 30's there was a severe drought during which runoff for a 10-yr. period averaged only a little more than 50% of the long-time mean. In this connection, while the state-wide runoff has averaged some 71,000,000 ac. ft. per season, the actual seasonal flows have varied from as little as 18,000,000 ac. ft. to more than 135,000,000 ac. ft.

Solving the problems

The California Water Plan will give consideration to water conservation and reclamation, to flood control and flood protection, to the use of water for agricultural, domestic, and industrial purposes, to hydroelectric power development, to salinity control and protection of the quality of fresh waters, to navigation, and to the interests of fish, wildlife, and recreation. It will contemplate the conjunctive operation of surface and ground water reservoirs, which operation will be essential to regulation of the large amounts of water ultimately to be involved.

The following concepts have entered into the planning studies, and, for proper evaluation of the results, should be borne in mind: (1) conceived as an ultimate plan, (2) designed to be comprehensive, (3) is a flexible pattern into which definite projects may be integrated in an orderly fashion, with due consideration to varying interests, and (4) the plan is designed to be susceptible of orderly development by logical pro-

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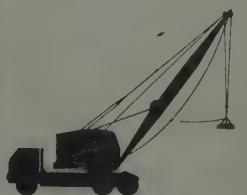
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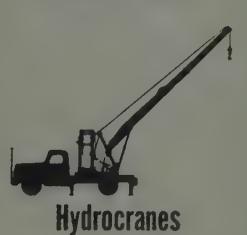
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gressive stages as the growing demands and requirements of the state may dictate.

The California Aqueduct System, comprises a complex combination of reservoirs and conduits to export surplus waters from the North Coastal Area and half from the Sacramento River Basin.

The aqueduct would be unprecedented in concept and scope. For purposes of study and description, this immense inter-area water conservation and transportation system can be divided into eight divisions.

Klamath-Trinity Division. This division would develop surplus flows of the South Fork of the Smith, the Klamath, the Trinity, the Van Duzen, and the Mad rivers, and convey the waters to the Sacramento Valley. It would include a series of major regulating reservoirs, conduits, pumping plants, and hydro plants appurtenant to the dams and reservoirs. The Klamath-Trinity Division would involve construction of 16 dams and reservoirs with aggregate storage capacity of 15,500,000 ac. ft., 7 hydro plants with installed capacity of 1,700,000 kw., 3 pumping plants with total installed capacity of 900,000 kw., and 6 tunnels having a total length of 76 mi. The works, which are susceptible of staged development, would make available some 8,200,000 ac. ft. of water seasonally for export, not including the yield from the Trinity Diversion Project.

Pumped upstream

The Eel River Division would include a series of major reservoirs and pumping plants to transport the conserved water from reservoir to reservoir, up the river, to gravity flow tunnels beneath the southerly divide. The division would involve 9 dams and reservoirs, 9 hydro plants with installed power capacity of 670,000 kw., 2 pumping plants, and 4 tunnels having a total length of about 22 mi. The works would make available some 2,600,000 ac. ft. of water seasonally for export.

The Sacramento Division would comprise the foothill reservoirs of the Sacramento River Basin, the natural underground storage in the alluvium of the Sacramento Valley, and the conduits, both natural and artificial, through which surplus waters developed for export would flow southward. In addition to at least 28,000,000 ac. ft. of usable ground water storage capacity, the Sacramento Division would include 14 major reservoirs, strategically located near the foothill line on tributaries of the Sacramento River, with gross storage capacity aggregating about 14,000,000 ac. ft. Existing storage in Shasta and Folsom reservoirs, and that which will be made available by the construction of Monticello Reservoir, is included in this figure. Water released from the sur-

face reservoirs, augmented in some instances by imports, would flow through hydroelectric power plants with installed power capacity totaling nearly 2,000,000 kw. These plants would generate an average of approximately 10,000,000,000 kilowatt-hours of energy seasonally. Facilities of the Sacramento Division would make available from the Sacramento River Basin an average of about 10,000,000 ac. ft. of water seasonally for export to the south, in addition to providing capacity for the southward conveyance of about 11,000,000 ac. ft. of North Coastal Area water.

Moving the water south

The San Joaquin Division would comprise the facilities to convey regulated waters of northern areas of surplus southward to and through the San Joaquin Valley. Since this valley is one of the principal areas of water supply deficiency in the state, a substantial portion of the imported water would be diverted for storage and use along this reach of aqueduct. The remaining portion would be conveyed further south.

Works of the San Joaquin Division would include three parallel conduits along the western side of the valley. The Feather River Project Aqueduct, including San Luis Reservoir and the pumping plants, would comprise the initial stage of this development. Major pumping plants at the south edge of the San Joaquin Delta would lift water into the west side canals, from where it would flow southward by gravity to the San Luis Forebay.

The San Joaquin Division would involve the construction of 1 major reservoir and 2 regulating reservoirs providing active storage of over 2,000,000 ac. ft., 9 pumping plants and an aggregate of 930 mi. of main canals. The works would make available some 7,000,000 ac. ft. of water seasonally for use in the San Joaquin River and Tulare Lake Basins, and would deliver approximately 10,000,000 ac. ft. of water each season for use in other water-deficient areas of California. Approximately 8,400,000,000 kw. of electric energy would be required seasonally for pumping.

The Southern California Division would supply supplemental water to meet the ultimate requirements of the area excepting that portion having rights in and to the waters of the Colorado River. The Tehachapi Mountains at the southern end of the San Joaquin Valley constitute a formidable barrier for such importation of northern waters. Alternative methods for crossing this barrier are presently under study, and several combinations of pump lift and tunnel have been found feasible from an engineering standpoint.

When the need arises, aqueduct system would deliver approximately 9,000,000 ac. ft. of water per season

into southern California. Of this amount, about 2,900,000 ac. ft. would be supplied to the South Coastal Area, and the remainder to the desert areas. In connection with the delivery of these supplies, substantial amounts of hydroelectric power would be generated at several strategic locations.

From the floor of the southern end of the San Joaquin Valley at Pastoria Creek, pumping plants would lift the water to a system of parallel tunnels one at an elevation of 3,357 ft. with a length of 10.5 mi. and two at an elevation of 3,140 ft. with a length of about 9 mi. each. The tunnels would convey the water through the Tehachapi Mountains to regulatory storage in the vicinity of Quail Lake. The main aqueduct system would then extend along the south side of the Antelope Valley, crossing the Mojave Desert in an easterly direction, and turning to the south in the vicinity of Cajon Pass.

The aqueduct would continue through a series of parallel tunnels to the vicinity of San Bernardino from which point water would be delivered to the southerly portion of the South Coastal Area and to portions of the Colorado Desert Area by two major routes. One route would continue southward, terminating in the vicinity of San Vicente Reservoir in San Diego County.

The Southern California Division would involve the construction of 6 regulating reservoirs and 9 pumping plants. The installed pumping capacity would be over 14,000,000 kw., requiring about 33,500,000,000 kwh. of power seasonally for project purposes. In addition to the Tehachapi tunnels, this part of the aqueduct system would include about 700 mi. of conduit. Three hydroelectric power plants on the aqueduct line, with an installed capacity of about 860,000 kw., would generate over 3,000,000,000 kwh. of electric energy seasonally.

Cost estimate

Preliminary estimates of capital costs of the new works incorporated in the California Water Plan are under preparation. They are generally based upon reconnaissance engineering and geologic surveys, very preliminary designs, and present-day construction methods and unit costs. The estimates indicate that the overall capital expenditure for the California Water Plan would eventually aggregate between \$12,000,000,000 and \$13,000,000,000, of which approximately \$9,000,000,000 would be expended for features of the California Aqueduct System. These figures include costs of the authorized Feather River Project, but not those for existing works, nor for any other of the authorized works presently in the construction or advanced pre-construction phases.

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ERECTING the seven 66-ton prestressed concrete girders was done with a temporary gantry crane. The traveling trolley moved on rails

110 ft. apart, powered by a 2-drum diesel-driven hoist. Rails rested on 16x32-in. box girders supported by dolphin piles.

Concrete deck slabs, 95-ft. long piles, 66-ton girders make up— Prestressed bridge barged 300 mi.

UNUSUAL FEATURES are easy to find on the Eureka Slough Bridge—it's the biggest prestressed bridge contract ever awarded by the California Division of Highways; the pretensioned concrete piles, some of which are 95 ft. long, are among the longest prestressed concrete piles ever driven anywhere; and all the prestressed units, deck slabs, piles, and seven 66-ton girders, are being barged to the site from the contractor's casting yard 300 mi. away.

Contractor Ben C. Gerwick, awarded the \$842,406 contract in June of 1955, has kept the job right on schedule despite a variety of difficult circumstances, including the heaviest rains and the worst floods in the history of the state.

In addition to the 947-ft. long bridge the contract calls for about 2.5 mi. of approach highway to be graded and surfaced with plant-mixed surfacing. This work is being done by Mercer-Fraser Co., Inc., holder of a \$283,000 subcontract which includes surfacing the bridge when it is finished.

Gerwick's first task was to dredge a channel from the main slough to the bridge site, a distance of about 650 ft., and then to dredge 38,000 cu. yd. of mud from the site to permit all pile-driving to be done from a floating driver. This was complicated by the fact that access to the site was

blocked by the existing highway bridge which has a clearance of 22 ft. In order to get the rig under this bridge it was necessary to dismantle the 100-ft. high leads.

Test piles were driven at ten locations across the channel to determine the resistance of the subsoil, so that



HANDLING a prestressed concrete pile 95 ft. long is easy because you can use a two-point hitch. All piles had hollow cores.

proper lengths of piling could be specified. There are now a total of 149 piles in place. All piles are 20 in. square with 12-in. hollow cores and vary from 45 to 95 ft. long. Gerwick's casting yard and prestressing facilities in Petaluma, Calif., were described in *Western Construction*, December 1955, p. 30. The 300-mi. barge trip from the yard to the site takes about two days.

Prestressed piles were a contract option. In general prestressed piles require less concrete per lineal foot to carry a given load, have better driving characteristics than conventionally reinforced concrete piles, and can be handled more easily. On this job even the 95-ft. long piles were picked up with only two points of support.

The S-10 hammer on the floating driver drove the piles to 45 tons or to refusal. About 2/3 were driven right to grade—the rest had to be either cut off or built up. A pretensioned pile can be cut off at any point without losing the prestress characteristics. When it was necessary to build a pile up, concrete was poured solid, without any hollow core.

Nineteen of the 26 pile bents consist of four piles, the center two vertical, the outside two battered to the side. Every fourth bent is a king bent consisting of six piles, each battered in one of four directions, thus provid-

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ing longitudinal as well as lateral stability. A total of 80 of the 149 piles are battered—all at a slope of 2 in 12. Spotting each pile before driving was done by cross-sighting with two transits. The driver positioned itself by means of quarter lines attached to the shore. Under the supervision of foreman Dick Verbrugge the tops of all piles were driven to within a 3-in. tolerance for line and grade. An average of 7 piles were driven each day, with 11 as the one-day high.

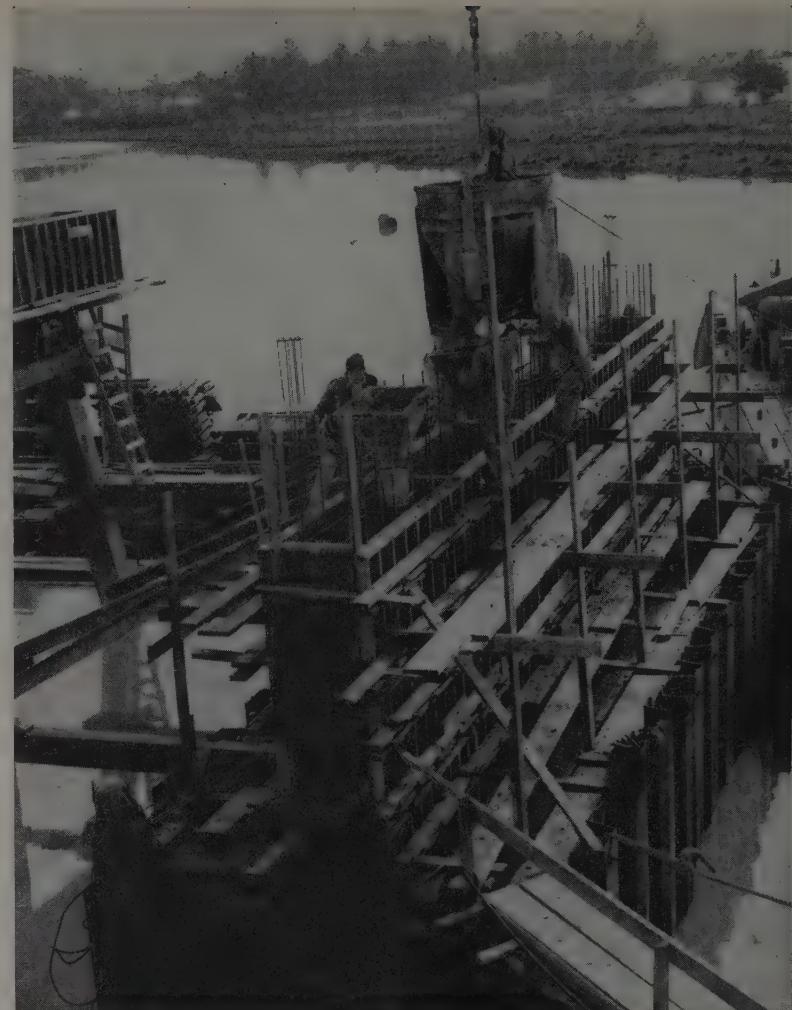
When all the piles were in place carpenter foreman Bill McCrae directed the construction of scaffolding and form work for the caps on each bent. Collars consisting of 6 x 12-in. blocks and 36-in. long 1-in. bolts were tightened around each pile. Girts, 6 x 12 in., rested on the collars and ran from one end of the bent to the other, and also from one bent to the next. Carpentry work was tricky on the king bents, where the piles slope in four different directions. In some cases several collars were placed on each pile to eliminate the possibility of slipping. Each cap is about 3 x 3 ft. in cross-section, 38½ ft. long.

Concrete placement is being handled by a 1½-yd. Link-Belt Speeder mounted on a barge. Concrete is brought to it in four concrete buckets on a converted Navy LCM which shuttles to transit-trucks on the shore.

A 60-ft. Chicago boom has been mounted on the pile-driver and is used to place the prestressed deck slabs. Each slab is 15 in. thick, 4 ft. wide, and 30 ft. long, with 3 hollow cores 8 in. in diameter to reduce the weight and volume of concrete. All the deck units are being made and pretensioned in Petaluma and are being barged to the job. When all the slabs are in place the joints will be grouted and transverse post-tensioning will be carried out so that the slabs will act as a single unit the full width of the bridge. Gerwick will do the post-tensioning with his own forces.

Cofferdams for piers

Seven 105-ft. long prestressed girders, resting on solid concrete piers, will carry the traffic over the main span. Cofferdams were necessary for the construction of the piers. First step was the driving of 28 timber piles to a depth of penetration of about 60 ft. measured from a plane 15 ft. below mean sea level. When the piles were in place a network of bracing was attached to them and this formed the template for the driving of ZP-32 sheet piling which acted as the walls of the cofferdam. A seal of 3 ft. 9 in. of tremie concrete was then poured—each pier taking about 90 cu. yd. After that the cofferdam was dewatered, the timber piles cut off at the top of the tremie seal, and the formwork and reinforcing put in



FORMING the pile caps was tricky, especially on the king belts where the piles sloped in four directions. Forms were supported by 6x12-in. wooden collars and girts fastened to the piles.



CONCRETE is brought from transit trucks on the shore to the pile caps in four concrete buckets on a converted Navy LCM. A 1½-yd. Link-Belt Speeder on a floating barge handles it from there.



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place. The piers are 2½ ft. thick, 38½ ft. long, and rise from elev. minus 15 ft. to elev. plus 23 ft. The sheet piling was sealed with a mixture of sand and sawdust which effectively stopped leakage. Concrete for the piers was also brought over water from transit trucks on the shore by the LCM.

Gantry for girders

Concrete trucks could not use the completed portion of the bridge to bring concrete to the pouring point because the abutments at each end of the bridge were not built—heavy equipment had no access to the bridge deck until the job was nearly completed in May. This delay in the construction of the abutments was due to the fact that the earth-fill approach embankments must be allowed to consolidate for 90 days under a temporary gravel surcharge.

The last phase of the operation was the placement of the seven 105-ft. long, 66-ton girders—which were manufactured and post-tensioned in Petaluma. Since there was no economical way to get cranes on the bridge deck, and since any floating rig must be dismantled in order to get it under the existing bridge, Gerwick decided to build a temporary gantry crane, to lift the big girders into place. Dolphin piles were driven about 50 ft. from each main pier, then 16 x 32-in. box girders were placed from the tops of the piers to

the tops of the dolphin piles. Each girder carried a rail on which the gantry trolleys traveled. Each trolley was tied to other with H-beams 110 ft. long. The box girders in place were perpendicular to the bridge several feet above deck level. The barge containing the prestressed concrete girders was positioned under the traveling gantry between the bridge and the dolphin piles. Power for moving the gantry along the rails and for lifting the girders was supplied by a 2-drum diesel-driven hoist mounted near one of the trolleys.

The Eureka area was one of the hardest hit in the floods of December and January. The project described here was not directly affected, but some of the construction force was put to work on nearby emergency projects.

Key personnel

Bill Goss is superintendent on the job for Gerwick, assisted by Syd Smith. Dick Verbrugge is pile driver foreman, and William McCrae is carpenter foreman.

For the Division of Highways, Alton Kay is resident engineer, assisted by Ray Samuelson, Lowell Allen, Ray Davis, and Joe Cuny.

Don Weaver, area manager for Ben C. Gerwick, Inc., coordinated casting schedule and barge movements between Petaluma and Eureka.



DIRECTING the work on the Eureka Slough Bridge for contractor Ben C. Gerwick, Inc., are Bill Goss (right), superintendent, and Syd Smith (left), assistant superintendent.

U. S. and Mexico plan dam—

PLANS FOR EARLY construction of the Anzalduas Diversion Dam on the Rio Grande have been outlined by the International Boundary and Water Commission. The dam will be constructed jointly by the United States and Mexico through the Commission, at an estimated cost of about \$5,000,000, U. S. Cy., to be shared equally by the two Governments. The Anzalduas site is 8 mi. south of McAllen, Texas, and 4 mi. upstream from Reynosa, Tamaulipas.

The dam is primarily a flood control structure and will substantially complete the Lower Rio Grande Flood Control Project undertaken by the United States and Mexico in 1933. It will be operated to divert flood waters into interior floodways and thence to the Gulf, limiting to 110,000 cfs. the maximum expected flows passing the dam. Diversions to other floodways downstream will limit to 30,000 cfs. the maximum flows expected at Brownsville and Matamoros.

In addition to flood control, the Anzalduas Dam will be used by Mexico for the diversion of irrigation waters through the Anzalduas Canal.

The plans, prepared for the Com-

mission by the Ministry of Hydraulic Resources of Mexico, are for a gated structure with concrete foundation, abutments, and piers, 524 ft. in length between abutments. There will be six electrically-controlled gates of a type unusual in this area; each is a 14-ft. diameter cylinder, 75 ft. in length, with a projecting lip at the bottom, which makes their overall height 21 ft. In operation, the gates roll up an inclined track and provide either full or partial opening, as desired. Massive piers 14 ft. wide separate and support the gates. On top of the piers are hoist houses containing electrically-operated hoists for the gates. The hoist house on the center pier also contains the electrical control board from which all gates are operated. An appropriate monument will be constructed to mark the international boundary line on the center pier. The river channel above and below the dam will be stabilized with rock riprap in order to prevent erosion of the river bed and banks. Earth abutments will be constructed from the dam to the existing river levee in the United States and to high ground in Mexico.

Equal division of costs between the

two governments will be effected by allocation of work items for performance by the respective sections of the Commission, each in accordance with the laws of its own country. Major items allocated to the United States include furnishing and installing gates, hoist, and electrical system, which will require approximately 1,500 tons of structural steel and miscellaneous materials; construction of the earth-fill for dike, containing 188,000 cu. yd. of compacted embankment; and placing 55,000 cu. yd. of riprap on embankment and river revetment.

Major items allocated to Mexico include construction of the reinforced concrete portion of the structure, including the foundation, aprons, service bridge, control and operating houses, requiring approximately 41,000 cu. yd. of concrete and 1,400 tons of reinforcement steel; construction of the earthfill levees on either side of the concrete structure and the dike on the right bank, totaling approximately 81,000 cu. yd. of compacted embankment; the stabilization of the approach channel on the right bank and a portion of that on the left bank by the placement of approximately 79,000 cu. yd. of rock riprap; and installation of service bridge girders totaling 196 tons of structural steel.

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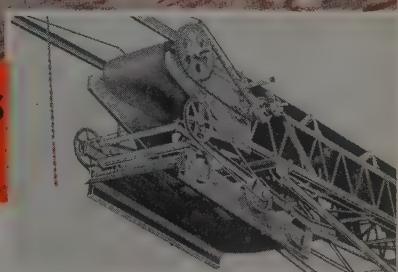
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A NEW SYSTEM for solving engineering problems in highway construction through the combined use of aerial photography and electronic computation was described at an interstate meeting of highway engineers sponsored by the Federal Bureau of Roads.

Preliminary tests indicate the method can reduce surveying and engineering time 30 to 1 and costs 15 to 1, according to a joint announcement by the Computer Division of Bendix Aviation Corporation, Los Angeles, and the engineering firm of Lockwood, Kessler & Bartlett, of Syosset, L. I.

An explanation of the system and its application to the construction of modern high-speed highways and freeways was made by representatives of Bendix, producer of the G-15 general-purpose computer, and Lockwood, Kessler & Bartlett to state road engineers of New York, New Jersey, Massachusetts, Connecticut, Rhode Island, Vermont, New Hampshire, and Maine.

The process involves these basic steps:

1. Aerial photography of proposed highway route "strips"—corrected to allow for variations in the plane's flight and tilt of camera.

2. Matching of the photographs to show the true location and elevation of every terrain feature common to them. (This is determined by pre-established ground control points.)

3. Drawing of a three-dimensional stereopticon contour map from which vertical, horizontal, and depth measurements can be taken along the highway route.

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At that point in the process, the section of the highway route is ready for staking and bulldozing. Earth-moving equipment can begin operations on the pattern provided by the computer's answer. A major part of field surveying—a traditional prologue to any highway construction program—thus can be eliminated by the new camera-to-computer technique.

In one test run the G-15 computer

solved highway earth-moving problems in 230 roadway cross-sections in 45 minutes at a total cost of \$38.80. The cost figure included \$13.80 for that particular period of the machine's operation, plus \$25 for preparation of input information by a trained computer operator.

When it is considered that manual methods require up to 45 minutes per cross-section, including the necessary drawing of the cross-section and road profile, a time saving of as much as 30 to 1—a day contrasted with a month—is achieved. The savings in cost is in excess of 15 to 1.

Two new films available

The WASHO Road Test is a visual summary of the large-scale road test in Malad, Idaho. The film (16 mm. color and sound, 35 min.) may be borrowed from the Division Engineer, Bureau of Public Roads, 753 Morgan Bldg., Portland, Ore., and from the Division Engineer, Bureau of Public Roads, 102 Old Mint Bldg., San Francisco, Calif.

The Dalles Dam Construction Film, (28½ min.), produced by the Portland District Corps of Engineers, is for loan from the Division Engineer, North Pacific Division, Corps of Engineers, 210 Custom House, Portland, Ore.

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MCKELVY MACHINERY CO., Denver, Colorado

LUBRICATION —A problem anywhere in the heavy construction field, and especially tough under Western conditions — A comprehensive review of the subject, with detailed information and suggestions for field servicing.

PART TWO OF TWO

THE petroleum supplier takes every precaution necessary to assure that lubricants are in the best possible condition when delivered to the customer. The user, likewise, should exercise equal care to see that when a lubricant is applied, it is in the same good condition as when it was received.

All of us know from experience the consequences of eating spoiled or contaminated food—illness, treatment, and doctor bills. Consequently, we take extreme measures to protect food and be sure that it is in satisfactory condition when we consume it. In a sense, fuels and lubricants are the food of machines. If fed spoiled or contaminated products, they, too, can become ill, and the treatment and "doctor bills" as represented by repairs and new parts can be very costly and expensive.

Many things can happen to a lubricant between the time it is received by the customer and the moment it is applied. Such things as careless handling, contamination, confusion of brands, exposure to extreme temperatures, and leakage can result in damaged equipment, excessive maintenance cost, and lost productive effort. The conditions under which a contractor must store and handle lu-

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and

E. J. BOWHAY

Research and Technical Dept.

The Texas Co.
New York, N. Y.

bricants are particularly hazardous from the standpoint of contamination and exposure to temperature extremes. Consequently, he should be unusually careful to see that nothing detrimental happens to them.

Loss of lubricant from damaged containers, loose fitting plugs, or careless handling (spilling) represents product that the user has purchased but will not be able to use. This all adds up to waste.

All contamination is undesirable and should be avoided, but the extent of the consequences will vary depending on the type of lubricant and the nature of the contaminants. In general, lubricants containing additives will be affected more adversely than will straight mineral oils. For example, a little moisture will not result in permanent damage to straight mineral oils. They may become cloudy but will clear up after standing as the moisture settles to the bottom. Certain additives, however, may be water sensitive and may be re-

moved partially or completely by contact with just traces of water. Also water will cause separation or lump formation in certain type greases.

Contamination with dirt, dust, or other solid bodies can be especially harmful if not discovered in time. Not only do these materials accelerate oil oxidation and shorten oil life, but also because of their abrasive properties, they can cause severe damage to the moving parts of the machinery.

Thus, extra precautions should be taken to protect lubricants from contamination. At best it can cause extra handling if discovered before the product is used (filtering out solid particles or allowing water to separate). Furthermore, contamination may permanently destroy some of the important properties of certain additive type lubricants—properties which are essential for satisfactory lubrication of the equipment where the product is to be used. Finally, if the contamination is not detected, some very serious consequences can result, including damaged equipment, costly repairs, and lost production.

Extreme temperatures

Exposure to either abnormally high or low temperatures also can result in temporary or permanent



THIS CEDARAPIDS portable primary double impeller impact breaker is producing base-course material. Western jobs are rock jobs.

5 "Euc" REAR-DUMPS

10 to 50 Ton Capacities

for
CONSTRUCTION, MINE, QUARRY and INDUSTRIAL WORK

10-Ton

Model UD has 128 h.p. engine
... 10-speed transmission ...
36 m.p.h. loaded travel speed
... spring mounted drive axle
with 12.00 x 24 duals.



15-Ton

There are two
ton models with
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14.00 x 24 tires. Model
has 165 h.p. engine, and 10 cu. yd.
Model R-15 has 218 h.p. engine,
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22-Ton



Euclid Rear-Dump hauling units for off-highway service are available in five sizes with capacities of 10, 15, 22, 34 and 50 tons. They have diesel engines of 128 to 600 total horsepower.

The simple rugged construction of "Eucs" pays off in long life and low maintenance cost. You get more work-ability because there's less down time for repairs. There are more Rear-Dump "Eucs" in service than all other makes of off-highway haulers combined.

Have your Euclid Dealer give you facts and figures on the complete line of Rear-Dumps and other Euclid equipment ... you may find, as hundreds of owners have found, that **Euclids are your best investment.**

EUCLID DIVISION, GENERAL MOTORS, Cleveland 17, Ohio



34-Ton

Model FFD has two engines providing a total of 400 or 436 h.p. to tandem drive axles through separate Torqmatic Drives. Dual tires are 16.00 x 25. Exhaust heated body has 24-yd. capacity.

50-Ton

Similar in design to the Model FFD "Euc", the 50-ton Twin-Power Model LLD has a total of 600 h.p. and an exhaust heated body with 32-yd. capacity. Tires are 18.00 x 33.

Model TD "Euc" is equipped with 300 h.p. engine, spring mounted drive axle with 18.00 x 25 duals, power steering and 15 yd. body. Available with Torqmatic Drive or 10-speed transmission. Standard or quarry body is available.

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



damage to lubricants, depending on the nature and composition of the product. Again, it is the additive type products which are most subject to harm.

Of the two extremes, contact with low temperatures is by far the more prevalent due to outdoor storage in areas where the winter weather is very cold. If nothing worse, exposure to low temperatures causes lubricants and greases to become viscous and stiff, making them difficult to handle. Various means are commonly used to heat products which have been subjected to low temperatures, some of which are not to be recommended. Where direct heat is applied, there is always danger of developing local overheating which may ruin the lubricant.

On construction operations in particular, it is most advisable, if at all possible, to apply the lubricant directly from the original container in which it came. The elimination of intermediate transfer receptacles erases a very serious source of contamination.

Dispensing equipment is now available to fit all of the standard containers used to package lubricants and greases. They permit product to be removed from its original container with no danger of contamination, waste, or mess.

Some "do's and don'ts" that apply to storage and handling of lubricants are outlined as follows.

1. Choose storage area carefully. Select a central location so that hauling distances are as short as possible. Also select an area where the atmosphere is free from dust and vapors.

2. Store lubricants indoors if possible—chances of contamination will be less.

3. If stored outdoors, drums should be placed on their side and on racks—don't lay them on the ground. When placed upright on end, rain water may accumulate and be sucked into the drum by the normal breathing action. If stored outdoors on end even temporarily, cover should be available to place over drum in the event of inclement weather.

4. Cleanliness is essential regardless of whether storage is indoor or outdoor.

5. Orderliness is another must. By keeping different brands and types of lubricants separated and in their proper places, there is less chance for confusion and error.

6. Don't store more products than necessary. The lubricant supplier will be glad to make a survey of lubrication requirements with a view to keeping the number of different products to a minimum. This also will reduce chances of confusion.

7. Exercise extreme care in heating products that have been exposed to low temperatures. If possible, transfer drums to a warm area and allow product to reach room temperature. If more rapid heating is required, use exhaust steam. Never apply direct heat, such as a flame, to exterior of the drum. This could melt the sealing compound and cause leaking. It might also harm the product.

8. Remember that exposure to

DIESEL FUEL SPECIFICATIONS AND CHARACTERISTICS

ASTM Diesel Fuels		GMC Detroit Diesel Engine Division						
Grade 1-D	Grade 2-D	Buda	Caterpillar (See Note 1)	Cummins	Class A	Class B (See Recommendation Below)	Class C	Class D
Gravity, °API	...	30-35	26 Min.	30-42	...	...	...	...
Flash, °F., Min.	100	125	150	100	...	...	...	...
Viscosity, SSU @ 100° F.	...	(32-45)	(34-41)	40 Max.	(34-42)	...	...	...
Viscosity, Kln. @ 100° F., cs.	1.4 Min.	1.8-5.8	2.5-4.5	(4.3 Max.)	2.4-5.0	...	...	...
Pour °F.		10°F. Below Use Temp.	0	20 Max.	10°F. Below Use Temp.	...	...	...
Sulfur, % Max.	0.50	1.0	0.5	...	1.0	0.25	0.50	0.50
Carbon Residue, % Max.	0.15	0.35	0.20	0.35	0.25	...	...	...
B.S.W., % Max.	Trace	0.10	Trace	0.10	0.05	...	...	...
Ash, % Max.	0.01	0.02	0.02	...	0.01	...	...	...
Corrosion, Copper Strip		Pass @ 122°F.	...	...	Pass @ 212°F.	...	...	...
Alkali & Min. Acids	...	...	...	...	...	...	...	...
Cetane No., Min.	40	40	46-60	...	45	45	45	40
Distillation, °F.								
IBP, Min.	...	...	...	...	...	...	...	...
10%, Max.	...	...	...	480	...	...	...	...
50%, Max.	...	...	...	...	...	...	...	...
90%, Max.	...	675	650	675	550	575	625	675
E. P., Max.	625	...	700	...	725	575	625	675
GMC Truck	Harnisch- feger	Hercules	International Harvester	Mack (See Note 2)	Murphy	Oliver	Waukesha	Superior
Gravity, °API	...	(This mfr. specifies	30 Min.	32-38	...	(This mfr. specifies	...	30 Min.
Flash, °F., Min.	...	115	125	Legal	150	...	...	...
Viscosity, SSU @ 100°F.	...	ASTM 2-D (32-45)	...	(34-38)	34 Min.	ASTM 1-D for year-round	30-50	35-50
Viscosity, Kln. @ 100°F., cs.	...	except for 2.0-20.0	...	2.5-4.0	...	use ASTM 2-D	...	...
Pour °F.	10°F. Below Use Temp.	0.5% Max sulfur content)	10°F. Below Use Temp.	10°F. Below Use Temp.	10°F. Below Use Temp.	10°F. Below Use Temp.	10°F. Below Use Temp.	...
Sulfur, % Max.	0.5	1.5	0.50	0.50	0.5	0.70	1.0	...
Carbon Residue, % Max.	...	0.20	0.25	0.20	0.20	warm weather (operation)	2.0	0.50
B.S.W., % Max.	...	0.05	None	0.05	0.05	0.10	0.5	0.10
Ash, % Max.	...	0.02	0.02	0.01	0.01	0.02	...	0.02
Corrosion, Copper Strip	...	...	Pass @ 212°F.	Pass @ 212°F.	...	...	...	...
Alkali & Min. Acids	...	...	...	Neutral	None	...	...	...
Cetane No., Min.	45	45	40	45	45	45	45	35-50
Distillation, °F.								
IBP, Min.	320	...	325	320	(98% Recov- ered at 600- 650°F.)	...	...	...
10%, Max.	...	...	...	...	...	...	...	...
50%, Max.	...	...	475	475-500	...	...	...	...
90%, Max.	550	...	...	...	...	...	...	...
E. P., Max.	600	...	610-675	675	...	...	...	...

NOTES:

¹ Caterpillar specifies "Commercial No. 2 Domestic Furnace Oils."

Specifications shown are for ASTM Fuel Oil Grade No. 2.

² ASTM Grade 1-D may be used at sacrifice of performance and economy.

GMC Fuel Class Recommendation

Type	Service	Ambient	Air	Temp.	°F. Above
Marine	C	B	B		A
Industrial & RR	C	C	B		A
Heavy Mobile	D	C	C		B

NEW 360 HALF-YARD

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DIGGER • SHOVEL • CRANE



360° SWING!

FAST CYCLING!

**180°
BUCKET
TILT**



Here's the completely hydraulic *mobile* shovel that equips you to do more jobs with lower equipment investment... at greater profit!

The 360 HOPTO swings three hundred and sixty degrees from its over-the-cab travel position. Operator's cab swings with unit for face-forward, *safe* operation. Feather-touch controls actuate every movement from positioning of outriggers to fast-cycling swing and 180° tilt of bucket! Heavy-duty hydraulic system with built-in relief valves gives an easily managed, oil-cushioned, 20 ton force to dipper stick!!!

Interchangeable backhoes and shovel buckets have H and L replaceable teeth and are available in three-eighths and one-half yard sizes. Check *NOW* on the many advantages of owning this work-hungry, mobile digger, shovel, crane!

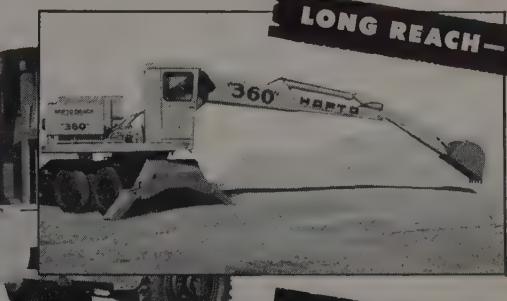
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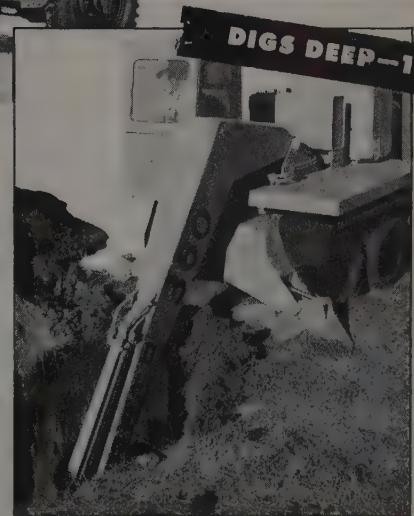
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DEPT. T • WINONA, MINNESOTA

LONG REACH—26'



DIGS DEEP—17'



LIFTS HIGH—12'





A 300-hp. engine handles this 18-yd. struck capacity LeTourneau-Westinghouse scraper.

temperature extremes can damage lubricants. If there is any reason to suspect that this condition has occurred, examine the lubricant before using. If the product appears abnormal, consult the lubricant supplier as to what to do. The lubricant may have to be discarded or it may be salvaged.

Preventive maintenance

To the contractor striving to complete his job on time, equipment maintenance is (or should be) of prime importance. A piece of machinery which must be pulled off the job for repairs represents lost time. Also equipment not operating at top efficiency can have far reaching effects. For example, a sluggish push tractor may upset the smooth operation of an entire fleet of scrapers; the breakdown of a single haul unit may mean delays to a big loader; and the breakdown of a loader—even for a short time—may delay a long series of operations.

Although the lesson has been learned the hard way, experience has proven that in the long run it pays to take care of equipment on the job and not neglect it. A program of

preventive maintenance, well planned and properly executed, will pay for itself over and over again. For example, it is much cheaper to keep a bearing adjusted than it is to buy new bearings, shafts, and gears that become damaged when unadjusted bearings fail. Major breakdowns, lost time, and high operating costs can be kept to a minimum by keeping parts lubricated, tightened, and adjusted. Furthermore an operator whose equipment is always in good condition is very apt to be a happy, satisfied employee.

Since no two jobs are exactly identical, the actual details and execution of preventive maintenance programs will necessarily vary from job to job. However, there are a few basic concepts which are common and essential to all successful programs.

1. Set up a definite schedule for lubrication and mechanical check-ups and stick to it strictly. Any program will begin to fall apart and become ineffective once exceptions are made and one starts to "cheat" on the original schedule. For example, if it is found that the interval between lubricant changes can be increased a certain amount with no apparent adverse effect, the natural

tendency then is to extend it further. Such practice will inevitably lead to disaster.

2. If possible, have the preventive maintenance work performed on an off-shift, as this will cause a minimum of interference with the productive effort.

3. Assign men to this job who are familiar with lubricants and who are thoroughly acquainted with the equipment. The consequences are too great to entrust this work to untrained personnel.

