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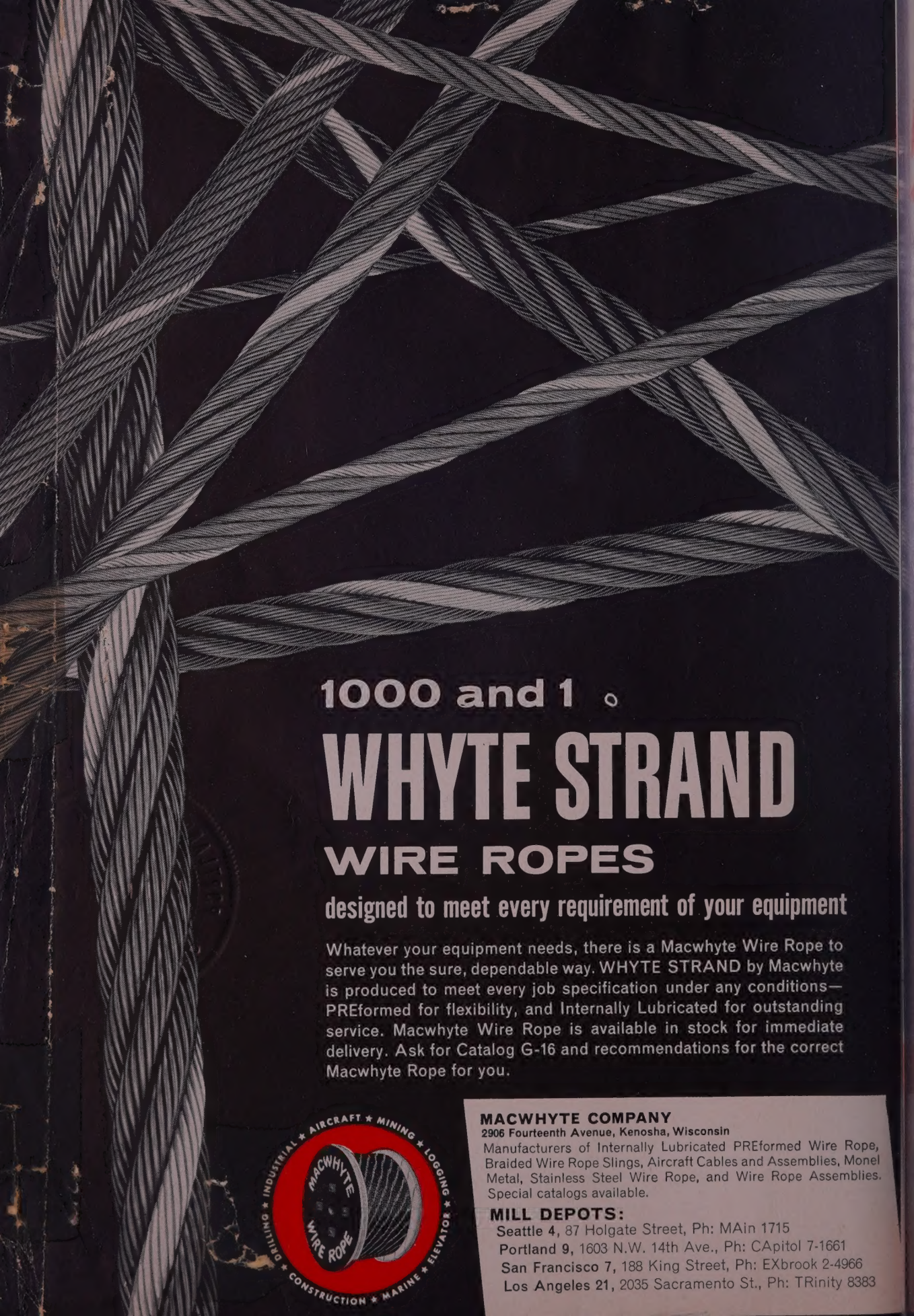
Jacking shield speeds
Hyperion tunnel job

Glendo Dam in
Wyoming nears
completion

Prestressed columns
for lift-slab project

MARCH 1957

COVER..... see page 4



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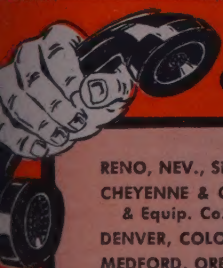


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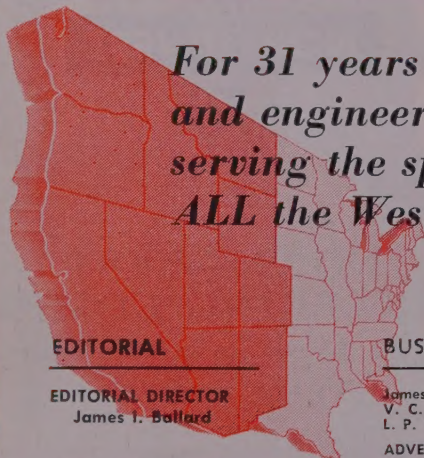
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FRONT COVER

MINERS on Hyperion Tunnel in Los Angeles work under the protection of a steel shield, jacked forward hydraulically. Combination of shield and ideal ground conditions has resulted in such record advances as 153 ft. in a day.



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Road Show observations

SIZE AND COMPLEXITY were the outstanding features of equipment displayed at the ARBA Road Show last month. Comparing the machines to those displayed nine years ago at the last show proved these trends. There appears to be no indication that any end is in sight. We will see bigger and more complex machines available for the construction industry in the years ahead.

Increases in size—this means added weight and greater capacity—result from the obvious demands of contractors for more yardage in fewer shifts. Outstanding result of this pressure has been to hold earth-moving costs at the unit prices of thirty years ago. Equipment manufacturers deserve a full share of recognition for this remarkable achievement.

Everyone appears to accept this continuing increase in size as logical and proper. Competition among contractors for jobs, and among manufacturers for sales, accelerates the trend—with some resulting problems. Every hour a big machine is doing productive work it is cutting costs below those possible with an older model. But, every minute the machine is down the corresponding investment charges go higher. This situation is forcing contractors to appreciate the value of cost and operating records. Downtime gets to be an ever bigger headache; not only hours required for overhaul, but even the minutes occupied with normal maintenance. The ordinary grease job used to be considered rather unimportant in the machine's output, but with the big machines of today it becomes a serious drag on production time. Even the time required to fill the fuel tank causes concern.

Advances in complexity tend to produce increasing field problems peculiar to this Western region. Reasons that lie behind the constant increase in mechanical complications are not as simple as those that dictate larger size. Among obvious factors are: the desire to keep pace with

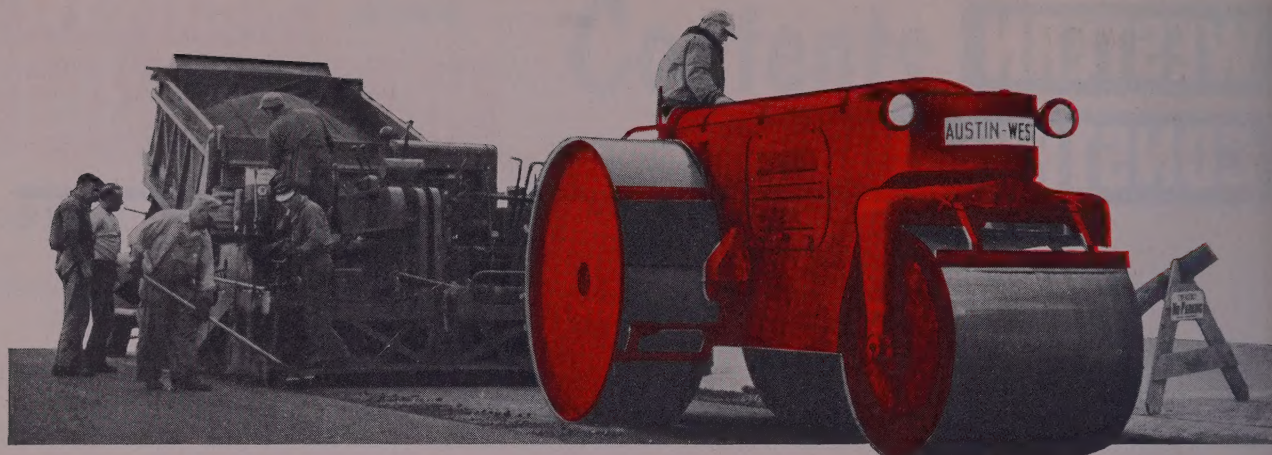
all types of modern machines from airplanes to autos, effort of manufacturers to substitute mechanical means for declining operators' skill, and the general round of selling pressure to provide new sales features. There are definite advantages to these added mechanical improvements, but there are corresponding problems. Foremost is the skill and training required for competent repair men.