4. Keep accurate records of the servicing done on each piece of equipment. This need not be a complicated procedure. A few simple check marks on a printed form are all that is required. A study of such records will usually serve as a warning of possible trouble. For example, excessive oil consumption is evidence of poor lube fittings or oil leaks—items which can be checked at once by the mechanic. Also these records will indicate when the machine is nearing the overhaul stage.

5. Keep on hand a stock of parts and expendable supplies—if they are available when needed, equipment requiring new parts will be out of service for a minimum amount of time.

6. Clean equipment before servicing. On the face of it, this may seem ridiculous since the machines will become dirty again as soon as they are put back in service. However, there are two good reasons for following this practice. First, the lubrication fittings will be uncovered, and the chances of any points being missed will be reduced. Fittings caked over with mud may be overlooked in accordance with the old adage "out of sight, out of mind." Second, there is less chance of dirt from the machine contaminating the lubricant at the moment of application.

These, then, are some points that should apply to any good preventive maintenance program. As mentioned earlier, the actual details of carrying out such a program must be worked out for each individual job. Usually, it is more difficult to set up an ideal program on short term jobs than on those that last for an extended period. As far as lubrication is concerned, the critical points are those which must be lubricated frequently and the critical time is at the start of the job.

Service suggestions

Some useful service hints on various parts of construction equipment are outlined as follows:

Keep valves clean to avoid excessive discharge temperatures and keep receivers drained of any accumulated oil. Service air cleaners every 5 to 10 hours, if necessary.

Ball and roller bearings often have seals to prevent grease leakage. If seals are in good condition, a grease charge should last about 200 hr. Use



TYPICAL OF THE WEST, this Zyd Bucyrus-Erie shovel is working in a rock cut.

A GOOD
MACHINE MADE
BETTER

THE $\frac{3}{4}$ YARD
LORAIN 25A

Now we call it the "25A" and it really is "Grade A" with its many new, profit-making improvements. It is even better than ever. A general-purpose $\frac{3}{4}$ -yd. machine that is easily converted to shovel, crane, clamshell, dragline or hoe.

Read below some of the features this newest Lorain brings you. If you are interested especially in dragline or hoe work, also read the many *additional* advantages that the new Lorain-25A has for you.

The swing clutches have been increased 20% in area for cooler, smoother clutch action and longer life—especially important for the constant wig-wag operation of dragline duty. New, smooth, easy Lorain "E-Z" controls on

friction clutches. "Hydra-Ease" power control of crawler steering, tread lock, house lock and shifting of swing-travel jaw clutches. Hydraulic Coupling Power Take-off available with no-stall, no-shock, "never-say-die" application of power.

These are but a few of the important features that put the new Lorain-25A a step ahead in the general-purpose $\frac{3}{4}$ -yd. class. There are many more—you should learn about *all* of them from your Thew-Lorain Distributor.

NEW DRAGLINE FEATURES

- New bucket boom. Square-tubular-chord design. Lighter, stronger. Can use longer, lower booms. Increased operating ranges. Can work with bucket farther out.
- New fairlead. 4-sheave, swivel type. All sheaves mounted on pre-lubricated, sealed, anti-friction bearings.
- New, free-spinning action of drag-in drum. Permits quicker release of drag-in cable for easier, smoother bucket casting—greater ranges.
- New, removable shell lagging of steel permits heavier, stronger drag-in cable for longer cable life, fewer shut-downs for cable replacement.



NEW HOE FEATURES

- New, longer 19-ft. boom available. Digs deeper. Increases work ranges. Tapered, gooseneck design gives better digging action, better operator visibility.
- Greater choice of cutting widths. 30", 36" and 40".
- New, removable shell lagging of steel permits heavier, stronger, drag-in cable for longer cable life, fewer shut-downs for cable replacement.
- New, heavier hoe front end. Handles the toughest digging. Crowds better into hardest of materials.



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Portland 10, and Eugene, Ore.

GENERAL EQUIPMENT CO.

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MCCOY COMPANY

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MOUNTAIN TRACTOR CO.

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NASH-DAVIS MACHINERY CO.
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SANTA FE EQUIPMENT CO., INC.

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SOUTHERN IDAHO EQUIPMENT CO.

Mile Falls, Boise and Twin Falls, Idaho

TRACTOR & EQUIPMENT CO.

Sidney, Mont. Branches: Miles City, Glasgow, Mont.

WORTHAM MACHINERY COMPANY

Cheyenne, Wyo. Branches: Casper, Sheridan and Rock Springs, Wyo.

YUKON EQUIPMENT CO. (for Alaska)

Seattle, Wash. Branches at Fairbanks and Anchorage, Alaska

WC-14



MODERN PIT-LOADING with a truck-crane of Thew-Lorain Shovel Co. emphasizes portability.

a low pressure gun and apply only a few shots unless bearing is vented. Forcing grease around the shaft will break the seals. Fill bearing between a quarter and half full.

Do not over-lubricate wheel bearings, as excessive lubricant may reach the brakes.

Since hydraulic brake mechanisms often contain rubber parts, use only approved fluids which will not affect them.

Do not lubricate cables that drag in the dirt. Cable winding on drums equipped with clutches should be lubricated sparingly to prevent the pos-

sibility of lubricant reaching clutch faces.

Other cables should be cleaned every 10-100 hr. as necessary to avoid dryness, and cable lubricant applied.

About every 500 hr. cables should be immersed for a minute or two in heated cable lubricant using a trough built especially for this purpose. Usually this is a horizontal trough equipped with pulleys arranged to keep the cable submerged while it is run through. A burlap collar wipes off excess lubricant before the cable leaves the trough.



THIS LINK-BELT SPEEDER shovel shows the demand for rugged equipment in loading rock.

In order to lubricate the pins of silent chains, remove chains every fifty hours, wash in diesel fuel or kerosene and soak in hot gear oil.

Use low pressure gun and do not over-lubricate clutch parts. Lubricant on clutch facings will cause slipping.

Inspect grease lubricated bearings every 2,000 hr. If grease has deteriorated or if dirt is present, clean and repack and add grease to housing until one-third full. Add small amount of grease every 1,000 hr. but do not over-lubricate.

Check oil level of oil lubricated bearings regularly. Wash out bearings every 2,000 hr. Do not flood bearings and wipe off any excess oil.

The drain period recommended by the engine manufacturer covers normal operation. More frequent draining is necessary if oil temperatures are above normal, if engines are started and stopped often, or idled for long periods, if the atmosphere is very dusty, or if the oil has been diluted to facilitate starting. Generally, oil should be drained from engines of construction machinery at 50-hr. intervals. Where operating conditions are not too severe, 100-hr. drain periods are entirely practical. On the other hand, if the filter or oil shows excessive contamination, filter cleaning and oil drain periods should be shortened. Extending the oil drain period is poor economy, since additional wear and deposits due to greater oil contamination will cause greater maintenance and shorter equipment life. Copper or white metal specks on the filter often serve as warning of incipient bearing difficulties.

Drain oil while hot—this is a must! If the oil filter is removed when draining oil, add an extra quantity when refilling the crankcase. Check the oil level every 10 hr., after the engine has been stopped for a few minutes to allow oil in the upper part of the engine to return to the case. When changing brands of oil, even when manufactured by the same supplier, it is advisable to drain the crankcase at the end of the first 24 hr. of operation to remove old oil deposits loosened by the new oil.

Crankcase ventilator air cleaners should be serviced when oil is drained.

Air cleaners may be of the wire gauze type in which the gauze is either replaced with a new element or washed in kerosene or diesel fuel, dipped in oil and reused. Usually any heavy oil (SAE 50) is satisfactory for coating the oil wetted type.

The oil bath-type cleaner requires inspection at 5 to 50-hr. intervals to keep the oil at the proper level and the oil cup clean. Stick a screwdriver down into the oil, and if the sediment is one-quarter to one-half inch deep, the unit should be cleaned and refilled. The entire assembly should be taken apart and cleaned

The Problem.....Move 16,000,000 Yards of Rock, Marine Clay, Boulders and Heavy Earth



again the answer was..... **Firestone NYLON TIRES**

In excavating the marine channel on Galop Island in the St. Lawrence Seaway, millions of yards of heavy boulder-strewn glacial till are being moved under the toughest haul road conditions.

The Galop Island project is well on its way and as on other Seaway jobs, Firestone nylon tires is the answer because they are tougher tires. They cut big downtime losses, give more retreads and keep tire costs at a minimum.

Firestone nylon tires are built for severe service. The

treads give maximum traction and they are extra tough to resist cutting. Double-thick sidewalls give added protection against cuts and snags.

Firestone's Safety - Tensioned *Gum-Dipped* nylon cord body gives greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

Let your Firestone Dealer or Store show you how Firestone nylon tires will cut downtime and increase the profits on your job.



A TIRE FOR EVERY ROAD, LOAD AND CONDITION OF SERVICE



GROUND GRIP GG WIDE BASE ROCK GRIP RG WIDE BASE ALL NON-SKID ALL TRACTION RIB EXCAVATOR

WHEN YOU BUY NEW EQUIPMENT OR REPLACEMENT TIRES, SPECIFY FIRESTONE

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

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WORKING IN ROCK, this Lima shovel represents a typical Western lubrication problem.

every 500 hr. Carryover of oil into the intake manifold indicates that the engine has been over-speeded, the oil is too light, or the air cleaner is too small. Do not remove the oil cup when the engine is running.

Centrifugal precleaners should be emptied when the glass container becomes half full.

To insure complete combustion and avoid contaminating the lubricating oil with fuel soot, engine cooling systems should be maintained at about 180 deg. F. This requires the use of shutters or other covering over the radiator when starting up or operating at light load in cold weather. In hot weather special attention should be paid to the fan belt, radiator, and water jacket to maintain the cooling system at maximum efficiency. Thermostats must be checked frequently by noting whether the radiator remains cold until the engine has reached proper operating temperature as shown by the indicator on the dash.

Permanent type anti-freeze solutions are preferred for construction machinery engines since alcohol boils at about 170 deg. F. and most cooling system thermostats are set above this figure for efficient combustion of the fuel. Kerosene and salt solutions should never be used.

The lower part of the distributor often is lubricated automatically from the engine. When driven from the generator, however, separate grease lubrication is usually required.

The upper distributor bearing may require either grease or oil lubrication. The wick under the distributor rotor requires two or three drops of light oil. An occasional touch of grease to the cam shaft is desirable, making sure, however, that none reaches the breaker points.

Fans mounted on the extension of the shafts of other engine accessories and having no separate bearings require no lubrication. Neither do those having permanently packed bearings.

Some fans require occasional grease application, while others must be lubricated regularly with oil. One type of oil lubricated fan is equipped with an overflow while another is provided with a standpipe to insure constant oil level. In the latter type, the reservoir is filled with oil and the excess drained by turning the fan until the filler hole is down. If over-lubricated, fans may throw grease or oil on the belts.

Over-lubrication causes deterioration of windings and gum formation on the commutator.

Clean or replace filter element at every oil change or more often under severe dirt conditions. Low temperature operation requires more frequent filter changing due to condensation forming an emulsion with the oil.

Oil filters do not remove fuel dilution or soluble oxidation products. Therefore, crankcase oil must be changed regularly regardless of the filter type. Bypass filters do not remove all of the finely dispersed soot. Consequently, where these filters are used, detergent oils may turn dark quickly in service. This is a sign they are functioning properly.

Some require no lubrication, since they are lubricated either automatically from the engine or permanently packed at the factory.

Others have a wick leading from an oil sump and some have porous bushings through which oil seeps to the bearings.

Grease lubricated pumps in which the grease does not come in contact with the engine coolant (i.e., when the grease is applied to an external support bearing) should be lubricated with a general purpose grease. Those in which the grease does come in contact with the engine coolant (i.e., when the grease is used to lubricate the packing seal) should be lubricated with a heavy water insoluble grease.

If cooling systems show signs of oil, it is an indication that either too

much or the wrong kind of grease is being applied to the shaft.

In most cases the oil need not be changed more often than every 1,000 hr., although the oil level in the gear boxes should be checked every 50 hr. Check the drain plugs after heavy rain or severe dust conditions, then drain and refill if water is present or if dust is getting in. Keep the oil seals in good condition to prevent leakage. Going to a heavier grade of lubricant does not necessarily reduce leakage, since under heavy loads the heavier oil will result in an increase in the gear case temperature which in turn will cause the lubricant to become less viscous. Foaming or overheating in gear boxes often indicates too high an oil level. This will also cause leakage. Keep vents open to prevent pressure build-up inside the gear case.

Lubricants for open gears may be one of two types—those which must be heated and applied by brush or pouring or those which contain a solvent and are fluid at normal temperatures, thus permitting easy application. Shortly after application the solvent evaporates, leaving a thick viscous film of lubricants.

Gears should be inspected every 10 hr. and more lubricant applied if necessary. Open gears operating in very dusty locations should be washed frequently with crankcase oil and no other lubricant applied. If gears must be run dry, reduce speeds and loads.

Wipe fittings before and after applying grease. When the plug must be removed and a fitting applied, it is an indication that this part should be lubricated only occasionally. Most parts, such as plain bearings, should be lubricated frequently and freely by applying product until clean grease shows at the point where the old grease is forced out.

The pumps and valves of hydraulic systems are precision made, and a premium grade, inhibited oil should be used which will protect parts against wear, rust, and corrosion and which will have high resistance to foaming and the formation of gum and sludge. Gum and sludge formation may result in erratic motion and eventually complete stoppage of the system.

Check the oil level frequently and keep it constant. This will prevent air from being drawn into system which could cause foaming. If foaming occurs or if the oil level is low, check the system for leaks.

Operate the clutch firmly to prevent slippage which results in overheating, hardening of leather oil seals, and leakage.

Oils and greases may cause natural and some synthetic rubbers to deteriorate. Keep tires, fan belt, rubber hose, engine mountings, rubber bushings on radius rods and spring shackles, and cooling system connec-

(Continued on page 88)

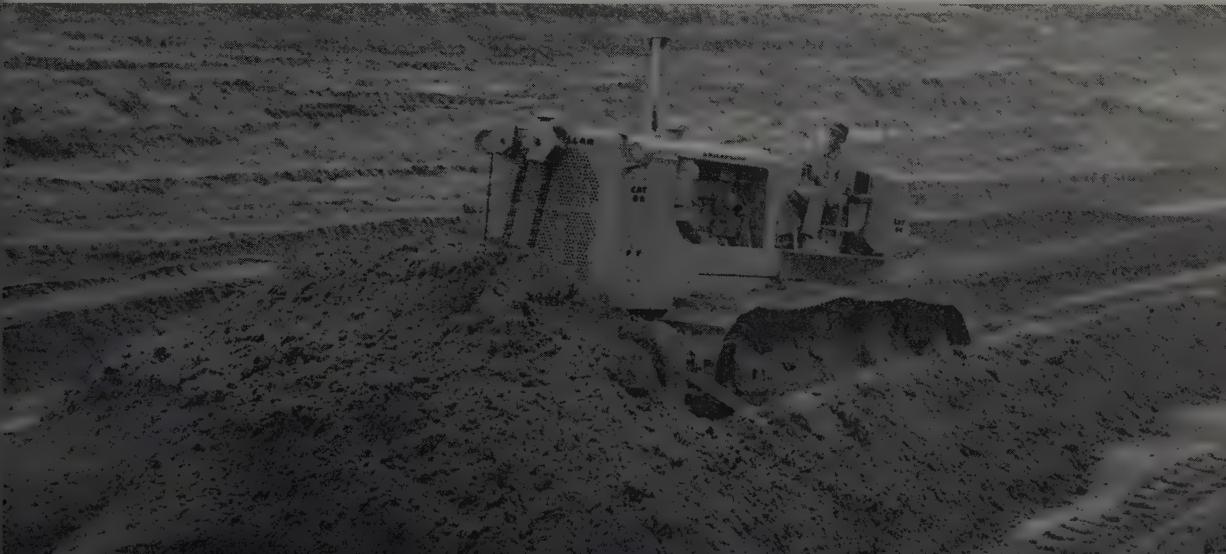


PARAMUS, N. J., building a shopping center, a D9 'does' sand and clay to help load scrapers quickly for Sam Braen

Construction Co., Wyckoff, N.J. After 'dozing, the D9 push-loads two CAT* DW21s in less than 60 seconds.

MINNESOTA, this D9 singlehandedly reduces this cut (50 ft. long by 150 ft. wide) to 8% grade for its owner, Johnson Construction Co., Grove City. The D9 handles

10 to 15 yards a pass on the cut involving 237,000 yd. of fine sand, blue and yellow clay. Job is relocation and widening of U.S. Highway 16.



WESTERN CONSTRUCTION

NEWS

ARIZONA

RECENT MAJOR CONTRACT AWARDS and low bids in Arizona include low bid of \$454,279 submitted by **Dale F. Payne** of Phoenix for 4.9 mi. of grading and surfacing in Navajo County. **Tanner Bros. Contracting Co.** of Phoenix submitted a low bid of \$197,289 for 1.8 mi. of grading, surfacing, and draining in Mohave County. **Wallace & Wallace** of Phoenix submitted a low bid of \$397,722 for 12.9 mi. of grading and surfacing Globe-Holbrook highway, Sitzgreaves National Forest in Coconino and Navajo counties. **Peter Kiewit Sons' Co.**, Phoenix, submitted a low bid of \$212,772 for 3 mi. of grading and surfacing east of Flagstaff on U. S. Highway 66, Walnut Canyon National Monument in Coconino County. A low bid of \$96,450 was submitted by **L. M. White Contracting Co.** of Tucson for grading and surfacing in Cochise County. A low bid of \$576,289 was submitted by **W. J. Henson** of Prescott for grading and surfacing in Yavapai County. **H. & J. Construction Co.** of Phoenix was awarded a \$2,000,000 contract for construction of a 25-store shopping center and parking area in Tempe. **Ashton-Mardian**, Tucson, submitted a low bid of \$2,233,395 for construction of a clinical building and veteran administration hospital in Tucson.

to begin in July on the project, which is estimated to cost about \$2,500,000. Major items include concrete viaducts on cast-in-place piles, retaining walls, pedestrian overpasses, sewers, paving, lighting, and traffic signals. Two years will be allowed for construction which will be under the supervision of City Engineer Reuben H. Owens.

CONSTRUCTION of a shopping center expected to cost \$15,000,000 has begun for the May Co. on a 55-acre site in West Covina. The job will be completed in the latter part of 1957 by the general contractor, T-S Construction Engineers, Inc.

LOS ANGELES Testing Laboratory has finished 80-ton pile load tests for piling that will form the foundation of the new unit of the Los Angeles County General Hospital. The \$10,000,000 reinforced concrete structure will be completed in July 1958 by general contractor, Robert E. McKee Co. Contractor for the tests was Bertram Drilling Co.

A \$1,000,000 concrete and steel caisson for one of the main piers of the Carquinez Bridge has been completed

at Bethlehem Shipyard in San Francisco. It will soon be towed to the bridge site by tugboats. The caisson is 103 ft. long, 53 ft. wide, and 30 ft. high. It weighs 3,300 tons. When the caisson is in place it will be slowly sunk to the bottom by filling it with concrete. This work will take about five weeks.

THE SOUTHERN CALIFORNIA Chapter of the Associated General Contractors of America has broken ground for a new building scheduled for occupancy by November. Notables present were Walter Maxwell, chapter president; Guy F. Atkinson and David Root of the Guy F. Atkinson Co., contractors; and the architect, Charles O. Matcham, AIA. AGC officials realized that normal procedures could not be followed in selecting an architect and a contractor, so both the architect and six contracting bidders were chosen by lot, with competitive bidding selecting the construction firm.

RECENT MAJOR CONTRACT AWARDS and low bids in California include an \$848,840 contract award to **Baldwin Contracting Co., Inc.**, and **H. Earl Parker, Inc.**, Marysville, for 1.3 mi. of grading and surfacing and

CALIFORNIA

CONCRETE POURING has resumed on the \$47,000,000 Monticello Dam project, interrupted last December by record floods. According to B. P. Bellport, supervising engineer for the Bureau of Reclamation, work has started on a three-shift basis, and should be completed in less than a year. About 100 men are at work on the project.

UPPER MARKET STREET, on east slope of Twin Peaks in San Francisco, will be widened, realigned, and improved for a distance of over 1 mi. according to Sherman P. Duckel, Director of Public Works for the City and County of San Francisco. Construction is expected



ROUND THE CLOCK PUMPING OPERATIONS IN COLORADO

Sub-freezing weather and frozen ground were normal operating conditions last winter for crews working on Canon City Metropolitan Sanitation District Disposal System. **Mountain States Construction Co.** will finish three months early.

15

ways to save time and materials on curb, gutter and sidewalk jobs...

CURB and GUTTER FORMS



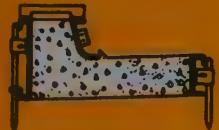
When joints
are 5 to 10 feet
apart



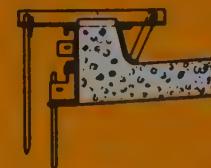
When joints
are not 5 to 10
feet apart



For curved work
of variable radius



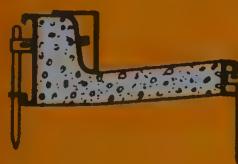
When joints
are not 5 to 10
feet apart



Integral
curb forms



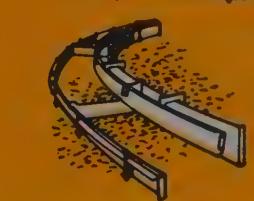
For use with
fixed radius back
and gutter forms



When joints
are 5 to 10 feet
apart

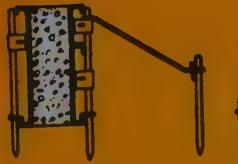


Integral
curb forms

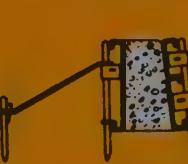


For curved work
when same radius
is repeated

CURB FORMS



Vertical back
and face



Vertical back
with battered
face



Vertical back
with battered
exposed face



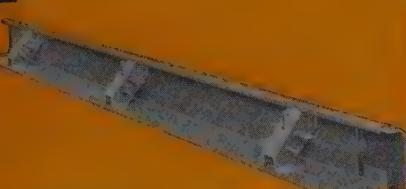
Integral curb form
with battered
exposed face



Integral curb form
with battered
exposed face



For any width
and thickness



SAVE COSTS WITH ROAD FORMS

Self-aligning road forms save time and expense on highway paving, too. They will assure you of rapid form setting always true to line and grade. Road forms are available in heights of 8" or more and Airport forms in heights of 12" or more.



This "Complete Package" of forms can be used over-and-over again to build any of the cross sections shown above and *build them faster at a lower cost*. If curb, gutter and sidewalk building is part of your business, you can save time and material expense with these Blaw-Knox Universal steel forms. They are the only *completely standardized* forms that can be used interchangeably on many different jobs so you can take on a wide range of jobs with a low investment in forms. They are self-aligning, easy to set and strip and practically eliminate hand finishing. For complete details, see your Blaw-Knox distributor.

BLAW-KNOX COMPANY

45 Charleston Avenue
Construction Equipment Division
Cable Address: BLAW-KNOX, N. Y.

construction of two bridges in Yuba County. **Rice Bros., Inc.**, Lodi, submitted a low bid of \$204,081 for grading and surfacing 8.2 mi. in Mono County. **Gordon H. Ball**, Danville, submitted a low bid \$1,485,158 for 5.7 mi. of grading and surfacing and construction of three bridges in Tulare County. **Ball & Simpson** of Berkeley submitted a low bid of \$861,959 for grading, surfacing, and construction of a bridge in Marin County. **W. F. Maxwell** of Los Angeles submitted a low bid of \$605,441 for construction of a detour, bridge work, grading and surfacing approaches across the Santa Clara River near Saticoy in Ventura County. A low bid of \$2,000,661 was submitted by **Griffith Co.** of Los Angeles for 2.6 mi. of grading, surfacing, and five bridges to be constructed in Riverside County. **Peter Kiewit Sons' Co.** of Medford, Ore., submitted a low bid of \$710,276 for construction of a bridge across Trinity River in Humboldt County. **Webb & White & W. J. Disteli**, Los Angeles, submitted a low bid of \$4,174,258 for 38 mi. of grading, paving, and construction of five bridges and two pumping plants in Los Angeles County. **Judson Pacific-Murphy Corp.** of Emeryville submitted a low bid of \$645,237 for construction of a bridge and retaining wall in Placer County. **Fredrickson & Watson Construction Co.**, Oakland, submitted a low bid of \$2,272,537 for 3.4 mi. of grading and paving and one bridge to be widened, construction of six bridges, all to provide a four-lane divided freeway in Santa Barbara County. A low bid of \$194,320 was submitted by **Baldwin Construction Co.** of Marysville for construction of a bridge 5 mi. north of Biggs in Butte County.

COLORADO

CONSTRUCTION of a \$4,500,000 steam power generating plant for the Public Service Co. on the Colorado River near Grand Junction will be started soon, company officials have announced. The plant will be known as the Cameo Plant and will have a generating capacity of 22,000 kw. and will be used to strengthen the power supply for the western part of the company's system.

RECENT MAJOR CONTRACT AWARDS and low bids in Colorado include a low bid of \$1,590,743 submitted by **Denver Tunnel Constructors, Inc.**, of Denver for schedule 1, tunnel lining, Moffat Water Tunnel, Denver Municipal Water Works, Denver. **Joseph C. Hastings**, of Denver was awarded a \$144,931 contract for 8.3 mi. of grading and surfacing in La Plata County. **Leon K. Suhm**, Denver, submitted a low bid of \$95,984 for grading, surfacing, and structures in Otero and Bent counties. **K. S. Mittry Construction Co.** of Ft. Collins submitted a low bid of \$128,784 for grading, surfacing, and structures on State Highway No. 69 in Custer County. **Latimer Construction Co.** of Denver submitted a low bid of \$54,073 for construction of a bridge over Cherry Creek in the City of Denver. **Peter Kiewit Sons' Co.** of Denver submitted a low bid of \$518,397 for 32nd Ave. improvement district in the City of Denver. **Western Paving & Construction Co.** of Denver submitted a low bid of \$157,047 for the Street Improvement District, City and County of Denver. A low bid of \$177,271 was submitted

by **Mile High Cement Co.** of Denver for street improvement in the City and County, Denver. **N. W. Engineering Co.**, Denver, submitted a low bid of \$273,761 for grading and surfacing in Larimer County. **Pendleton & Garner Construction Co.** of Longmont submitted a low bid of \$159,963 for grading, surfacing, and structures from Greeley west in Weld County.

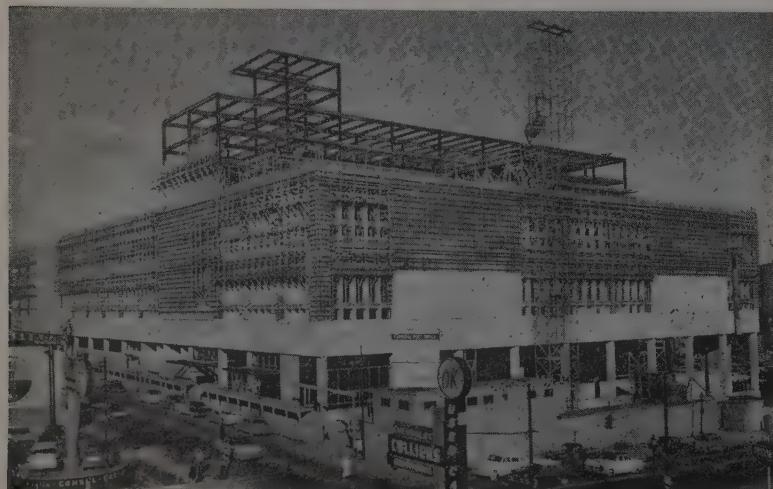
IDAHO

SORENSEN CONSTRUCTION CO. of Murray, Utah, is low bidder at \$188,000 for bituminous surfacing of about 24 mi. of roadway at the National Reactor Testing Station. The roads now have temporary surfaces. The contract will call for a 2-in. plant-mix bituminous surface, 24 ft. wide.

RECENT MAJOR CONTRACT AWARDS and low bids in Idaho include a low bid of \$124,600 submitted by **Wadsworth Construction Co.**, Idaho Falls, for construction of additions to the SPERT control area of the National Reactor Testing Station. **Eagle Construction Co.** of Boise was awarded a \$744,650 contract for constructing roadway and construction of a bridge on 12.9 mi. of State Highway No. 68 in Blaine County. **Carbon Bros.** of Spokane, Washington, received an \$805,669 contract award for grading, surfacing, and constructing maintenance projects at various locations in Benewah, Kootenai, Bonner, Boundary and Shoshone counties. **C. H. Elle Construction Co.**, Pocatello, submitted a low bid of \$839,000 for construction of Hawthorne Junior High School, in Pocatello. A low bid of \$204,576 was submitted by **Aslett Construction Co.** of Twin Falls for construction of roadway, bridge, and approaches, west of Bennett Creek and east of King Hill and over Bennett Creek. **James Crick & Sons**, Spokane, Washington, submitted a low bid of \$592,715 for grading and surfacing in Idaho County. **Twin Falls Construction Co.**, Twin Falls, submitted a low bid of \$89,230 for grading and surfacing from Bingham County line east from Midway Junction East and from Big Lost River to Midway Junction.

MONTANA

RECENT MAJOR CONTRACT AWARDS and low bids in Montana include a \$553,822 contract award to **Naranche & Konda** of Butte for 7 mi. of grading, draining, and gravel surfacing the Gallatin Gateway-Bozeman and Bozeman East highway in Gallatin County. **Inland Con-**

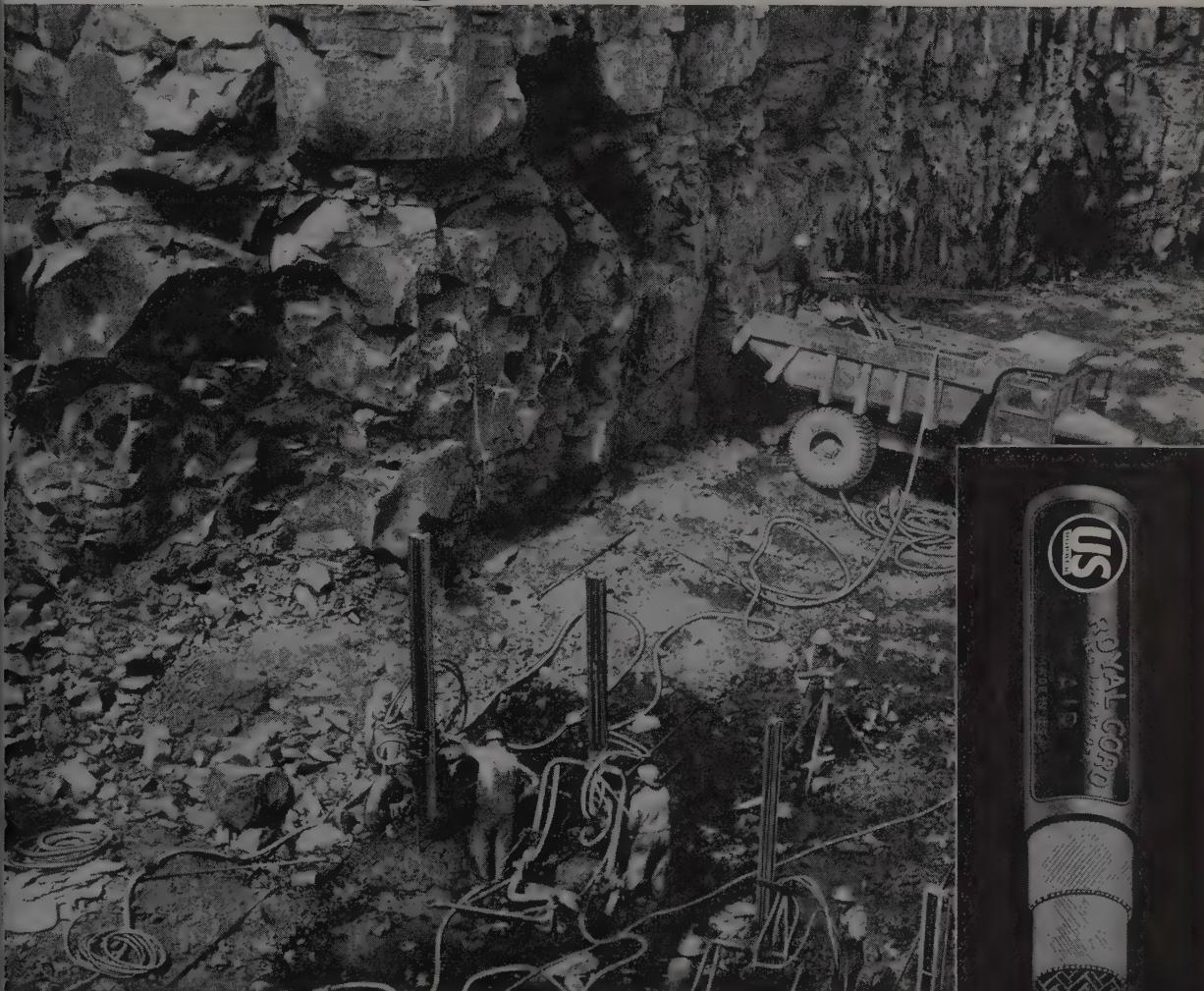


CONSTRUCTION OF \$13,000,000 POST OFFICE IN VANCOUVER, B. C.

Costing \$13,000,000 Vancouver, B. C.'s, new post office, under construction at Homer and Dunsmuir Streets, will be of split level design, with four and six stories. Underground tunnels will give access for railway unloading of mail, while facilities are being provided on the roof for helicopter landing. **Smith Bros. & Wilson, Ltd.**, are general contractors for the project.



Royal Cord Air Hose



"close order drilling" with the U. S. Army Engineers!

Near Portland, Oregon — on the mighty Columbia River — they're cutting out 1,000,000 cubic yards of tough basalt to construct The Dalles Dam. It's a \$270,000,000 project. Much of the drilling is in deep, narrow cuts where highly abrasive rock and close quarters give air hose extra rough treatment. "Nothing is harder on air hose than the type of work involved on The Dalles Dam."*

What's more, deadlines and penalty clauses keep the work up to the tight schedule. So the contractors simply can't afford air hose failures. "We're using U. S. Royal Cord

Air Hose. It measures up in every way to our own high-performance requirements."*

You, too, will find that U. S. Royal Cord will "measure up," because it's *the only air hose built like a tire*. True tire-cord construction means Royal Cord is so tough it needs no protective cribbing — yet it's lightweight and highly flexible.

Get Royal Cord Air Hose at any of the 28 "U. S." District Sales Offices or write us at Rockefeller Center, New York 20, N. Y.

*Direct on-the-job quotations from officials of the contractors building this multi-purpose dam.

Let's look under the cover

- quality neoprene tube for maximum hot oil resistance.
- braided cotton breaker ply for permanent tube-to-carcass adhesion.
- exclusive counter-spiraled plies of special yarn for outstanding strength and flexibility.
- brown cover is of the strongest natural rubber ever put on a molded hose.



Mechanical Goods Division

United States Rubber

struction Co., Miles City, was awarded a \$379,849 contract for 8.8 mi. of grading and surfacing in Fallon County. **S. Birch, Inc., and Birch & Sons Construction Co.** of Great Falls received a \$366,881 contract for 3.9 mi. of grading and gravel surfacing the Armington-Lewistown Highway in Judith Basin County. A \$168,470 contract was received by **G. E. Marshall** of Roundup for 2.4 mi. of grading and gravel surfacing in Valley County. **Frank E. Olson** of Wiliston, North Dakota, received a \$194,823 award for 9 mi. of grading and surfacing the Lame Deer-Colstrip Highway in Rosebud County. **Inland Construction Co.** of Miles City was awarded a \$109,384 contract for 9.2 mi. of reshaping and surfacing the Ekalaka-Mill Iron Highway in Carter County. **S. Birch, Inc. and S. Birch & Sons Construction Co.** received a \$154,268 award for 9.9 mi. of plant-mix oiling in Blaine County.

NEVADA

RECENT MAJOR CONTRACT AWARDS and low bids in Nevada include a \$620,192 contract award to **James Stewart Company** of Phoenix for construction of Ordnance Storage Facilities, Lake Mead Base. **Morrison-Knudsen Co., Inc.**, Salt Lake City, Utah, received a \$1,064,978 contract for construction of a portion of highway in Elko County.

NEW MEXICO

RECENT MAJOR CONTRACT AWARDS and low bids in New Mexico include a \$167,031 contract award to **O. D. Cowart** of Albuquerque for 7.1 mi. of grading and surfacing the Conchas-Tucumcari road in San Miguel County. **Harry Trotz** of Lovington was awarded a \$233,990 contract for 16.8 mi. of grading and surfacing the Clovis AFB-Portales road in Curry and Roosevelt counties. A \$275,880 contract was awarded to **Henry Thygesen & Co.** of Albuquerque for grading, surfacing, and structures on U. S. Highway 666, McKinley County. **D. D. Skousen & Son**, Albuquerque, was awarded a \$143,022 contract for construction of a bridge and approaches in Santa Fe County. A \$124,375 contract was awarded to **G. I. Martin and O. D. Cowart**, of Albuquerque, for 11.9 mi. of grading and surfacing the Stanley-West Road in Santa Fe County.

OREGON

RECENT MAJOR CONTRACT AWARDS and low bids in Oregon

include two awards to **Ross B. Hammond Co.** of Portland: for construction of a Biological and Agricultural Building including utility tunnel \$1,104,597; for construction of two men's dormitories and a cafeteria, \$1,446,798, both for the Oregon State College, Corvallis. **The Shea Co.** of Alhambra, Calif., submitted a low bid of \$957,280 for construction of a diversion tunnel and Kitson Springs detour road, including timber bridge at Hills Creek Reservoir on the Middle Fork Willamette River in Lane County. **Northwood Inc.** of Portland submitted a low bid of \$571,636 for first construction work on the Cougar Dam on the South Fork McKenzie River. The contract is for constructing a diversion tunnel and clearing 34 acres at the site, seven miles upstream from Blue River, in Lane County. **White Bros. Co.** of Walla Walla, Wash., submitted a low bid of \$173,399 for construction of a bridge on the Woodburn-Estacada Highway in Clackamas County. **J. C. Compton**, McMinnville, submitted a low bid of \$219,987 for grading and paving the Oregon Coast Highway in Curry County. A low bid of \$99,090 submitted by **P. S. Lord, Mechanical Contractors** of Portland for bridge construction on the Wilson River in Tillamook and Washington counties.

UTAH

RECENT MAJOR CONTRACT AWARDS and low bids in Utah include a low bid of \$104,099 submitted by **Wilkinson Construction Co.** of Morgan for construction of Sevier River Bridge to junction with Hinckley-Main St. in Millard County. A low bid of \$371,829 was submitted by **W. W. Clyde & Co.** of Springville for grading and surfacing near Utah County line to Scofield in Carbon and Utah counties. **L. A. Young Construction Co.** and **Vernal Sand & Gravel Co.** of Richfield submitted a low bid of \$285,978 for 5.2 mi. of grading and surfacing in Sanpete County. **Mountain States Construction Co.** of Bountiful submitted a low bid of \$458,567 for construction on the Slaterville Diversion Dam, Layton Pump Intake Channel, Weber Basin Project.

WASHINGTON

PIERCE COUNTY commissioners are advertising for new bids for the construction of a Pierce County-City of Tacoma building. Proposals will be accepted until July 10. The original plans brought in bids totaling about \$8,500,000. These were rejected because they exceeded avail-

able funds and the plans were revised. Two floors and one wing have been eliminated. The estimated cost of the revised building is about \$4,500,000.

RECENT MAJOR CONTRACT AWARDS and low bids in Washington include a low bid of \$569,270 submitted by **Donald M. Drake Co.**, Portland, Ore., for earthwork and structures, Evergreen Pumping Plant Intake Channel and discharge lines, West Canal Laterals, Columbia Basin Project. A \$101,679 award was received by **J. W. Hardison** of Yakima for 2.4 mi. of grading and surfacing in Douglas County. A \$199,799 award was received by Washington Asphalt Co., Seattle, for 10.2 mi. of grading and surfacing in Kittitas County. **C. J. Painter** of Pasco was awarded a \$192,314 contract for 14 mi. of grading and surfacing in Grant County. A \$239,205 award was received by **Quigg Bros. & McDonald, Inc.**, of Hoquiam for Grass Creek and Chenois Creek bridges and approaches in Grays Harbor County. **Thos. Scalzo Co.**, Seattle, received a \$352,616 contract for grading, surfacing, and structures on 3.6 mi. of highway in King County. **N. Fiorito Co.** of Seattle received a \$424,818 contract for 1.9 mi. of grading, surfacing, and structures on Highway No. 12, Bear River to Greenhead Slough in Pacific County. **Murphy Bros. Inc.** of Spokane submitted a low bid of \$545,109 for 2.5 mi. of grading, surfacing, and structures in Kittitas County. **R. H. Sussex**, Bellevue, received a \$195,997 award for 6.5 mi. of grading and surfacing in Adams County.

ALASKA

THE CHUGACH Electric Association, Inc., of Anchorage, has filed an application with the Federal Power Commission requesting a license for a 15,000-kw. hydroelectric project on the Kenai Peninsula in Alaska. The proposed project would be located on Cooper Lake and Lenai Lake and would cost about \$6,000,000. The project would include an earthfill dam 50 ft. high, a tunnel conduit and penstock with a combined length of 10,300 ft.

RECENT MAJOR CONTRACT AWARDS and low bids in Alaska include a low bid of \$1,184,617 submitted by **Nelse Mortensen & Co.** of North Seattle, Wash., for construction of Post Office and Federal Court House in Nome. **B-E-C-K Constructors** of Seattle submitted a low bid of \$2,470,665 for construction of family quarters, bachelor officers quarters for women and NCO open mess, Fort Greeley. **C. H. Clark** of Anchorage submitted a low bid of \$115,246 for construction of radio range station at Campbell Creek, Anchorage.

ONE-MAN OPERATED

21.5 m.p.h.

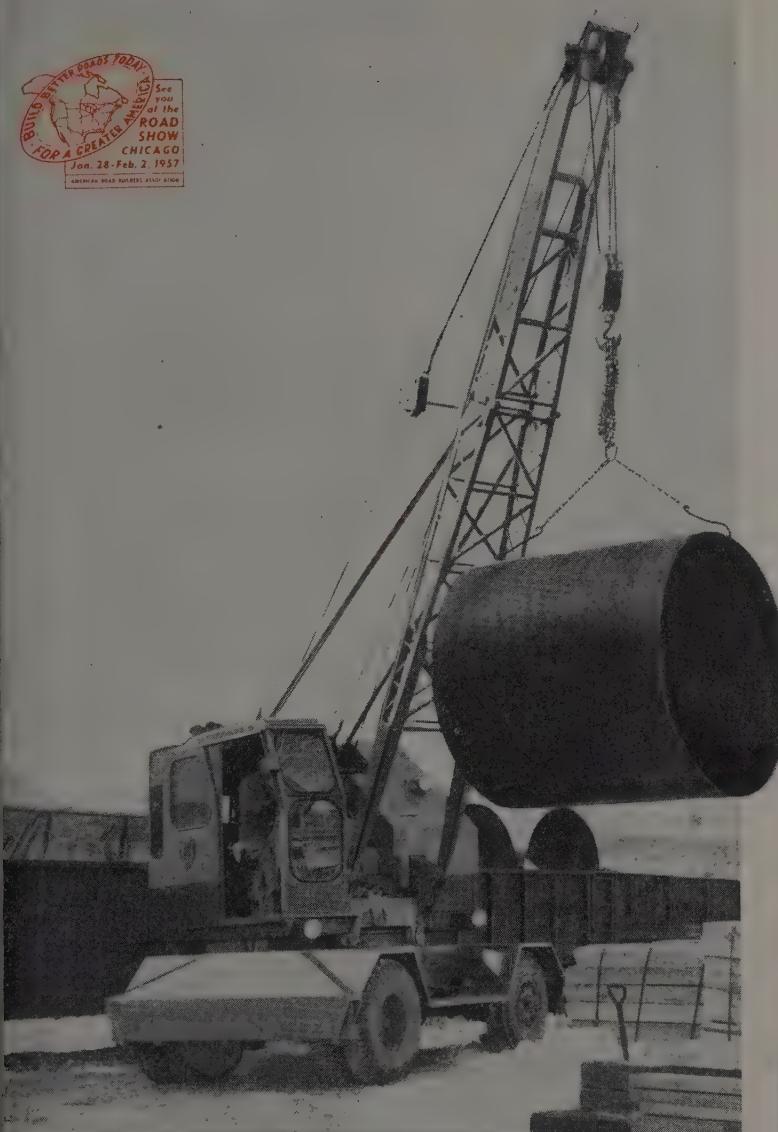
KOEHRING CRUISER

Now, high-speed travel is combined with one-man operation in the new Koehring 205 Cruiser Crane. You get a full range of low shuttle speeds from 0 to 7 m.p.h. for lift-and-carry — plus road speeds up to 21.5 m.p.h. High-way travel is unrestricted. Overall width is 8 feet. Axle-load distribution meets highway regulations in most areas — even when carrying 25-foot folded boom.

For all its speed and roadability, this 4-wheel-drive Cruiser has the tractive power to climb 30% grades. It's easy-handling, maneuverable on and off-road. Turns in 27½-foot radius. Has power steering, smooth torque-converter drive, big air-hydraulic brakes. One engine supplies all power for work and travel — one man controls all operations.

205 Cruiser[®] safely lifts up to 15 tons (based on 85% rating). Without outriggers, it lifts 12.7 tons over the back, and travels. Boom lengths: 25 to 55 feet, plus 15 to 30-foot jib. Converts to $\frac{1}{2}$ to $\frac{3}{4}$ -yard clamshell, dragline, $\frac{1}{2}$ -yard shovel, hoe. Get all the facts. Call your Koehring distributor today.

Big-capacity 205 also is available on truck-mounting (below) with optional remote control — or on crawlers with automatic crawler traction-brakes.



OPERATING EASE:

20" main-drum clutch, self-adjusting.

Main operating levers on antifriction, self-aligning bearings.

Independent traction optional — on 205 Cruiser or crawlers.

SIMPLE, HEAVY-DUTY DESIGN:

Only 2 main-shafts in upper machinery, fewer parts, less maintenance.

Splined shafts, antifriction bearings.

Butt- or pin-connected crane boom.

Heavy-duty construction of welded, high-strength steels.

205 WORK CAPACITIES:

15-ton lift on rubber — (Cruiser or truck mounting).

10-ton lift as a crawler crane.

$\frac{1}{2}$ to $\frac{3}{4}$ -yard clamshell, dragline.

$\frac{1}{2}$ -yard dipper as shovel, hoe.



K695R

AMERICAN MACHINE CO., Spokane, Washington

PACIFIC HOIST & DERRICK CO., Seattle, Washington

COLUMBIA EQUIPMENT CO., Portland, Oregon

HARRON, RICKARD & McCONE CO. of Southern California

Los Angeles, California

STANDARD MACHINERY CO., San Francisco, California

KIMBALL EQUIPMENT CO., Salt Lake City, Utah

NEIL B. McGINNIS CO., Phoenix, Arizona

THE HARRY CORNELIUS CO., Albuquerque, New Mexico

SAN JOAQUIN TRACTOR CO., Bakersfield, California

ENGINEERING SALES SERVICE, INC., Boise, Idaho

McKELVY MACHINERY CO., Denver, Colorado



REPORTS from the COURTS

By HOWARD S. BURNSIDE, Low and Burnside
Attorneys at Law, San Francisco—Menlo Park

Beware the implied warranty

Sellers of equipment and specialty contractors must constantly be on guard against making an implied warranty on their product or installation for which they later become liable for damages or fail to recover the price. As a practical matter implied warranty situations probably occur most often because a buyer is eager to effect a saving and a seller is anxious to make a sale. As a legal proposition the implied warranty of fitness arises when the buyer tells the seller the purpose for which the goods are required and relies on the seller's judgment or skill in selecting or applying the goods.

Warranty of fitness means that the goods shall be reasonably fit or suitable for the purpose for which they were purchased. An implied warranty is a contractual assurance or representation which is not in writing; but it may be implied in either an oral or written contract. Most states adopt the principle of implied warranty under laws governing sales or contracts.

This case involved the installation of asphalt tile over a concrete floor which had been covered with magnesite. No sealer had been applied nor was there any water barrier above or below the concrete; but this was not discussed beforehand. The plaintiff knew nothing about flooring and the defendant, after examining the floor of the showroom and office involved, recommended a tile to meet the plaintiff's needs.

About a week after the floor was laid a dark sticky substance began oozing up between the tiles. The oozing or sloughing continued. Eventually the magnesite beneath the tile grew spongy and caused the floor to rise in spots, resulting in an uneven surface and cracks in the tile. The magnesite was crumbling and falling apart. The plaintiff commenced an action upon a breach of an implied warranty of fitness and received a favorable judgment.

In reviewing the case the Supreme Court of Washington noted an inference that the defendant's representative knew of the possibility of moisture rising through the magnesite and damaging the tile but made no inquiry about a water barrier nor advised plaintiff of the risk. "Knowing or being charged with knowledge

that there was a risk involved, of which (plaintiff) was obviously ignorant, and having failed to warn her of this risk before she made her investment, the appellant must be held to have warranted that the floor would be fit for the intended use regardless of the structure of the underflooring."¹

Friskin vs. Art Strand Floor Coverings 288 p. 2d. 1087.

Sale of goodwill restricts competition

Plaintiff Bergum and defendant conducted a partnership business. Defendant sold his interest, including goodwill and name, to Bergum and the Ewings and agreed not to compete for one year in all of Los Angeles. After a year had passed defendant then engaged in the same business and solicited the customers of the former partnership for the identical product. Apparently he acquired some or many of the customers for his new competing business.

"Did the defendant, by the contract . . . impliedly covenant not to directly solicit the customers of plaintiffs who had been customers of the business he had sold to them."¹ The appellate court answered this question in the affirmative and referred the case back to the trial court for further proceedings.

"The goodwill of a business is property and may be transferred. The customers of a business are an essential part of its goodwill.

"When the goodwill of a business is sold, it is not the patronage of the general public which is sold, but that patronage which has become an asset of that business. It follows that one who has sold his interest in the goodwill of a business can no more act directly to destroy that asset than he could to destroy or make useless any other asset which he had for value transferred to the purchaser.

"The law implies in every contract a covenant that neither party will do anything that will deprive the other of the fruits of his bargain.

"The direct solicitation by the seller of the customers of the business, the goodwill of which he has sold, is a violation of this covenant. This implied covenant does not prevent the seller from engaging in a competing business and by fair means soliciting the business of the public

generally. It does prevent him from directly soliciting the patrons of the business he has sold."¹

If what the plaintiffs alleged was true then the defendant was engaged in unfair competition. The principles set forth here will apply generally regardless of the particular article or product involved in the business.

1. Bergum vs. Weber 136 C.A. 2d. 389.

Error requires rescission

If you ever felt that you zipped when you should have zipped then you can sympathize with the plight of the electrical contractor in the case of Lemoge Electric vs. County of San Mateo.¹

The contractor submitted a low bid of \$172,421 and on the day following the bid opening discovered a clerical mistake. One item of \$10,452 had been inserted as \$104.52. He immediately called the mistake to the attention of the Board of Supervisors but the Board adopted a resolution accepting the erroneous bid.

The contractor filed an action for reformation of the contract to make the contract recite a price of \$184,165. This was his second mistake according to the court. An alternate choice would have been to rescind, that is, simply to restore everything as it was at the outset and not enter into a contract. The court sustained a demurrer to the complaint without leave to amend which was a holding that he could not state a right to reformation. Meanwhile he entered upon and thereafter completed the work.

The appellate court confirmed the judgment that the case was not a proper one for reformation. Under the Civil Code² reformation is available as a remedy to reform a written contract which because of fraud or mutual mistake failed to express the intention of the parties. "The purpose of reformation is to effectuate the common intention of both parties which was incorrectly reduced to writing."³

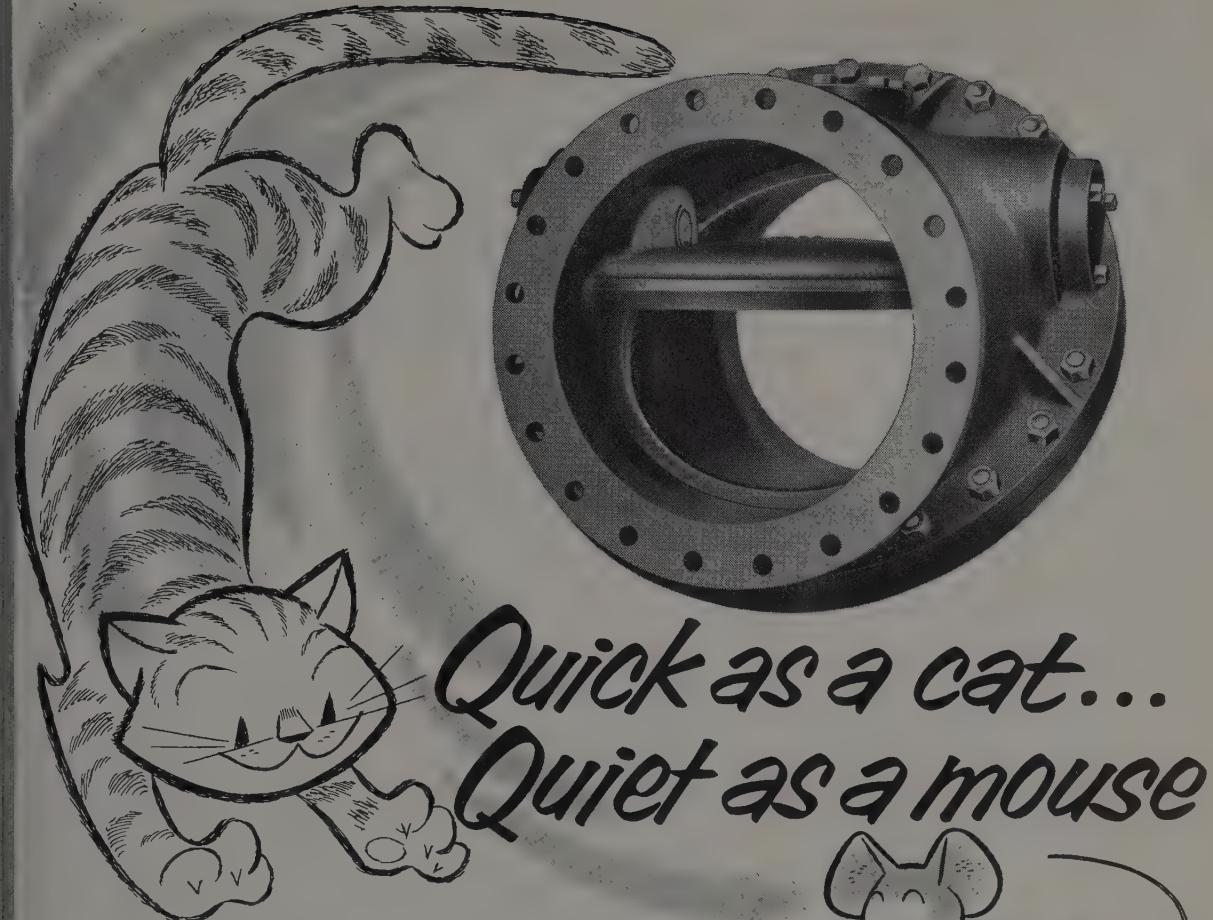
In conclusion the appellate court said, "The facts alleged would apparently justify a decree of rescission . . . Appellant did not pray for rescission but for reformation only. If rescission was still possible we might reverse on the ground that the complaint states a cause of action for reformation, but the question of rescission has been rendered moot. By appellant's own statement on oral argument it has now fully performed the contract."¹

In reviewing case reports much is left to the imagination even in the full reported opinions. In this case for example it might well have been the contractor's free and profitable choice to proceed rather than rescind.

1. Lemoge Electric vs. County of San Mateo, 136 C.A. 426 (Hearing granted in Supreme Court).

2. 3399 Calif. Civil Code.

3. Bailard vs. Marden, 36 Cal. 2d. 703.



CHAPMAN Tilting Disc Check Valve

There, in a nutshell, is the story of a Chapman Tilting Disc Check Valve . . . quick as a cat, quiet as a mouse. It's designed that way. It's built that way . . . for fast, sure, quiet action. Or, in other words, it's yours for best performance at lowest long-range operating costs.

With a Chapman Tilting Disc Check Valve, there's no noise, no vibration, no fluttering. There's no banging or slamming with damage to system or valve. There's no scraping or wearing of disc and seat. Your head loss or flow resistance is kept at a minimum.

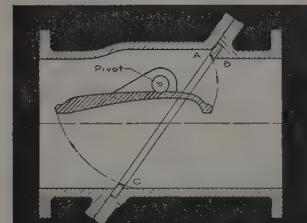
To put it briefly, with a Chapman Tilting Disc Check Valve, there's little or no maintenance even under severe operating conditions.

For Chapman Tilting Disc Check Valves in iron and steel . . . valves for handling fluids or gases under a wide range of pressures . . . valves for replacement or new piping systems . . . just check our Catalog 30-A. It's yours for the asking. Send for it now.

The CHAPMAN Valve Mfg. Company
INDIAN ORCHARD, MASSACHUSETTS

Never a Flutter, Never a Slam!

Designed and Built for
Quiet Efficient Operation



In open position, specially designed "airfoil" disc balances perfectly. No vibration. No flutter. When flow subsides, disc drops quickly and quietly to a tight closed position. No jarring. No slamming. No damage to system or valve. Note enlarged area around disc to insure low flow resistance.

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

ROAD TO PARADISE—A vast new area, termed a "paradise" for hunters and fishermen by bush pilots who have seen it, will be opened when the road from Fairbanks to Nome is constructed. This road has a top priority in the Alaska road construction program. At the last meeting of the Territory's Board of Road Commissioners, held in Fairbanks, emphasis was placed on planning for U. S. Route No. 97. This is the proposed thoroughfare from Fairbanks to Nome to Cape Prince of Wales. This road would traverse a vast area now a virgin wilderness explored only sketchily by flying prospectors and migrating Eskimos. More important, the road will link the colorful gold rush community of Nome with the United States. Placing of the Nome road on the priority list for road construction represents the first tangible step toward realization of the big project.

NOME ROAD priority was high point of the commissioners' meeting. Irving Reed, territorial highway commissioner, said the Alaska Road Commission has indicated it will use Federal funds available for road-building purposes in the order of priorities set by the territorial board. The board voted not to spend any territorial road funds for work on highways within city limits, although it is now permitted by the Alaskan attorney general's decision.

OTHER PRIORITIES—Of interest to contractors and construction men is the roster of other priorities for road building established at the important meeting of the commissioners. Second priority was assigned to construction of the Copper River highway which will link Cordova with the rest of the territorial road system. Some work is currently being done on this project. Third priority went to the proposed Fairbanks-Nenana-McKinley system road. Plans on this call for eventual extension of the road to Ruby and the Kuskokwim River. For the first time in several years, emphasis was placed on new road construction instead of improvement of already-established roads, during discussions by commissioners.

MISCELLANEOUS ROAD WORK—A number of other road projects have either been given the nod for construction or are now in process of being built. Fishermen will be glad to know of a new road slated to be built from Yakutat to Situk River Village—passing through some of Alaska's best fishing

waters. Small-scale road construction throughout the territory will be continued this year where most needed, the commissioners indicated.

HAPPY HIGHWAYS—News of highway construction proposed and under way is good news for Alaskan planners. Right now, Federal fund allocations for fiscal 1958 will bring Alaska approximately \$11,500,00. Present indications are that the program will call for expenditure of about \$15,500,000 in 1959. Alaskans will be called on to pay a greater share of their road costs. Under the Federal formula, a much greater contribution of territorial funds to the program must be made than was the case during previous voluntary contributions made to the Alaska Road Commission, a branch of the Department of Interior.

HIGHWAY NEGLECT—Many Alaskans feel the government has sadly neglected road building in the territory. Alaska today has only 3,700 mi. of highway with only about 800 mi. paved. The state of Delaware, with only 1/285th the area, has more miles of road. Nevada, which has a population comparable to that of Alaska, has about eight times as many miles of highways. Development of wilderness areas and use of Alaska's vast natural resources, most experts consider, will not come about until road building in the territory is accelerated.

WHAT IT MEANS—The increased interest in road building in Alaska should be highly meaningful to the construction industry. The knowledge that so much remains to be done in this province should allay fears that there will be no "cushion" when defense spending tapers off to a trickle. A year-by-year increase in road construction accompanied by concurrent development of towns and cities seems in the cards. Alaska, a land of vast distances, is, in many ways, the answer to a road builder's dream.

SURPLUS GRAB-BAG—Buyers at Alaska's biggest surplus property sale early in June came away with \$352,524 in purchases—but the value of all the items bought for that sum probably ran over a million dollars. The big sale was arranged by the General Services Administration and aroused widespread interest among contractors and other buyers. Property bought by construction companies in the surplus "grab-bag" sale included such items as tractors, shovels, cranes, steel, plumbing and heavy

equipment. After the sale was over, the Alaska Railroad, former owner of the property, announced that the entire amount taken in from the sale was about 23% of what the railroad paid for the property to begin with. Officials indicated they felt well rewarded.

HAINES-FAIRBANKS FURORE—Publication in a Whitehorse, Yukon Territory newspaper of an article which charged that nearly 1,000,000 gallons of jet plane fuel was pumped on to the ground along the Haines-Fairbanks pipeline while it was being repaired caused a furore in Anchorage and Fairbanks. Daily newspapers headlined the report, which was followed by a statement from the Defense Department that the loss of fuel was "negligible." Military officials in Anchorage said the account was "highly exaggerated."

DEWLINE DEVELOPMENT—Establishment of Anchorage as the Alaskan headquarters for the Federal Electric Co. was hailed as a far-reaching development on Alaska's economic scene. The firm was picked by the military to operate and maintain the "White Alice" and "DEW-line" defense warning system in the Far North. Raymond S. Perry, president of the company, told an Anchorage bankers' group that more than 600 men will be employed by the firm, most of them locally. Expenditure of about \$45,000,000 annually for operation of the two communications networks was forecast.

BIG DOCK PLANNED—Voters in Anchorage have approved a project that will probably make the city Alaska's busiest seaport a year or two hence. Voters approved a \$6,800,000 bond issue for the project, and preliminary studies have already been completed. About \$2,000,000 in general obligation bonds was authorized for the big project. Total cost of the new Anchorage port would be \$8,800,000. The dock would provide for, eventually, three berths and a transfer bridge connection to the railroad to allow unloading of railroad cars from a sea-train type of ship. The dock would have a concrete deck with steel and concrete caissons and an area of 75,000 sq. ft. of transit shed.

CONSTRUCTION BRIEFS . . . The city of Seward has applied to the Federal Power Commission, asking for a license to build a power plant on Crescent and Crater lakes at a cost of \$2,400,000 . . . Many Alaskan construction projects were held up by floods in May . . . Rivers inundated thousands of square miles, including areas where defense construction was in progress . . . Hardest hit were areas traversed by the Yukon and Kuskokwim rivers . . . The Anchorage Board of Education plans to call bids soon on a \$250,000 addition to the high school.

DW15s move earth fast at Fort Gaines Dam



THE Fort Gaines Lock and Dam project on the Chattahoochee River is now going ahead in high gear. Moss Construction Co., of Columbus, Ga., building a 400-foot section of the dike on the Alabama side, is moving earth at the rate of over 1000 cu. yd. per hour, and expects to double that figure this summer. Total dredge on the Moss contract will be about 2½ million.

A major share of the earthmoving is handled by six CAT* DW15 Tractors with No. 15 Scrapers. Push-loaded by D8s, these units have carried average loads of 13.5 cu. yd., working in loose sand. Round-trip haul distance is about 3200 feet. This will lengthen as the job progresses, but in clay and other random material, loading will be faster. Good 60-foot-wide haul roads are maintained by Caterpillar Motor Graders.

In all, some 32 pieces of Cat equipment are at work here. W. P. Moss, managing partner of the construction firm, likes the performance of his DW15s. He raises their ease of handling, operator comfort and balance of weight to horsepower. "I have used Cat machines for over 20 years," he says. "The fact that my present equipment is all Cat is due to my belief

that Caterpillar leads the field in design, quality control in manufacture and, most important, in service."

The DW15 is in all ways a modern heavy-duty earthmover. It gives you a dependable Cat Engine with 186 HP (maximum output); new tubeless tires on drive and scraper wheels that eliminate tube and flap trouble and reduce down time; fast, easy-operating controls and 10 forward speeds. It has won acceptance everywhere on its profitable performance.

Ask your Caterpillar Dealer for a demonstration on your own job. He backs the DW15, like all the machines he sells, with service and parts you can trust.

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

CATERPILLAR*

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NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE

ENGINEERS on the move

Lt. Col. John E. England, who supervised construction of \$40,000,000 Alcango pipeline, leaves military



**Lt. Col.
John E.
England**

service to become new civilian chief of construction for the Alaska District Corps of Engineers.

* * *

William J. Dabel, assistant city engineer of Napa, Calif., since June 1953, recently accepted the position of director of public works and city engineer of North Sacramento.

* * *

R. S. Minnick is resident engineer for the California Division of Highways on a project 4.2 mi. west of Mariposa to Mariposa. Work consists of widening and realignment of Highway 140. Until recently Minnick was located on a job at Vallejo.

* * *

A. P. Schmitt is project supervisor at Winnemucca, Nev., in the employ of the Western Pacific RR. Co., which is welding 39-ft. rails into 78-ft. lengths.

* * *

San Francisco Post, Society of American Military Engineers, recently elected new officers and directors and when the ballots were counted found its top three officers represented engineering organizations in the Army, Navy, and Air Force. This is the first time all three services are represented in the Post's top offices. New officials are President, **Brig. Gen. William F. Cassidy**, Division Engineer, South Pacific Division, Corps of Engineers; 1st Vice President, **Commander W. J. Valentine**, Assistant District Public Works Officer, 12th Naval District; 2nd Vice President, **Col. Edwin M. Eads**, Air Force Installations Representative, South Pacific Region.

* * *

Jack B. Baines has been appointed assistant chief engineer of the Port of Oakland, Calif. He has been a member of the Port 20 years.

* * *

Frank Rooney, president of The Associated General Contractors of

America, has appointed the following members of Northern California Chapter to 1956 national committees: **George H. Atkinson**, Guy F. Atkinson Co., to advisory board and labor committee; **E. L. Clements**, Hayward, public relations committee; **Ben C. Gerwick, Jr.**, San Francisco, contractors forms and specifications; **Grant P. Gordon**, Guy F. Atkinson Co., contractors forms and specifications; **Charles L. Harney**, San Francisco, legislative committee and SAA-AGC joint cooperative committee; **Felix H. Siri**, Piombo Construction Co., San Carlos, equipment committee.

Simultaneously four members of Seattle Chapter were appointed to national committees: **James W. Cawdrey**, executive committee, ethics and trade practices committee (chairman), and finance committee; **Cliff Mortensen**, public relations committee and advisory board; **Olav Boen**, apprenticeship committee; **John F. Boespflug**, specifications.

* * *

James D. Marshall, executive director of The Associated General Contractors of America, Washington, D. C., recently assumed full responsibility and authority of chief executive in the management of the association. While **H. E. Foreman**, managing director, is much improved in health, according to announcement by **President Rooney**, he is not able to resume in full the duties of the office without impairment to his health. He continues under the title of managing director on a full-time basis as consultant and advisor on high-level policies.

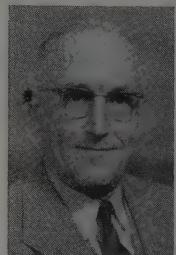
* * *

Walter L. Huber, former president of the American Society of Civil Engineers, was recently elected chairman of the Interior Department's advisory board on national parks, historic sites, buildings and monuments. Huber, a consulting engineer with offices in San Francisco, has been a member of the advisory board since 1953.

* * *

David H. Meldrum, formerly in the military planning branch of the North Pacific Division of the Corps of Engineers, has been appointed assistant to the chief of the engineering division, according to announcement by **Brig. Gen. L. H. Foote**, Division Engineer. Meldrum succeeds to the post of **Ray E. Holmes** who was assistant to **F. S. Brown**, engineering head.

Charles H. Wagner, who was resident engineer at Bridgeport, Wash., for the Corps of Engineers during the first 5½ years of construction of Chief Joseph Dam, and for the past year chief of the construction division at Seattle District headquarters, recently left for a new assignment as resident engineer on a lock and dam under construction on the Ohio



Wagner



Smith

River. With the transfer of Wagner to the Pittsburgh, Pa., District, **Col. N. A. Matthias**, Seattle District Engineer, announced the appointment of **Roy O. Smith** as the new chief of the construction division. Succeeding to Smith's former post as head of supervision and inspection branch is **Leland W. Garrett**.

* * *

W. Frank Bort has been named manager of industrial construction, and **Stanley Kimball** has been appointed manager of heavy construction for Kaiser Engineers. Bort will have charge of all industrial construction within the continental United States. Kimball will supervise heavy construction work coupled with engineering design on joint ventures carried out by Kaiser Engineers and other firms.

* * *

Announcement of the formation of a new firm was made by **Haas** and **Haynie**, general contractors of San Francisco, and **T. "Fred" Frandsen** and **"Vic" B. Frandsen** of Los Angeles. The new firm known as **Haas & Haynie**—Frandsen has opened its headquarters at 8913 Olympic Blvd., Beverly Hills, Calif. The 53-year old firm of Haas and Haynie is well known for its many large construction projects throughout the West. Fred Frandsen, who heads the new Los Angeles partnership, was formerly president of Baruch Corporation. His brother Vic, who also was connected with the Baruch organization in charge of its community development program, will carry on similar duties in the new firm. Other key personnel on the staff of the newly organized contracting company include **Al Dahlquist**, chief estimator, and **Stewart J. Stronach**, chief construction coordinator.

* * *

William A. Bugge, Director of Highways for the State of Washington, was recently selected by the ex-



Sam Braen confers with his Truck Superintendent, Fred Aldrich (seated in truck No. 80, foreground) and Bill Wilson, Asst. Truck Supt. (extreme right), at his Hawthorne, N. J. plant. The picture features some of Braen's new GMC W630 tandems with transit-mix bodies.

"I've been buying GMC's since 1926 because they cost me less to use!"

—says Sam Braen of Sam Braen Industries,

top New Jersey contractor with 132 GMC trucks on the road

EVER SINCE Sam Braen bought his first GMC—the same year he organized his firm—he's been coming back for more. Today, there are 132 of them in all—75 of them 59,000 GVW tandems equipped with 5½-yard concrete barrels.

They put in about 20,000 miles a year. That's modest—until you discover that a big percentage is rugged off-the-road work. And most of the highway travel is through heavy suburban traffic.

Yet this punishing daily diet goes easy on Braen trucks. Road failures are almost nonexistent. Down-times are few—and far between. And a truck

goes in for overhaul only after *two years* of hard service. Naturally, maintenance costs are way down.

So are fuel costs—in spite of all the traffic and traffic lights. In fact, Braen GMC's average *a mile a gallon better* than comparable trucks doing the same job!

Obviously, Sam Braen's preference for GMC's is strictly a dollars-and-cents proposition. And it's based on 30 consecutive years of experience.

If you'd like to know more about profitable performers like these—for any kind of truck-work up to 59,000 GVW—see your GMC dealer!

GMC TRUCK & COACH—A General Motors Division

ecutive committee of the American Association of State Highway Officials as first vice president of the organization. A vacancy in this office had been automatically brought about when **Rex M. Whitton** became president of AASHO following the death of **Frank Merrill**.

* * *

E. I. Roberts, Vancouver, Wash., has been elected to the board of directors of the Northwestern Society of Highway Engineers. Roberts is assistant district construction engineer for the Washington Department of Highways.

* * *

S. D. Kelly, director of safety for Macco Corporation, was one of the recipients of an invitation from President Eisenhower to attend the recent conference on occupational safety in Washington, D. C. The



**S. D.
Kelly**

President called the conference in an effort to reduce human suffering, economic loss and waste of skill and man-hours resulting from nearly 2,000,000 work injuries in the United States annually.

* * *

M. P. Butler, president of Mountain Pacific Chapter, Associated General Contractors, has been named to the National Advisory Board of AGC in Washington, D. C.

* * *

Ralph Kerslake, formerly state aid engineer in the Seattle District Office of the Washington Department of Highways, has been appointed district construction engineer in the Wenatchee District Office, replacing **Ted Morehouse**. Morehouse, veteran highway engineer, went to Guatemala to represent the U. S. Government as a technical advisor on roads.

* * *

Francis N. Hveen, of the California State Division of Highways materials and research engineer has been elected president of the Sacramento Section, American Society of Civil Engineers. Other officers for this year include **Francis G. Christian**, 1st vice president; **Irvin M. Ingerson** 2nd vice president; **Robert F. Fingado**, secretary, and **M. E. Cornelius**, treasurer.

* * *

In the event of flood emergency, **Col. Jackson Graham**, Portland District Engineer of the Corps of Engineers, has a band of engineers ready. **Kenneth R. Dibblee** and **Dean L. Harshberger** are named field consult-

ants. Should an emergency occur those in charge under Colonel Graham at headquarters will be **Robert B. Cochrane**, **Cecil E. Keith** and **Donald H. Basgen**. Field engineers assigned to various areas will be **E. C. White**, **A. M. Capps**, **Harry L. Hendrickson**, **Winthrop A. Wells**, **Harold F. McShatko**, **George G. West**, **Frederick G. Wieden**, **Joseph L. Barger**, **Phillip L. Cole**, **Hal M. Myrand**, **W. O. Owens** and **Melvin E. Harbert**.

* * *

Tudor Engineering Co. of San Francisco has opened an office in Washington, D. C., to serve as consultants and advisors to the Government in connection with the engineering and economic feasibility of certain foreign aid projects. Several Western engineers are on the staff. **Thomas J. Murray**, who was formerly general manager of the Port of Everett, Wash., is project manager. Assistant project manager is **John Marr** who was city planning engineer of Oakland. Staff engineers are **David E. King**, civil engineer formerly with the Los Angeles County Flood Control District; **Tyler Sprake**, consulting engineer of Seattle and San Francisco; and **Ralph Wadsworth**, retired city engineer of San Francisco.

* * *

Maj. Gen. Louis W. Prentiss (USA Ret.) recently took over the office of executive vice-president of the American Road Builders' Association, Washington, D. C., succeeding **General Eugene Rebold**. A graduate engineer, the new ARBA executive head has a background of more than

**Maj. Gen.
Louis W.
Prentiss**



35 yr. of distinguished military service. After regular army service he transferred to the Corps of Engineers in 1929 and has held increasingly important posts in the Corps. In 1952 he was appointed Engineer-Commissioner of the District of Columbia and served for two years. In 1954 he took over command of the Engineer Center at Fort Belvoir, Va., until his recent retirement.

* * *

J. A. Kuehl, veteran engineer and utilities executive, has been named to succeed **W. A. Kunigk** as superintendent of the Water Division of the City of Tacoma, Wash. For the past several months Kuehl has served as assistant superintendent under Kunigk, who is leaving the Division following 44 yr. of service.

George F. Hellesoe, maintenance engineer for the California Division of Highways and the man responsible for keeping the 14,000 mi. in the state highway system in repair, is retiring after nearly 31 years in State service.



Baxter



Hellesoe

His successor is **Frank E. Baxter**, presently district engineer of District IX at Bishop. Baxter's post is being taken over by **E. R. Foley**, a staff engineer.

* * *

Carl A. Weers has been promoted to assistant chief engineer in the San Francisco office of the National Board of Fire Underwriters, succeeding **Herbert Rains** who is retiring.

* * *

Appointment of **Allen R. Bacon** as resident manager for construction of Kaiser Aluminum & Chemical Corp.'s new aluminum plants at Ravenswood, W. Va., is announced. Bacon recently served as project manager of a \$31,000,000 powerhouse at The Dalles, Ore. Previous to this he was project manager for Albeni Construction Co., supervising construction of Albeni Falls powerhouse, Idaho. On his latest assignment he will supervise construction of a rolling mill now under way, and aluminum reduction plant to start shortly. **J. J. Sorenson** will be general superintendent for the entire project.

* * *

R. A. "Arch" Work of Portland, Ore., received the Department of Agriculture's Superior Service Award at a ceremony at Washington, D. C., on June 5. The builder and head of the

**R. A.
Work**



Soil Conservation Service snow survey program in the 17 Western states and Alaska received the award in recognition of a quarter century of work and study in water supply forecasting in the West. For upwards of ten years a summary of these forecasts has appeared each May in *Western Construction*.