No longer is it possible for an ordinary mechanic with simple tools to make repairs. Those days are gone. Here in the Western states the problems can reach serious proportions. What about the medium size highway contractor sweating out downtime on a mountain or desert job a hundred miles from expert service help. This situation is going to put a higher premium on the service facilities of both manufacturer and distributor. The purchaser of equipment will be thinking more and more of the service he is buying with the machine.

At the same time, machine builders are able to put more and more hours of uninterrupted operation in these modern controls and devices. Equipment is more reliable today. Periods between maintenance are being extended, and overhaul has correspondingly longer intervals.

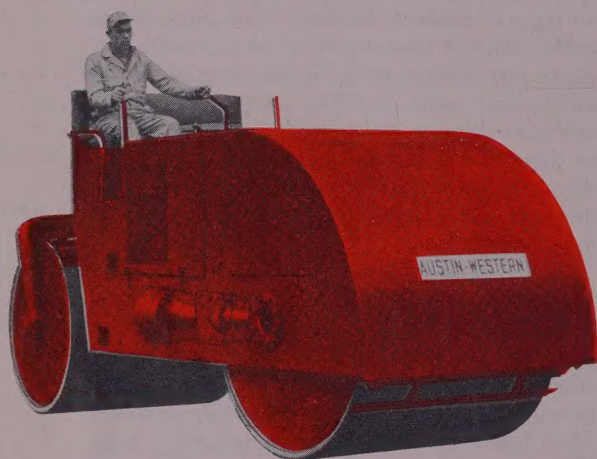
Both size and complexity increase. Manufacturers and contractors can take joint credit and responsibility for these two trends that were so obvious at the 1957 Road Show. They represent a combination of added efficiency and maintenance problems that must be accepted in all types of modern machines. We are going to see more of the same in the years ahead.

Jim Ballard



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8-11, 10-12, 12-14 ton models. The left drive roll is keyed to the axle shaft; the right turns on heavy duty bushings independent of the left roll and axle. Torque-proportioning-type differential transfers power automatically from a slipping roll to the opposite one, giving traction under almost any conditions.



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MARCH 1956

Finishing Glendo Dam in Wyoming

Bureau of Reclamation's earthfill structure will be completed in summer of 1957—power is planned for spring of 1958. Biggest problem is erratic sizing of material, especially deficiency in fines. Contractor places 300,000 cu. yd. in one month.

By **WILLIAM N. FLEMING, Engineer**
Commissioner's Office
Bureau of Reclamation
Denver, Colorado

CONSTRUCTION is nearing completion on Glendo Dam and Powerplant, principal features of the Bureau of Reclamation's multipurpose Glendo Unit of the Missouri River Basin Project in southeastern Wyoming. At the end of the 1956 construction season the contract for construction of the dam and powerplant foundation was about 85% completed. The dam will essentially be completed by summer of 1957.

The dam, located on the North Platte River about 4 mi. southeast of the town of Glendo, will impound 800,000 ac.-ft. of water for use in power production, irrigation, and flood and sediment control. When topped out, the earthfill structure will have a height of 170 ft. above riverbed and length of 2,200 ft. at the crest, and a volume of about 2,650,000 cu. yd.

The dam is in a narrow canyon of the North Platte where the river enters a horseshoe bend. A combined power and outlet tunnel 21 ft. in diameter and 2,100 ft. long passes through the neck of the bend from an inlet structure which is about ½ mi. upstream from the dam on the south shore of the reservoir. The powerplant near the outlet of the tunnel will house two 12,000-kw. generating units operating at an average head of 107 ft.

The dam embankment has a central impervious core, stabilized and protected upstream and downstream by semi-pervious materials. A 3-ft. layer of rock riprap protects the upstream

face, which slopes 2½:1 from the crest at elevation 4,675 to elevation 4,655, and then 3:1 to the minimum water surface elevation 4,545.0. A disposal zone, sloping 5:1 below elevation 4,545, forms the upstream toe. The downstream portion of the dam has a zone of free-draining materials. The slope of the downstream face varies, beginning at the crest, from 2:1 through 2½:1 to 5:1 at the toe. (See accompanying drawing for explanation of the zones.)

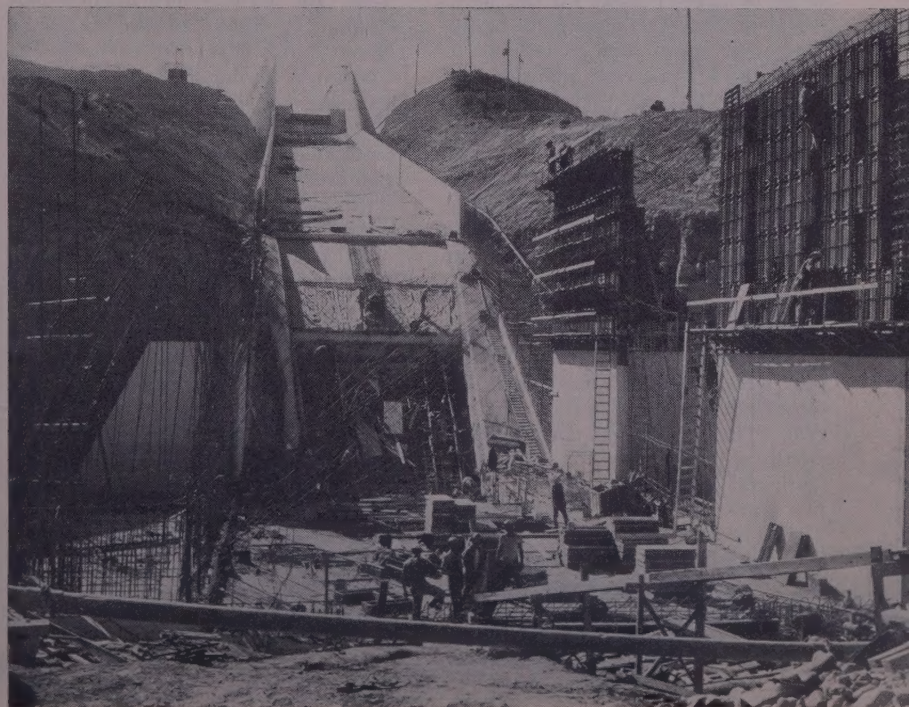
At the right abutment of the dam is the spillway, consisting of a riprap-lined approach channel, a concrete-lined inlet channel between converging walls leading to the 45-ft.-wide ogee crest, a concrete-lined chute and stilling basin and an outlet channel leading to the river. The crest structure includes a concrete girder

and deck highway bridge having a 24-ft.-wide roadway. Seepage is controlled by a concrete cut-off wall and grout curtain under the crest and a drain system under the floor of the chute.