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Now small soil stabilization jobs can be handled profitably, too! The P&H EA-56 Single Pass Stabilizer has been designed to stabilize small jobs such as streets, roads, alleys, parking areas, airports, road shoulders, sub-base work and for reclaiming worn out streets and roads.

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tinuous principle. It does its own digging, pulverizing, blending of admixture, applying of liquids and complete final mixing—all in one single pass—all controlled by one operator.

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Firm _____

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LUBRICATION . . .

(Continued from page 70)

tions free from fuel, oil, and grease.

Use only approved fluids in shock absorbers, brake cylinders, and hydraulic control systems containing rubber diaphragms, plungers, or seals.

Keep gear housing filled with recommended oil to lubricate gear surfaces, bearings, and steering shaft. Use a low pressure pump to prevent lubricant from being forced up the steering column.

Track rollers of crawler mechanisms having plain bearings require frequent lubrication to prevent dirt and water from working in. Those on shovels, draglines, and cranes should be lubricated every hour when traveling.

Do not lubricate. This refers to treads only and should not be confused with the track roller or idler assemblies. The pin between individual treads is designed to operate without lubrication as dirt or other abrasives which could be picked up

by the oil would act as a lapping compound and shorten the life of the track.

Do not lubricate (except double flange type with hook rollers). Lubricant will cause rollers to slide and wear flat. Lubricate bearings of turntable rollers sparingly to avoid dripping on paths.

Some universal joints are provided with lubrication fittings. The ball and trunion type should not be over-lubricated as the boot will become filled with lubricant. Some roller bearing types require disassembly and hand packing by an experienced mechanic.

The propeller shaft splines usually are equipped with a fitting. The type of plug or fitting should not be changed as the balance of the rotating part would be affected.

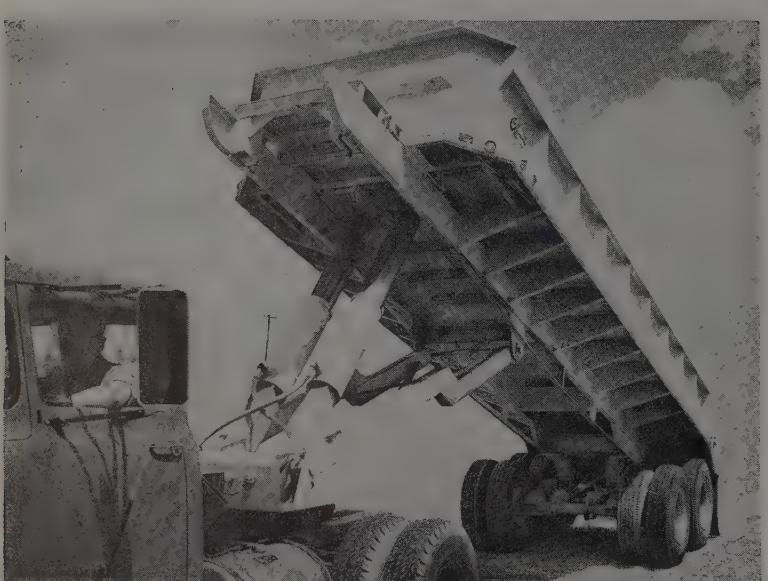
Some rear wheel bearings have to be removed, while others are lubricated automatically from the differential or are permanently packed at the factory. Some are equipped with a grease cup or fitting, and still others have a plug which must be removed and a fitting substituted, the plug being replaced after the lubricant is applied.

Premature failure often is caused by contamination with dirt and dust during cleaning and repacking. Whenever wheel bearings are removed they should be examined, washed carefully, and dried with air. After cleaning, grease should be packed around the bearings and the bearings replaced. Grease seals should be examined carefully and replaced if necessary. Ball bearings must be adjusted so that the wheel will turn freely with no end play.

Summary

Investments in heavy construction equipment and expenditures for construction projects are at an all time high and are expected to increase still further during the next few years. Over 20% of the total sum spent on construction operations is devoted to keeping equipment operating, but less than 1% of the total is spent on lubricants. In view of the recognized importance of proper lubrication to the performance and life of the machinery and the relatively low amount spent for lubricants, it is evident that compromising with lubricant quality is false economy.

Operating costs can be reduced to a minimum and equipment life can be extended by: (1) adopting a simplified lubrication plan which will keep the number of lubricants on the job to a minimum but will still satisfy all of the lubrication requirements; (2) storing and handling lubricants properly so that chances of contamination will be minimized and (3) establishing a preventive maintenance program which includes periodic mechanical and lubricant check-up and following it to the letter.



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and Vibratory Screeding Equipment



ADJUSTABLE SCREED HOLDER

Consists of a 1" threaded rod to which is welded a cradle to hold the pipe screed. This cradle is slotted as shown so that the arms may be bent over to secure the 1 1/4" or 1 1/2" I.D. pipe screed. Threaded onto the rods is a half nut which provides the adjustment.



Especially Designed for Use on Bridges, Underpasses and Overpasses

These Screed Supports are designed to take the heavy loads imposed by traveling vibrating screeding equipment. The Bases for the screed holders are of two types: (1) The Metal Base for use on structural steel members; (2) the Chair-Type Base for use on a plywood deck.

On Structural Steel: As shown above, the Metal Base is tack-welded to the top flange on approximately four foot centers. The Screed Holder is set into the base, and adjusted to height by turning the nut. The threads are fast, three to the inch, and of a contour type, non-clogging and easily cleaned.

On Wood or Plywood Decks: The Chair Base is set on the deck at approximately four foot centers. It is easily secured to the deck by nailing across the upturned legs. If desired, legs can be supplied of galvanized wire. The Chair Base with holder is shown below.

Adjustable Standard SUPERIOR SCREED CHAIRS

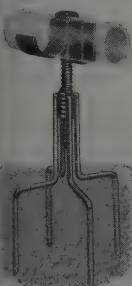
FOR FORMED SLABS 4 1/2" AND GREATER

With re-usable screed holders using 1" I.D. pipe and rectangular bars for screeds.



FOR SLABS ON FILL

With re-usable screed holders using 1" I.D. pipe and rectangular bars for screeds.

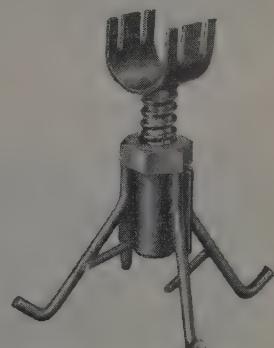


PERFORMANCE

Superior's Heavy-Duty Adjustable Screed Supports have been used on turnpike structures and other projects. Results in the field indicate that this method of supporting screeds provides a simple answer to an otherwise expensive and complicated set up. *Write for Bulletin.*

HOLDER INSERTED IN CHAIR BASE

Only the inexpensive bases are left in the concrete. The Adjustable Holders are easily removed, together with the pipe screed, because the holders are set, not screwed into the base. The nut fully covers the base opening and prevents concrete from entering.



SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office

1775 Broadway, New York 19, N. Y.

Pacific Coast Plant

2100 Williams St., San Leandro, Calif.

SUPERVISING the jobs

Key Men on Tri-Dam Project



Perkins

Tucker

Here are some additional names of important men working under O. H. Tucker, project manager, and B. L. Perkins, general superintendent, since our last report on Tri-Dam Constructors' personnel on Beardsley Dam, part of the Tri-Dam Project under construction on the Stanislaus River in Central California. Handling labor relations on this unit in conjunction with the Donnells unit is A. Fraser. D. Richards is project engineer. W. McMurren is handling costs and production. Paul Arwood is field engineer, with P. McDonald, powerhouse engineer, and B. Doyle, computor. The office is in



Fleming

Krumpotic

Heinz



Cox



Doherty

Zigelhofer

Dickson

charge of J. Hobson. G. Bartlett is handling the warehouse record. D. Billings is camp manager, with R. Steinbock in charge of barracks. R. Vogel is chief accountant. P. L'Esperance, purchasing agent. R. Poss, paymaster, and E. Cutte and A. Bartlett, clerical assistants.

Byron Doherty is head master mechanic, and E. Rickson, assistant with Henry Zigelhofer, C. Dapro M. Eychner in the shop, and J. Shar in the warehouse. Chris Nielsen is drill and shoot superintendent. D. Hobbeck is in charge of safety and first aid, with H. Virgo acting as fire warden. E. W. Stubbart is general labor foreman, and L. Terry, electrical maintenance foreman. H. D. Gar is day excavation superintendent, assisted by T. Baker, Marvin Moore and Mel Stoddard, foremen. Night superintendent is K. J. Hayes who has the assistance of Ted Bowles, night foreman, and E. Hansen, truck foreman. Bill Dickson is welding foreman.

Stewart Smith is superintendent for Del Monte Electrical Co., sub contractor. Henry Heinz is supervising the subcontract of Process Diamond Bit & Tool Co.

For Tudor-Goodenough, Engineers, A. H. Griffin is resident engineer. Loyd Garst is laboratory engineer. Tom Sutton is chief inspector and the following are inspectors: Charles W. Lane, powerhouse; George Fleming, grouting; W. W. Simms, fill; Clyde Barrett, tunnel and Bob Schnieder, bottom pit.

G. N. Cox is structural superintendent; Mike Krumpotic, concrete superintendent. "Norm" Swanson is carpenter superintendent, with L. Erickson, shop foreman, and E. "Pete" Beall, field foreman. J. J. Jefries is aggregate plant superintendent.

E. C. Shipp, administrator, Si Picmont, project manager, and Stanley M. Stearns, project engineer, head the list of personnel employed on Donnells Dam, second upstream unit of the Tri-Dam Project. Other key men for the joint venture firm of Tri-Dam Constructors are J. L. Wixson, general powerhouse superintendent; Palmer M. Lee, general tunnel superintendent, with Tom Lacke



We've overhauled our six-year-old No. 12 once— ever done anything to our three-year-old grader"

Bud King, Missoula, Mont.

Bud King is describing his CAT* No. 12 Motor Grader, working on a 4.76-mile construction job of U. S. Highway 93 near Arlee, Mont. It is a remarkable statement when you see the rough conditions in which these No. 12s work.

"I've been running big yellow equipment for 25 years," Bud King explains. "As far as graders are concerned, there isn't any that holds a candle to Caterpillar. We've overhauled our six-year-old No. 12 once—never done anything to our three-year-old grader. Work it hard."

The No. 12 is trimming slopes of a new subgrade, most of it containing heavy rock. This is the type of going which shows the rugged characteristics of Motor Graders to best advantage.

For under such conditions, it is doubly important that the unit is built by *one* manufacturer. That way, engine, blade capacity and working speed are carefully matched for sure-footed traction and high production. Furthermore, it is important that the blades are made of high-strength alloy steels and cutting edges and bits of high-carbon steel. Here's where you appreciate having

the circle drawbar and blade supporting circle built of heavy box sections to withstand maximum loads.

And new tubeless tires are available at no extra cost, eliminating 80% of down time caused by tire trouble. They run cooler, last longer, give better puncture and blowout protection.

Have your dealer give you full details on this rough-and-ready motor grader. He'll tell you, for instance, about the exclusive new oil clutch which can operate up to 1500 hours without adjustment. But he'll do more than talk. He'll demonstrate—on *your* job. You name the date.

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

CATERPILLAR*

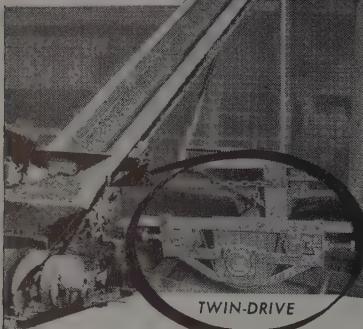
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

99% OF ALL CAT MOTOR
GRADERS EVER BUILT
ARE STILL ON THE JOB

MULKEY

TWIN-DRIVE* BELT CONVEYOR

*Pat. Pending

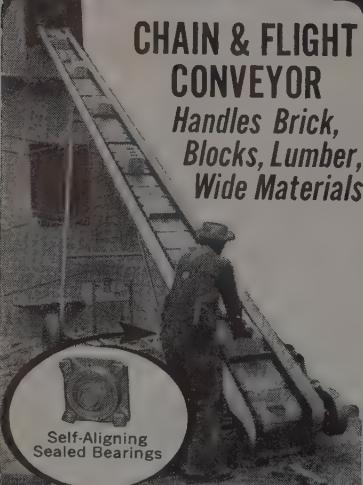


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GRAVEL, WIDE MATERIALS

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CHAIN & FLIGHT CONVEYOR

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Blocks, Lumber,
Wide Materials



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CRAMER MACHINERY CO., Portland
UNIVERSAL EQUIP. CO., Seattle
GENERAL MACHINERY CO., Spokane
ARNOLD MACHINERY CO., INC.
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CONTRACTORS EQUIP. & SUPPLY CO.,
Albuquerque
THE UNIVERSAL CO., Denver
EDWARD R. BACON CO., San Francisco,
Sacramento, Fresno, Oakland



Jones

Lytle

Mark



Hankins

Piedmont

Woodin

and Max F. Lurz serving as superintendents under him. James E. Gore, A. D. Tryon, Frank V. Urban, Walter Y. Torgerson and Chester Tryon, excavation superintendents. Other superintendents are Odus J. Hankins, rigger; James E. Woodin, pipe; Lawrence G. Jones, carpenter; Clarence L. Harmon, plant and equipment; Lionel W. Hoffman, tire shop; Paul V. Lytle, batch plant; Harry E. Smith and Everett J. Woodhead, electrician. Rex P. O'Brien is master mechanic; Clarence R. Cline is assistant, and Paul

G. Edwards is tunnel master mechanic. Tunnel walkers are Carl Cochran, Daniel N. Daggs, Oscar Peterson, Russell O. Ray with Mila A. Roych on the night shift.

D. M. Drugan is office manager. F. A. Bader is chief accountant. A. W. Conger, paymaster; Richard Enos, purchasing agent. William M. Burbridge is safety supervisor, and Philip C. Chapman, camp manager. Alan W. Fraser is labor coordinator and Howell H. Virgo is fire patrol supervisor. Safety engineer is a fellow called "Mark."

Don Baker is superintending a job in Montezuma County, Colo., for Northwestern Engineering Co. This contract covers grading, stabilization, structures, and plant-mixed asphaltic surfacing, total length being 5,083 mi. Located on State Highway 10, east of Cortez, bid price was \$287,699. Burt Wisdom is field accountant. Grading foreman is Bernard A. Leo. Under way since April 1, work is expected to be completed by the end of July.

AED Annual Meeting

Region 11 of the Associated Equipment Distributors will hold its annual meeting at The Ahwahnee in Yosemite National Park, Sept. 21-22. In order to secure adequate accommodations, make reservations as soon as possible through Beal Shaw, Director of Region 11, 5100 Anaheim-Telegraph Road, Los Angeles, Calif.

PAVING PROFITS UP ... All "Specs" Met!

Heltzel engineers have come up with a line of Batchmaster Plants specifically designed to meet the exacting demands of today's paving schedules and specifications.

They're extra big and extremely portable, with more room for truck access. But, what will interest paving contractors most, is the operating mechanisms of these plants. Heltzel's New Gravity Vane Cement Charger is unmatched in speed and accuracy, far and away the industry's finest. And new improved split and twin batchers assure users a more profitable aggregate operation.

The greater accuracy possible with these Batchmaster Plants means far less material waste, and closer conformance to specifications. The extra speed means that batch trucks spend less time loading and make more trips per day.

Before you buy batching equipment, be sure you have all the data on these new Paving Batchmasters. Contact the distributor below or write direct.

HELTZEL

Batchmaster

BATCHING PLANTS

THE HELTZEL STEEL FORM AND IRON CO., WARREN, OHIO



9949



Heltzel's Type 200 Portable Aggregate Paving Plant.

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Los Angeles.....Garlinghouse, Fremont & Co.
San Francisco.....Coast Equipment Co.

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NEW MEXICO

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& Supply Co.

El Paso, Tex.....Francis Wagner Co.

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Phoenix.....Equipment Sales Co.

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Salt Lake City.....The Lang Co.



The Amazing New Heltzel E-3 Portable Cement Plant.

WYOMING

Cheyenne Kremi Tractor & Equipment Co.
Salt Lake City, Utah.....The Lang Co.

MONTANA

Butte.....Hall-Perry Machinery Co.
Billings.....Hall-Perry Machinery Co.
Great Falls.....Hall-Perry Machinery Co.
Missoula.....Hall-Perry Machinery Co.

Brownlee and Oxbow Dams

Work is gaining momentum each day on the hydroelectric development on the Snake River in Idaho where Morrison-Knudsen Co., Inc. is currently building two dams in the Hells Canyon area for the Idaho Power Co. The first, Brownlee Dam (\$63,000,000) is 8 mi. north of Robinette, Ore.-Idaho. The second, Oxbow, is 13 mi. below and is being constructed at a contract price of \$22,000,000. Construction at both sites is under the same organization, with Glenn C. Johnson as resident manager, and Martin E. Broan, construction manager.

The following are some pertinent facts about Brownlee as reported by Russ Martin, project engineer for the entire M-K project. **Dam:** length at crest 1,330 ft., height above bedrock 395 ft., total cubic yards 5,390,000. **Powerhouse:** 4 S. Morgan Smith turbines, 142,000 hp.; 4 Westinghouse generators, 100,100 kva. **Concrete:** approximately 185,000 cu. yd. **Penstocks:** 4 steel lined, 540 ft. each. **Diversion tunnel:** 38 ft., standard horseshoe, 2,555 ft. long. **Permanent access bridge:** 600 ft. long, designed load 187 tons. **Huntington railroad bridge** (U.P. main line): length 600 ft., miles relocation 8.5. **Reservoir length:** 57 mi. **Camp:** Total capacity 315 men, with messhall accommodations for 260. **Trailer camp:** 136 units, with enlargement now planned. **Excavation:** intake, 1,352,000 cu. yd.; powerhouse and tailrace, 1,018,000 cu. yd.; and spillway, 1,409,000 cu. yd.

Following is list of M-K supervisory personnel on both Brownlee and Oxbow under the direction of the three men already mentioned: Carl E. Tappan, consulting engineer; Edward L. McLean, office engineer; David C. Tolles, field engineer; Joe Jordan and Floyd Hatcher, cost engineers; and Carl Pharris, party chief. Clifford T. McBride, office manager; Paul Araquistain, chief accountant; Norman Falk, equipment accountant; Gene Gardner, cost accountant; James Armistead, chef; William L. Baker, purchasing agent; Evert L. Fuller, warehouse manager; Art Serene, paymaster; Ken Simpson, camp manager; Harold Thornock, labor coordinator; Reau Gibson, safety engineer.

Superintendents: William Allen, diamond drill; Frank J. "Sam" Barta, master mechanic; R. C. Bassette, bridge; John E. Bolin, structural steel; Clancy C. Brownner, tunnel; John N. Carter, pipe; Stuart F. Compton, tire shop; Gaylord A. Coonse, lube foreman; William E. Hardin, shop foreman; Alden L. McGuire, tunnel shifter; Roy J. Rasmussen, electrical; Leo P. Ruffing,



Johnson

Broan

Coonse

Barta



McLean

Jordan

Toles

Martin Hatcher

Pharris



Candeaux

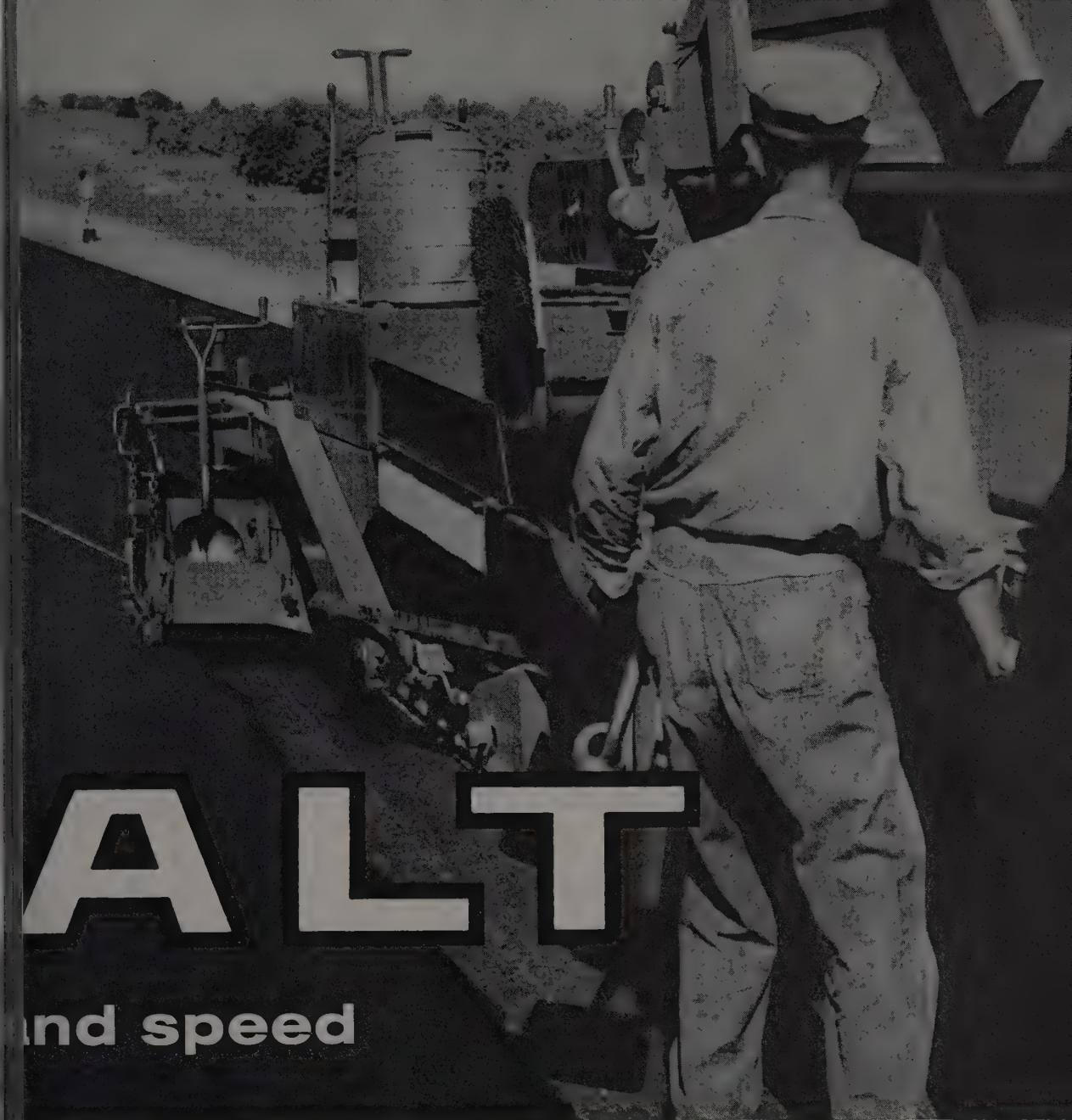
Allen

Swan

Harrison R. Thomas Caster

Connor and Howard A. Nickels, labor; Raymond Quinn, tractor; Edgar C. Bryan, reinforcing steel; Charles B. Whiting, plumber; Jim Harrison, Walt Caster, Harry Lentz, D. R. "Whitey" Candeaux, carpenter.

Idaho Power Co.'s chief personnel are Fred R. McCormick, project engineer; Gomez H. Condit, resident engineer; Clifford E. Bissell, chief surveyor; Carl Lewis, detail engineer; Russell Stewart, chief inspector; Wesley A. Kluckholm, project



Asphalt

and speed

In 1955, work was under way on the 88.5-mile Northeast extension.

Modern, heavy-duty asphalt construction like this is proved ideal for turnpikes and primary roads. People like driving on asphalt "ribbons of velvet smoothness". Taxpayers like its low costs. You'll like its design versatility, its speed and ease of construction, its rugged durability. Often, local aggregate can be used.

Modern highway design calls for Asphalt pavement. It's rugged, durable, smooth, safe and economical. Make your next design asphalt.

Ribbons of velvet smoothness



THE ASPHALT INSTITUTE

Asphalt Institute Building, College Park, Maryland

MODERN **ASPHALT** HIGHW



Bassette

Thomas



Hardin

Campion



Leedy

De Morgan

accountant, and Rodney Wallgren, field accountant.

Contract got under way last November 9; some work is being performed at both sites, with completion date planned for late 1958.

MAJOR EQUIPMENT AT BROWNLEE-OXBOW

- 16 Ford and Chevrolet pick-ups
- 2 Dodge power wagons
- 1 IH boom truck
- 1 Chevrolet 4-yd. dump
- 4 Chevrolet flatbed trucks
- 2 White tandem dumps
- 1 grease truck
- 1 fuel truck, 1 water truck
- 2 Kenworth flat bed trucks, 10-ton
- 2 Transport trucks
- 2 White transit-mix with Rex mixers
- 21 Euclid 17-yd. end dump trucks
- 8 Euclid 17-yd. bottom dump (17 cu. yd. bottom)
- 1 Noble 150-yd. batch plant
- 3 Ingersoll-Rand 1200 CFM compressors
- 8 Ingersoll-Rand 600 CFM compressors
- 1 Ingersoll-Rand 210 CFM compressor
- 1 Rex electric Pumpcrete machine
- 4 Joy core drills, Model 22
- 2 Gardner-Denver track drills
- 2 Chicago Pneumatic track drills
- 6 Ingersoll-Rand Trac drills
- 1 800 electric shovel (used underground)
- 1 Jumbo with 14 hydraulic drifters
- 1 Williams mucking machine
- 1 Bucyrus-Erie 22B 3/4-yd. shovel
- 1 Bucyrus-Erie 54B 2 1/2-yd. shovel
- 2 Bucyrus-Erie 71B 3 1/2-yd. shovel
- 2 P&H truck cranes
- 2 P&H 1055 3 1/2-yd. shovel
- 1 Manitowoc 4500 dragline
- 2 Caterpillar No. 12 patrols
- 10 Caterpillar D-8 tractors
- 2 IH TD-14 with monitors
- 19 portable welders
- 23 pumps, 1 to 20 in. in size
- 2 McKiernan-Terry pile hammers, 10B, 9B3
- 1 lot of carpenter shop equipment
- 1 lot of machine shop equipment
- 1 ambulance
- 5 automobiles
- 1 school bus
- 2 suburbs

TO COME:

- 5 25-cu.yd. aggregate trucks
- 2 bulk-cement haul trucks
- 1 Manitowoc 4500
- 1 P&H 1055 3 1/2-yd. shovel

* * *

Robert H. Tyree, well known master diesel mechanic, has left the construction field and is now located at the Strawberry Garage, doing diesel work in the Tri-Dam area at Strawberry, Calif.

C. T. Morton, president of Duncanson-Harrelson Co., is acting as project manager on a bridge nearing completion at Richardson Bay, Marin County, for the California State Division of Public Works. **G. W. "Buck" Fink** is general superintendent, and **R. F. Dashiell** is assistant superintendent on the \$3,017,000 project, contract for which is held by the joint venture firm of Duncanson-Harrelson Co. and Pacific Bridge Co.

Bill Milot is engineer on this job. **Tracy Morton** is timekeeper. Carpenter superintendent is **E. E. "Curly" Lewis**; labor superintendent, **Glen Hodgson**. Foremen are: **C. E. Burgstahler**, pilerunner; **Bob Abbott** and **Walt Bluhm**, carpenter; **Clarence Pearce** and **George Keeran**, falsework; **Tom Woodbull**, equipment; **Harry Nyberg**, labor.

Reinforcing steel is subcontracted to **Ryerson Steel-Rutherford & Skoubye**. "Buck" Sawyer is placing foreman.

This construction started in September 1954 and completion date is set for October this year. **Wayne McAuley** is resident engineer for the State.

* * *

R. C. "Dick" Wise and **Jim Andrade** are superintendents for the combination firm of **Edward Keeble-Dan Caputo** which is handling a \$2,000,000 contract from the California Division of Highways for construction of an overpass involving 2 1/2 mi. of grading and paving at Mill Valley. **L. L. Waters** is office manager. **Fred Card** is master mechanic. **R. E. Woods** is grade foreman, and **H. Johnson** is carpenter foreman. Work has been going on here since August last year and is expected to be finished in January 1957.

* * *

Lee Clements is superintending Tom Lillebo's recent award for grading, paving, and viaduct over Southern Pacific R. R. switch yard on Sixth St.—Klamath Falls—Lakeview highway in Oregon. **Bill Vian** is general foreman. Grading is subcontracted to **F. L. Somers**. Asphalt Paving Co. has the paving and utilities, with **Ray Burns**, supervising. Electrical work is subcontracted to **Steek Electric Co.** This approximately \$900,000 contract got under way in February and will probably end October 1957.

Herb Lewis, project manager, and **Ralph Rasmussen**, general superintendent, assisted by **Bob Vickers**, are directing the work of **M. R. Fisher** on this contractor's \$500,800 award from the City of Beverly Hills, Calif. for construction of **Sunset reservoir**. Foremen on the job, which started in February with completion scheduled for September, are **M. Quintan**, labor, and **Otto Schneider**, iron worker.

* * *

C. E. Larson, project manager, **C. E. Ackers**, general superintendent, and **J. H. Cacan**, job superintendent, are **P. S. Walker**'s key men on the erection of an office building in Los Angeles for **Gershon-Scott Corp.** **V. P. Arrow**, office manager, is another key man. Other important men are **Jack Huey**, general carpenter foreman, and **C. Gauthey**, general labor foreman. **Resteel** is by **Meehleis** and structural by **Bethlehem-Pacific**. **F. B. Gardner** has the heating and ventilation, with **Harold Craps** foreman. This \$1,800,000 construction was started in August 1955 and the Walker contracting company expects to have the building finished in November.

* * *

Jack Stanton is project manager for **Gust K. Newberg Construction Co.** on construction of the nearly \$20,000,000 Los Angeles County Courthouse, on which **Charles A. McMahon** is superintendent. **W. L. Neal** is assistant superintendent of this structural steel, fireproof building, work on which got under way in October and is expected to be finished about mid-1957. Other key contractor men are **Karl Bradley**, **Elmer Jensen**, and **Harold Carlson**.

* * *

George Borovich is superintendent of a \$369,953 job for **Thomas Construction Co.** at Auburn, Calif. Other key men on this work which covers three bridges and approaches are **Frederick Hunsaker**, concrete superintendent, **Chris Kinzel**, master mechanic, and **Carl Harmeling**, grading superintendent. Construction started in February and will be finished about October.

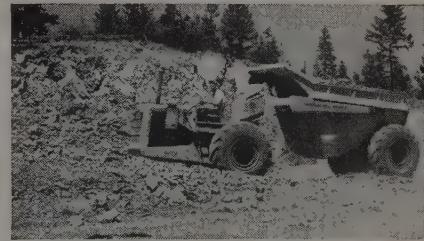
* * *

Tom Moran, project manager, and **Stuart Allen**, general superintendent, are top men for the **Bechtel Corporation** which is constructing the **Associa-**



D Tournapull Rear-Dump's ability to turn around in only 24'8" enables it to spot fast in tight quarters. With 10 to 11 passes of $\frac{3}{4}$ -yard shovel, unit loads 8 pay yards in about 3 minutes. Big 10'11" x 5'10 1/2" bowl opening, with low rear entry, makes loading easy.

Hauling from pit to crusher, "D's" average 900' distance in $1\frac{1}{2}$ minutes... returning in about 55 seconds. Units' 4-wheel multiple-disc air-brakes assure positive control at all times... give operators complete confidence on winding roads and steep grades.



Better than trucks where going is tough"

says Superintendent R. E. Merritt of Oregon's Jackson County

speed delivery of rock from quarry crusher, Jackson County Highway Dept. teamed up 2 D Rear-Dumps to handle all crusher requirements.

the job the "D's" encountered tight corners, rough quarry terrain underfooting, and adverse grades on haul roads. Unit's speed and maneuverability, plus ease in spotting in restricted places, helped keep crusher supplied with rock at all times.

1800' cycle in $9\frac{3}{4}$ minutes

en pictures were taken, the 11-ton "D's" had already moved 28,000 yards of rock to the crusher. Time studies showed that each "D" was averaging 8 pay yds. per load... 1800' cycles were completed in about $9\frac{3}{4}$ minutes, including 3.65 min. to load and a 3.95 minute waiting time.

"Work in closer quarters"

Comparing the operation of the Rear-Dumps to trucks, Supt. Ralph E. Merritt

said, "The D Rear-Dumps are a lot better than trucks where the going is tough." Operator Floyd Sherman added, "D's can get around in a lot closer quarters, too."

Safer than trucks

Besides being faster and more maneuverable than ordinary trucks on rough roads, D Rear-Dumps are also safer when dumping loads. Front-wheel-drive on "D's" keeps power and traction on solid footing well ahead of rear wheels. Because body does not need to clear frame, springs, axle, or differential, its center of gravity stays low, even during dumping. Over-size multi-disc air brakes—with more braking surface on one wheel than comparable-size trucks have on all four—prevent creeping or rolling, especially when dumping.

If you have a tough hauling job... better check D Rear-Dump's advantages for yourself. See how the 11-ton "D", 22-ton "C" or new 35-ton "B" can help you.

Tournapull—Trademark Reg. U.S. Pat. Off. DR-903-P-B



At crusher, "D" dumps 8-pay-yard load in 20 seconds. Operator Floyd Sherman said, "You can get around in a lot closer quarters with 'D's' than you can with a truck." He added, "These D Rear-Dumps are not as hard on the operator as many other types of haulers."

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company





Hill

Medrid

Achomson

Wellson

ciated Oil Co. refinery at Avon, Calif. Superintendents are **George Wilcox**, **Bill Landauer** and "Babe" Carter; assistants, Bob Roller, Bill Gould, Doug Nye, W. Pierce, and on piping, Barney Christman. **H. H. McCaffery** is rigger superintendent. General foremen are: "Blackie" Wittset, ironworker; Bill Roark, pipefitter; Wayne Lemoine, boilermaker; Al Barber, laborer. Jim Newcombe is painter foreman.

* * *

Claud Emerson, superintendent, is in charge of a \$113,759 contract for grading and paving 10.3 mi. of State Highway 82 in Pitkin County, Colo., recently awarded to Blanchard Construction Co., which expected to start work about mid-June, and finish in early July. Plant-mix superintendent is Oscar Shehorn. Dick Simmons and Lee Wheeler are foremen.

* * *

Harry Varischetti is superintendent for Isbell Construction Co. a recent award for grading and surfacing 3.9 mi. in Washoe County, Nev. Assisting as foremen on this \$552,932 contract are **George Conley**, grading, and **Don Collins**, labor. Work started in March, with the concluding date set for August.

* * *

Melvin A. Johnson, grading superintendent, and **W. Jay Grant**, gravel superintendent, are in charge of work on the recent \$80,758 award to Grant Construction Co. for grading and surfacing in Franklin County, Wash.

* * *

Raymond Burns, superintendent for Gardner Construction Co., heads the job personnel on three concrete bridges, grading, and road-mix asphalt surfacing under construction between Julesburg and Holyoke, Colo. Other men on this \$312,645 job, which will be finished about September, are **Harold Wilson**, piling foreman, and **Rex Wyatt** and **Walter Reid**, shovel and dozer operator respectively.

John V. Leone is superintending Domenic Leone Construction Co.'s \$1,026,762 award for 12.7 mi. of grading, surfacing, and structures on highway from Colorado Springs south, in El Paso County, Colo. Key foremen are **George J. Gahm**, grading; **Joe Bubnic**, structures; **Alex Eccher**, pipes. Starting date was last December.

* * *

Willis A. Smith is Fisher Contracting Co.'s superintendent on 9 1/4 mi. of grading and draining, placing select material aggregate base and bituminous plant-mix on a \$488,873 project on the Tucson-Benson highway. **Eugene Pierce** is field office manager. **Jesse James** is equipment serviceman.

* * *

Kenneth Mann, superintendent, with the assistance of **W. W. Scott** and **J. W. Mihooner**, foremen, is in charge of a \$287,943 award to Peter Kiewit Sons' Co. for 3.8 mi. of grading, surfacing, and structures in Arapahoe County, Colo. **J. M. Verant** is office manager for this project.

* * *

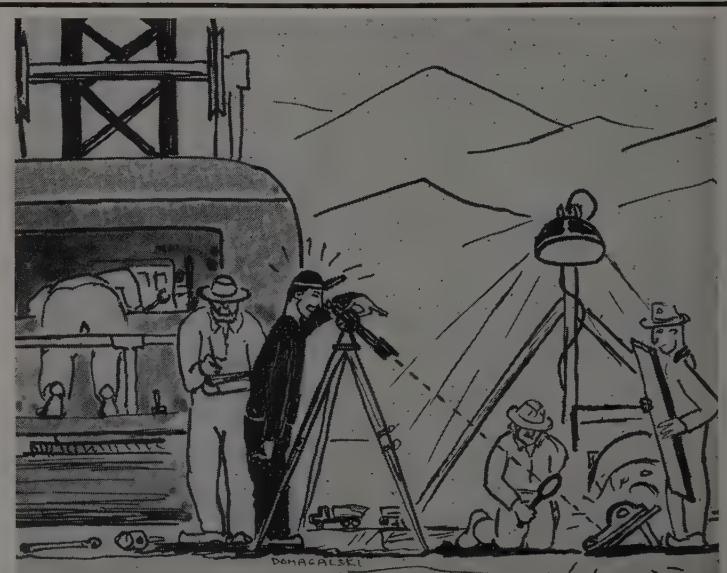
K. N. Baird, grading superintendent, and **D. A. Wagner**, surfacing superintendent, are top supervisors on a \$424,640 job for Woodward Construction Co. in Wyoming. Work consists of grading, draining, graveling, and plant-mix construction of 14.7 mi. on the Rock Springs-Hiawatha road in Sweetwater County.

* * *

Earl Jordan, superintendent for J. W. Jones Construction Co., is supervising a \$309,837 contract for 10 mi. of grading, surfacing, and structures southwest of Dulce, Rio Arriba County, N. Mex.

Down-time

By Domagalski



"Part number E79-PD-731 . . ."

Western Construction



Four-wheel drive, and tires 2' wide, give Tournatractor ample traction to make full use of its 208 hp.



Root-Rakes

Here's what high-speed in rubber can do for you

Tournatractor, with 17 mph forward speed and 8 mph reverse speed, can do many tractor jobs twice as fast as a crawler-tractor.

Drives anywhere

cause of its big low-pressure tires, Tournatractor drives anywhere under its own power. Job-to-job moves can be made across pavement, over curbs, sidewalks, and road tracks. On long moves it saves time, bother, and expense of using a trailer, moving in extra power and transport equipment, loading and unloading.

Reduces maintenance

Tournatractor greatly reduces maintenance and service costs by eliminating some 500 wearing parts that bind through dirt in a crawler-track assembly. Eliminated also is friction caused by grit-grinding the track assembly which reduces rated horsepower.

Easy to operate

In simple, easy-to-handle, power controls, and comfortable, adjustable, foam-rubber seat, operator on

Tournatractor works comfortably, with less fatigue, maneuvers faster, gets more work done, in less time, with less effort.

High-speed performance

Constant-mesh transmission eliminates delays in changing gears... saves vital momentum... gives any gear-ratio instantly. As a pusher or dozer, Tournatractor high-speed reverse (up to 8 mph) is a very important time saver.

Versatility helps get more work done

Wide range of attachments increase Tournatractor range of applications, extend length of work season. Since Tournatractor is a "traveling man", these optional attachments are especially important in finding profitable jobs in a wide range of big or small industries and in any climate or area selected.

- a. Equipped with Bulldozer or Angledozer blade, Tournatractor push-loads scrapers, moves short-haul dirt, cleans up at shovel, loads and spreads on dump, digs drainage ditches, maintains haul roads, clears land, terraces, digs

stock piles, grades roads. Does all these jobs fast.

- b. Root-Rake makes 208 hp Tournatractor a powerful tool for clearing brush, grubbing roots, raking out boulders, etc. The 11'4" wide x 4'6" high rake has 10 teeth of 4" high-grade steel, to resist shock, do heavy work.
- c. Tree-pusher attached to Tournatractor, reaches high on tree with 32' forked boom, provides extra leverage to push trees down fast. Boom angle creates down-pressure on tires, increases traction, helps remove more trees in less time.
- d. Tournatractor with drawbar attachments does wide variety of chores—keeps working at 100% availability. Pulls scrapers, sheepfoot rollers, rooters, and other drawn equipment.

Ask for owner-verified job reports on work similar to yours.

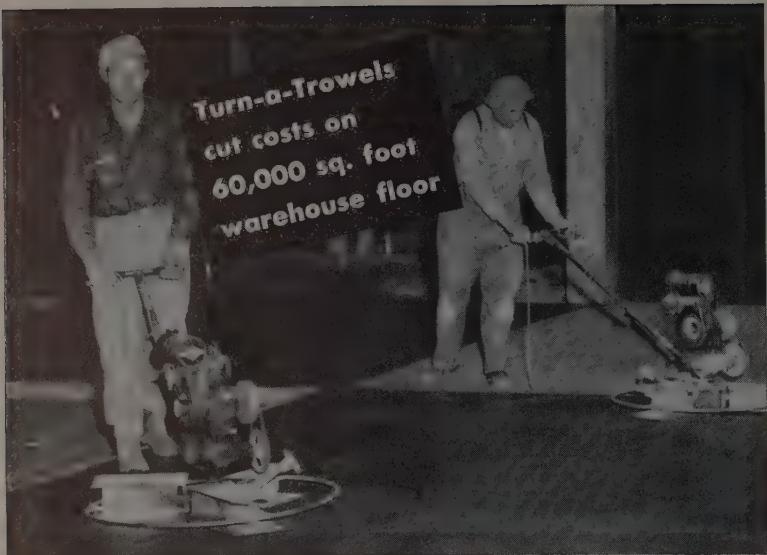


Tree-pusher

Tournatractor, Angledozer, Rooter—
Trademark Reg. U.S. Pat. Off. T-954-G-bw

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



"...they 'Mastered' the situation".

"Our Master Turn-a-Trowels knock down every hump on the floor slab." "I've used others that ride right over the uneven spots."

Contractors can make those statements because the Turn-a-Trowel has rigid—not flexible—blades. Bumps in the floor *have* to come off, so Master-finished floors are flat.

And, because Master blades *adjust* for either floating or finishing, they stay right on the machine. You can't lose or mislay them.

The Master Turn-a-Trowel is a rugged, powerful, top-quality piece of equipment that will help you finish concrete better, quicker and cheaper. Write for information on 34" and 48" models or see your Master distributor for a free demonstration.



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AC or DC gas, diesel; natural gas engines; $\frac{1}{2}$ KW to 12.5 KW; portable mountings. Also continuous duty plants up to 20 KW. Floodlights.



Concrete Vibrator. 9,000 rpm vibration, yet lightweight; rugged, gives long service; gas and elec.; wheel mounting available; accessory tools; $1\frac{1}{2}$ to 6 hp power units.



Midget Trowel. New Light-weight, one man carries; gets into tight spots; only 24" across yet does top trowel job 6 times as fast as by hand. 70 lbs.; 1.6 hp engine.



Portable Space Heater. Clean, instant, odorless heat blown where you want it, rugged, long-lasting, trouble-free; uses kerosene or fuel oil; 160,000 to 400,000 BTU.

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SHRIVER MACHINERY COMPANY.....	Phoenix, Arizona
SIERRA MACHINERY COMPANY.....	Reno, Nevada
WORTHAM MACHINERY COMPANY.....	Casper, Cheyenne, Newcastle, Riverton, Rock Springs, and Sheridan, Wyoming

C. N. Glass, district superintendent for T. F. Scholes, Inc., and **V. O. Purvis, Jr.**, project manager, are top men on this contractor's \$2,373,568 award at the U. S. Air Force Academy, Colorado Springs, Colo. Work covers grading at cadet-academic area, parade and drill field facilities, and miscellaneous work. Contractor started work in April and expects to be finished by the end of the year.

* * *

Larry Mahan is superintending Birch & Sons Construction Co.'s \$520,853 award for 9.4 of grading and graveling in Big Horn County, Wyo. Other key men on this job are **Ed Kivinen** and **Jim White**, foremen; **Austin Tayer**, mechanic, **John Nykalayou**, serviceman, and **Arnold Eidam**, timekeeper. Work started in April and will probably end about October.

* * *

Raymond Blanchard, general superintendent, and **James Guilford**, superintendent, head the list of job personnel working for Northwestern Engineering Co. on a \$418,668 job in La Plata County, Colo. Construction consists of grading, stabilization, structures and plant-mix asphaltic surfacing on a total length of 3.701 mi., located on State Highway 10, south of Durango. Field accountant is **Marvin L. Jensen**. **Samuel Samuelson** is grading foreman.

* * *

Under the direction of **W. N. Evans**, project manager, **E. E. Snyder**, general superintendent, and **J. B. Gibson**, job engineer, the following are key men on Arundel Corp.-L. E. Dixon Co.'s \$8,500,000 contract from the Oakdale and South San Joaquin Irrigation Districts for construction of Tulloch Dam near Knights Ferry, Calif., third unit of the Tri-Dam Project. **G. A. Henningsgard**, office manager; **H. L. Schmidtgall**, assistant. Also superintendents, **H. A. Hoover**, electrician; **Jim Morris**, carpenter; **Bill Jones**, rigger; **E. F. "Swede" Edner**, excavation Master mechanic **B. A. "Bud" Riggle**, and **J. M. Henningsgard**, warehouseman. Excavation foreman **Reuben Miller**; drill foremen **Pete Ciucci**, **Mike Evanov** and **Harry Remlinger**; labor foreman **Ray Perrenoud**. First-aid man **D. T. Adkins**; timekeeper **T. H. Keyes**; clerical aides **H. L. Snyder** and **Catherine Doig**. This contract got under way last December and will probably end by March 1958.

* * *

Joe Haak is superintending grading, fencing, and surfacing, and **H. C. Strohm** is superintending pipe culvert and snow fence construction on Platte Valley Construction Co.'s \$433,276 contract on 10.8 mi. of Sheridan-Ulm road, Wyo. Other important men on this job are **Dean Greenfield** and **Don Skinner**, grading foremen. Job got under way the first of May and will run 150 working days.



GO-power makes the difference

Watch the smoothness of a modern Adams motor grader at work in ditch, bank or surface cut. See how easily it picks up the load, how steady it blades at any work speed. Take the wheel, drive it as you would your automobile... through city streets, to 25 mph... in reverse to 13 mph. Stand or sit at the controls, notice how clearly you can see grade and load on the blade. With convenient and positive-working power-controls you raise, lower, revolve, or extend the blade to any desired position.

Look how heavy, box-construction, one-piece frame of this husky grader is built to resist shock and stresses. Grader weight is distributed to make use of full power in all gears. Big, powerful engine starts easily in any temperature; develops power-to-spare, with lugging ability to move heavy loads in tough going. Note how constant-mesh transmission gives smooth progression of speed through all gears... no gear to clash.

8 Forward Speeds (up to 25 mph)

There is a speed for every grading operation. You get work done fast, and save time moving job-to-job. Three additional "creeper speeds"

(.23 to 1.82 mph) are optional. They make it easy to rip hard-packed roads and old asphalt, take out unseen roots and stones without severe shocks. Important also for accurate finishing in tight places. *No other grader offers this wide range of operating speeds.*

4 Reverse Speeds (up to 13 mph)

Wide range of reverse speeds saves time on shuttle-grading and mixing, backing out of tight quarters.

Double-Action Hydraulic Brakes. Service brake applies braking action to transmission as well as wheels; quick, safe stops are assured, with less pedal effort.

Rubber-Mounted Engine Vibration is not transmitted to grader to annoy and fatigue operator. Means more accurate grading, better end-of-day work efficiency.

See ADAMS before you buy

Judge your next motor grader on the basis of *performance*. Ask your LeTourneau-Westinghouse Distributor to show you a modern Adams grader at work. Find out for yourself why Adams graders do *more work, in less time, at lowest cost*. GO-power makes the difference!

A size ADAMS for every need

Model 660

—150 hp Diesel Engine, 27,730 lbs.

Model 550

—123 hp Diesel Engine, 23,500 lbs.

Model 440

—104 hp Diesel Engine, 21,500 lbs.

Model 330

—80 hp Diesel Engine, 20,500 lbs.

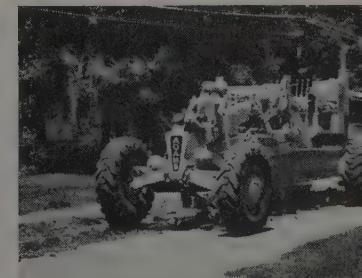
Model 220

—60 hp Diesel Engine, 14,865 lbs.

TraveLoader—A high-speed, heavy-duty, self-propelled, belt-type loader for loading materials into trucks from windrows or stockpiles.



With dozer blade (optional) Adams grader roots out brush, pushes debris off right-of-way, backfills around culverts, etc.



Rugged scarifier (optional) rips up gravel, crushed stone, blacktop, sheet asphalt road and street surfaces. Has longer-wearing replaceable points.

AG-2-G-B

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

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SHOWN HERE are a few of the men in the employ of Atkinson-Ostrander, working at The Dalles Project in Oregon: Joe Canto, excavation superintendent; D. M. "Blackie"

Costner, excavation foreman; C. C. Stanford, another excavation foreman; Charles Mason, rigger superintendent, and William Bobo, rigger foreman.

Completion contracts on three large Western dams are in the hands of contractor Gunther & Shirley-Lane: Chief Joseph in Washington; The Dalles in Oregon, and Palisades in Idaho. G&S-L's project manager on the \$3,400,000 contract from the Corps of Engineers at Chief Joe is Forrest F. Risken. Maurice F. Risken is general superintendent, with Herb Schroeder as general foreman. This contract is expected to end December 1958. At the \$3,200,000 C. of E. contract at The Dalles, George Rienhardt is general foreman, and Jack Johnson, rigger superintendent under Forrest Risken. Work here is scheduled for completion by the end

of 1960. At the Bureau of Reclamation dam at Palisades, Forrest Risken is also project manager, with Perry Burksdale, general superintendent on this \$700,000 contract, also scheduled to end in December 1958.

* * *

Walter Petersen, general superintendent for Manson Construction & Engineering Co., is in charge of work on the \$1,900,000 award to this contractor for bridge piers at the Morrison Street Bridge, Portland, Ore. Superintending the job is Clyde Sherman. Bill Booth is engineer. Other key contractor men working on this county job are pile-driver foremen Sam Allen, Richard Cole,

Lee Mattson and Ray House.

* * *

H. O. Montag is acting as project manager, and C. C. Montag as general superintendent for the \$12,000,000 contract awarded by the Corps of Engineers to the combination firm of Montag-Halvorson-Cascade-Austin for construction at The Dalles Project 3 mi. upstream from The Dalles, Ore. Assistant project manager is C. V. Jonasson; assistant superintendent, Daryl Mason. Harold Johnson is project engineer, and C. J. Allen is office engineer. Superintendents are R. W. Austin, concrete; Howard Fosnot and Wes Mays, carpenter; Lou Mace, labor.

WE'LL BET YOU'LL LIKE THIS PAVER... BECAUSE



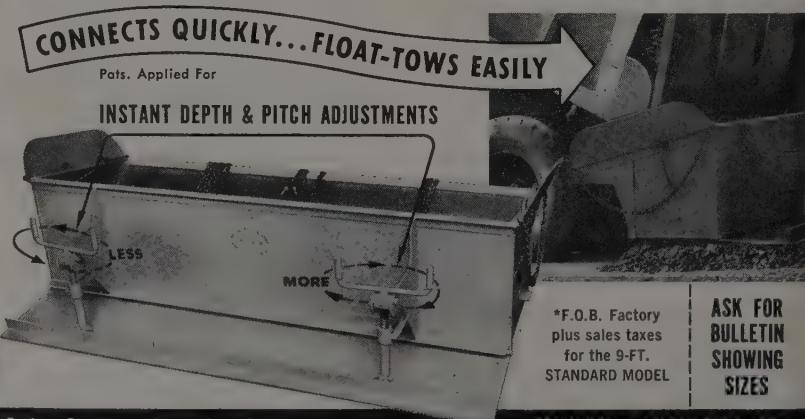
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403 Oak Lane, Baltimore, Maryland

How wide range of work keeps high-speed loader busy all year 'round



Here is a heavy-duty, self-propelled, belt-type loader having a wide range of applications for highway construction. It loads easily any type of loose material out of windrows or stockpiles. In addition to high-loading capacity, it gets around fast from job-to-job.

Use Adams TraveLoader for picking up surplus material on road and street construction or reconstruction. Use it for loading materials out of borrow pits and stockpiles. TraveLoader works fast in dirt, sod, sand, gravel, crushed stone, slag, and cinders. It loads topsoil for landscaping with no prior preparation.

How it works

TraveLoader loads in any one of a wide range of 5 working speeds from 0.29 to 1.9; has 5 travel speeds from 3.90 to 26.7. The floating, revolving, screw-type feeder automatically adapts its speed to the load ahead and places a continuous flow of material on the conveyor-belt. Trucks can be loaded with loose materials at up to 10 yards per minute. Travel speed range makes it easy to keep TraveLoader working to capacity. Trucks load behind loader, do not interfere with passing traffic. Moves job-to-job over highways and city streets at speeds to 26.7 mph.

Heavy, durable construction

All-welded, box-construction, one-piece frame extends full length of

machine. Heavy-duty front and rear axles, sturdy feeder mechanism, rigid conveyor with sealed-for-life roller bearings, give TraveLoader the necessary strength to handle heavy loads at fast speeds with minimum downtime and maintenance. Available with gasoline or diesel engines.

Easy to operate

You will like TraveLoader's centrally-located control station...up out of the dust, permitting clear vision in all directions. Easy, fast, hydraulic controls, give quick adaptability to any working condition.

Get all the facts on the Adams TraveLoader from your LeTourneau-Westinghouse Distributor.

On this road-widening job, surplus materials are loaded from windrow into truck in a matter of seconds. No traffic interference.



Side-shiftable cross conveyor (optional) loads trucks on either side of machine, assures proper balancing of load. A great time-saver in materials yards. Conveyor position power-controlled from operator's cab.



Loading crushed stone at truck-a-minute rate from stockpile. Material is being hauled for sub-base on new highway. TraveLoader handles all loose materials with equal efficiency.



Here a contractor cuts and loads gravel out of a natural bank. Many contractors and highway departments use TraveLoader for loading stockpiled materials of all kinds. AL-5-G-bw

LeTourneau-WESTINGHOUSE Company

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Among the foremen are L. J. Nugent, concrete; J. D. Toothman, J. M. Keels, D. V. Morris, F. F. Jordan, J. E. Dickens and Ed Monette, labor; L. Jolley and W. M. Lofland, shop; O. D. Jones, plant; E. C. Beaty and F. G. Jones, cement mason; H. F. Blattner and H. L. Murphy, ironworker; H. McKee, T. C. Stack, R. S. Howell, T. Leon, Sr., T. J. Peck, J. D. Bryson and H. J. Holt, carpenter.

* * *

Appointment of Herbert C. Ball as general superintendent of Ford J. Twaits Co., Los Angeles contractor,



Herbert C.
Ball

is announced by Carl H. Wittenberg, partner and general manager of the firm. Ball is not new to the Twaits organization. He was in the employ of the company previously from 1934 to 1945 at which time he resigned to form his own company.

* * *

J. C. Hubbard, general superintendent for Etlin E. Peterson Co., expects

to have completed by August 1 a \$367,879 job consisting of 3.3 mi. of grading, surfacing, one bridge, and miscellaneous work on the Moorcroft-Gillette road, Wyoming. Foremen on this job are Clayton E. Peterson, structures, W. N. McMurry, grading, and Lennard Mathiesen, oiling.

Hubbard is supervising several other Peterson contracts in Wyoming. One, on which Strong Company is general contractor, covers two bridges and miscellaneous structures on 20.4 mi. of road, Jackson-Moran, a \$335,450 job on which Joe Baier is structures foreman. This job will finish about Oct. 30. Another is a concrete and steel bridge, Guernsey-Fort Laramie, on which Bert Oakley is foreman; cost \$62,460. The third is a concrete slab span costing \$66,560, Moorcroft-Razet, with C. E. Peterson acting as foreman here also. Book and timekeeping records on all this work are in the hands of Meryl Hubbard.

* * *

John Hogan is superintending Walter C. Groshing's \$140,000 job covering a concrete retaining wall 472 ft. long, 18 ft. high, on the ocean front, Berth 11, Long Beach Harbor, Calif.

* * *

Jesse C. Moore, superintendent; Glen L. Harvey, foreman; George E. Monighan, timekeeper, and B. A.

Rickman, master mechanic, are key men on a highway contract nearing completion by Taggart Construction Co. The work consists of grading, hot plant surfacing and miscellaneous work on 4.9 mi. in Washakie and Hot Springs counties, Wyo. Contract price was \$339,304.

* * *

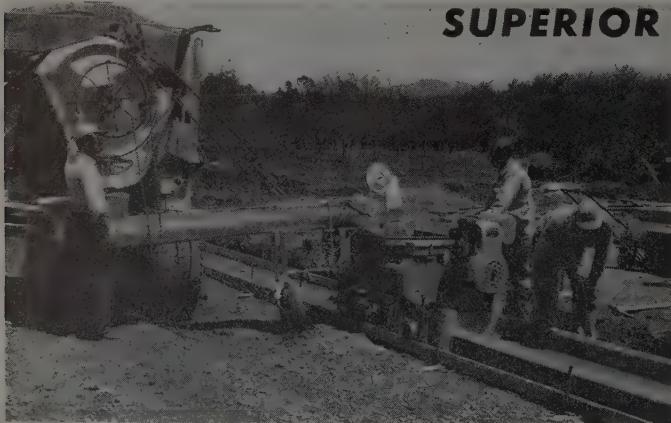
A. L. Acton is superintending the \$342,178 highway job just completing on 5.4 mi. of the Worland-Thermopolis road, Hot Springs County, Wyo. Contractor on the work is Taggart Construction Co. Grade foremen are F. R. Acton and Gail George. Timekeeper is George E. Monighan.

* * *

Bill Stecker is project manager for Stecker & Scott on grading, paving, drainage structure and bridge demolition near San Ardo, Monterey County, Calif., a \$228,344 contract now completing. "Chuck" Bode is superintendent; Jim Little pipe foreman.

* * *

H. P. Graham, head of the Graham Construction Co., and William F. Murphy, official in the same firm, are directing the firm's recent award for the second of a series of jobs on the Pueblo freeways, Colorado. This is a \$388,628 project consisting of 4-lane highway, two overpasses, with connecting roads. Waste from nearby steel mill is being used for construction of the highway.



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NEW LITERATURE

Movalls for dumping and loading

"Movalls or End-Dump Trucks?" is the title of a four-page folder just released by C & D Division, Yuba Manufacturing Co., Perkins, Calif. It compares end-dump trucks and Movalls on eleven points, including spreading on the fly, dumping on grade, dumping over edge of fill, and handling sticky or frozen material, and is illustrated by on-the-job photos. Copies may be obtained by writing the factory, mentioning Western Construction.

Coburn overhead conveying equipment

A bulletin on Coburn overhead conveying equipment has been issued by Wickwire Spencer Division of Colorado Fuel & Iron Corp., 575 Madison Ave., New York. The illustrated bulletin includes such equipment and hardware as chain hoists, monorail carriers, continuous conveyors and types of locks, switches and transfers. For copy, write to Colorado Fuel & Iron or to Coburn Sales and Engineering, 56 Sterling St., Clinton, Mass.

DragScraper catalog

Full details and specifications on DragScraper excavating and conveying machines are provided in a 30-page catalog now available from Sauerman Bros., Inc., Dept. W-6, 620 S. 28th Ave., Bellwood, Ill. Parts 1 and 2 of the catalog cover standard installations from 1/3 to 3 cu. yd. Parts 3 and 4 describe Rapid Shifting DragScrapers in sizes from 1/3 to 5 cu. yd. Part 5 details track cable machines and tower excavators. The publication includes job photos of the machines working in sand and gravel, overburden, chat, and other materials.

Brick-Gunite walls

Combination brick-Gunite walls as applied to lift-slab and other types of construction are covered in a four-page bulletin released by Gunite Contractors Assn., 714 W. Olympic Blvd., Los Angeles 15, Calif. The bulletin shows progress photos of a typical job, with detailed captions and a general discussion of this type of construction. Request Bulletin 127.

Fruehauf trailers for construction field

A four-page brochure covering a complete line of Fruehauf trailers adapted to construction industry needs is now available. The brochure features latest developments in dump

trailers, carry-alls, bulk cement handlers, platform units, pole trailers, and other types, illustrating and describing each unit and its purpose. Copies may be had by addressing the Advertising Dept., **Fruehauf Trailer Co.**, 10940 Harper Ave., Detroit 32, Mich.

H-6 Load-N-Gate tail-gates

Publication of a two-page catalog (Bulletin No. 151) describing Model H-6 series Load-N-Gate tail-gates is announced by Hercules Steel Products Co., Galion, Ohio. The catalog describes 600-lb. capacity electrically powered gates, with description and illustration of construction, operation, and controls. Condensed Specifications shown.

Five Caterpillar publications

Caterpillar Tractor Co., Peoria, Ill., has made available five new releases concerning aspects and applications of selected equipment. "Something Special" is a booklet (No. DE606) dealing with the manufacture of fuel injection equipment with insight into the practices used at the San Leandro, Calif., plant, which produces the equipment. "Let's Talk Tractors" (Form No. 31921) is a booklet which features the D6, D4, and D2 tractors and discussion of such topics as how to multiply the work power of a tractor, prevent down time, cut operating costs, and maintain machinery. It includes a complete list of all attachments available for the three models. "Why Cat Diesels Are Best" (No. 31873) contains seventeen of the most frequent questions about Cat engines, covering economy, insurance rates, engine life, parts and service, ratings, turbochargers, availability for existing equipment, and others. These three publications are also available in Spanish, French, and Portuguese.

"Traxcavator News" is the title of a fold-out introducing the new No. 977 Traxcavator, largest of its class, with 2 1/4-yd. 100-hp. front end loader. The publication, No. 977, explains latest engineering developments and contains complete specifications. Specifications and advantages for the company's No. 8 tractor-mounted ripper, along with explanation of Caterpillar's "live drive," are contained in Form No. 31872. All releases available from manufacturer.

GE low-voltage equipment catalog

A 160-page 1956-57 general catalog of low-voltage electrical distribution equipment and components has been issued by General Electric Co. The

publication provides a single bound reference for products manufactured by the company's Trumbull Components and Distribution Assemblies departments. It provides information for specifying electrical power equipment and components for applications up to 600 volts. The catalog (GEC-1032A) contains photos, descriptions, ratings, list prices, and application information on the following GE product lines: lighting and distribution panelboards, wireways and busways, switchboards, motor control centers, distribution center unit substations, safety switches, open knife switches, molded case circuit breakers, and service entrance equipment. Copy can be obtained by writing Assemblies and Components Sales, **General Electric Co.**, 87 Whiting St., Plainville, Conn.

Teco timber connector

Use of Teco split-ring timber connectors in timber joints of roof trusses and other wood structures is discussed in "Tapered Tightness," a leaflet issued by Timber Engineering Co., 1319 Eighteenth St. N.W., Washington 6, D. C. Timber Engineering is research affiliate of the National Lumber Manufacturers Assoc.

Docks, wharves, piers

De Long jacks and dock construction technique are described in a 20-page illustrated booklet just released. The De Long steel dock can be prefabricated in shipyards where costs are controlled and towed to the installation site as a dock-barge carrying its own installation gear. Booklet also illustrates the company's piers, wharves, and drilling platforms. For copy, write to Mrs. Dorothy Duffy, **De Long Corp.**, 29 Broadway, New York 6.

Concrete handling equipment catalog

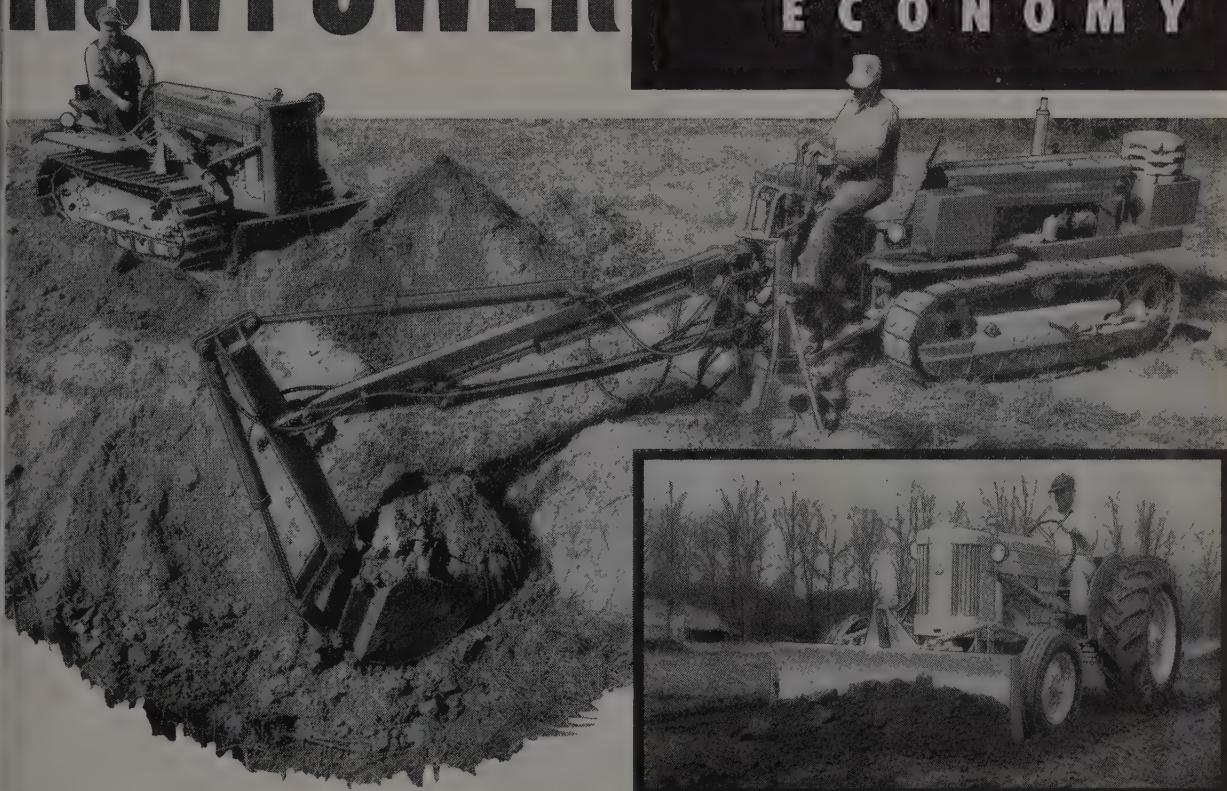
Specifications for more than 300 items of concrete handling equipment are contained in an illustrated 34-page catalog issued by **Gar-Bro Manufacturing Co.**, 2415 E. Washington Blvd., Los Angeles 21, Calif. The catalog, No. 300, features concrete buckets, chutes and hoppers, bucket attachments, powered crane hooks, collection hoppers, carts, wheelbarrows, bins and batchers, bin gates, paving vibrators, splicing rigs, and industrial wheels.

Calcium Chloride for stabilization

A comprehensive guide for dense-graded aggregate construction, Manual SM-1 "Calcium Chloride for Stabilization of Bases and Wearing Courses," has been prepared for highway engineers, contractors and material suppliers. The 40-page illustrated text includes sections on properties, design and construction methods, with specifications for bases and wearing courses. Recommended

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Everywhere... on all types of work... John Deere "40" Series Crawler and Wheel-Type Tractors have been making good with contractors, municipalities, and industrial users.

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Here is the all-around economy—fuel economy... oil economy... maintenance economy that sets new high standards—economy that means real dollars-and-cents savings, more profit each year of the tractor's long life.

Top: HANDYMAN "420" CRAWLER... 25 drawbar h.p. ... 4- and 5-roller sizes... little giant in work capacity. Shown with backhoe, one of its many matching tools.

Above: HANDYMAN "420" UTILITY... the low-built, highly maneuverable wheel-type tractor for all-around work. Three-point hitch regular. Shown with front-end dozer.

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City _____

State _____

use of calcium chloride and advantages of its proper use are explained. Single copies available on request to Calcium Chloride Institute, 909 Ring Bldg., Washington 6, D. C.

Galion truck-mounted telescopic hoists

Publication of a new 4-page catalog describing the Galion line of truck-mounted telescopic hoists is announced by Galion Allsteel Body Co., Galion, Ohio. The two-color catalog (LL-3059) contains complete descriptions, condensed specifications, illustrations, and action photos covering single cylinder and twin cylinder

front mounted hoists. Cutaway illustrations of hoist cylinders and pumps are included, plus description of Model NF series dump bodies.

Instant emergency light

The new Sentry-Lite, designed to provide instant automatic emergency light over large areas if power is interrupted, is described in a folder released by Sentry-Lite & Battery Division of Hobby & Brown Electronic Corp., 55 Front St., Rockville Center, N. Y. Total weight of the unit is 50 lb., including the Sentry-Camel automatic recharge battery which provides 12 hr. of continuous operation

and requires water only once a year. Light is provided by two 5,000-candle power sealed beam lamps. More lamps may be added and choice of flood or spotlights is available.

Thor air tools for construction mining

Thor Power Tool Co., Aurora, Ill., announces a new No. 44 catalog, second edition, listing the company's complete line of mining and contractors' tools. The 68-page two-color book gives addresses of Thor plants in Aurora, Chicago, Los Angeles, Cincinnati and Tynemouth, England, and of the company's 20 sales and service branches. Catalog is thoroughly indexed, three-hole punched. Complete specifications and information are given on a number of tools introduced since the first edition, such as the SW-1 and BW-5 wagon drills, 15 utility hammer, 16M clay digger, and others. Listing of attachments, accessories, replacement parts, and specifications is provided for each of the basic tools and its related models.

Symons cone crushers

Operation and design features of standard and short head type Symons cone crushers are detailed in a 24-page three-color bulletin (No. 247) just published by Nordberg Manufacturing Co., Milwaukee 1, Wis. The Symons crushing process is fully explained and illustrated in cutaway views, as are such features as few moving parts, lubrication system, Nordberg "Stepped Liners." Tables list more than forty different crushing cavities and their respective feed openings, product sizes and capacities. Includes dimensions, horsepower requirement, operating speed and weight of each model.

Atlas Compo Forms catalog

Time and labor saving applications, uses, and features of Atlas Compo Forms for concrete construction are outlined in a 16-page catalog just issued by Irvington Form & Tank Corp., 20 Vesey St., New York. Directions for assembly and removal of forms and typical setups are illustrated in detail. Catalog includes full list of accessories and available form sizes.

Pressure pipe installation

"Transite Ring-Tite Pressure Pipe Installation Guide" is a new 108-page instruction manual for on-the-job use at the trench site just issued by Johns-Manville, 22 E. 40th St., New York 16. The manual is a handy 4 1/4 x 8-in. pocket size with durable cover for long outdoor field service. It contains instructions for every step from receiving pipe at the job to testing finished installations, and includes information on special situations, such as bridge crossings. It incorporates a comprehensive index to subjects and a hundred illustrations.

"My extra-fast, ruggedly built TEALE LOADER sure stands up under tough jobs . . . without 'down'-time,"

says James F. Crone, owner of a TEALE LOADER mounted on a Cat. D-2, who is shown on the job in the Palos Verdes Estates, on the coast west of Los Angeles, Calif.



"There are several reasons why I particularly like my TEALE LOADER," says Mr. Crone. "It's ruggedly built, and stands up under the tough jobs I give it. The bucket's center-mounting gives it additional strength, too. It's the easiest to operate I've ever handled, and also is extra fast. Once I loaded a truck with five buckets (from a stockpile) in just one minute. And it's always ready to go. I don't have any down-time . . . which, with the 'full-bucket' work I always get from my TEALE, makes it a profitable investment!"

and YOU'LL find the TEALE LOADER a PROFIT-MAKER, too!

Whether you're handling hard, dry, packed dirt, rock, gravel or sand . . . whether you're digging basements, grading, leveling or working in quarries, gravel pits . . . you'll find the tough, durable, PROVEN TEALE LOADER is built to take ANY thing a crawler can give it . . . and hand back steady, dependable performance. The finest in hydraulics, sturdy construction, plus removable, zerk-lubricated, alloy steel bushings at all hinge points . . . assure long, dependable, trouble-free operation.

For CLEATED or SMOOTH SHOE . . . LONG or SHORT TRACK CRAWLERS
The Heavy Duty TEALE fits: TD-6, D-2, Oliver A . . . COMPLETE \$1925
TD-9, D-4, or HD-5 . . . COMPLETE \$1990

also made for Oliver B & HD-6!

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Teale & COMPANY

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Phone: Elgin 9-3721

Seattle, Wash. Branch
2411 Sixth Avenue South
Phone: Mutual 0487

Spokane, Wash. Branch
West 1107 Third Avenue
Phone: Madison 9151

Boston Woven Hose construction products

A specially prepared 12-page color catalog for the construction industry listing its construction line of mechanical rubber products has been issued by Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass. Dredging, steam, concrete, fire and water hose, belting, V-belts, packing and tape are among products described. Catalog contains photos and cutaway views of each product plus sections on various types, sizes, diameters available. Request copy from manufacturer, Dept 3391E.

Clarks Welding Works states its business

A catalog of its products and service has been issued by Clarks Welding Works, Perkins, Calif., to answer the question, "What is the nature of our business?" The firm is a steel fabricator, specializing in all types of custom equipment for the construction, logging, and transportation industries and will rebuild, build, or repair all types of heavy duty equipment to suit specifications. The company produces and markets Ruby batch plants and silos, Clark lumber rolls, tire carriers, load binders and diesel mufflers, and is a distributor for Schrock motorized head pulleys, Tulsa winches, power take-offs, power dividers, speed reducers and Vickers hydraulic steering systems. Catalog includes detailed information on all machinery offered.

Buffalo-Springfield 3-wheel rollers

Variable weight 3-wheel rollers in the 10-14 ton and 12-15 ton classes are shown in a new illustrated 12-page Bulletin No. S-72-156 released by Buffalo-Springfield Roller Co., Springfield, Ohio. The two models, VM-31D and VM-32D, feature power roll brakes for the first time on 3-wheel rollers, which are recommended for handling the large variety of materials in fills, subgrades, and unfinished bituminous pavements. Operational and construction features are given in detail. All standard and optional equipment is listed. Data covering dimensions, specification, weights, and compressions of the models are presented in tabular form.

Universal's biggest jaw crusher

A new bulletin (No. 132-561) has been released to introduce Universal Electric's 4448 "WRB" overhead eccentric jaw crusher, believed to be the largest of its type in current market production. Approximate capacities of the unit range from 200-350 tph. at a 4-in. discharge opening to 800-950 tph. at the maximum 12-in. opening. The bulletin highlights such design features as stress-relieved, welded steel base; 102-in. stationary jaws, 115 $\frac{1}{4}$ movable; and spherical self-aligning bearings hy-

draulically removed. Universal Engineering Corp., 625 "C" Ave., N. W., Cedar Rapids, Iowa.

2-way radio for ready-mixed producers

Now available is a 10-page booklet entitled "Increased Profits for Concrete Producers through Complete Control of Ready Mixed Trucks with RCA 2-Way Radio" outlining principal features and benefits of specially designed RCA equipment. The booklet details through case histories ways in which ready mix producers have been able to increase efficiency and describes a 4-point protection program which makes available nationwide service by RCA factory-trained technicians. Copies available on request to R. L. LaTerza, Bldg. 15-1, Radio Corporation of America, Camden 2, N. J.

Blackhawk Trench Hog

Arps Corporation, New Holstein, Wis., has released an 8-sided foldout catalog describing design and performance of the Blackhawk Trench Hog. The two-color publication is liberally illustrated to show job applications and detail components and accessories. Specifications list is included.

Twin Disc power take-offs

Twin Disc Clutch Co., Racine, Wis., has published a comprehensive bulletin (No. 308) on its complete line of friction power take-offs. The new bulletin provides horsepower and torque capacities, side pull limitations and dimensions for all Twin Disc power take-off clutches. Includes latest information on SP Type take-offs, designed especially for high-speed, high-output industrial engines. SP line is currently available in models ranging from 95- to 602-hp. capacity.

West Coast lumber grade stamps

An 8-page booklet entitled "Grade Stamps for West Coast Lumber" has been published by the West Coast Lumber Inspection Bureau, 1410 S. W. Morrison St., Portland 5, Ore., as a guide to reliability and quality for lumber buyers. The booklet interprets official Bureau stamps for Douglas fir, West Coast hemlock, Western red cedar and Sitka spruce—for finish grades, bevel siding, boards and dimension and timbers. The Bureau is an independent branch of the West Coast Lumbermen's Association with inspection and grading service available to any producer, user, distributor, or dealer handling West Coast lumber products.