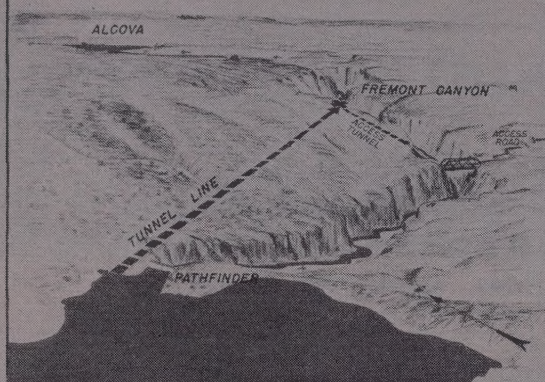
Dam site

Several potential sites for the dam were investigated along the river in the general vicinity of Glendo, the final site being chosen principally because the narrow neck of the bow of the river provided a convenient location for the combined diversion, outlet, and power tunnel, and because of the desirable spillway site afforded by a neck of sound rock jut-

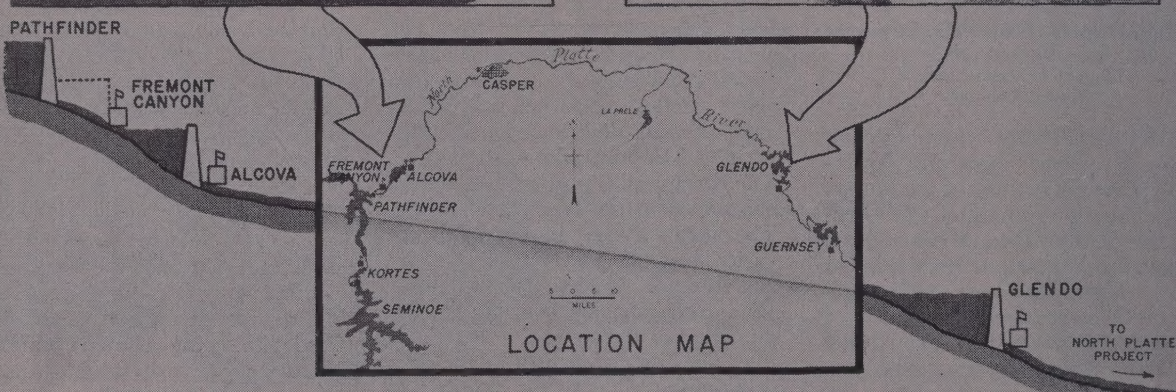
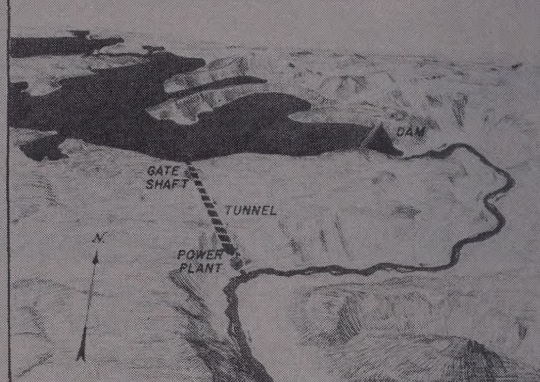
BELOW: View of spillway construction looking upstream from stilling basin.



FREMONT CANYON POWERPLANT AND PRESSURE TUNNEL



GLENDO DAM, RESERVOIR AND POWERPLANT



MULTI-PURPOSE GLENDON UNIT is part of the Bureau of Reclamation's Missouri River Basin Project in southeastern Wyoming. Glendon Dam

will impound 800,000 ac. ft. of water for flood and sediment control, power, and irrigation. Average head on generators will be 107 ft.

ting out from the right side of the valley.

The reservoir basin is an erosional valley in gently dipping sedimentary rocks. A narrow ridge on the south rim of the reservoir consists of highly permeable sands and gravels up to 25 ft. thick lying over siltstone, the upper 5 to 10 ft. of which is fractured at close intervals. However, nearly all the sand and gravel lies above the maximum water surface elevation 4,669, and the siltstones are sufficiently impermeable below elevation 4,653 (top of flood control pool) to prevent significant leakage.

Geologically, the dam site is dominated by the shales, sandstones, and limestones of the Morrison formation, which at the site has a slight dip somewhat greater than the fall of the river. The foundation consists principally of interbedded shales and thin lenticular limestones, and two massive sandstone beds 10 to 20 ft. thick. The upper bed forms the rimrock above the site; the lower bed lies just below the river sands and gravels, which range up to 37 ft. deep.

Contractors and construction

Bids calling for construction of Glendon Dam, powerplant foundations, and roads, were opened November 9, 1954, in the Bureau's North Platte River Projects office at Casper, Wyoming. The contract was awarded to C. F. Lytle Company and Green Construction Company of Sioux City, Iowa, at the combination low bid of \$6,270,790. Construction under the contract provisions began November 29.

In general, the contractor has carried out the work consistently in advance of the time allowed. During the first year of construction emphasis was placed on the outlet works tunnel and powerplant foundations preparatory to a planned diversion of the river through the tunnel the following spring. However, the contractor also carried out as much preliminary work on the dam as possible to permit maximum construction efforts during 1956.

Beginning upstream, the outlet works consist of a vertical intake and

trashrack structure, and a horizontal concrete conduit section leading to the 21-ft.-diam. outlet tunnel. Near the upstream portal of the tunnel is a 16.5 x 21-ft. fixed-wheel bulkhead gate reached through a concrete-lined shaft to the ground above. The downstream outlet structures consist of a 21-ft.-diam. steel liner inside the tunnel, a short length of 21-ft.-diam. pipe, a steel surge tank 22 ft. 4½ in. in diameter rising from the pipe just outside the tunnel portal, and pipe branches to the two powerplant turbines and the river outlet works. The river outlet branch terminates in 3 outlet pipes, each to be controlled by 7.25 x 7.75-ft. high-pressure gates. The outlets discharge into the stilling basin alongside the powerhouse.

Open-cut excavation at the inlet portal of the outlet works began on December 16, 1954, and by March 1955 had advanced sufficiently to permit tunnel excavation to start. Beginning at the inlet portal, the upper two-thirds of the tunnel was driven first, using roof bolts for sup-

port until the sandstone-shale contact dipped below the roof near the half-way point. From there on, steel H-beam ribs and channel lagging were used. Following hole-through on May 24, 1955, the invert was excavated, closely followed by placement of a concrete pad to protect the rock from traffic over the invert. Nearly 42,000 cu. yd. were excavated for the tunnel and gate shaft.

Concrete for the tunnel lining was delivered either through the downstream portal or through the gate shaft from the batching plant located near the river upstream from the powerhouse site.

Embankment construction

The contractor began stripping the embankment foundation in May 1955. By the time earthwork operations were suspended because of cold weather in November, he had completed foundation stripping, cut-off excavation, and grouting except in the river channel. Prior to diversion, embankment operations were restricted entirely to the right side of the river and mostly downstream from the cut-off trench. Earthfill placements were principally in the zone 2 portion of the dam, permitting the contractor to place rather than stockpile major quantities of material from structural excavation. After diversion rapid progress was made; the cut-off trench and grouting were completed in the river bed and 300,000 cu. yd. of embankment were placed during August 1956.

Construction of the foundation grout curtain followed a general program of drilling and grouting at 10-ft. centers through a concrete grout cap which extended up both abutments. In general, grout takes were nominal and limited to the upper 30 to 40 ft. of each hole, although there were isolated exceptions at shale-sandstone contacts. Highest takes for the job were at the sandstone outcrop in the left abutment where two adjacent holes took nearly 4,000 sacks of cement in the first 10 ft. of hole. To insure a good curtain in this area, additional holes at 5 and in some cases 2½-ft. centers were grouted. Similar precautions were taken with the outcrop on the right abutment.

By June 1956, all necessary steps preliminary to diversion of the river through the outlet works—which required construction of the intake structure, tunnel, powerplant sub- and intermediate structures and still-



LOOKING TOWARD right abutment during placement of impervious core materials following clean-up of the cutoff trench. Dam volume is 2,650,000 cu. yd.

ing basin, and fabrication and installation of outlet piping—had been completed, and diversion was accomplished by the end of the month.

Foundation dewatering was carried out through a sump to bedrock located near the downstream side of the upstream cofferdam and a sump 500 ft. upstream from the toe of the dam, and sumps at each side of the cut-off trench. Seepage in the cut-off trench was carried by tile drains from wet areas to gravel-filled ditches along each side of the trench at the base, and pumped from two sumps in the upstream ditch and one sump in the downstream ditch.

Placement of the selected clay, silt, sand, and gravel for the impervious core of the dam closely followed grouting and final clean-up which was made by motor patrol, hand, and air blast. Following clean-up, the foundation surface was moistened and immediately covered with 12 to 14 in. of embankment. Pumping was continued through pipes reaching up through the embankment until about 30 ft. of embankment was placed, then the entire system was grouted.