Lincoln Electric revises "Weldirectory"

Lincoln Electric Co., Cleveland 17, Ohio, has revised its "Weldirectory" for Mild Steel and Low-Alloy High-

EXACTLY THE RIGHT DESIGN
FOR TOP PAYLOAD
IN YOUR STATE!

Tensile Steels" (SB-1351) to include the newest iron powder and other electrodes. The 28-page bulletin incorporates a detailed description of each electrode, its physical properties and chemical composition, recommended welding procedures, and operator's reference table, and a list of typical applications for each electrode.

Truck and Trailer Size and Weight Restrictions

The 1956-57 edition of "Truck and Trailer Size and Weight Restrictions," a handy pocket-size compilation of the road laws of all 48 states and the District of Columbia, is now

available at no charge to common and private carriers. The current booklet, published by Four Wheel Drive Auto Co., is the 25th revision since the company first undertook the compilation in 1933. All regulations quoted have been checked and authenticated by highway or motor vehicle officials for each state. Public Relations Dept., Four Wheel Drive Auto Co., Clintonville, Wis.

Onan Electric plant catalog for 1956

An 8-page three-color catalog describing the complete line of Onan electric generating plants and accessories for 1956 has been released by the manufacturer. The fully illus-

trated catalog lists equipment, size and capacity specification, as well as optional accessories, for every model in the following series: 1-cylinder air-cooled; 2-cylinder air-cooled; 4, 6, and 8-cylinder water cooled and air-cooled diesels. Detailed tabulations enable the reader to select the proper series and model to suit his needs with a minimum of effort. D. W. Onan & Sons, Inc., Minneapolis 14, Minn. Ask for Catalog A-428.

Caterpillar power plants, motor graders

"Cat Electric Sets for Power and Protection" is the title of a 16-page booklet which describes uses for Caterpillar power plants and depicts their adaption to a variety of applications in actual installation photos. Booklet, Form No. 31922, shows new Cat generators and discusses advantages of compactness, operation and maintenance, and power output.

The importance of blade positioning is discussed in a new 8-page booklet (Form No. 31902) "When You Buy a Motor Grader," a guidebook to purchasing for performance. Both booklets available in English, Spanish, French, and Portuguese, free of charge. Caterpillar Tractor Co., Peoria 8, Ill.

Pioneer bituminous mix plants

Three new two-color, 8-page bulletins describing the three sizes of Continufluo bituminous mix plants have been published by Pioneer Engineering Works, Inc., Minneapolis, Minn. Bulletins concern the Model 51 plant (Form No. 619A), with capacity of from 40 to 60 cu. yd. per hr.; Model 81 plant (Form No. 653A), rated at 60 to 80 cu. yd. per hr.; and Model 102 (Form No. 658), with production ranging up to 150 cu. yd. per hr. Flow of material through each of the plants is illustrated in large cutaway spreads, with component parts detailed.

Le-Hi air hose fittings

Le-Hi air hose fittings for mining, tunneling, contracting, quarrying, and other compressed air applications are described in a detailed 8-page bulletin, No. 110, released by the Le-Hi Division of Hose Accessories Co., 2700 N. 17th St., Philadelphia 32, Pa. The bulletin contains complete information on sizes, part numbers and weights for all types of fittings.

Adjustomatic Special scaffolding catalog

An 8-page catalog (No. 1054) detailing the Adjustomatic Special line of scaffolding equipment is now available from Automatic Devices, Inc., 6107 Bartmer Ave., St. Louis 14, Mo. The catalog, fully illustrated, includes specifications on basic panels, braces, and accessories, along with arrangement methods, job assemblies, load tests, and a list of safety rules.

Two-man crew
installs
Armco Liner
Plates



Two-man crew works face of Edmonton tunnel. One operates clay spade; other removes excavated material. Both install Armco Liner Plates.

Edmonton, Canada, tunneled 10,000 feet with 68- and 98-inch-diameter Armco Liner Plate structures.

To contractors, the interesting factor on this job is that crews of just *two men* worked various headings on each shift. These crews had no previous experience with this type of construction.

According to the Edmonton construction engineer, the city got "a good, economical job."

More Contractor Advantages

This case history demonstrates that large crews and previous experience are not requirements for installation of Armco Liner Plates.

Also, with Armco Liner Plates you can reduce the amount of metal to buy and handle without sacrificing strength. This is because Armco Plates, on a pound-for-pound basis, are the strongest made!

Structures formed from Armco Plates can be round, elliptical, or almost any curvature of arch. Write us for data.

ARMCO DRAINAGE & METAL PRODUCTS, INC.

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ARMCO LINER PLATES



le like the ability of the

TRACTOMOTIVE TL-12 TRACTO LOADER

o Quickly from one phase
of our job to another"

ys Mr. Bruce Bird, superintendent of T. F. Scholes, Inc.
— contractor on Little Rock Air Force Base job,
Jacksonville, Arkansas.



LOADS INTO CENTER OF TRUCKS. Tires do not extend beyond cowl to rob operator of valuable reach. No time wasted moving to distribute load.

SETS UP AND CARRIES 24" AND 36" SEWER PIPE WITHOUT STANCE — made possible with TIP-BACK BUCKET and easy manipulation of dump lever. Also grades ditch and sets pipe into it.



SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

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Joaquin Tractor Co.—Bakersfield

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NEVADA

A D Machinery Company, Inc.—Elko and Las Vegas

Reno Equipment Sales Co.—Reno

This 4-wheel drive, 1 1/8-yd excavator-loader went on the job last September to demonstrate its ability to handle a variety of jobs with equal efficiency. It proved it could more than earn its own way — so it stayed!

Up to the time these pictures were taken — latter part of February — the TL-12 had 800 hours of operation and no downtime from any mechanical failures.

Once you watch this rugged, all-round loader perform on your job, you too will see its many profit-making possibilities. Choice of diesel or gasoline engine. Various interchangeable attachments.



BACKFILLING GOES FAST WITH POWER STEERING AND CLUTCH-TYPE TRANSMISSION. No shifting — operator pulls or pushes a lever to go forward or reverse.

HYDRAULIC TORQUE CONVERTER DRIVE SPEEDS PULLING WORK as well as loading. Moves smoothly, steadily ahead — no wheel spinning, no "digging in" in soft going.



OREGON

Pape Brothers—

Eugene, Roseburg and North Bend

Haupert Tractor Company—Medford and Klamath Falls

Wood Tractor Company—Portland

UTAH

Cate Equipment Company, Inc.—Salt Lake City

WASHINGTON

A. H. Cox & Company—Seattle

American Machine Company—Spokane

Mid-State Equipment Company—Wenatchee

WYOMING

Studer Tractor & Equipment Company—Casper

NEW EQUIPMENT

For your convenience in obtaining more information quickly the manufacturer's address provided with each review.

Fibre-glass trailer for rough use

Now on the market is a fibre-glass trailer which can follow a jeep or similar vehicle through any kind of country. The back opens out to form a chuck wagon and



inside is sufficient room to store surveying equipment, bed rolls, etc. Attached to the top of the trailer is a boat of laminated fibre-glass which forms an integral part of the unit. The trailer sells for about \$1,500 and is available through H. H. Huber, 241 E. 14th St., Oakland, Calif.

Link-Belt 3-cu. yd. shovel-crane

Link-Belt Speeder has added to its line of shovel-cranes the crawler-mounted, 3 cu. yd. K-608, which is convertible to shovel, crane, dragline, clamshell, and piledriver attachments. The machine, largest of its class produced by the company, features fingertip-operated hydraulic control and hydraulic-actuated steering clutches and has



ground clearance of 18 in. on the 7-roller frame model and 24 in. on the 9-roller frame. Standard equipment includes torque converter and engine combination; all-welded, stress-relieved upper and lower frames; independent position chain crowd. Independent rapid boomhoist is optional. Additional details available in Catalog 2552 from Link-Belt Speeder Corp., Cedar Rapids, Iowa.

Ready-mix concrete trucks

Two ready-mix concrete trucks with six-wheel drive, designed for delivery of concrete to off-highway locations where terrain is rugged or soft, have been introduced by Four Wheel Drive Auto Co., Clintonville, Wis. They are Model C6-407, a conventional-cab unit with 10,000-lb. capacity front axle and capable of carrying up



to 7 cu. yd. of concrete, and Model CS6-457, with one man cab design and 15,500-lb. capacity front axle. The latter model can transport up to 8 cu. yd. of concrete and increases legal payloads where rear tandem limits allow but gross vehicle weight limits are liberal. The trucks are adaptable to use with any type of truck concrete mixer. They feature six-wheel air brakes, aluminum rear suspension with rubber load cushions and bushings, 15-in. single plate clutch with 256 sq. in. of lining, Series 5C65 transmission, transfer and axles and $\frac{1}{4}$ -in. frame innerliner from front spring rear hanger to rear end. Engine is 212 hp., six-cylinder RD-501. Standard equipment includes 8-ton hydraulic jack, steel disc wheels, dual outside rear view mirrors.

World's largest ditcher

The world's largest ditching machine, the Gar Wood Buckeye 336 has successfully completed its first field trials. The machine excavates 600 cu. yd. per hr. and cuts

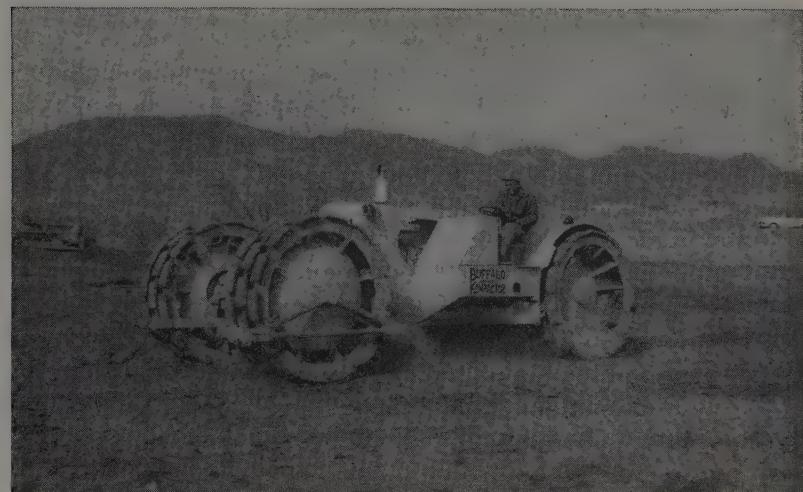


a trench 11 ft. 3 in. deep and 5 ft. 4 in. wide. Besides pipeline and deep sewer work the 330 can be adapted for open ditch irrigation work, digging a trapezoidal ditch with a top width of 19 ft., a depth of 8 ft., and a bottom width of 3 1/2 ft. Gar Wood Industries, Inc., Wayne, Mich.

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Colorado contractor's **KOMPACTOR** **WORKS** **CLOSE-UP**



eliminates all hand tamping costs!

"We're more than satisfied with the close compaction of the K-45," says Domenic Leone, referring to the excellent work the self-propelled K-45 Kompactor is doing on his \$26,762.25 job on State Highway 1 in El Paso County, Colorado.

Domenic Leone Construction Company, Inc., Trinidad, Colorado, is impacting 1,722,000 cubic yards on 7.26 miles of highway south of Colorado Springs. Included are 6 concrete box culverts, 10' x 12', making close compaction a necessity.

Not only has the highly maneuverable K-45 eliminated hand tam-

ing on culverts . . . it also averages 1100 yards an hour on banked material. Faster speeds, up to 5 mph, and its "interrupted pressure" principle of operation that directs *all* compaction effort downward, enabled Domenic Leone to replace several other pieces of compaction equipment with *one* K-45 Kompactor.

Write today for full information—or see your nearest Buffalo-Springfield distributor.

The Standard of Comparison
**BUFFALO-SPRINGFIELD
ROLLER COMPANY**
SPRINGFIELD, OHIO



Here's how close the flexible K-45 can work to culverts and abutments, and it's faster, better, more efficient in the "wide open spaces" too.



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CONCRETE CURING COMPOUNDS

Clear — Pigmented — Black

• TILT-UP COMPOUNDS

Wax Base — Non-Wax Base

• LIFT SLAB COMPOUNDS

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Wax Base — Non-Wax Base

• SPRAY EQUIPMENT

Hand and Power Operated

JOINT SEALING COMPOUNDS

(COLD APPLIED IN 3 TYPES)

Ready Mixed Rubber Base Mastic,
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• SEALING COMPOUND APPLICATORS

AIR ENTRAINING AGENT

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AIR METERS FOR CONCRETE ENGINEERING

- Comply with all leading specifications
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San Antonio, Texas, Rufus A. Walker & Co.
Honolulu, T. H., R. L. Castendyk Company
Vancouver, B. C., Canada, Burrard Construction Supplies, Ltd.

TO BE SURE . . .



USE THE FINEST!

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INCORPORATED

COMPANY

600 Lairport Street, El Segundo, California

LeTourneau-Westinghouse 416-hp. Twin-C tractor

LeTourneau-Westinghouse Co., Peoria, Ill., has introduced a 416-hp. rubber tire, two-engine tractor, the Model Twin-C, which is claimed to be the biggest, most powerful tractor on the market. The machine weighs more than 40 tons and will reach speeds of 20 mph. forward and 5.8 mph. in reverse. The machine is designed primarily to



push-load large self-propelled scrapers and has recorded in dynamometer tests a drawbar pull of 65,900 lb. All four wheels are drive wheels with 29.5 x 29 tires, 6 ft high, which provide 2-ft. 5-in. ground gripping traction. Front and rear automatic power-transfer differentials match pull to traction. Push bowl, 4 ft. high and 7 ft. wide incorporates a spring loaded mounting which automatically smooths contact between tractor and scraper. The unit is equipped with electric controls, powered by GM 6-71, 208 hp. diesels.

New line of Page walking draglines

A new line of single deck walking draglines, in capacities from 5 to 15 cu. yd., has been introduced by Page Engineering Co., Clearing Post Office, Chicago 38, Ill. Single deck construction of the new line makes for mobility, fast, low-cost erection, and reduced shipping costs.



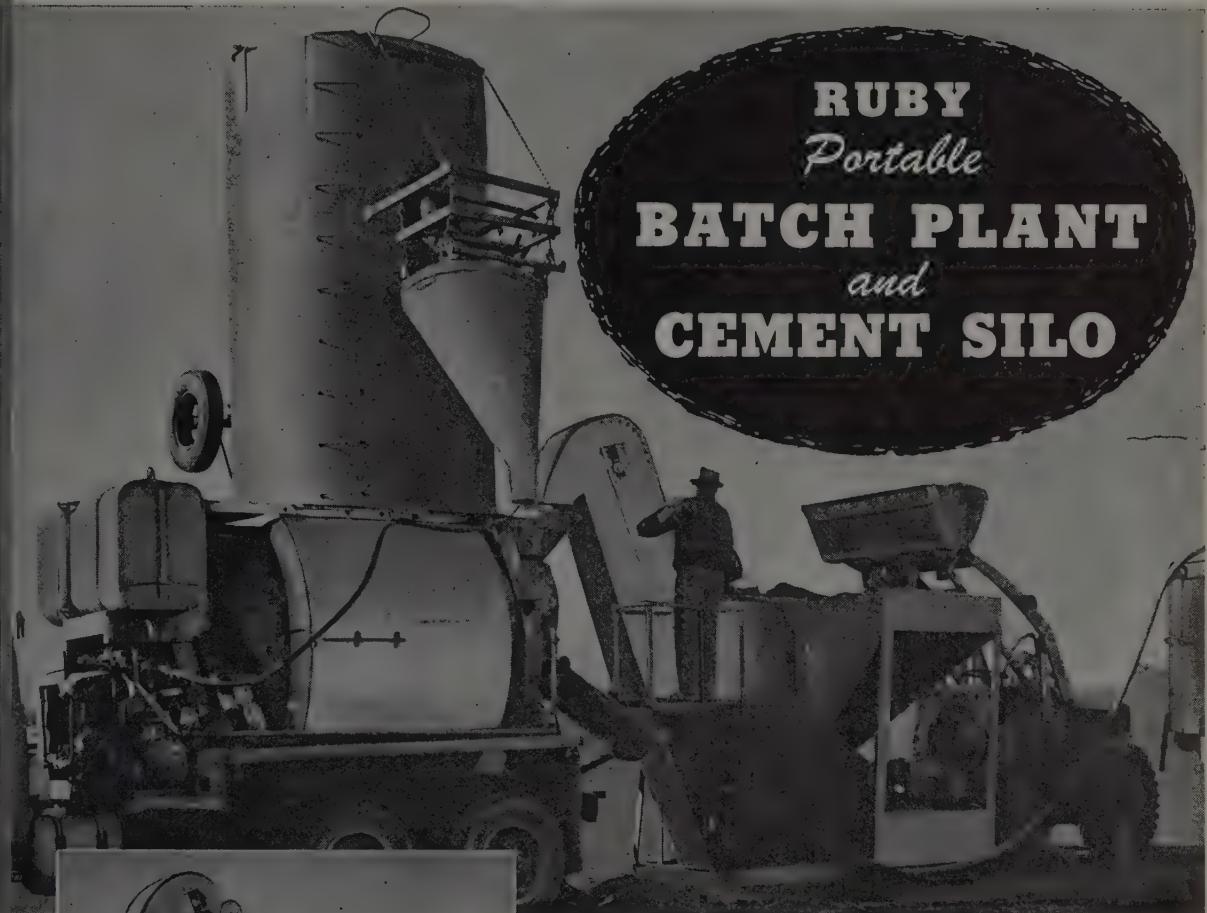
Boom is supported by a Becket Staff and cables attached at three equi-distant points along the length to strengthen the superstructure while allowing free movement in any direction. Engine is a horizontal V-type diesel consisting of two banks of horizontal cylinders and equipped with a control to reduce or increase engine output automatically as required by the machine in its operating cycle. Lubricating system is controlled and fed from one centrally located pump. Electric oil pre-heater allows only warm oil to be fed into the engine.

Vibration for specified density

For rock or all types of granular soils the Jackson Electric Vibrating Compactor secures the specified density in a minimum of time. Unusual features of this machine are the multiple units which can be used as a gang or separately. Each unit is operated by an electric motor and when handled by the special carriage-tractor has a forward speed up to 60 ft. per min. and reverse travel at 5½ mph. Standard width of the gang is 13 ft. and the individual units have bases 12 to 26 in. wide. The complete machine may be used on sections of highway base and the smaller unit detached and used effectively around the foundations of structures. Information from Jackson Vibrators, Inc., Ludington, Mich.

win-C tractor, Peoria, Ill., has a 100-hp. engine tractor, the biggest, most powerful tractor ever built. The machine weighs more than 100,000 lbs. and can travel 15 mph. forward and 10 mph. backward. It is designed primarily for use in the construction industry.

the Ruby "Team" that saves batching Dollars!



When you find complete portability of both Batch Plant and Silo . . . "one-man" economy of operation . . . and quick, efficient production, all combined in one **LOW COST** team, it's NEWS! . . . **REAL NEWS** for the transit mix operator, AND his pocketbook!

The Ruby Portable Batch Plant, in either 3 or 5 yard capacity, is designed for completely portable highway transport and quick, easy installation. Used with the Ruby Portable Cement Silo (170 barrel capacity), as a one-man operated . . . one location . . . batch-on-the-job team, it means lower operation costs from the first day!

The Ruby Portable Cement Silo, also designed for easy highway transport without special permits, is engineered for "team" operation with the Ruby Batch Plant. The Silo scale hopper accurately measures the bulk cement needed for controlled batching. One man operates both units from the Batch Plant platform. Lost time and added labor costs of separate silo and batch plant locations are eliminated.

The Ruby Portable Cement Silo makes bulk cement use a "profit-maker" on jobs requiring even small amounts of transit mix concrete. Complete portability of both units means dollar savings on every yard of concrete handled.

Write to Clark's Welding Works, Dept. 5, Perkins, California, for complete information or the name and address of the dealer nearest you.

CLARK'S WELDING WORKS

WEEKENDS CALIFORNIA FINES ON SACRAMENTO



**Sketch of Ruby Cement Silo
showing loading hopper**

NEW!

Ingersoll-Rand Electric POWER HAMMER

a rugged, light weight tool for
✓ MAINTENANCE
✓ CONSTRUCTION

Now, a rugged, dependable electric power hammer that will retain its efficiency longer...with far less maintenance. No piston air cushion to leak and rob hammer of its efficiency—no rubber bands to break. Ingersoll-Rand's exclusive spring floated piston assures long, trouble-free life.

Weights less than 13 lbs.—delivers more power per pound than any other hammer. Hundreds of uses—drill, chisel, chip, caulk, batter, etc.—on concrete, metals, wood, tile, stone, earth, masonry, etc.

Ask your Ingersoll-Rand distributor for a free demonstration in your plant now!

18-332



New Ingersoll-Rand H54U Electric Power Hammer

- LIGHT WEIGHT
- MORE POWER PER POUND
- COUNTER BALANCED CRANK
- SPRING FLOATED PISTON
- HIGH VELOCITY MOTOR COOLING FAN
- EXTRA LONG LIFE

Write for this catalog on the new Ingersoll-Rand H54U Electric Power Hammer!

← Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N.Y.

Pioneer washing and screening plant

Model 365 W, a stationary washing and screening plant designed to produce up to 100 tons per hr. of wash sand and gravel is now being offered by **Pioneer Engineering Works, Inc.**, 1515 Central Ave., Minneapolis 1, Minn. The model can be equipped to turn out up to four sizes plus oversize of washed gravel and one size of washed sand simultaneously and is adaptable to vary in product size requirements. Optional equipment includes a 1036 jaw crusher and 18-in. x 85-ft. return conveyor for reduction of oversize; a 21-cu. yd. bin which can be substituted for the bent at the head of the sand delivery conveyor; and an 18-in. conveyor of desired length which will stockpile pea gravel from the revolving screen. Water consumption runs from 500 to 750 gal. per min. The feeder is chain driven from the feeder conveyor tailshaft. All other units are driven by individual electric motors. Approximate weight of standard plant is 77,000 lb. For additional information ask for Form No. S.B. 4 from manufacturer.

Self-propelled road sweeper

A self-propelled road sweeper, the SP-C, has been placed on the market by **Little Giant Products, Inc.**, Peoria, Ill. Claimed to be the first machine of its kind, the sweeper is a combination prime mover and rotating brush, each with its individual assembly. The prime



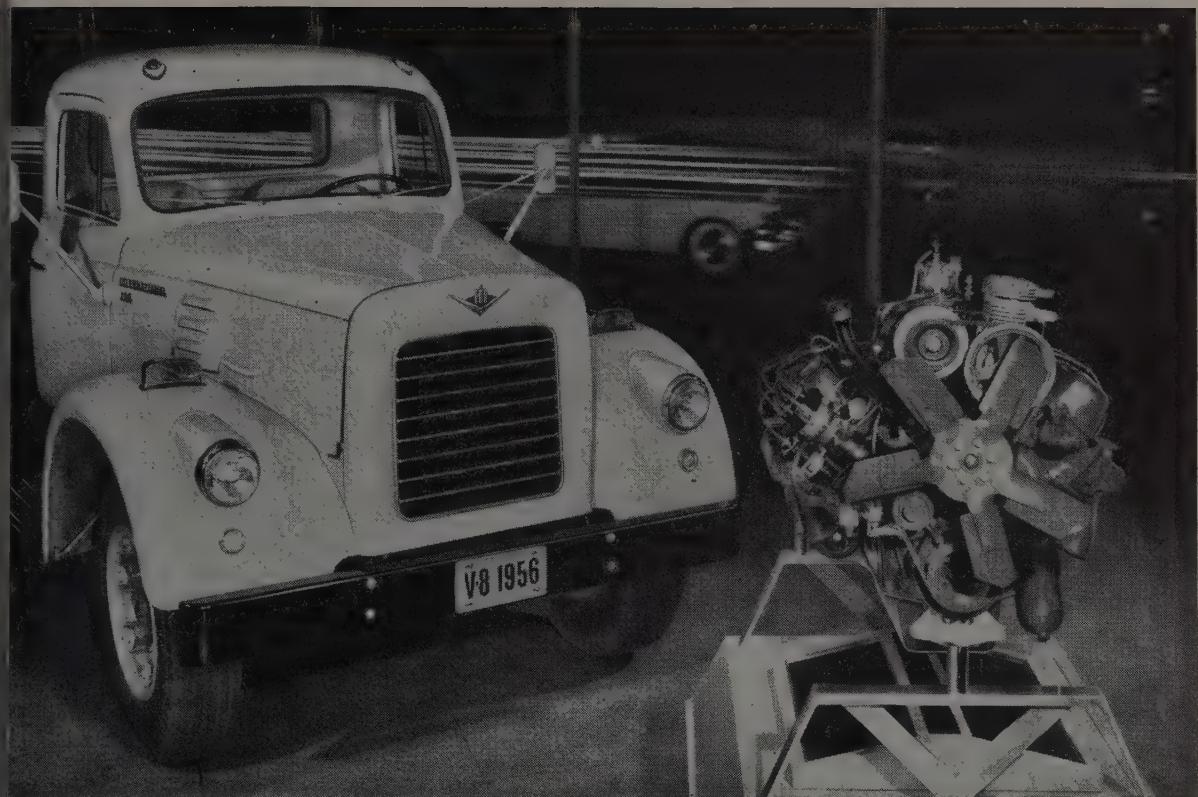
mover has a 48-hp. industrial engine, water cooled and electrically started, hydraulic brakes, and an automotive type four-speed transmission. Rear wheel steering provides 11-ft. turning radius. The brush is powered by a 7-hp. air-cooled engine.

Oshkosh concrete carrier

Now available is an all-wheel drive concrete carrier, the Oshkosh Model 18-34 6x6, designed to carry mixers with a capacity of 5½ yd. and more. The carrier provides weight distribution of 18,000 lb. on the front axle and 34,000



on the rear axle. Power steering is standard equipment. Features include an engine cantilevered forward of the front axle for easy servicing; front shock absorber; speeds forward; and "level-ride" driver's seat. For details, write to Oshkosh Motor Truck, Inc., Oshkosh, W.



Now! New Heavy-Duty V-8's!

With the most GO under any truck hood!

V-8 power to cut your costs!

These new 206, 226, 257 hp. modern truck V-8's in the new INTERNATIONAL V-Line have "built-in" reserve power that gets your biggest loads moving *fast* . . . a lively response that keeps them rolling with shifting greatly reduced, even on the most rugged off-highway operations. You save operating costs and you save trip time.

In short, the new INTERNATIONAL V-Line is built to set new highs in your profit column!

Tested and proved as no other trucks have ever been!

Developed and tested in the lab, then put through more than 1,000,000 test-track miles, and in 2,500,000 on-the-job miles in 39 different truck vocations.

These tests were made by profit-minded truckers with a gimlet-eye on mileage, hauling time and repair bills. Their conclusions—"GREAT, on every count!"

3 Great New INTERNATIONAL V-8 Engines!

	V-401	V-461	V-549
Displacement	400.9 Cu. In.	461 Cu. In.	548.7 Cu. In.
Bore and Stroke	4 1/8 x 3 3/4	4 1/8 x 4 5/16	4 1/2 x 4 5/16
Maximum hp.	206 @ 3600	226 @ 3600	257 @ 3400
Maximum Torque	355 @ 1800-2000	420 @ 1600	505 @ 2000

Pressure Controlled-Flo Cooling! Full circulation, fully controlled. Cold weather by-pass.

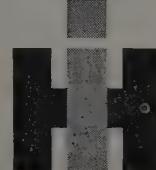
"Wet" Replaceable Exhaust Valve Guides!

Exhaust Valve Faces and Seats of Stellite!

19 Pound Aluminum Flywheel Housing!

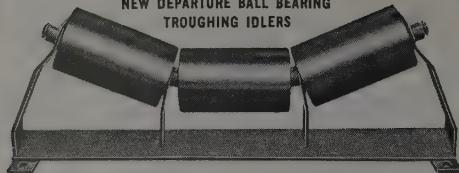
Get all the facts behind this great new truck story. Send for booklet "New Heavy-Duty V-8 Power Where You Need It Most." Write INTERNATIONAL HARVESTER COMPANY, P. O. Box 7333, Chicago 80, Illinois, or see your INTERNATIONAL Dealer or Branch.

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NEW DEPARTURE BALL BEARING
TROUGHING IDLERS



CONVEYCO
TIMKEN ROLLER BEARING
TROUGHING IDLERS

Patent No. 2,687,799

THERE'S A SECRET TO LONGER IDLER LIFE!

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Whatever your job conditions may be, Conveyco Idlers with sealed-for-life New Departure Bearings or Conveyco Timken Bearing Idlers will give you better performance over a longer period. The secret is in the patented construction... let a Conveyco engineer show you how to reduce idler maintenance. Note: Conveyco is a convenient source for repair or replacement parts on conveying equipment. Bearings, pulleys, etc.

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CAPSTAN TYPE, DRUM TYPE
AND SPECIAL TYPES

Model SC
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Carpuller

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Carpuller

One man can move
hundreds of tons of rolling
load with practically
no effort. Economical,
efficient, Carpullers are
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International Harvester shows new line of equipment

The new line of equipment manufactured by International Harvester's Construction Equipment Division (formerly known as the Industrial Power Division) was recently shown to a group of construction magazine editors from all over the country. The equipment demonstration at the Dundee, Ill., proving ground climaxed two-day press conference.

Introduction of International's Model 12 Payloader and the 18- and 24-ton Payhaulers, off-highway, rear dump trucks, greatly broadens International's line of construction equipment. International now produces models of crawler tractors, 18 power units, three sizes of 4-wheel scrapers, two self-propelled scrapers, two new off-highway trucks, a self-propelled, bottom-dump wagon, five International Drott Skid Shovels, and the new rear-engine Payloader, in addition to 228 different attachments. The Frank G. Hough Co., a wholly-owned subsidiary, produces six rubber-tired, rear-engine, front end loaders.



Model 12 Payloader

The Model 12 Payloader, a rear-engine, high-speed crawler tractor with a front-end loader is the result of five years of developing and testing. Highlights of the unit are a 9 1/2-hp. engine, full power shift transmission, torque converter drive, power steering, 40-deg. bucket tip-back at ground level, a body tilting arrangement which provides maintenance accessibility, a closed hydraulic system with pressure control, a 1 3/4-yd. capacity an 8 ft. 10-in. discharge height, and 3 forward speeds from zero to 10.1 mph. and 3 reverse speeds from zero to 13.1 mph.

By removing two pins at the rear of the loader, releasing two jack-screws at the front and applying pressure to the boom, the body tilts up to expose the rear deck of the main frame, an important maintenance feature. Cost of the unit is \$16,500 FOB factory.

International's entries into the off-highway market are two models which have greater horsepower to payload weight ratio than is available in any other off-highway trucks. They are the result of testing in the field on 44 different projects. The 24-ton model 95, 16-tye Payhauler is powered by a Cummins diesel engine developing 335 hp. at 2,100 rpm. The 18-ton model 65, 12-ton Payhauler is powered by a Cummins diesel engine developing 250 hp. at 2,100 rpm. The model 65 with either the five- or ten-speed transmission, and the air-assist master clutch, can roll along at 36 1/2 mph., 50% more than the common haulers in its size class. The model 95 has a top speed of 37.2 mph., when equipped with a standard 9-speed transmission, and a top speed of 38 mph. with a torque converter and power shift transmission. The off-set cab design gives unobstructed view to the rear.

Also featured during the demonstrations for the press were the International-Drott TD-6 Four-in-One Skid

Powerful Payload Booster

In ANY
Material!

3-WAY PROFIT-MAKER! With hydraulic-tilt bulldozer in front and ATECO ripper behind, this tractor's ready to rip, push-load or bulldoze—instantly!



ROCK RIPPER

for Caterpillar D9, D8, D7 & D6 Tractors

GET EXTRA-YARDAGE SCRAPER LOADS FASTER... A pass or two with your ATECO Rock Ripper shatters and loosens packed earth, cemented gravel, hardpan, shale or rock. Your scrapers pick up heaped loads, with a shorter loading cycle that really boosts yardage and cuts costs!

SAVE SCRAPER DAMAGE AND DOWNTIME... There's far less strain on scrapers, less heavy push-loading, when you rip first. Saves you plenty in costly scraper repair and downtime!

Available now for Caterpillar D9, D8, D7 and D6 tractors. Thoroughly performance tested on hundreds of jobs by leading contractors. Why lose yardage, time and money with a "half-equipped" CAT?—Make yours a three-way profitmaker with an ATECO Rock Ripper now. See your Caterpillar dealer or write us today for literature, prices.

TURN COSTLY "SHOOT & SHOVEL" JOBS INTO ECONOMIC SCRAPER OPERATIONS... Rugged ATECO Rock Ripper's exclusive curved-shank shattering action rips rock and hard materials you'd formerly have to shoot, shatters 'em into easy-loading scraper condition, fast!

NO OTHER LIKE IT... Mounts on tractor, balances dozer weight for increased traction, easier handling. Works anywhere tractor can go. Lifts out of way instantly for bulldozing, push loading.

Exclusive curved shanks and rock-splitting points shatter and lift hardest materials. Extra rugged; takes full power of tractor without damage to tractor or ripper!



ATECO EARTHMOVING EQUIPMENT

Designed and Manufactured Since 1920

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Available From
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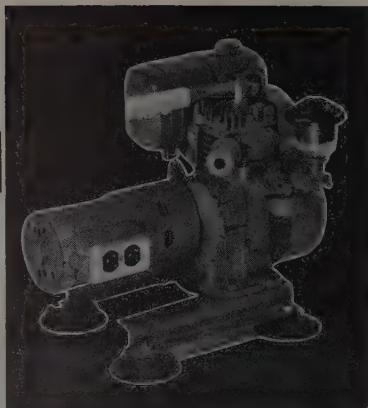
AMERICAN TRACTOR EQUIPMENT CORP.

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BULLDOZERS • ROADBUILDERS • SCRAPERS • TAMPERS • RIPPERS • FARM IMPLEMENTS • FRONT LOADERS • HYDRAULIC PUMP • TANK & VALVE ASSEMBLIES

Galland

Tool-King Power Unit



Here's electricity in a tough little plant made for running power tools . . . carry it to the job, put it in the back of a car, it weighs only 65 lbs. and it packs all the power you'll ever need to run a 7" saw, a 1" drill, an impact wrench, or a small vibrator! This is a dependable electric plant that really does the work—at a cost so low you can have several of them—and put a Tool-King on the smallest jobs as well as large! See the Tool-King in action at your equipment dealers or let us send full details on the Tool-King and other plants in sizes to 3000 W.

F. J. GALLAND & CO.

544 Market St., San Francisco, Calif.
1200 4th St., Berkeley, Calif.

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SELF-PRIMING CENTRIFUGAL PUMPS

*33,000 gallons of water pumped with 1 gallon of gasoline

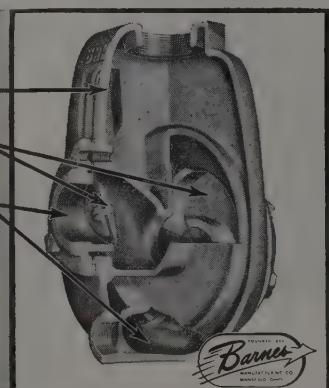
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simplified impeller adjustment — self-lubricating super seal

rugged
heavy, thick wall sections
dependable
non-clogging, trash-type impeller — automatically operated suction valve

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direct flow suction — exclusive self-priming principle

3,000 to 90,000 GPH —
Gasoline, Diesel,
Electric or Pulley Drives
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Central Equipment Co., Berkeley, Calif.

The C. H. Jones Equipment Co., Salt Lake City, Utah

Larson Equipment Co., Los Angeles, Calif.

Lowry Equipment Co., Redding, Calif.

The Rix Co., Inc., San Francisco, Calif.



Models 65 and 95 Payhuler

Shovel, a versatile front end loader; a TD-9 Skid-Loader and Scarifier; two TD-14's, one equipped with a hydraulic bulldozer blade and another with a Drott logging rack, and a TD-18 equipped with a bullgrader. One TD-24 torque converter tractor equipped with a bulldozer blade was also included.

Completing the list of equipment shown the editor were these Hough Payloaders, Models HA, HAH, HU, HO, HH, HS, and TM, and four International power units, the UD-1091, UD-450, UD-123, and UD-350, all mounted on two trailers pulled by an International 30-ton tractor. Two sizes of the new V-line of motor trucks were shown—Model VF-202 with dump body and V-195 tractor and trailer unit.

Lang drop bottom spreader

A high speed drop bottom spreader designed to spread highway surfacing materials in a mat 8 ft. wide at an controlled depth has been developed by The Lang Company, P. O. Box 479, Salt Lake City, Utah. The unit i



designed to minimize blade work. Ten yards of gravel can be hauled legally on its single axle and spread at speed up to 35 mph. For speed and convenience, gate is completely air operated for opening and closing from the cab of the trucks.

Big 102 Continuflow plant turns out 150 cu. yd. per hr.

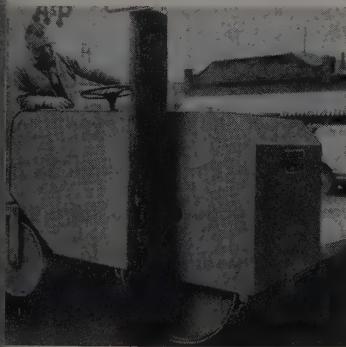
Pioneer's Big 102 Continuflow bituminous mix plant has been redesigned to attain greater adaptability to various jobs. With demonstrated production capacity ranging 150 cu. yd. per hr., the plant has only two main units to haul from job to job. One unit includes combination drier and dust collector; the other carries combination gradation and mixing unit. Each unit is assembled in a straight line on a single chassis for high portability. Four compartment bin allows great latitude, flexibility in composition of aggregate fed to mixer. Where less than four sizes of aggregate are sufficient, bin can be converted to production of whatever fewer sizes are needed. For bulletin describing the Big 102, write Pioneer Engineering Works, Inc., Minneapolis, Minn.

n. Rok-Master bit

Addition of a 6-in. Rok-Master to line of percussion rock drill bits has been announced by Brunner & of Los Angeles, Inc., 2425 E. 37th Los Angeles 58, Calif. The bit is use on I-R Quarrymaster drills. It features 2 x 3. API threads and bide inserts in the bit body. Full information available from manufacturer.