Principal source of impervious materials has been a borrow area in valley flatlands about 2 mi. upstream on the right side of the river, supplemented from another area just upstream from the outlet works intake structure. In general, the materials

are moistened by irrigation in the borrow areas, cut to the underlying sands and gravels and carried to the dam by motor scrapers. There they are spread in layers and compacted by 12 roller passes. Placing and compacting equipment included 4 rolling units of two rollers each, 2 dozers for leveling, one scarifying tractor pulling two rows of 14-in. disks and one 5,000-gallon water wagon. Where needed at the steeply sloping sandstone outcrops or around structures, special compaction has been provided using power tampers and a 50-ton pneumatic roller.

The sand, gravel, and cobbles for the semi-pervious zone have come from the dam borrow area and from the river bed upstream and downstream from the dam.

Most of the miscellaneous materials for the downstream pervious zone have come from the spillway excavation. Ranging from sandstone, limestone, and shale fragments to fine blow sand from the tailrace excavation, effective use of these materials has been made by alternating 12- to 18-in. layers of rock with layers of sand, then wetting and rolling to the desired 12-in. lifts.

By early November 1956, nearly 2,000,000 cu. yd. of the dam embankment had been placed, and spillway and gate shaft concreting and surge tank erection were essentially completed. Closure is now planned for

October 1957. Work remaining after closure includes plugging the opening in the base of the outlet works intake structure, and installing the fixed-wheel gate in the tunnel and the high-pressure gates in the downstream outlets.

Work has begun on a \$1,120,447 contract awarded October 25, 1956, to Eagle Construction Corporation of Loveland, Colorado, for completion of the powerplant and switchyard. Initial generation of power is planned for the spring of 1958.

Construction facilities

Construction power is being provided from the nearby Alcova-Gering 115-kv. transmission line, which also will serve to transmit power from the completed powerplant. Transportation to the site is by way of rail and highway facilities reaching Glendo and a temporary access road constructed to the site by the contractor. The Lytle and Green contract also includes construction of 2.5 mi. of permanent roads for access to the dam, shaft house, and powerplant, 1 mi. of permanent access road toward Glendo, and relocation of 4 mi. of county road across the dam, to replace the road that will be inundated by the reservoir.

Raw aggregates for concrete were excavated by dragline from gravel deposits along the river upstream from the powerplant, and trucked to stockpiles near the processing plant on the right bank of the river about 1,000 ft. upstream from the powerplant site. Basic units of the plant consist of a preliminary screening unit which includes provision for raw feed washing, return of oversize to a crusher, and bypass of sand to a scalping tank; and a final screening

unit with 1½-in., ¾-in., and No. 4 screens. From the scalping tank the sand passes through a screw classifier, then to stockpile. Biggest problems have been erratic sizing of the raw materials, especially a deficiency in fines. The deficiency was met by careful blending in the raw storage pile and constant water adjustment in the scalping tank, and the addition of blow sand from the powerplant excavation. The batching and mixing plant consists of a 150-ton, 4-compartment bin with cumulative weight batcher, and a 2-cu. yd. mixer having a back-end mixing chute.

Concrete mixes included use of type II low-alkali cement, 3-in. maximum size aggregate, water-cement ratio ranging from 0.47 for thin sections of exposed concrete to 0.60 for concrete protected from freezing and thawing, and entrained air ranging up to 6%, depending on aggregate size.

Project functions

From its source in the Medicine Bow Mountains in north-central Colorado, the North Platte River flows roughly north to the vicinity of Casper, Wyoming, then generally east to its junction with the South Platte near North Platte, Nebraska. Altogether the river is 655 mi. long and drains 32,000 sq. mi. of land. Four Bureau dams in the mountainous country above Casper—Seminole, Kortez, Pathfinder, and Alcova—provide storage and power for two large Reclamation Projects. These are the Kendrick Project near Casper, and the North Platte Project along the river in Wyoming and Nebraska. Downstream from Casper near the Wyoming-Nebraska state line is Guernsey Dam, which pro-

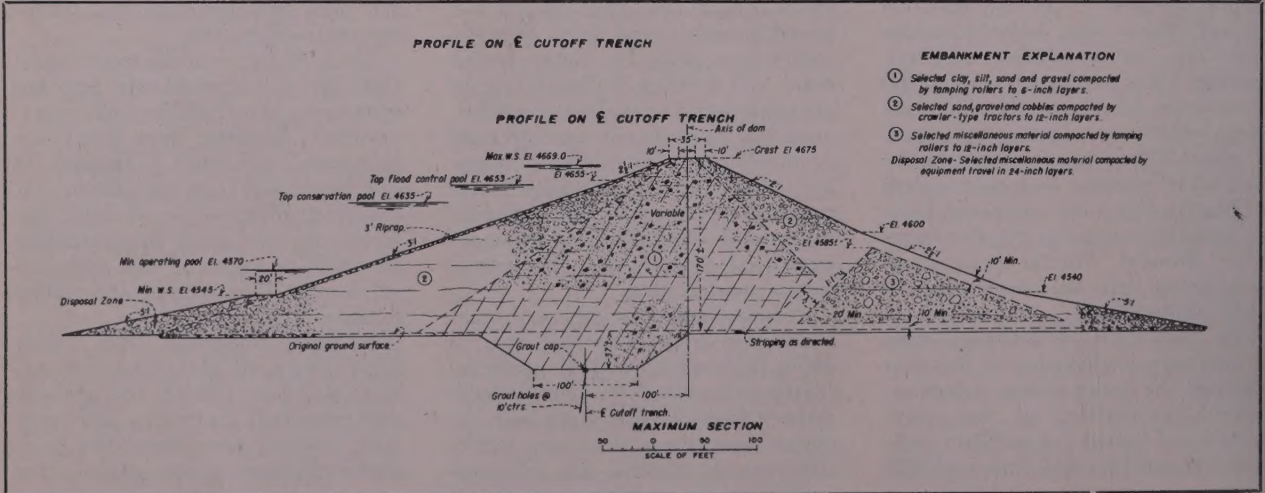
vides re-regulation of upstream releases and develops 4,800 kw.

The Glendo unit was authorized for construction under the Flood Control Act of 1944 as a unit of the Missouri River Basin Project. Originally planned for a reservoir capacity of 150,000 ac.-ft., subsequent studies indicated this was not adequate for the needed development of power, flood control, and other needs along the river, and the capacity was expanded to 800,000 ac.-ft. A total of nine plans was considered and finally reduced to two. One was for reservoir operation without irrigation storage, the other included irrigation storage but needed the consent of the interested states and the Supreme Court to a change in river flow. This consent, obtained in 1953, permits storage of 100,000 ac.-ft. and annual releases not to exceed 40,000 ac.-ft. for irrigation. The water will provide a dependable supply for private irrigation districts that have natural flow rights but no storage rights on the river.

Personnel

James E. Dunn has been superintendent for the prime contractor. Designs and specifications for Glendo Unit features were prepared in the engineering offices of the Bureau at Denver, Colorado, under the direction of Assistant Commissioner and Chief Engineer L. N. McClellan. Technical supervision of construction is also under McClellan's direction. The Bureau's construction engineer at Glendo is C. S. Rippon. The Glendo Unit is in the Bureau's Region 7; R. J. Walter, Jr., whose offices are in Denver, is regional director. The North Platte Projects Office is at Casper; I. J. Matthews is project manager.

CROSS-SECTION OF GLENDO DAM AT POINT OF MAXIMUM HEIGHT



Changes method, triples advance

Contractor on Hyperion tunnel in Los Angeles tries jacking a partial shield and triples rate of progress. Advance of 153 ft. in one day is record for any tunnel.

SPECTACULAR tunnel driving records are being set in Southern California. A combination of ideal ground conditions and proper equipment is helping to make this possible. A 20,000-ft. horseshoe shaped tunnel, the North Central Outfall Sewer, is being constructed for the City of Los Angeles in connection with the expansion of the Hyperion Sewerage System.