Ken-Roll general purpose roller

The redesigned line of Ken-Roll 3-ton general purpose rollers has been introduced by Pfahler Manufacturing Co., Galion, Ohio. Principal changes from previous models are increased weight range; cushioned, adjustable, more fully enclosed drive seat; and engine heat shield. The unit retains tolerance of $1\frac{1}{2}$ -in. clearance on the right-hand side to permit rolling close to walls and



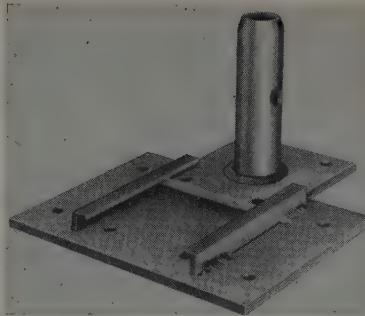
sts; compression roll which delivers up to 85 lb. per lin. in. with water last and 138 lb. with water and ballast; two-section steering mechanism and 93-gal. sprinkler tank. Manufacturer offers a trailer for transportation of the roller which can be loaded by one man.

Winco idling control

An idling control that reduces the engine to idling speed at the flick of a switch is a feature of the Winco 2500 watt direct-drive engine generator announced by Wincharger Corp., Sioux City 2, Iowa. The idling development is to conserve fuel, extend engine life, and lower maintenance cost. The generating plant, Series 6B14S2D, is offered with the following optional equipment: extra generator for close, steady voltage regulation, indicator pilot light, and retractable starter.

Shoring plate for scaffold-shoring

A specially designed shoring plate for use on scaffold-shoring applications is being offered by Universal Manufacturing Corp. of Zelienople, Pa. Designated the S681, the plate goes over standard Universal S25 and S20 base plates and provides an additional 6 x 8-in. bearing surface. It features dichromate galvanizing



finish which eliminates rust. Bolt-on plate of same dimensions is also available. A catalog covering the entire Universal line will soon be available from the manufacturer.

International tractor power steering

Now available for installation on the International 300 Utility tractor, new or already in use, is a power steering mechanism which operates off the Hydra-Touch system of the tractor to minimize manual steering effort, particularly when the tractor is equipped with front-mounted loaders, lift forks, or material buckets. The device is of the cam and lever type with built-in hydraulic valve and cylinder. When the steering wheel is turned, the valve on the steering post directs hydraulic power to the cylinder piston that moves the steering arms on the tractor. Also available for factory application on the Farmall 300, Farmall 300 Hi-Clear, Farmall 400, and Farmall 400 Hi-Clear tractors. International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

Transit-level for light construction

A transit-level with internal focusing telescope for such building applications as setting batter boards for small buildings and aligning stone walls, retaining walls and fences is now available. Fixed cross hairs in the eyepiece of the 10-power erecting telescope simplify focusing. Sealed against dust, the telescope is a one-piece casting with rack and pinion adjustment, convertible from transit to level by a lock. It features 20-mm. diameter achromatic objective lens and precision ground telescope vial. Three-in. diameter centered arc reads directly to single degrees; 360-deg. horizontal circle, with index, is graduated to single degrees in quadrants. Detachable jeweled compass with dampening mechanism and pinion for setting off declination is optional. For details write C. L. Berger & Sons, Inc., 37 Williams St., Boston 19, Mass.

Twin Disc torque converter

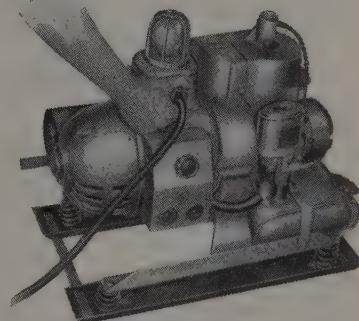
A new line of single-stage torque converter is now in production by the Hydraulic Division of Twin Disc Clutch Co., Rockford, Ill. Available in the 1500 Series, the converters are

CHOOSE
from a full line of
HOMELITE
Carryable
Construction
Equipment



SELF-PRIMING CENTRIFUGAL AND DIAPHRAGM PUMPS

Sizes: 1 $\frac{1}{2}$ " to 3" — capacities to 15,000 g.p.h. for dewatering and water supply.



ELECTRIC GENERATOR SETS FOR TOOLS AND LIGHTS

Complete range of sizes and voltages up to 5,000 watts.



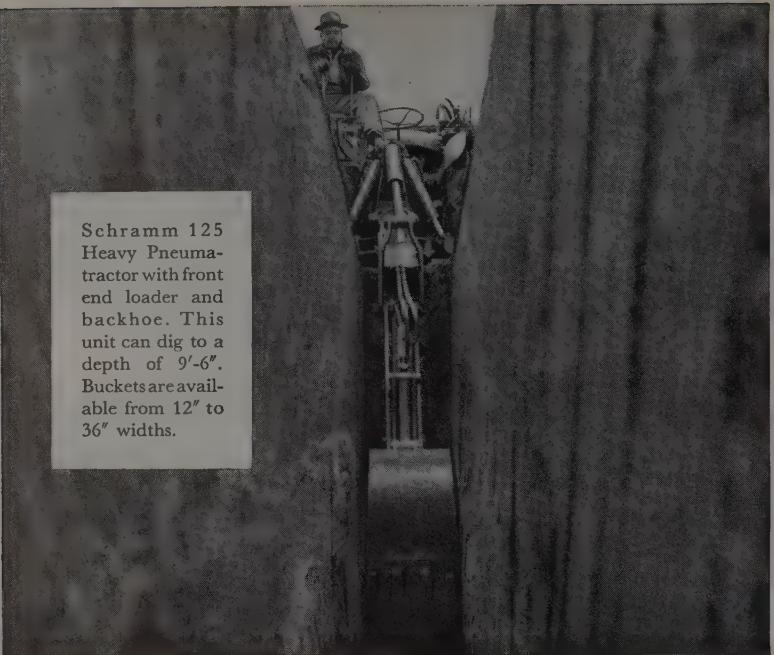
LIGHTWEIGHT POWERFUL ONE-MAN CHAIN SAWS

Complete line of saws with clearing and brushcutter attachments for every woodcutting job.

HOMELITE

A DIVISION OF TEXTRON, INCORPORATED
PORT CHESTER, N. Y.

Schramm 125 Heavy Pneumatractor with front end loader and backhoe. This unit can dig to a depth of 9'-6". Buckets are available from 12" to 36" widths.



MAJOR BUILDING CONTRACTOR SAYS:

"For loading, hauling, digging, lifting . . . we use this self-propelled air compressor"

Big essential on most construction jobs is a mobile source of compressed air. Schramm Pneumatractor—air compressor and tractor combined—provides this source, and also serves as an all-round construction tool.

Self-propelled, the Pneumatractor travels to any part of the job where compressed air is needed. And, with auxiliary attachments provided by Schramm, Pneumatractor becomes an *all-purpose* machine. You can drill or break out concrete with it—use it to load or unload materials, or move them from place to place. You can push, pull, dig and grade, too—even lift men and materials for work that otherwise would require a scaffold. Pneumatractor is the most versatile, flexible "work horse" you've ever seen—first on the job and last to leave because it does so many things so well.

Pneumatractor delivers 125 c.f.m. of compressed air at 100 pounds gauge pressure. Yet it costs much less than a 125 c.f.m. compressor and an industrial tractor. Write for free copy of Catalog 5540.

Your local Schramm Dealer is listed in the Yellow Pages of your telephone directory.

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS
625 North Garfield Ave. West Chester, Pa.



This one-yard bucket on this Schramm Heavy Pneumatractor can handle up to 4000 pounds. With bucket and backhoe, you get a unit that replaces many individual machines on the job.



This photo shows Pneumatractor's ability to cope with hard-to-handle materials. Other attachments include dozer blades, material buckets, sweepers, snow plows, drills and many more.

for engines producing from 30 hp. at 1,150 rpm. and 198 hp. at 2,400 rpm. Specific torque ratings are 165, 200, 240, 285, and 330 lb.-ft., depending on impeller blade used. The unit features "unloading" of the engine through a blade design wherein the turbine develops a counter-head which stops fluid circulation at high speed ratios. Initial production includes four models: Model "C" with clutch input; Model "S" with spider drive input; Spacer-Type Model "S" with double ended SAE housing; Model "U" with flange input and output.

Two Cat 650-hp. V-type engines

Two V-type industrial engines capable of producing maximum 650 hp. and available in turbocharged, roots blown, naturally aspirated and spark ignited versions are now in production by Caterpillar Tractor Co., Peoria, Ill. The 8- and 12-cylinder D37 and D397 engines are of four-cycle design. Main variations from former models are in the cylinder heads, exhaust manifolds and methods of supercharging, designed to provide respectively, direct path from combustion chamber to exhaust manifold, adaptability of engine to specific need, and increase of power with less fuel by utilization of exhaust gases. New spark ignited engines use magneto to feed low tension current to high tension transformers located near the spark plugs. Spark ignited engines burn natural gas as fuel. Further information available from manufacturer.

Pump for 4-in. wells

A pumping unit for wells as small as 4 in. in diameter is being marketed by Layne & Bowler Pump Co., 2940 Vail Ave., Los Angeles 22, Calif. It is called the Verti-Line Package Pump, engineered for ordering by unit number and delivery as a complete package, and is available in two sizes—4 and 6 in. The unit features a General Electric 60-cycle VH weatherproof motor for 3,600-rpm operation; cast iron surface discharge head with bronze bushes, stuffing box and 2½ in. inside diameter; column and shaft assembly equal to setting specified, with 5-ft. bearing centers, ¾-in. shaft and rubber bearings. Available from 2 to 7½ hp., with heads to 340 ft. and capacities from 200 to 7,500 gal. per hr. Specification sheet available.

1/25-watt pilot light

A neon pilot light that utilizes 1/25 watt of current has been developed by Pass & Seymour, Inc., Syracuse, N. Y., to replace 6-watt incandescent pilot lights. It is claimed the light uses so little electricity it could burn continuously for an entire year for only a few cents. The light is housed in an unbreakable prismatic *Plexiglass* dome.

(Continued on page 142)

News of DISTRIBUTORS

Westerners attend Smith opening

George B. Brose, president of The Brose Company, Oakland, Calif., and Bob Lippi of Pacific Coast Aggregates, attended the recent opening of the new truck manufacturing plant of the T. L. Smith Co. at Lufkin, Tex.

Additions at Gridley Equipment Co.

Gridley Equipment Co., Los Angeles, Calif., announces the addition of three men to its staff: C. A. Mattison, Jim Allison, and Don Cates. Company has also taken on the distribution of products of American Road Equipment Co.—American Economobile, Omaha, Neb.

Philpott has new So. Calif. location

G. M. Philpott Co., San Francisco, announces a new location in Southern California: 125 N. Vineland, Puente. This firm, headed by G. M. Philpott, president; R. G. Fletcher, vice president, with J. G. Woodford, in charge of service and sales,

handles Euclid equipment, Marion power shovels, Gardner-Denver products, Marlow pumps, steel and bits, ball and roller bearings, bronze bushings, chain and sprockets, National seals, and many other lines.

New address for Denver distributor

Constructors Equipment Co., Inc., Denver, Colo., has moved to 3611 Walnut St., a half block from former address. This is a temporary location pending completion of new modern building.

Braman-Dickerson enlarges staff

Announcement of the addition of four men to the organization of Braman-Dickerson Co., Riverside, Calif., was recently made. Named exclusive Hough Payloader salesman for San Bernardino County is F. L. Remington. Joe Riley is named salesman for Victorville and Barstow areas, and John Pantanella for the San Bernardino, Rialto, Fontana area. Charles Bray was appointed personnel manager.

Bouchard leaves Philpott company

R. L. Bouchard, sales engineer at George M. Philpott Co., Portland, Ore., recently left the organization.

Changes in sales representation

Western Construction Equipment Co., Billings, Mont., announces that Harold B. Wright, who has been Missoula sales representative for several years, has been promoted to field sales manager, working with both Great Falls and Billings division salesmen. Replacing him at Missoula is a new man, Dorsey Van Dyke, handling Wright's former territory. Gordon Okerman is a new salesman with headquarters at Butte, Mont.

Spokane firm adds two lines

Equipment manufactured by Pettibone Mulliken Corp. and Wagner Tractor, Inc., is now handled in the Spokane, Wash., territory by Andrews Equipment Service of Washington.

New branch office

A new branch at 225 N. First St., Buckeye, Ariz., has been opened by Arizona Machinery Co. of Phoenix. Paul Krznarich is manager; Jim Ryan, sales manager.

New Portland equipment salesmen

Two new salesmen have been taken on by Contractors Equipment



Tell your Private Eye to shut his eyes

You won't need him. For it doesn't matter what you want, you'll find it fast in the Yellow Pages. From raw materials to any specialized service you require...the Yellow Pages will tell you where to call.

So look in the Yellow Pages whenever any problem comes up in your business. The chances are you'll find a complete list of qualified people anxious to help you out.

You'll find it fast in the YELLOW PAGES



Pacific Telephone

Corp., Portland, Ore., distributor: Don Orr, who was formerly with Willamette Tug & Barge Co., and W. A. "Bill" Zone, who hails from Oakland, Calif., and has had considerable experience in the construction industry.

Air Rentals, Inc., news

Scott Pearson, formerly with Conley-Lott Machinery Co. at Lubbock, Tex., has joined Air Rentals, Inc., Denver, Colo. Air Rentals has been appointed distributor for Vibro-Plus Products, Inc., manufacturing at Stanhope, N. J., a line of concrete vibrators as well as vibratory road roller, the "Terrapac."

Gunderson-Taylor handles Press-weld

Gunderson Taylor Machinery Co., Denver, Colo., has been named distributor by Pressed & Welded Products Co. for "Press-weld" pneumatic concrete placement equipment for tunnels.

Personnel change-over at Reno firm

R. A. King, president of Tractor Equipment Co., 1525 East 4th St., Reno, Nev., announces new personnel as follows: R. J. "Dick" Knutson, general manager; J. H. "Jim" Galbraith, sales manager; Frank Fergoda, service manager, and Joe Anxo, parts manager. Tractor

Equipment Co. is dealer for International Harvester, Hough Payloader, Drott Skid-shovels, Galion graders and rollers, Bucyrus-Erie shovels, Joy Manufacturing Co. products, Carco winches and arches.

De Walt line in Washington

Hatten Machinery Co., Seattle, Wash., has acquired the distributorship of the complete De Walt line of radial arm saws for the western Washington territory.

C. H. Grant represents scraper line

C. H. Grant Co., Oakland, Calif., has taken on the complete scraper line of the Wooldridge Manufacturing Division of Continental Copper & Steel Industries, Inc.

Republic Supply named distributor

The Northern Division of The Republic Supply Co. of California, San Leandro, has been appointed distributor for Boston Gear Works. In addition to a complete inventory maintained by Republic, specialized sales and engineering assistance is provided by R. E. Hess, a trained technical power transmission engineer. Hess has been in this field for more than 15 yr., nine of which were spent with Boston Gear Works, where he rose to manager of all operations in the eleven Western states.

Change in top sales personnel

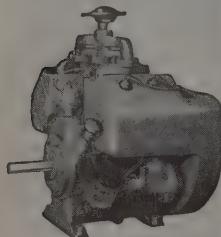
George Jamison and L. E. Wick of A. H. Cox & Company, Seattle, Wash., announce that after twenty years of very pleasant business association, Larry has sold his interest in the company to the company and has resigned as vice president and general sales manager. He has no immediate plans except to enjoy a Northwest vacation. Named to succeed him as sales manager is Norman R. Viles. Viles joined the Cox sales organization six years ago in the Yakima territory after having five years of selling construction equipment in the Spokane area. His latest territory covered the area north of Seattle.

News from Pacific Tractor

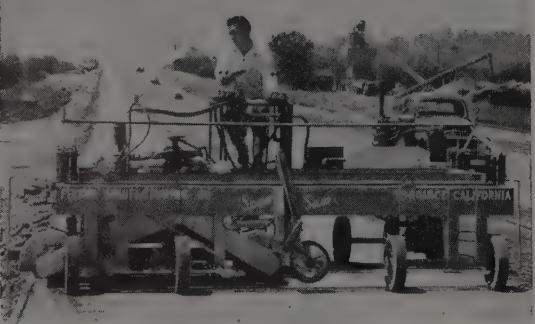
Appointment of Earl White to the new position of industrial sales representative was recently announced by Guy Harkey, general manager of Pacific Tractor & Implement Co., Richmond, Calif. White has spent the past ten years as a regional sales and service representative in another division of Ford Motor Co.

Recently Pacific Tractor & Implement Co. held demonstration schools for its dealer salesmen. Tractor and equipment were hauled to eight Northern California points where White and Bill Prather, training manager, explained the equipment and the technique of effective demonstration.

WISCONSIN-POWERED CONCRETE SPAN-SAW Cuts Costs...Speeds Up Work



This V-type 4-cylinder model is one of two Wisconsin Engines that operate the Concrete Span-Saw.



Here is an interesting construction application for Wisconsin Heavy-Duty Air-Cooled Engines that really demonstrates the rugged serviceability of these engines.

Used for diamond-sawing control joints in new highway and airport concrete, this Felker Di-Met Span-Saw spans the concrete slab, riding either the header boards or concrete. Powered by two Wisconsin Air-Cooled Engines, this multi-bladed machine saws control joints at desired intervals and, according to the builders (Felker Mfg. Co., Torrance, Calif.), speeds up work, cuts costs and minimizes manpower.

Wherever there's tough, dirty work to be done, Wisconsin Engines rate "Number One" in steady-going performance, low-cost maintenance and heavy-duty dependability. Every Wisconsin Air-Cooled Engine has such features as tapered roller bearings at BOTH ends of the crankshaft, rotary type high tension outside magneto, pump-circulated lubrication and efficient AIR-COOLING at all temperatures from extreme sub-zero to 140° F.

All models (3 to 36 hp.) can be furnished with electric starter and generator, or starter only and may be equipped with Stellite exhaust valves and valve seat inserts, clutch and clutch reduction assemblies, and rotating screen. Reduction assemblies available for all models except the VG4D.

You can't do better than to specify "Wisconsin Power" for your equipment. Write for Bulletin S-188.



WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

—Equipment Co. is dealer for International Harvester, Hough Payless and rollers, Bucyrus-Erie and Manufacturing Co. products, Marconi winches and arches.

De Walt line in Washington
Hatten Machinery Co., Seattle, Wash., has acquired the distributorship of the complete De Walt line of radial arm saws for the western Washington territory.

C. H. Grant represents scraper line
C. H. Grant Co., Oakland, Calif., has taken on the complete scraper line of the Woodbridge Manufacturing Division of Continental Corp. & Steel Industries, Inc.

Republic Supply named distributor
The Northern Division of The Republic Supply Co. of California, Leandro, has been appointed distributor for Boston Gear Works in addition to a complete line maintained by Republic. Special sales and engineering assistance provided by R. E. Hess, a technical power transmission engineer. Hess has been in this field more than 15 years, nine of which were spent with Boston Gear Works where he rose to manager of all operations in the eleven Western states.

Change in top sales personnel
George Jamison and L. E. Wick, A. H. Cox & Company, Seattle, Wash., announce that after two years of very pleasant business association, Larry has sold his interest in the company to the company and resigned as vice president and sales manager. He has no immediate plans except to enjoy Northwest vacation. Named to succeed him as sales manager is Norman R. Viles. Viles joined Cox sales organization six years in the Yakima territory after having five years of selling construction equipment in the Spokane area. His latest territory covered the north of Seattle.

News from Pacific Tractor
Appointment of Earl White to new position of industrial sales representative was recently announced by Guy Harkey, general manager of Pacific Tractor & Implement, Richmond, Calif. White has spent past ten years as a regional sales service representative in the division of Ford Motor Co.

Recently Pacific Tractor & Implement Co. held demonstration schools for its dealer salesmen. Tractor equipment were handled in Northern California points by White and Bill Prather, sales manager, explained the technique of effective demonstration.



The 10 Best Reasons Why You Should Not Miss The A.R.B.A. Road Show and Convention

1. First Road Show in nearly 10 years!
2. The best way to "catch-up" on latest advancements in equipment, materials and methods.
3. Helps you determine best buys in machinery through first-hand comparisons.
4. Gives you information you need to improve your operating efficiency.
5. Hear top-ranking specialists in all phases of highway, street and maintenance work.
6. Learn how latest Federal Government plans and regulations will affect YOU.
7. Meet leading Federal, State, County and Municipal authorities.
8. Discuss equipment and service needs with manufacturers and distributors.
9. Swap ideas with construction and maintenance experts from all over the world.
10. Renew old contacts . . . make new friends.

The Whole Construction Story wrapped up in one Gigantic Package!

A.R.B.A. ROAD SHOW and CONVENTION

International Amphitheatre—Chicago

Almost 10 years since the last Road Show has seen vast changes—changing personnel in your organization—new people and expansion. Field operations cannot possibly permit the fullest study or comparison of equipment and the press of business reduces the opportunity for learning all there is to know of new methods.

The A. R. B. A. Road Show and Convention will bring you the whole construction story wrapped up in one package. 300,000 sq. ft. of equipment—over 1,000 pieces of machinery—down-to-earth discussions by leading construction authorities—a 6-day opportunity to "catch up" on all that's new in construction.

The tremendous immediate future of the industry warrants your planning to be there. Write for data on reservations. Ask to be put on the list for future information on the 1957 A. R. B. A. Road Show and Convention.



AMERICAN ROAD BUILDERS' ASSOCIATION

World Center Building Washington 6, D. C.

At 3 P.M....

CAVE-IN!



MANUFACTURERS

Caterpillar plans move

Operations of the Peoria Parts Department of Caterpillar Tractor Co., Peoria, Ill., will be transferred, early in 1958, to a new building in Morton, Ill., according to recent announcement by Harmon S. Eberhard, president.

Dick Tomb joins Chain Belt

Richard "Dick" M. Tomb recently joined Chain Belt Co. at the factory branch in Los Angeles. He comes to Chain Belt with a sales background with Air Reduction Co., Inc., and Air Reduction Pacific Co., and has experience in the concrete and construction equipment field with Willard Concrete Machinery Sales and Tomb Concrete Co.

Don E. Johnson joins Baxter staff

William C. Cairns, district manager of J. H. Baxter & Co. at Portland, Ore., announces the addition of Don E. Johnson to the sales and engineering staff. Johnson, a director in the Oregon Section of the American Society of Civil Engineers, was formerly with Mercer Steel Co., Portland.

New sales manager named

Appointment of Richard S. Nelson as sales manager of the Austin Overshot Loader Co., a division of

Hercules Galion Products, Inc., is announced. Before joining Austin Overshot, Nelson was export sales

**Richard S.
Nelson**



manager of Gates Rubber Co., Denver. From his headquarters in the company's general offices in Galion, Ohio, he will direct all sales of Austin overshot loaders, bulldozer blades, timber loaders, grizzly screens, and other attachments.

Winslow appoints new sales manager

The appointment of John F. Bacher as new sales manager of Winslow Engineering Co., Oakland, Calif., was recently announced. Bacher joined the Winslow staff eight years ago. After serving as one of the company's sales representatives in the United States, Canada, and Mexico, he was named Western division sales manager, working out of both the home plant in Oakland and a newly-established factory in Kentucky.

It takes **POWER** to move a mountain



and **EDWARDS WIRE ROPE** **is built to handle that power!**

Heavy construction equipment is getting bigger, faster and heavier. You need the "built-in" extra performance of Edwards Wire Rope to keep shovels, scrapers and dozers operating profitably.

Call or write today for the address of your nearest Edwards Distributor.

EDWARDS WIRE ROPE

E. H. EDWARDS COMPANY

General Office: SOUTH SAN FRANCISCO, CALIFORNIA

Seattle • Portland • Los Angeles • Houston



L.B. FOSTER CO.

3460 Wilshire Boulevard
LOS ANGELES 5, CALIF.

PITTSBURGH 30 • NEW YORK 7
ATLANTA 8 • HOUSTON 2 • CHICAGO 4

Iowa Mfg. Co. appoints sales rep
Charles H. Kimball, recently added
to the sales representative staff
of Iowa Manufacturing Co., Cedar
Rapids, Iowa, will represent the
Cedarapids line of aggregate produc-
ing and bituminous mixing equip-
ment.



Charles H.
Kimball

ment in the territory of Arizona,
Colorado, New Mexico, Utah, South-
ern California, and southwest Texas.
His headquarters will be in Scotts-
dale, Ariz. Kimball brings to his new
position 22 yr. experience in the
construction equipment industry.

Top promotions at CB&I

Horace B. Horton was recently
elected chairman of the board of
Chicago Bridge & Iron Co., Chicago.
Horton joined the company in 1907
and has been president since 1945.
Ernest E. Michaels, formerly execu-
tive vice president, succeeds Horton
as president.

Jack Truck names new sales rep

Appointment of Stanley J. "Bud"
Coffey as Western off-highway
equipment sales representative is an-
nounced by Mack Motor Truck Corp.,
division of Mack Trucks, Inc.,
through J. C. Rowold, vice president
and Western division manager. Pre-
viously, Coffey, whose headquarters
will be in Los Angeles, was sales
manager for eight years for Cummins
Diesel Sales of Oregon, at Portland.

Link-Belt names district sales mgr.
Appointment of Jack E. Fleming
as district sales representative in the
Pacific Northwest to cover Oregon,
Washington, Idaho, as well as Brit-
ish Columbia and Alaska, has been
announced by Link-Belt Speeder

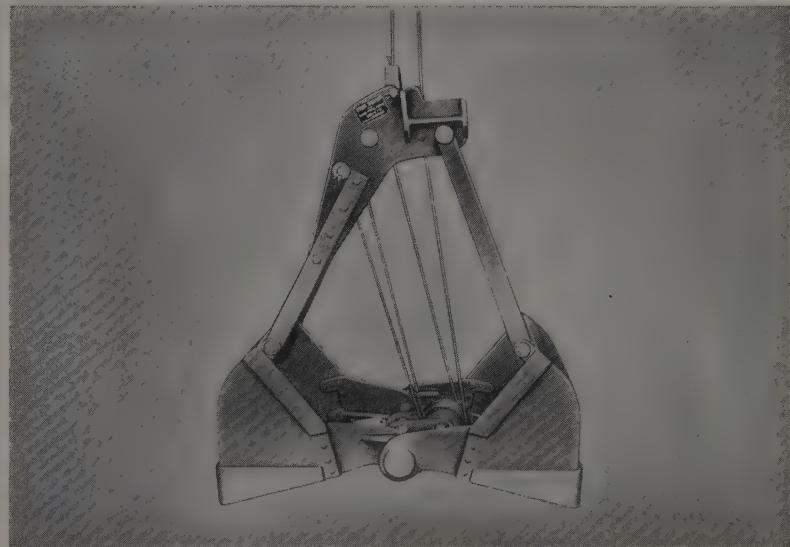


Jack E.
Fleming

Corp., Cedar Rapids, Iowa. Since
joining this shovel-crane manufac-
turer in 1953, Fleming has served as
a strict representative in various
western localities and now resides in
Portland.

ATTENTION . . . Lightweight Crane Owners

ERIE'S NEW 3/8 YD. CLAMSHELL GIVES YOU ALL THE FEATURES OF REGULAR 2-LINE MODELS



Quick Way, Shield Bantam, Sargent, Dixie, Little Giant, Mitey-Mite and other light weight crane owners—ERIE's new $\frac{3}{8}$ yd. bucket is built to help you get the most pay load out of your equipment.

Rigid, one-piece, welded head; thick, strong corner bars; over-size bearings; massive hinges and low silhouette—all the features that make ERIE buckets standard for the world—scaled to fit your requirements. You'll be agreeably surprised at the job this new bucket does. We who developed it were surprised and we expected a lot.

Once you try ERIE's new $\frac{3}{8}$ yd. clamshell, we're sure you'll agree with us—it's the hardest digging, longest wearing and easiest handling bucket you ever rigged to a light weight crane.

Heat treated teeth on all ERIE buckets are guaranteed for the life of the bucket against breaking. A new set if they break

These features make ERIE the bucket experienced operators prefer:

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Treated steel teeth and high carbon steel lips bite up full payloads even in clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low headroom for fast work in tight quarters; low center of gravity for easy positioning.

For catalogs, write Dept. WC76



ERIE STRAYER CO.

3776 GEIST ROAD • ERIE, PENNSYLVANIA

Makers of Light, Standard and Wide Rehandlers, General Purpose,
Heavy Duty, Extra Heavy Duty, Electric and Mechanical Clamshells.

NEW

FLEXCO

SPEED TOOLS

CUT APPLICATION TIME

IN HALF

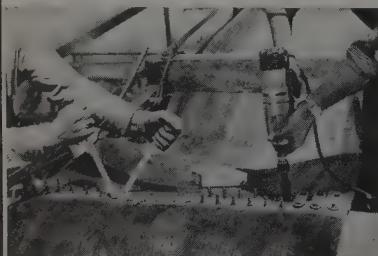
Your two man belt team can now join a belt 30" wide in 15 to 20 minutes . . . using the new FLEXCO Power Tools.



The FLEXCO Power Tool Boring Bit used with electric or air impact tool speeds boring of holes.



New FLEXCO Templet positions bolts for quick joining of belts. Reaching under belt has been eliminated.



Running down nuts is fast with the new FLEXCO Speed Wrench used with electric or air impact tool. Two Bolt Breakers are used together to complete the joint.

If you are interested in speeding up fastener application, order the new Speed Tools from your local FLEXCO Distributor. Write for Bulletin F-112-A.

FLEXIBLE STEEL LACING CO.

4704 Lexington Street • Chicago 44, Illinois

Gardner-Denver moves branch

A new office and warehouse building at 7654 E. Slauson Ave., Los Angeles, was recently taken over by Gardner-Denver Co. The building consists of an air-conditioned office area of 2,400 sq. ft., a concrete and steel machinery warehouse of 5,600 sq. ft., and an enlarged 1,100-sq. ft. parts department. W. A. Nilsson is Los Angeles district manager.

Caterpillar forms Western parts dept.

Formation of a parts department in Denver, Colo., is announced by M. T. Deames, manager of parts general office, Caterpillar Tractor Co., Peoria, Ill. The new department will supply Caterpillar dealers in the Rocky Mountain and Pacific Coast region with their normal parts inventory requirements. The company's parts depot in Denver will continue to handle dealers' emergency orders.

Insley starts new plant construction

With the letting of contract, construction of extensive manufacturing facilities are under way at Puente, Calif., by Insley Manufacturing Corp., of Indianapolis, important producer of excavators, shovels, clamshells, and crane equipment. Insley will be the first in the industry to engage in this type of production in Southern California.

MacwhYTE's Western sales

F. D. Holden, vice president in charge of sales of the MacwhYTE Company, announces the appointment of Fred M. Sime as manager of the company's Pacific Coast Sales Division which embraces the eleven Western states, Alaska, and the Hawaiian Islands. Sime has been identified with the MacwhYTE organization for a number of years and formerly occupied the position of district sales manager of the Pacific Southwest Division. Dean Hillyer has joined MacwhYTE sales force in the San Francisco territory, and Vernon H. Swan has been added to the Seattle sales organization.

A. M. Byers changes address

Announcement is made that the Pacific Coast Division office of A. M. Byers Co. has moved from 225 Bush St., San Francisco, to new location at 1256 Russ Building. The Pacific Coast Division, headed by A. D. Sheere, has jurisdiction over sales of wrought iron pipe, plates, and bars in Washington, Oregon, California, Arizona, as well as Alaska and British Columbia.

Thor sets up new division

A construction equipment division has been formed by Thor Power Tool Co., Aurora, Ill., and is beginning its activities at once, according to Neil C. Hurley, Jr., president. Named to

(Advertisement)



TRUCK LOADING AS IT GOES, this "Baby Digger" solves the spoil removal problem as it sneaks alongside a chain link fence while digging an 18" x 36" utility trench. Just another example of Cleveland's outstanding ability to *dig more trench . . . in more places . . . at less cost*. THE CLEVELAND TRENCHER CO., 20100 St. Clair Ave., Cleveland 17, Ohio

head this new division are William J. Miller and Elmer R. Stitt, former president and vice president of Master Vibrator Co. They will establish headquarters at Thor's main works at Aurora.

Kaiser Steel promotes Babylon

Elvan R. Babylon has been named manager of engineering sales for Kaiser Steel Corp. in Oakland, Calif. He joined Kaiser Steel in 1944 as sales metallurgist and has served in that capacity at the Fontana mill, in the Los Angeles sales office, and more recently at the home office.

Bullard names sales manager

E. W. Bullard, Jr., vice president in charge of sales for E. D. Bullard Co., San Francisco, Calif., announces the appointment of Paul W. O'Donnell to the position of sales manager. With Bullard since 1952, O'Donnell has been in charge of distributor sales east of the Mississippi, and for the present time will continue to make his headquarters in Chicago.

Clark starts West Coast operations

Clark Equipment Co. recently announced the start of operations on the West Coast in a 40,000-sq. ft. structure in Richmond, Calif. The building will be used as a modification center and parts depot for slow-moving parts by Clark's Industrial Truck Division, according to R. H. Davies, vice president in charge of his division.

New Vibromatic sales representative

Arthur W. Smith has been appointed paver sales representative by Pioneer Engineering Works, Inc., Minneapolis, Minn. His function will be to give technical assistance to pioneer distributors in connection with all domestic and Canadian sales of the new Vibromatic bituminous paver being manufactured by Pioneer.

New LeT-Wes Co. parts depot

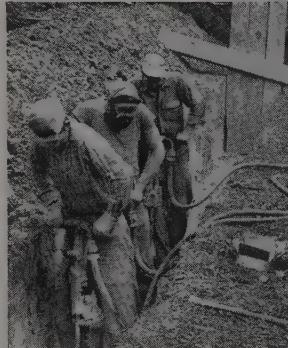
Work on LeTourneau-Westinghouse Co.'s new Western parts depot is in final stages. Located at 9121 G St., Oakland, Calif., the depot will carry a complete line of parts for both old and new model LeT-WesCo equipment. C. L. Henderson, West Coast depot manager, points out that opening of the new installation is another step in the company's program of expanding service to keep pace with the growth of its equipment line.

Essick has new facilities

Essick Machinery Co., Los Angeles, recently opened its new Orange County Division at 12202 Westminster Ave., Santa Ana, Calif. The new division is well equipped to offer sales, service, and rentals of all types of construction equipment to contractors in this area.

"MINE KING"

The Name to Remember When Buying Air Hose



STRONG!

Molded—and—braided construction, with materials and workmanship meeting the very highest standards for quality and reliability.

TOUGH!

Extra durable smooth brown cover withstands severest abrasive wear; resists the shock of falling rock, tools and timbers; and prevents penetration of water into carcass.

LONG LENGTHS!

Availability in long lengths . . . up to 500 feet . . . permits "Mine King" to be used with fewer intermediate connections, reducing the time required for coupling and uncoupling.

A Goodall "Standard of Quality" product, "Mine King" can be relied upon to carry a full, uninterrupted supply of power to rock drills, pavement breakers and other air tools, and to stand up longer under severest wear and abuse. It will pay you to buy and use it! Sizes $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1".



Contact Our Nearest Branch for Details and Prices

If it's GOODALL, it MUST be Good!

Standard of Quality—Since 1870



HOSE • BELTING • FOOTWEAR • CLOTHING
AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches and Distributors Throughout the United States and in Canada

Waterstop in place in seconds!



LABYRINTH WATERSTOP after first pour has been made and form removed. The grooves receive the concrete from the second pour, providing an interlocking joint.

Just a few seconds were needed to nail this LABYRINTH WATERSTOP to the form... just a few seconds and water seepage worries were over before they could ever have a chance to start. LABYRINTH WATERSTOP forms a waterproof bond between two pours. The corrugated ribs bond firmly with the concrete.

LABYRINTH WATERSTOPs are made of flexible polyvinyl plastic... that has superior weathering qualities, is not affected by temperature changes and chemical activity.

LABYRINTH WATERSTOPs are easy to work with, can be cut to any desired length. "L" and "T" joints can be welded with just a hot knife. Find out now how your costs can be cut... and end your seepage problems.

Distributed by

WATER SEALS, INC.

Chicago 6, Illinois by:

THOMAS CONCRETE ACCESSORY CO.

1219 S. Herbert St.
Los Angeles 23, Calif.

HYDRO PRODUCTS CO.
1350 Old County Road
Belmont, Calif.

CHAS. R. WATTS CO.
4121 Sixth Ave., N.W.
Seattle, Wash.

PLASTI-SPRAY CO.
353 S. State
Orem, Utah

BAKER-THOMAS-WOOLSEY
300 S. Twelfth St.
Phoenix, Ariz.

W. J. BURKE & CO.
2344 N.W. 21st St.
Portland 9, Ore.

Expanded sales prompts promotions

Wilson D. Patterson, Pacific Coast regional manager of the White Motor Co., announces several important personnel promotions. Howard P. Strother, well known throughout the trucking industry in the West, has been made branch man-



Strother
(above, left)



Ragan
(above)



Lynch
(left)

Ragan's post as territory manager of the Rocky Mountain area.

Parsons names two sales reps.

Appointment of John J. Harvey and Eugene H. Nelson as factory sales representatives has been made by the Parsons Company of Newton, Iowa, according to R. E. Bansemer, sales manager. A subsidiary of Koehring Company, Parsons designs and manufactures Trenchliners, a full line of trenching equipment in five sizes that include wheel and ladder types and a small utility size Trenchmobile. Both of the newly appointed sales representatives are well versed in the construction equipment field. Harvey has been with Parsons for more than six years. Nelson joined the company in 1955.

Western regional office opening

M. W. Kellogg Co. announces the establishment of a Western regional office with headquarters in San Francisco's Russ Building. Kellogg is a subsidiary of Pullman Incorporated. William R. Dunn, formerly Pacific Coast Manager of the Elliott Company, has been appointed sales manager. His assistant will be Paul S. Jones of Salt Lake City.

New Denver branch offices

The Denver branch office of Thor Power Tool Co., Aurora, Ill., a leading manufacturer of portable air and

GET MAXIMUM USE OF YOUR 4-WHEEL DRIVE!



**New!
WARN
LOCKOMATIC
HUBS**

**New Convenience
with AUTOMATIC
FREE-WHEELING
2-WHEEL DRIVE
and AUTOMATIC
4-WHEEL DRIVE
forward and reverse
AS YOU SHIFT!**

Plus "Locking" controls for
4-wheel drive engine brak-
ing control safety.

Over 75,000 Warn Hubs in use

Stop front-end drag in 2 w. d.!

Warn Hubs make your 4-wheel drive doubly useful—the only service vehicle you need! Use it as a conventional "free-wheeling" 2-wheel drive most of the time; as a 4-wheel drive whenever you need it. Warn Hubs "take out" the front drive in 2-wheel drive, stop drag, front gear whine, shimmy—give your vehicle new economy, pep, speed, handling ease. And, when you need 4-wheel drive, you have it automatically, with Warn Lock-o-matics, manually with Warn Locking Hubs. Keep track of one day's driving—you'll find 2-wheel drive is enough most of the time. That's where Warn Hubs save gas, gear wear, tires. Available for all makes of 4 W.D.'s to 1½ tons. See your dealer, today, or write:

WARN MFG. CO.

Riverton Box 6064-WC7
Seattle 88, Washington

lectric power tools, has been moved to new, enlarged quarters at 2704 West Eighth Ave., Denver. Featuring twice the floor space available in the former office, the new building offers modern repair and service facilities. Headed by C. H. Gabriel, manager, the branch serves Colorado, Utah, Wyoming, parts of New Mexico, Idaho, Nevada, Oregon, Montana, and South Dakota.

Personnel assignments

To provide closer service for customers in the Northwest, American Pipe & Construction Co. has made two important personnel reassessments in its sales department. Lee J. Moremen is now district sales engineer



Lee J.
Moremen

covering eastern Washington, eastern Oregon, and northern Idaho. He returns to Spokane, Wash., after an absence of four years at the Portland, Ore., plant. William A. Rodger, formerly a company sales engineer at Portland, is district engineer covering the Puget Sound and western Washington area, making his headquarters at Seattle.

New sales managers

G. W. Gutekunst, general sales manager of Gardner-Denver Co., announces the appointment of William J. Knoderer as sales manager of the industrial division, and Niel M. Fishback as sales manager of the mining and contracting division. Knoderer had been sales manager of Keller Tool Co. before it was merged with Gardner-Denver, and he moved to the home office of the company in Quincy, Ill., in 1955. Fishback had been serving as district manager of the El Paso branch until this recent appointment.

Sales-engineering representative

Simplicity Engineering Co., Dundand, Mich., announces the appointment of Richard A. Aleshire, Whittier, Calif., as its direct sales and engineering representative on the Pacific Coast. He makes his headquarters at 7719 Gerda Court.

Euclid maintenance school

Maintenance personnel of Morrison-Knudsen Co., Inc., recently completed a training program at Boise, Idaho, by a mobile training unit of Euclid Division, General Motors Corp. The training school is part of the manufacturer's program to help owners get maximum production from their Euclid equipment at the lowest maintenance cost.

Unique Prefab Form System Speeds Sewage Plant "Y" Wall Construction



MECHANIZED FORMING with new "Y" wall trusses and UNI-FORM Panels speeds construction, saves labor and material

Field reports on a new system for forming "Y" walls in aeration tanks and settling basins indicate very satisfactory operation and important labor and material saving advantages for the system.

Developed by the Universal Form Clamp Co., Chicago, the new system is said to completely eliminate the many problems and difficulties encountered by contractors in forming this special type of wall in sewage disposal plant construction.

Specially designed trusses, which can be made to handle any type, height, shape or wall thickness, are used in conjunction with standard UNI-FORM Concrete Forms to form the "Y" wall. Assembly of the truss and UNI-FORM Panels into a complete form, ready to receive concrete is a fast, mechanical operation. Positive internal spreading and accurate wall thicknesses are assured by the use of Universal Spirloc Cone Nut Assemblies.

Features incorporated in the design and operation of the Universal "Y" wall form-



STRIPPED WALLS are clean and accurate

ing system eliminate the necessity of additional lumber or tying devices for the alignment and bracing of the unit.

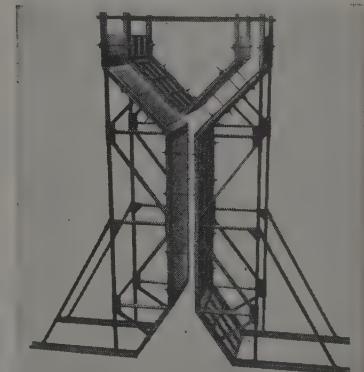
Erection, stripping and movement of the form can be handled either as individual

UNIVERSAL FORM CLAMP CO.
1238 N. Kostner Avenue • Chicago 51, Illinois

pieces or as a large unit. Both methods have been very successfully used on recent projects.

Because standard UNI-FORM panels are used to form a large percentage of the "Y" wall contact area, it is possible to strip all UNI-FORM panels within a very short time after the actual pouring of concrete, leaving the trusses in place to provide the necessary support for the required period of time.

In this way, faster forming cycles, using minimum UNI-FORM equipment are pos-



ASSEMBLED SECTION of "Y" wall truss with UNI-FORM Panels

sible, resulting in lower labor and material costs. UNI-FORM Panels are rented or sold, or rented with an option to purchase.

For complete details on Universal "Y" wall forms and UNI-FORM Panels, Write:

UNIVERSAL FORM CLAMP CO.
5855 S. Western Ave., Los Angeles, Calif.

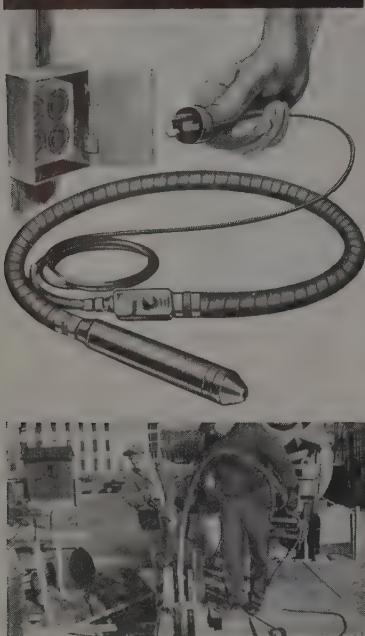
McCRACKEN-RIPLEY
2221 N. Albine Ave., Portland 12, Oregon

UNIVERSAL EQUIPMENT CO.
1549 Eastlake Ave., Seattle 2, Washington

UNIVERSAL FORM CLAMP CO.
2051-59 Williams St., San Leandro, Calif.

Mall

**JUST PLUG THIS NEW
UNIVERSAL
MOTOR-IN-HEAD
VIBRATOR
INTO ORDINARY 115
VOLT OUTLET**



IT'S EASY ON THE FORMS, TOO!

Now, you can forget your expensive generating equipment . . . even eliminate it entirely. The new MALL Universal motor-in-head vibrator operates off any standard 115 volt current. There is another big advantage: it is easy on the forms. 10,000 vibrating frequencies per minute are highly effective but gentle enough not to damage forms. A sealed, shock-proof switch and a thermal overload device to protect against overheating are important safety features. Write for complete details and a FREE copy of the new Mall Construction Tool Catalog.

MALL TOOL COMPANY
Portable Power Tools: Electric • Gasoline • Air
7706 South Chicago Avenue, Chicago 19, Illinois

Gentlemen: Send your new catalog containing complete information about MALL construction tools.

Name _____
Address _____
City _____ State _____
CU-220

NEW EQUIPMENT

(Continued from page 132)

HO Payloader tractor-shovel

A large model HO Payloader tractor-shovel with heaped capacity of $2\frac{1}{4}$ cu. yd. and struck capacity of $1\frac{3}{4}$ cu. yd. has been announced by Frank G. Hough Co., Libertyville, Ill. The model incorporates power-shift transmission, torque converter,



and planetary axles. A torque-proportioning differential to combat wheel slipping provides up to 24% more torque to the wheel with better traction when poor tractive conditions are encountered on one side. Hydraulic load shock-absorber is standard. Model is available with either gasoline or diesel power.

15,000-lb. fork truck

A 15,000-lb. capacity, dual wheel drive, pneumatic-tired fork truck designed for lumber handling and heavy outside work has been intro-



duced by the Industrial Truck Division of Clark Equipment Co., 1921 Escott St., Battle Creek, Mich. Named the YL-150, the machine is equipped with high speed power steering, outside turning radius of 160 in. and a swing length of 189 in. Uprights tilt 6 deg. forward and 10 deg. backward.

Pioneer impact breaker

The Pioneer Cuber Senior, Model 3648, a dual rotor breaker featuring a multi-stage, triple-action reduction

**Only one man to move a
White TROWELER**

Retractable wheel, up to trowel, down to move.

Remove blades and ring in seconds . . . for cleaning, changing blades, or moving through doorways.

Adjust blade pitch during rotation from handle. Safety throttle control stops rotation if operator lets go handle.

**PORTABILITY, patented, exclusive! PERFORMANCE, unbeatable!
PRICE, comparable to trowelers *without* these features! Model T-1,
36" diameter, Patent No. 2,621,568.**

White MANUFACTURING COMPANY

ELKHART 15, INDIANA

Some Dealers' Territories Available—Write Today

principle, is now being marketed. It is suitable for both stationary and portable installations and both primary and secondary breaking of non-abrasive stone, and is recommended for use with jaw and roll crushers where a high reduction ratio and cubical particles are desired. The unit features an adjustable rock-deflecting baffle, provision for varying speed of the hammers, and adjustable discharge grate. Simultaneous production of a wide range of concrete and luminous aggregate sizes and probable percentages of aggregate lime is possible. Two rotors revolve at 550 to 50 rpm. First impact explodes material along natural cleavage lines; second impact projects it towards a baffle that deflects oversize into the path of third impact. Maximum production capacities are: minus 3 in., 50 tph.; minus 2 in., 275 tph.; minus 1 in., 150 tph. Pioneer Engineering Works, Inc., Minneapolis 13, Minn.

Hyster pneumatic-tired lift truck

A pneumatic-tired Monomast lift truck of 2,000-lb. capacity at 24-in. load centers has been announced by Hyster Company, 2902 N. E. Clackamas St., Portland 8, Ore. Designated the Hyster QN-20, the truck is applicable to both inside and outside



shops and will work in narrow aisles and crowded warehouse areas. The unit offers unobstructed visibility for the driver. The upright assembly can be field installed on current Hyster QN-20 models.

86-lb. Onan short stroke engine

A single-cylinder, 4-cycle, air-cooled gasoline engine which weighs 86 lb.—Model AJ—has been announced by D. W. Onan & Sons, Inc., Minneapolis 14, Minn. The engine was developed primarily as prime mover for the firm's line of portable electric generating plants. It develops 5.5 hp. at 3,600 rpm. and is started by a manual pull-rope. Recoil starters or electric starting, rotating exhaust valve and exhaust seat insert, mounted fuel tank, fuel pump and oil pump are optional. The engine has a 2 3/4-in. bore, 2 1/2-in. stroke, 14.9-cu. in. piston displacement and 6.25:1 compression ratio.

Wild N-3 precision level

A Wild precision level, designated N-3, which provides accuracy of plus or minus 0.01 in. in one mile of single leveling and is easy to set up and operate is now on the market. The coated lens telescope is internally focused and has magnifying power of 42X. Centering is accomplished by the standard Wild prism system in which bubble ends are brought to coincide. Bubble image is observed through 2X magnification. All are equipped with tilting screws, coincidence level, and built-in micrometer. Full information and advisory service offered by Wild Heerbrugg Instruments, Inc., Main at Covert Sts., Port Washington, N. Y.

Advertisement



Symons Forms on 2 1/2 Million Gal. Reservoir Tank

Cahill-Mooney Construction Co., Butte, Montana, general contractor, used approximately 5,000 square feet of 2' x 6' Symons Concrete Forms to build this reservoir tank which is 130 feet in diameter and 25 feet high. The tank will hold 2 1/2 million gallons of water, and was constructed for the Butte, Montana, water department.

Symons experienced engineers' ability to tackle and analyze any job, no matter how large or small, is your assurance of efficient, money saving form erection. With your plans, our engineers will prepare a complete form layout, bill of materials, and make recommendations for the most efficient and cost saving method of forming.

Symons Forms, Shores, and Column Lamps may be rented with purchase option. Our general catalog is available FREE upon request. Symons Clamp & Mfg. Co., 683 Thornton Street, San Leandro, California.



"IT'S THE GREASE FOR TOUGH OPERATIONS"

says McCULLOCH MOTORS CORP.
Makers of the famous McCulloch Chain Saws

"We tested all types and makes of lubricants for the Zerol gears in the transmission. The one grease selected for long, tough operation was LUBRIPLATE. Now that we have produced thousands of McCulloch Chain Saws, we more than ever recommend the use of LUBRIPLATE Lubricants in our tools."

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE



LUBRIPLATE H. D. S. MOTOR OIL . . . needs no additives

LUBRIPLATE DIVISION, Fiske Brothers Refining Co.
Newark 5, N. J. or Toledo 5, Ohio

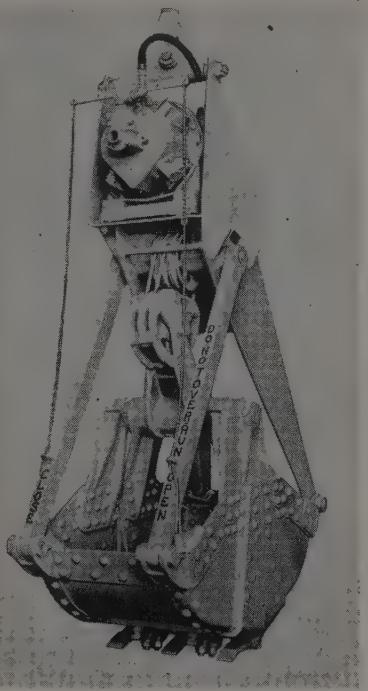
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Bart-Sayer Co., El Centro, Calif.
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Hendrie & Bolhoff Co., Denver, Colo.
Sawtooth Company, Boise, Idaho.
Paul Roberts Co., Pocatello, Idaho
Industrial Lubrication Supply Co., Eugene, Ore.
Moy & Van Dyke, Inc., Klamath Falls, Ore.
Goodyear Rubber & Asbestos Co., Portland, Ore.
Industrial Supply Co., Billings, Mont.
Utah Bit & Steel Service Co., Midvale, Utah
Western Sales Engineering Co., Salt Lake City, Utah
Campbell Industrial Supply Co., Seattle, Wash.
Nolt-Awater Company, Spokane, Wash.
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Dodge-Yakima Supply Co., Yakima, Wash.
Fleck Brothers, Ltd., Vancouver, B. C., Canada
Wilkinson & McClean, Ltd., Calgary, Alberta, Can.

LUBRIPLATE
THE MODERN LUBRICANT

Blaw-Knox clamshell bucket

Now available through Blaw-Knox distributors is a pneumatic closing type clamshell bucket for use with single drum hoists in shaft mucking



"The Head Pulley with Motor Inside." Safe, compact, simple—no chains, no belts, no sprockets, no exposed motors.

Built by Yuba for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington.

Built and sold in other states by Iowa Mfg. Co., Cedar Rapids, Iowa.



IF YOU USE BELT CONVEYORS OR BUCKET ELEVATORS SAVE SPACE, CUT DOWNTIME with YUBA-SCHROCK HEAD PULLEY

All moving parts fit compactly inside pulley shell, protected against weather and dirt, thus practically eliminating pulley troubles. This pulley with motor inside requires no more

room than an idler pulley; can be installed quickly. Diameters 10½" to 56", ½ to 125 hp. for voltages to 2300. Job proved. Write TODAY for folder and name of nearest distributor.

Waterproofing material stops leakage

A waterproofing material that sets in 5 min. and bonds to concrete or other masonry walls or floors to eliminate dampness and active water leakage above or below grade is being offered by Maintenance Engineering Co., 16 W. Johnson St., Philadelphia 44, Pa. The material, called Meco Sealite, is supplied in liquid form and mixed with portland cement for severe conditions or with portland cement and sand for average jobs.

Corrosion-resistant paste pigments

Chemical Sealers, Inc., Belleville, Ill., is now manufacturing a new type of multiple paste pigments, metallic and non-metallic, under the registered trademark CPC. The company claims the pigments are non-hydroscopic, non-oxidizing, non-corrosive, non-hydrolyzing in the presence of water, acids, or alkalies, non-discoloring and non-volatile.



YUBA MANUFACTURING CO.

82

Pulley and Sprocket Dept.

PHONE 628

BENICIA, CALIFORNIA

Air-Maze oil bath filter

An oil bath air filter which achieves low-pressure-drop operation without any moving parts or any outside energy supply has been developed by **Air-Maze Corp.**, 25000 Miles Rd., Cleveland 28, Ohio. The filter, designated LPD, reverses the conventional oil and air circuit, drawing air in under a weather hood and directing it through a regulator tube to an oil control pan, where it picks up oil droplets. Oil is carried through a diffuser cone where air and oil are thoroughly mixed and air is scrubbed. Filtration element then

removes dirt and oil, permitting only clean air to flow to engine, blower, or compressor. Tests show 97.5% of dirt arrested. Large oil reservoir permits long operation before servicing. Special bulletin available from manufacturer.

Lightweight duct-forming tubing

A new type of lightweight metal tubing particularly useful for ducts in the construction field is now manufactured by **Titeflex, Inc.**, 10 Hendee St., Springfield, Mass. Designated Titeflex 500, it is formed of a thin metal strip (lead-coated steel for

construction applications) wound into a tube which has a smooth bore on the inside and helical ridges on the outside. External ridges make the tube resistant to crushing and anchor it within concrete forms with few supports. It can be bent by hand, stays bent in shape and can be cut with a knife, so installation may be done by unskilled labor. Smooth inside bore facilitates sliding of stress bars into the tube in prestressed concrete application. Available in seven sizes from $\frac{7}{8}$ - to 2-in. I.D. weighing .11 to .26 lb. per ft. Furnished in any length required.

UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—Grading and paving on Tualatin Valley highway in Oregon.

Oregon—Washington County—State. Warren NW, Inc., submitted a low bid of \$401,671 for grading and paving on the Cornelius-Hillsboro, orrest Grove and Hillsboro sections of Tualatin Valley highway.

Warren NW, Inc.	\$401,671
Parker-Schram Co.	427,889
Vernie Jarl.	453,487
Central Paving Co., and Calkins Crushing Co.	468,272

	(1)	(2)
All Spec. Clearing and grubbing.	\$7,500.00	\$6,450.00
6 only Removal of catch basins.	15.00	10.00
180 lin. ft. Removal of curbs.	.75	.10
100 sq. yd. Removal of walks.	.50	.50
1,400 cu. yd. Drainage excavation, unclassified.	2.50	3.00
0,500 cu. yd. General excavation, unclassified.	.44	.30
0,000 yd. st. Short overhauls.	.01	.01
3,500 cu. yd. Long overhauls.	.40	.32
3.27 mi. Finishing roadbed and slopes.	500.00	400.00
550 lin. ft. Rounding cutbanks.	.20	.12
2,200 lin. ft. 12" concrete pipe.	1.49	1.85
360 lin. ft. 18" concrete pipe.	2.90	3.35
200 lin. ft. 22" arch type corrugated metal pipe.	4.50	4.85
160 lin. ft. 43" arch type corrugated metal pipe.	14.00	14.00
600 lin. ft. 12" sewer pipe.	1.75	1.80
300 lin. ft. 15" sewer pipe.	2.20	2.55
370 lin. ft. 18" sewer pipe.	3.00	3.10
1,000 lin. ft. 24" sewer pipe.	3.50	4.60
80 lin. ft. Extra for pipe under pavement.	3.00	7.50
20 only Concrete catch basins.	70.00	75.00
8 only Concrete manholes.	225.00	200.00
4 only Adjustment of manholes.	50.00	40.00
130 cu. yd. Concrete curbs.	35.80	45.00
20 sq. yd. Concrete walks.	3.40	4.25
100 only Metal sight posts.	2.40	3.00
7,000 cu. yd. Coarse crushed material in base.	1.98	2.35
0,600 cu. yd. $\frac{3}{4}$ "—0 material in base.	2.08	2.50
2,200 M gal Sprinkling.	2.00	2.00
3.27 mi. Preparation of base.	150.00	200.00
700 cu. yd. $\frac{3}{4}$ "—0 material in binder course.	3.60	3.50
110 ton RC-3 asphalt in binder course.	40.00	40.00
4,000 ton Asphaltic concrete mixture.	3.75	3.55
1,440 ton 85-100 asphalt in mixture.	29.00	31.00
48 ton RS-1 asphalt in tack coat.	50.00	50.00
110 only Extra for asphalt concrete approaches.	25.00	25.00
100 ton RS-2 asphalt.	36.00	41.00
500 cu. yd. Aggregate in pavement seal.	4.75	4.50
4,000 lin. ft. Asphaltic concrete traffic markers.	.90	.75
1,020 cu. yd. Furnishing and placing aggregates.	4.50	4.00
85 ton 150-200 asphalt in shoulder oiling.	34.00	36.00
24 ton RS-1 asphalt in shoulder oiling.	36.00	40.00

RIDGE—Concrete girder bridge and approaches south of Monterey, California.

California—Monterey County—State. James B. Allen & Lee Arnold, Inc., submitted a low bid of \$361,980 for construction of a concrete girder bridge at Limekiln Creek, about 55 mi. south of Monterey, and for grading approaches and surfacing with plant-mixed material on cement treated base.

James B. Allen & Lee Arnold, Inc.	\$361,980
Granite Const. Co.	367,690
Ben C. Gerwick, Inc.	423,542
Chas. MacClosky Co.	459,731

	(1)	(2)
Lump Sum Remove. exist. br.	\$ 2,000.00	\$ 4,000.00

375 cu. yd. Stripping.....	1.00	1.20
Lump Sum Clear & gurb.	3.50	3.00
410 M gal. Applying water.	1.50	1.20
5,500 cu. yd. Roadway excavation.	10.00	15.00
210 cu. yd. Structural excavation, Type "A".	3.00	3.00
1,425 cu. yd. Structural excavation.	3.00	4.00
1,210 cu. yd. Structural backfill.	5.00	2.50
50 cu. yd. Ditch & channel excavation.	.01	.01
34,000 sta. yd. Overhaul.	.50	.25
5,040 sq. yd. Mix, spread & compact. C.T.B.	.50	.25
175 bbl. Portland cement.	5.60	5.40
5 ton Asph. emul. (pt. bdr. & sl. ct.)	50.00	50.00
5 ton Liq. asph. SC-2 (pt. ct. & pen. tr.)	50.00	50.00
590 ton Plant-mixed surfacing.	11.30	15.00
450 lin. ft. Plac. P.M.S. dikes.	.36	.50
50 ton Screenings (med. fin. sl. ct.)	15.00	15.00
115 cu. yd. Cl. "A" conc. (footing blocks).	35.00	40.00
5 cu. yd. Class "A" conc. (struct.)	80.00	150.00
Lump Sum Class "A" conc. (br.) (1,500 cu. yd.)	126,690.00	146,000.00
1,265 lin. ft. Concrete rail.	6.00	7.00
200 lin. ft. Bar reinforc. steel.	.12	.20
Lump Sum Bar reinforc. steel (br.) (335,000 lb.)	45,000.00	37,500.00
50 cu. yd. Steel precast prestressed conc. girder.	1,912.00	1,800.00
2,450 lin. ft. Erect. precast prestressed conc. girder.	750.00	400.00
21,000 lb. Furnishing steel pile.	3.30	4.00
21,000 lb. Driving piles.	96.00	150.00
390 lin. ft. Steel pile splices.	30.00	30.00
330 lin. ft. Misc. iron & steel.	.40	.30
15 ea. Metal plate guard rail.	5.00	4.00
15 ea. Salvaging guard rail.	1.30	1.00
15 ea. Remov. & reconstr. guard rail.	2.80	1.50
50 lin. ft. Guida post, culv.mkr., clear. mkr.	9.00	6.00
50 lin. ft. & horiz. refl. units.	6.00	5.00
50 lin. ft. 18" C.M.P. (16 ga.)	10.00	8.00
50 cu. yd. 24" bit lined C.M.P. (14 ga.)	10.00	4.00
7 ea. Filter material.	44.00	40.00
150 lin. ft. Entrance tapers.	3.00	3.00
7 ea. 8" C.M.P. drdr.	31.00	30.00
7 ea. Dndr. slip joints.	28.00	30.00
7 ea. Dndr. pipe anchors.	600.00	200.00
240 sq. ft. Asbestos bonded metal bin-type retain.	6.50	6.50
360 sq. ft. Asbestos bonded metal bin-type retain.	7.50	7.50
350 sq. ft. Asbestos bonded metal bin-type retain.	10.00	9.00

HIGHWAY—Roadwork at Grand Canyon National Park, Arizona.

Arizona—Coconino County—Bureau of Public Roads, Peter Kiewit Sons' Co. submitted a low bid of \$749,174 for construction on 8.641 mi. on East Rim Drive and South Entrance Road, Grand Canyon National Park.

(1) Peter Kiewit Sons' Co.	\$749,174
(2) Rogers Constr. Co. (San Diego, Calif.)	749,776
B. L. Gustafson Contr.	776,776
Arizona Sand & Rock Co.	795,142

	(1)	(2)
Lump Sum Extra and misc. force account work.	\$3,800.00	\$3,800.00
57 ac. Clearing and grubbing.	1,000.00	1,500.00
95,500 cu. yd. Uncl. excava. (except pub. use bldg. site)	1.20	1.22
3,500 cu. yd. Uncl. excava. (for pub. use bldg. site area)	2.00	1.75
915 cu. yd. Unclassified excavation for structures.	5.00	3.50
2,000 cu. yd. Unclass. excav. for borrow, case 1.	.70	1.10
10,100 sta. yd. Overhaul (1,000 feet free haul).	.03	.025
2,000 cu. yd. mi. Spec. ov' haul of bor. (1,000 ft. free haul)	.30	.10
100 hr. Rolling existing ground.	15.00	16.50

150 lin. ft.	Furrow ditches.....	.25	.50
4,000 continuous sq. yd. sum	Obliteration of old roadways (force account).....	4,000.00	3,000.00
12,200 M gal.	Watering of embankment, subgrade & base crse, items 29, 41, 50 & 52A.....	2.50	3.00
Lump Sum	Prov. & maint. water plant, or plants 5,000.00	5,500.00	
58,725 ton	Selected borrow base course.....	1.80	1.77
51,195 ton	Crushed gravel or crushed stone base course, class 2, grading E-1.....	2.60	2.12
192 ton	Rapid-curing cutback asphalt, grade RC-2, 3, or 4, for prime coat.....	62.00	50.00
44 ton	Emul. asph. for tack coat (grade MS-1).....	100.00	95.00
13,572 ton	(Class F pavement, type F-1) plant mixture, grading A-1.....	4.00	5.00
2,893 ton	Cl. F pave. fin. surf. crse. (top layer).....	9.50	8.00
1,101 ton	Asphalt grade (150-200) for type F-1 (and for finish surface course).....	54.00	50.00
165 cu. yd.	Class "B" stone masonry in parapets.....	130.00	100.00
290 lin. ft.	Class "A" stone masonry in parapets (terrace wall).....	15.00	15.00
90 lin. ft.	12" CGSM culvert pipe.....	5.00	4.00
536 lin. ft.	18" CGSM culvert pipe.....	6.00	5.00
1,150 lin. ft.	24" CGSM culvert pipe.....	9.00	7.50
180 lin. ft.	36"x24" CGSM culvert pipe (arch type).....	12.00	11.00
180 lin. ft.	Removing, cleaning and stockpiling or re- laying salvaged culvert pipe.....	2.00	3.00
26 ea.	18" galvanized sheet metal end sections.....	50.00	40.00
28 ea.	24" galvanized sheet metal end sections.....	100.00	50.00
1 ea.	36"x22" galv. sh. met. end sect. (arch type).....	125.00	60.00
1 ea.	Drop inlet, 18" size (type 2).....	200.00	100.00
2 ea.	Drop inlets, 18" size (type 4).....	300.00	200.00
3 ea.	Drop inlets, 24" size (type 4).....	350.00	225.00
1 ea.	Drop inlet, 36"x22" size (type 4 special).....	400.00	300.00
1 ea.	Steel inlet cover.....	15.00	25.00
6 ea.	Welded steel gratings, (type 4).....	50.00	50.00
12 lin. ft.	Concrete curb (rolled type).....	4.00	5.00
10,054 cu. yd.	Cut stone masonry curb (concrete base).....	4.60	5.00
890 sq. yd.	Flagstone terrace.....	17.00	16.00
Lump Sum	Entrance terrace lighting system.....	1,000.00	500.00
1,340 cu. yd.	Furnishing and placing loamy topsoil.....	2.00	1.50
750 cu. yd.	Furnish. & placing loamy topsoil (in skpl.).....	1.50	1.00
358 M sq. ft.	Turf shovels.....	20.00	20.00

HIGHWAY—Grading, surfacing, and draining in Montana.

Montana—Roosevelt County—State. Albert Lalonde Co. submitted a low bid of \$337,420 for grading, gravel surfacing, bituminous surfacing treatment, and drain on 10,657 mi. Froid-West highway.

(1) Albert Lalonde Co.	\$337,420
2) Norgaard & Hilling (Williston, N. Dak.)	341,616
Peter Kiewit Sons' Co.	342,109
Richardson Const. Co.	342,757
S. Birch, Inc., and S. Birch & Sons Const.	344,366

	(1)	(2)	
252,199 cu. yd. Unclassified excavation and borrow.	\$.23	\$.23	
1,996 cu. yd. Culvert excavation.....	2.00	1.50	
34,064 mi. yd. Overhaul.....	.17	.15	
3,995 ton	Cover material.....	4.50	6.00
27,622 ton	Type "A" top course.....	1.25	1.60
104,284 ton	Select. borrow base course.....	.93	1.02
55,918 gal.	1st app. MC-2 l. asphalt.....	.23	.18
55,977 gal.	2nd app. RS-2 emul. asphalt.....	.23	.18
540 units	Rolling embankment.....	8.00	7.00
625 units	Rolling surf. course.....	8.00	8.00
6,795 M gal.	Watering.....	1.00	1.80
1,150 lin. ft.	Corr. metal. P. culvert 15" diameter.....	4.35	3.80
112 lin. ft.	Corr. metal P. culvert 18" diameter.....	5.10	4.50
822 lin. ft.	Corr. metal P. culvert 24" diameter.....	7.75	6.00
72 lin. ft.	Corr. metal P. culvert 36" diameter.....	13.70	12.00
92 lin. ft.	Corr. met. pipe arch cul. 29" sp. by 18" rise.....	8.90	7.00
592 lin. ft.	Corr. met. pipe arch cul. 58" sp. by 36" rise.....	22.00	16.00

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allow for borders and composition.

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Johnston Stainless Welding Rods

Critical, Down-to-Earth Welding Rods
Alloys as they are supposed to be

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A. P. JOHNSTON CO., INC.
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BACKFILL, uncompacted

Watch those employees who are minors

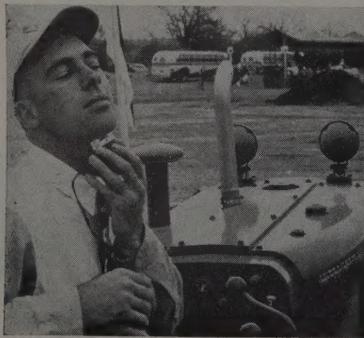
With school vacation time at hand and many minors seeking summer employment, the Industrial Indemnity Co. urges contractors to check carefully the requirements of both State and Federal labor laws relating to such employment. Violations of these laws carries a penalty which may be especially severe if an unlawfully employed minor is injured on a job. According to Thomas Soule, Chief Safety Engineer, the company has prepared a digest of related laws and it is available to contractors. Address **Industrial Indemnity Company**, 155 Sansome Street, San Francisco 4, Calif., and ask for "Employment of Minors" chart No. 255.

U. S. owns a lot of Idaho

Typical of many Western states, a land classification for Idaho shows that 66.6% of its area is owned and controlled by the Federal Government.

This creates the typical Western problem in connection with highway development. The 600,000 people living in Idaho, many on isolated ranches in mountain valleys, are vitally interested in their highway problems, but they cannot finance them. Where and how and for what purpose to build highways is the continuing problem. This is aggravated by the tourist attraction of Idaho during the summer months, which was well illustrated by the fact that at one time last summer there were more cars from California in Stanley Basin than from any other state, including Idaho.

DURING the two-day press conference put on by International Harvester Co. last month, the operator took time out to demonstrate that the outlet on the machine which usually holds a cigarette lighter will also power a shaver.



A duck through a lock

A mallard duck and her brood was locked through Willamette Falls locks enroute downstream. Given a special lockage the duck and her 12 young ones grouped behind her went through the locks and the trip was recorded in the daily log. Tonnage was listed as feather weight and lock-master John Tatone noted in the log that he was unable to obtain a manifest.

Watch the height of hand rails

The human body is not in very stable balance and it does not take much of an obstacle to upset a person, particularly one employed off the ground. For this reason low hand rails are almost worse than no railing at all if they strike the body of a workman below the center of gravity. Safety orders of the State of California require all platform hand rails to be 42 in. high. This height gives maximum protection against upsetting of the average individual when thrown or stumbling against such a rail.

NEXT MONTH

A SERIES OF TWELVE design charts will start in the next issue. They will present in condensed form the ACI requirements for the design of structural members. Each chart will bring together in one convenient presentation all the information from "The ACI Building Code" necessary for the experienced designer. Brought together from various sections of the Code, the individual chart will make available all the design stipulations relating to any one type of member, such as floor slabs, beams, columns, or walls for fast design and checking.

The author, Thomas Haran, is a member of ACI and ASCE. He organized the material into these twelve convenient charts for his own use. Their usefulness caused more and more of his associates to ask for copies. He is now making them available through the pages of **Western Construction**. The first one accompanied by a general explanation of their use will appear in August.

Twenty-five years ago in *Western Construction*

"Sunnyvale, California, has been selected by the Federal Government as the site of a hangar which will house a lighter than air ship (ZRS-4) for the Navy."

"Mercer-Frazer Co. has work under way on the Rogue River Bridge for the Oregon State Highway Department. The bridge is the first one in this country to include the Freyssinet method for adjusting the 230-ft. concrete arch spans."

"The \$4,000,000 St. John's Suspension Bridge across the Willamette River at Portland, Oregon, has been completed and will be dedicated this month."

"L. E. Dixon Co. has completed the Big Tujunga Dam for the Los Angeles County Flood Control District. The concrete arch is 200 ft. high above streambed."

"The State of California has completed a plan for state water development estimated at cost of \$374,000,000, and the governor will probably call a special session of the legislature to get this program underway."

"The Western Association of State Highway Officials is holding its annual conference in San Francisco this month. Henry H. Blood of Utah is president and Dr. L. I. Hewes is on the executive committee."

"J. E. Shea Co. has established a world record in tunnel excavation on the Owyhee Project in Oregon, driving 1,315 ft. of 11 x 11-ft. tunnel in 31 days and 63 ft. in one day. Mort Boss is superintendent."

"General Construction Co. is now placing concrete at Owyhee Dam with Ben Cook, general superintendent, and C. G. Clapp, superintendent on the Dam."

"Low bids received for construction of the Golden Gate Bridge were accepted and contracts awarded."

... The Editor

Will it save engineering hours?

In an effort to speed the Federal Highway Program there is a suggestion that the Government permit state highway departments to call for lump-sum bids, rather than the usual unit prices. This would be a means of saving engineering time and manpower in highway offices. Certainly the preparation of detailed figures for an earth-moving job takes man-hours of engineering and sub-professional time. Highway departments would benefit, but a gain in one direction may mean a loss in another. The suggested plan will of necessity throw more engineering work on contractors' forces. What is worse, it might result in several contractors duplicating field surveys to determine quantities to be used in preparing bids. Certainly no contractor is going to bid an earth-moving job higher for a lump-sum or at a unit price without knowing quantities. They represent the fundamental cost figure. In the past the contractor has accepted figures presented in the bid call. But if they are not there he will have to develop them himself. It could result in a joint quantity survey prepared for all bidders, but the general lack of enthusiasm for quantity surveys on other types of construction would lead to the conclusion that each bidder would want to make his own survey.

The real problem is the overall shortage of engineers, and the suggested plan would merely take the same amount of engineering time and transfer it to contracting organizations. One sure result would be a raise in bid prices. Also, the contractors might outbid the public agency for engineering talent. Rather than helping, the result could further aggravate the distressing shortage of personnel for state highway departments. Transferring the engineering work load is not reducing the amount of work or solving the problem. Finding means to reduce the man-hours of engineering work is the answer.

Highway design by emotion

How early, and in how much detail should the public participate in planning major highway improvements, particularly arterial routes that extend into urban areas? Should the engineers of a state highway department initiate hearings and consult the public at the very start of planning an express route through a metropolitan area?

The Board of Supervisors of San Francisco recently passed a resolution asking the state legislature to consider a law requiring the California Highway Commission to hold public hearings at the beginning of any planning on highway routes. It was implied by the resolution that the lack of such procedure would prove the Commission high-handed and functioning without regard for the public interests. The circumstances that prompted this local political outburst advocating public-engineering are not important. Pressure groups claimed the public was not consulted in time. The comment of B. W. Booker, assistant state highway engineer located at San Francisco, that "You can't hold a factual hearing on sentiment alone," touches the key to the problem.

Highway planning and engineering is a highly complex procedure, and grows steadily more so. Studies of today's traffic and the future potential are just the beginning. Growth trends of the area and the developing traffic patterns are the next consideration. Costs then begin to enter the picture, based on topography, the number of lanes required, and real estate values. Answers to these and many other technical problems require involved engineering skills. At this stage, the best solution cannot be mixed with emotional citizenry if a logical answer is to evolve.

The typical public hearing, with its vociferous do-gooders, is usually a babel of confusion based on feelings rather than figures and can accomplish nothing constructive in the early stages of the project. No public improvement designed to benefit the majority will be acceptable to all. Engineers and highway commissioners know that. But, if the minority is loud enough, the majority may be overpowered and the result can be a miscarriage of engineering judgment. While engineers are in the stage of assembling, organizing, and analyzing data they should be allowed to deal in facts without every individual lot owner adding comments and suggestions.

With population growth in the West what it is today and will be tomorrow, it is essential that state highway commissions strengthen their public relations to the point where their engineers can develop designs based on facts, without benefit of public caucus. When the plan and alternatives have been advanced to a studied conclusion it is time for the engineer's proposal to be presented to the public for reaction and comment. Engineers plan and design; the public approves or suggests changes.

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