Contractor on the \$6,196,691 contract is a joint venture composed of Arundel Corp., L. E. Dixon Co., and Kemper Construction Co. with L. E. Dixon Co. sponsoring the excavation and the Kemper Construction Co. sponsoring the concrete lining. The tunnel runs from Centinela Boulevard in Culver City southeast under Sepulveda, Manchester, Lincoln and Coast boulevards, and will end at Imperial Boulevard near the Hyperion Sewage Treatment Plant on the beach.

Preliminary studies

In 1955, after the voters of Los Angeles approved a \$60,000,000 bond issue for construction of expansions to their sewerage system, the City retained the services of Hyperion Engineers, a joint venture composed of the engineering firms of Holmes & Narver, Inc., sponsor; Daniel, Mann, Johnson & Mendenhall; and Koebig and Koebig; in consultation with the offices of Clyde C. Kennedy, Bowlus-Pomeroy, and the

city engineer. When the final route for the tunnel had been determined, 54 test holes, averaging 75 ft. in depth, were excavated along the line. Five hundred undisturbed soil samples were collected between the elevations 35 ft. above and 15 ft. below the proposed invert. Seventy-five per cent of the undisturbed samples were tested to determine moisture, density, direct shear, and particle size. Ground-water was chemically analyzed for chloride and sulfate content.

Five of these holes were provided with a 3-in. perforated pipe extending from top to bottom of the boring so that a current record of water levels could be obtained during the construction of the tunnel, thereby allowing the contractor to anticipate any water problems that might develop. The sub-surface conditions revealed by this extensive investigation also permitted a lump sum type of construction contract. Principal items in the winning bid submitted by Arundel-Dixon-Kemper were \$3,612,000 for 20,376 lin. ft. of tunnel excavation and support, and \$2,300,000 for the same length of tunnel lining.

The soil varies from fine silty sand to well-graded granular sand with an occasional layer of clay. Because of this uniformity the method and extent of supporting the tunnel was made the responsibility of the contractor. It is expected that the sandy



MINERS shovel sand from tunnel face as hydraulic jacks push steel shield forward. An overshot loader works behind them, dumping sand onto a conveyor which loads cars.

material will close in on the tunnel supports rather rapidly after excavation and as a consequence overbreak is being minimized to avoid subsidence of the ground surface. About 50% of the tunnel passes under residential areas and therefore specifications call for well-controlled mining operations.

Changes to shield

The contractor began work on the north portal in July of 1956, using the conventional spiling and rib method. A month later the south portal was opened by using a partial shield built for the joint venture by the Flocrete

VIEW outside north portal shows stockpiles for lagging and steel supports. Carpentry area is in left background. Ideal ground conditions, proper equipment, meant fast rate.



Co. Before many weeks had passed it became evident that the shield was by far the most economical way to drive the tunnel. The decision was made to change the method of driving in the north heading and work was started on the building of another shield.

Early in December the second shield was ready and it was brought into the north heading in four sections on special dolly cars. In order to provide space for the assembly a 30-ft. long section of the tunnel had to be excavated at a slightly larger diameter. The heading was shut down for about a week while the shield was being assembled. As it turned out this delay was quickly made up.

Best day: 153 ft.

Using the conventional pile driving method the heading had been advanced about 35 ft. per day. With the shield this rate was much improved. In the week of January 21, working around the clock, crews pushed the 2 headings forward the spectacular distance of 1,304 ft., for what must be a record for any kind of a tunnel. On the best day the north heading was advanced 153 ft. while the south heading was making 137 ft.

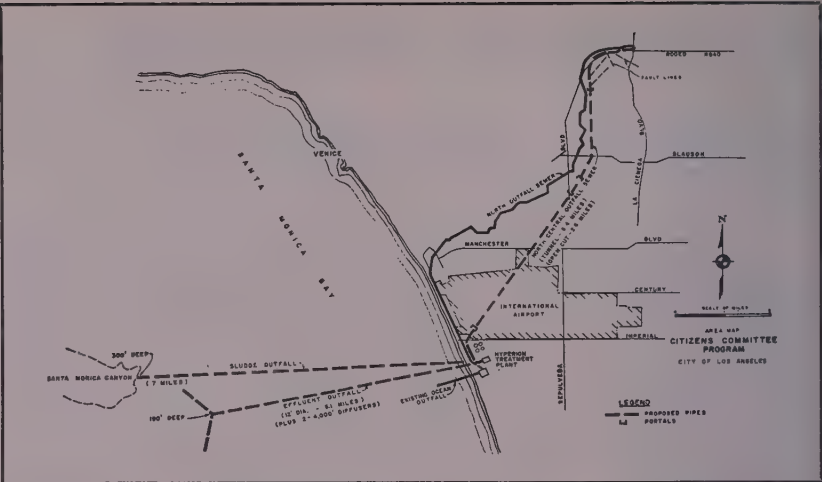
The shield is shaped to fit the 12-ft. diameter horseshoe tunnel. The shield is about 22 ft. long and made of 1/2-in. steel plate. It is jacked forward by 6 hydraulic jacks which bear against the 3 x 8-in. collar braces. A 4-ft. thrust takes about 25 min. Fluid is supplied to the jacks at a range of 750 to 2,000 psi. by a hydraulic pump powered by an air motor. Air boosters on each jack are used to control the direction of advance of the shield. (See picture on cover.)

The tunnel ribs, supplied by Commercial Shearing & Stamping Co., are 4-in., 13-lb. H sections, placed 4 ft. on centers. The lagging is 2-in. material.

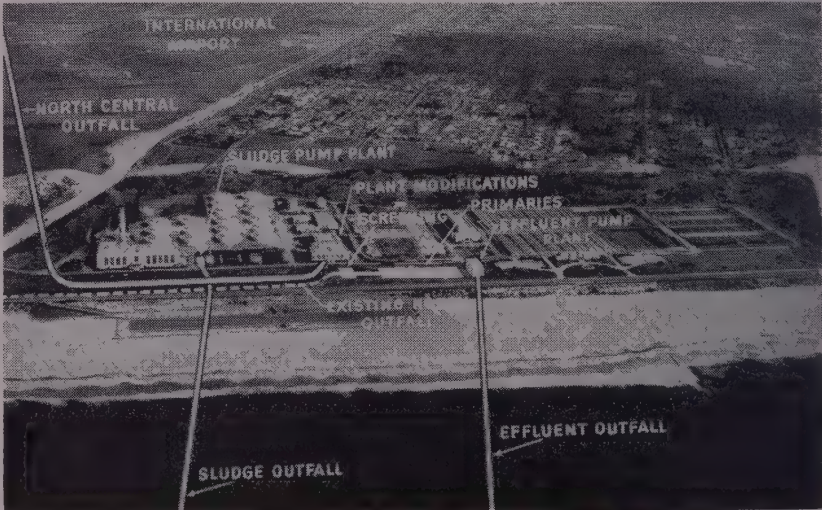
An Eimco crawler overshot, operated by air, mucks onto a conveyor. The conveyor, made by Conveyco, is 114 ft. long and is used to load the 4-cu. yd. Madsen cars.

Goodman storage battery powered locomotives handle the cars, operating on 24-in. gage, 40-lb. track.

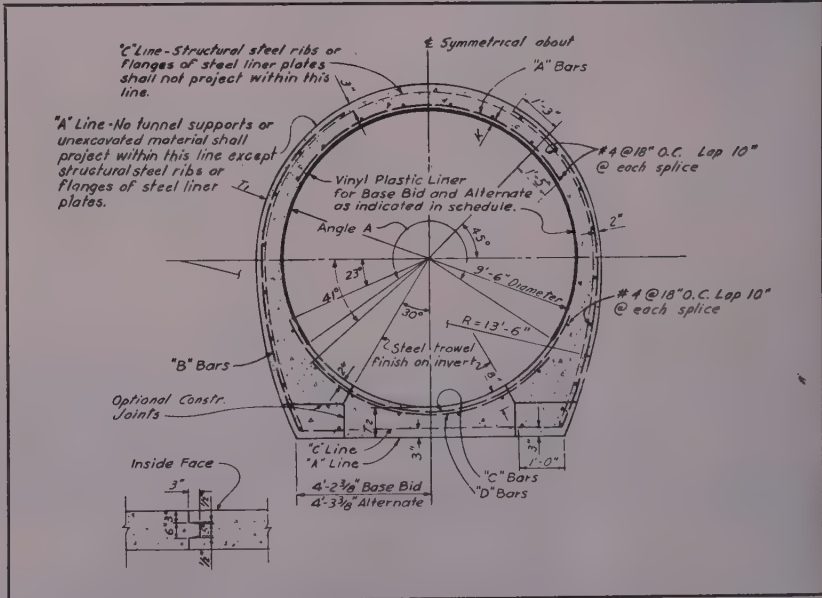
The shield, conveyor, and mucker are operated by air. The ventilation pipe is 16 in. in diameter. Compressed air is supplied by a Joy 750-cfm. compressor powered by a 150-hp. motor. Electricity for the project is supplied at 500 kva. at 440 volts by the Bureau of Water and Power.



MAP SHOWING RELATION OF TUNNEL TO PLANT AND OUTFALL



AERIAL PHOTOGRAPH shows elements of the \$60,000,000 Hyperion expansion program. Five-mile effluent outfall, 12 ft. in diameter, is now out for bids, may cost \$18,000,000.



PLASTIC LINER will be unusual feature of lining operation, will be described in later article. Flocrete equipment will be used for lining, will start in several months.

The compressed air is carried in a 6-in. diameter steel pipe at 110 psi.

The contractor is working three shifts per day with twenty men on each shift in each heading. The general superintendent is J. P. Williams, heading superintendents are Orris "Heavy" Holman, and Joe De Milita. Shifters are George Savage, Alex Volock, Ted Slaight, Tex Marksbury, Bob Grant and Gil Decker. Ed Walsh is resident engineer for Hyperion Engineers.

The tunnel project described here is only one part of the general expansion program being carried out under

the 1955 bond issue of \$60,000,000. Just to the north of the Arundel-Dixon-Kemper job another tunnel of the same cross section and similar sandy soil conditions is under way by contractor Anderson & Young. The \$4,930,000 Anderson & Young contract also features a hydraulically powered shield similar to the one described here.

A contract for \$2,629,000 has been awarded to Healy-Tibbitts Construction Company for the construction of a sludge ocean outfall, due for completion in October 1957. The 2-ft. diameter pipe will extend almost 7

mi. out to sea, terminating in water 300 ft. deep. Now out for bids are enlargements to the Hyperion Treatment Plant estimated to cost \$4,000,000 and an effluent outfall line which will extend more than 5 mi. out to sea. The cost of the construction of the 12-ft. diameter outfall may run as high as \$18,000,000. The successful bidder will have 1,000 days after award of contract to complete construction.

Although the Hyperion Engineers design group has been disbanded, engineering personnel will remain active until the project is completed.



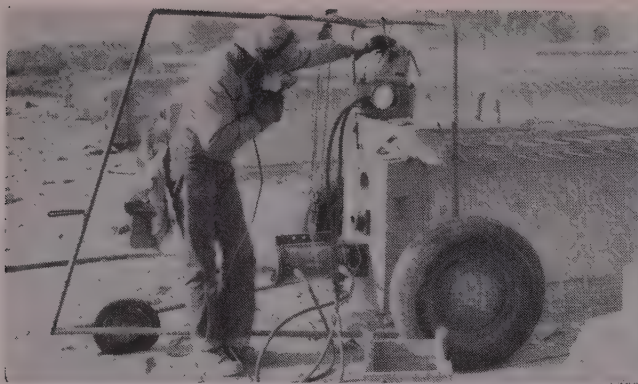
EXCAVATED MATERIAL is dumped from cars, then loaded into trucks by front-end loader. Madsen cars, Goodman locomotives are used.



PROJECT MANAGER for Arundel-Dixon-Kemper is J. P. Williams, right. At left is Bruce Kemper, member of joint venture company.



AT THIS POINT the contractor changed from conventional pile driving to the partial shield. Section in foreground was made several feet larger to permit assembly of shield. Note that portion driven with shield is very uniform, shows efficient use of lagging.



VOICE-POWERED PHONES keep operators of 100-ton jacks in contact with each other during stressing operation. Jacks are powered with



electric hydraulic pumps and are carried with a portable rig made out of reinforcing bars. The BBR system of stressing was used.

Latest methods for prestress bridge

Contractor sets up casting bed at job site to turn out 184 girders 71 ft. long for 1,636-ft. long bridge. Close control of concrete eliminates variation in camber. Pier forms re-used 22 times.

PRESTRESSED CONCRETE is nothing new, but it's new enough so that almost every job has unusual features, new problems, and valuable lessons to be learned. There are plenty of these on the bridge being built by the California Division of Highways at Saticoy, north of Los Angeles.

W. F. Maxwell Company holds the \$600,000 contract, which involves construction of a 1,636-ft. bridge and 800 ft. of widening the existing structure. Work started in May of 1956 and is expected to finish in May of 1957.

Designed for continuity

In a departure from the usual bridge design practice of simply supporting precast members, the Saticoy bridge girders are designed to be continuous over every 3 piers. In order to tie the girders solidly together across a support, the last 7½ ft. of the flanges are omitted (all girders are T in cross-section). This permits a 15-ft. closing section to be cast in place, providing the necessary fixity. The closing section contains conventional reinforcing steel to resist the negative moment at the support.

Another design feature of the 71-ft. long girders is the varying thickness of the web. In the 15 ft. at each end of the girders, the web increases from 9 to 16 in. in thickness.

This permits maximum efficiency in resisting shearing stresses, which increases as the support is neared.

Since the prestressed members were specified to be precast and later erected on the piers, Maxwell chose to set up a casting bed adjacent to the bridge. Forty-eight reinforced concrete casting beds were constructed. Each bed is in the exact shape of the soffit of the girders. All but eight of the beds will be used four times to make the 184 girders.

While the casting yard and girder forms were being made the contractor was busy with the construction of the bridge piers. There are 22 piers, each one 18 in. thick and 33 ft. wide. They range in height from 24 to 37 ft. With such uniform design there was a good chance for re-usable forms, and the contractor took maximum advantage of the opportunity. The forms are made of a ⅝-in. thick hard surfaced plywood called Plyglaze. The forms will be used the full 22 times. The piers are being formed and poured in two sections. First, a small footing resting on steel H-piles is formed and poured integrally with 6 ft. of the pier stems. These stems support the main form panels when the rest of the pier is poured.

In making the stems, the reinforcing cage is first erected and the forms are lowered over it in one unit. The forms are stripped in two halves and rejoined for lowering on the next reinforcing cage. Four form panels

18 ft. wide and 40 ft. high take care of forming the rest of the pier, and will be used on all the piers.

The forms are designed to withstand full hydrostatic head. Walers are double 4 x 8s on 3-ft. centers and studs are full 3 x 4s on 12-in. centers.

Prestressing operation

On most jobs, in the manufacture of post-tensioned girders, the flexible metal hoses containing the wires are positioned in the shape of a parabolic or catenary curve. The position of a parabolic curve is easy to compute and a catenary curve can be laid out simply by hanging a string from one end of the girder to the other. This simplicity doesn't exist on the Saticoy project, however, because of the continuous nature of the design. In order to facilitate the layout of the rather complicated curve, plywood boards with three notches were used to locate the height of ⅜-in. reinforcing ties that hold the metallic hoses. The notches were cut in advance to the required height of the hoses at specified positions. This eliminated measuring in the field, thereby cutting down the chance for errors.

The BBR technique is being used in the post-tensioning. This system involves button-headed wires in stressing washers, anchored with split-shims to a steel distribution plate which is cast into the girder. The stressing is done with electric hydraulic Blackhawk pumps and 100-ton William S. Pine jacks. The connection from the jack to the stressing washer is made with a 2-in. steel rod threaded on both ends.

The jacks are equipped with calibrated hydraulic gages. Stressing is

carried out from both ends of the member simultaneously and operators are connected by voice-powered telephones in order to keep the elongation under close control.

The wire is stress-relieved by stressing to 80% of the ultimate (240,000 psi.) holding it for 2 min., and then releasing it to the correct anchoring stress. The wire is Union Wire Rope fabricated and supplied by Joseph T. Ryerson & Son, Inc., of Los Angeles. The flexible hose is 1 3/4 in. in outside diameter. J. P. Kourkene, BBR licensee, supervised prestressing and grouting operations.

The initial stress on the girders which will be fixed at both ends is 387,000 lb. over three cables. There are sixteen 1/4-in. round wires in each cable. The girders which will be simply supported on one end and fixed on the other are stressed to a total force of 420,000 lb. on three cables, with 17 wires to the cable.

Close concrete control

Variation in camber, a source of trouble on many prestressing jobs, is not present at Saticoy. A big reason for this is the careful attention to detail being shown at the batch plant. The concrete is being batched at the Saticoy Rock Co., located just 1/2 mi. from the job. Concrete is made with 7 1/2 sacks of cement per cu. yd. Aggregate is 1-in. maximum, non-reactive. Admixture is Pozzolith No. 8, added in solution at the rate of 1/4 lb. per sack of cement. A strength of 5,000 psi. is obtained in 14 days, using a 2 1/2-3-in. slump. Curing is by Hunt's process.

The operator of the batch plant is kept informed of the moisture content in the sand by a calibrated gage operated by an electrode in the sand bin. A chart prepared by the resident engineer informs the operator of the exact weight of each batch, given any moisture content or any size of total batch. Before any transit truck is filled, it is carefully washed out with a hose.

Another factor which contributed to the uniformity of the girders was the relative ease with which the concrete could be placed in the forms. Unlike most designs, the webs were 9 in. thick, for the center 40 ft. of girders, flaring to 16 in. at the ends, had straight sides, and contained only three cables. It was unnecessary to add water to the mix for reasons of workability.

The total camber just after stressing runs 1 1/4 in. for fixed-end girders

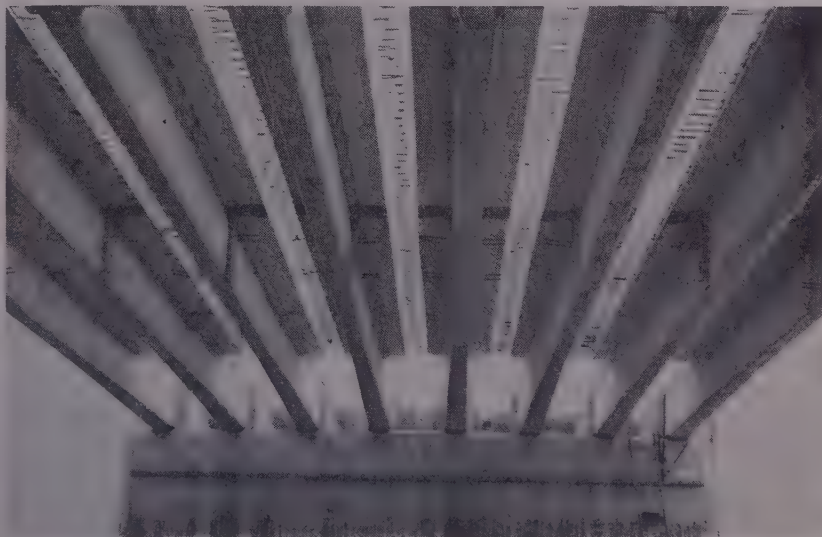
(Continued on page 80)



GROUT HOMOGENIZER has a one horsepower electric motor turning a 30-in. long shaft which mounts three 4 1/2-in. blades. The can is one foot in diameter and 30 in. long.



GROUT is returned to hopper on portable grout pump through rubber hose from far end of girder. There is no spillage and constant motion prevents it from stiffening.



GIRDERS IN PLACE show interlocking dowel steel between flanges. Note how web thickens as it nears support. Thickness changes from 9 to 16 in. in last 15 ft.

3 Payhauler® Units match 4 competitive rigs on "W.Va.'s most dangerous road job!"

**Earn 25% equipment saving
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Acme Construction Company,
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All haul units on the job are in the same capacity and power class. They're all loaded by a 1½ cu yd shovel...they all travel the same ½-mile to the fill and the same return route. Yet, the Payhauler trucks because of their ample, turbo-charged diesel power, plus load-matched gear ratios, smooth the get-away—and permit quick shifting into time-gaining, hill-climbing higher gear! This performance under rough and rugged conditions has caused Jim Chase to say, "We get the same production from 3 International '65' Payhaulers as we do with our four other units...a 25% savings in equipment, a 33% gain in production!"

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International TD-24 dozes shot-rock down the slope to 1½ cu yd shovel and easy-loading International "65" Payhauler. 250,000 pounds of dynamite were used...about a pound to every 3 yds of rock!



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...le power from a 250 hp Turbo-charged
...ne drives the model "65" at produc-
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Double acting hoist cylinder in all stages
with 106,300 pounds of force in first stage
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Strongest frame in its class and big 10 x 14
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mit faster, more carefree loading of rock
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hauler body gives you big, profit-boosting,
18-ton capacity. model "95" a husky 24 tons.





TWO STAGES of lifting in progress with final position shown in the background. Being raised by the ten jacks of Western Concrete Struc-

tures Co., the roof with inverted beams (foreground) will pick up the second floor slab by means of tie rods and move up together.

Floor on hangers goes up with roof

THIS STRUCTURE is a two-story office building of U-shape adjoining and connected to the existing building. It provides outside offices in a clear first story and flanking a central corridor in the second story. The building houses offices of the U. S. Geological Survey at Menlo Park, Calif.

The two wing sections, or legs of the U, have columns on lines outside the exterior walls, spaced 20 ft. on centers. Second floor and roof, both of prestressed concrete lift-slab type, span 42 ft. transversely between these column rows. In effect, this layout breaks up into first story bays of 20 x 42 ft., without the obstruction which would result from interior column support. The layout of the central section, or base of the U, provides additional space by an extension to double width with a row of interior columns.

Design features

Two particular design features were used to accomplish these results without the necessity for thick slab sections, with consequent increase in weight and cost.

FIRST: The columns, designed for

By **SAMUEL HOBBS**

Los Angeles, Calif.

strength in bending as well as vertical load capacity, and of minimum section to produce this strength, are of precast, prestressed concrete, manufactured at a commercial plant and delivered to the job. These columns proved to be less costly than steel members, they require no continual maintenance, and they have the required rugged strength for the lifting operations involved in the construction of the building.

This is believed to be the first use of concrete columns—both precast and prestressed—in the erection of a building, and it indicates distinct advantages as applied to the prestressed lift-slab method.

SECOND: The prestressed lift-slab sections are relatively thin; in fact, the 6-in. floor slab would be about 9 in. thick if designed in conventional reinforced concrete. The elimination of interior columns to support the second floor slab is made possible by providing intermediate support from above rather than from below. This is accomplished by the use of a double row of heavy tie-rod hangers, an-

chored in roof and floor, located in the wall lines of the 6-ft. second-story corridors, opposite each pair of wall columns.

Thus, the ruling dimension between supports is reduced to 18 ft. on the 42-ft. column spans. By means of these tie-rods, the second floor is suspended from a series of inverted prestressed concrete beams which are supported on the exterior columns and are built integrally with and above the roof slab. Recessed bolts that are grouted in anchor the tie-rods in the roof beams, and second floor anchorage is provided by weld connection to slab inserts. These beams extend across the roof at 20-ft. intervals.

Advantages

A number of benefits were obtained by means of these design and construction features.

1—Layout to provide outside offices was facilitated.

2—Maximum flexibility was obtained. Tie-rod supports were built into the corridor walls, and movable non-bearing partitions allowed division of space as desired.

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LIFT-LOADER



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HUBER-WARCO MAINTAINER

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Graham Road Equipment Company, Inc.....3325 Brighton Boulevard
Denver 5, Colorado
Construction Machinery Company.....2601 Second St., N. W.
P.O. Box 1716, Albuquerque, New Mexico

3—Limitation and control of deflection was made possible by prestressing to produce a calculated stress pattern under load.

4—The effects of vibration were minimized by the prestressing and stress pattern control.

5—Use of inverted beams and tie-rods provided a clear first story, eliminated second story columns, and produced smooth ceilings.

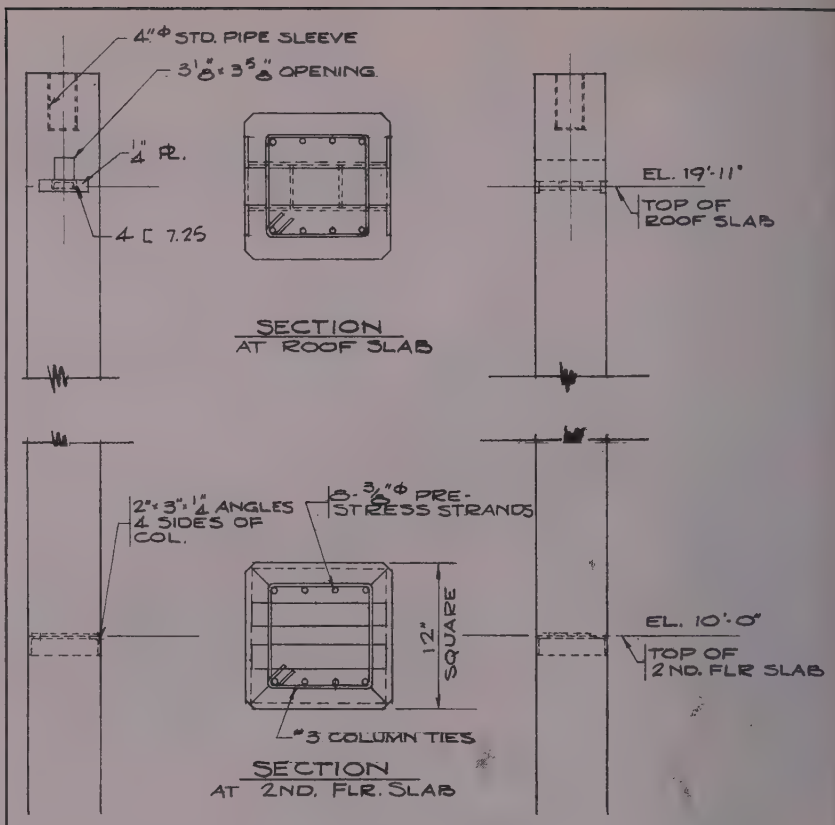
6—Design and construction method permitted reduction of section sizes and economized in time and in cost. The raising of a two-story section (roof and floor) required only one day, including the lifting and the moving and setting of jacks. Lifting rate was $5\frac{1}{2}$ ft. per hour. The usual lift was on 8 to 12 columns, but in the central section at the base of the U, the entire double width section was lifted on 15 columns.

Details of design

The precast prestressed concrete columns were pretensioned at the plant. They are $13\frac{1}{2}$ in. square in section and have a total height of 22 ft. Second floor and roof slabs were cast successively over the ground floor as a primary casting bed. They are 6 in. and 5 in. thick, respectively.

The second floor slab was prestressed in both directions, by means of cables composed of six high-strength wires of $\frac{1}{4}$ -in. diameter, suitably draped and post-tensioned. The roof slab, spanning between beams, was similarly prestressed; in one direction only.

Roof beams are of hollow box type, of variable section, with increased depth at midspan (see illustration).



SECTION through prestressed columns indicating location of shear keys. These columns were produced at a commercial plant and trucked to the site. They are 22 ft. long.

Typical intermediate beams of the wings have total end depth of 1 ft. 11 in., center depth of 3 ft. 5 in. They have 5-in. top and bottom slabs and 5-in. walls thickened to 7 in. at the ends, and total width of 2 ft. Typical beams were post-tensioned with six cables composed of 7 wires of $\frac{1}{4}$ -in. diameter, placed and draped accurately according to the requirements of the structural design.

Construction details

Precast prestressed concrete columns were positioned and plumbed in prepared sockets and grouted in. The ground floor slab was cast in place and, after curing, a bond breaker was applied. Then, lifting collars for the second floor slab were set to grade, prestressing cables positioned and supported and the second floor slab cast and finished.

In like sequence, the roof slab with its integral inverted beams was cast over the second floor, with tie-rod hangers anchored in the slab and extending upward through the beams. Prestressing of the second floor and roof slabs and of the roof beams was performed by portable jacking rigs, post-tensioning longitudinal cables at the closure strips, and transverse cables at one wall line.

Hydraulic-ram, air-powered jacks set at the column tops first raised a roof section on its column group to the proper height. Next, tie-rods were secured by bolting to the roof beams. Lifting then proceeded, with the suspended second floor rising with the roof section to final position. Adjustment and collar welding fixed the floor and roof at their precise finished elevations.

A feature of the final connection of roof and column was the use of a shear key. This key was passed through a slot at the bottom of the beam, engaged and entered a matching slot in the column, to provide a precise connection, both economical and permanent.

Credits

The following firms performed major portions of the work described:

Architect-Engineer: Akol, Angell and Apaydin, Berkeley.

Prestress consultants: T. Y. Lin and Associates, Los Angeles.

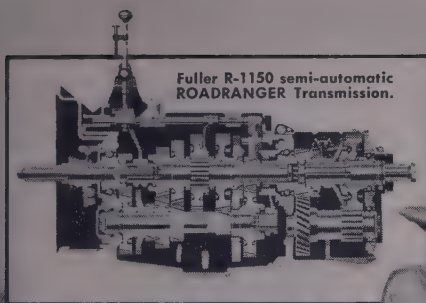
General contractor: J. Cyril Johnson, Menlo Park.

Prestressing and lifting: Western Concrete Structures Co., Inc., Los Angeles.

Precast-prestressed columns: Basalt Rock Co., Napa.



LIFTING crews place 75-ton jack with aluminum frame on column preparatory to a lift.



The new Wooldridge "Cobrahaul" Rear Dump Unit with Fuller 9-speed R-1150 ROADRANGER Transmission.

FULLER R-1150 ROADRANGER® Transmission *standard on new Wooldridge "Cobras"!*

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Fuller Transmissions provide maximum ease of shifting ratios for faster acceleration and long life required for these operating conditions.

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Road problems in a mountain county



By MELVIN E. DALE

Road Commissioner, Trinity County
Weaverville, California

IN THE WEST, the term "mountain county" means scenery, vacations and recreation for the average highway user. To the county road administrator it means a large area, small population, long mileage of county roads and inadequate funds. The combination creates special problems for county highway engineers which require unusual solutions and constant struggle.

Such a county is Trinity in the northwestern part of California. Some of the Trinity County road problems and the methods we are developing to find adequate solutions may be of help to other county road engineers in similar mountain counties throughout the West.

This county has an area of 3,100 sq. mi. and elevations which range from 1,500 ft. along the southern boundary to 9,000 ft. along the crest of the Trinity Alps on the north. The terrain ranges all the way from rolling hills to towering mountains, and is actually rugged throughout its entire area.

Precipitation in this northwest corner of California is heavy, particularly in the higher elevations. Total annual rainfall in Trinity County will average about 45 in. per year, while in the mountains as much as 168 in. of snowpack has been recorded for a season.

The Trinity River rises in the extreme northern part of the county and runs southerly to Douglas City, near Weaverville, and thence west to its confluence with the Klamath at Weitchpec in Humboldt County. This river, with its three main branches and innumerable large tributaries, drains a tremendous area of heavy precipitation and snowfall, and even in normal years the run-off

Typically Western, with rugged terrain, scattered population and large road mileage, Trinity County in the northwest corner of California (see map) wages a constant fight to get the most out of its limited highway funds. Airplane solves problem of field contacts.

is correspondingly heavy. This presents a formidable problem in road and bridge maintenance, and in keeping communications open and transportation moving. In exceptional years storms of record size will cause excessive and expensive damage to county road installations, as will be reviewed a little later.

Population and road funds

Typical of mountain areas, the population of Trinity County is small, totaling about 8,500 at the present time. The county seat at Weaverville with its population of approximately 2,400 is the largest concentration, and the natural hub of any road system serving the people of the area. With the exception of the town of Hayfork, with a population of 2,250, the rest of the population is distributed throughout the county in very small communities and ranches.

Trinity County, while large in size, has a relatively small tax base due to the fact that over 75% of the area is non-taxable public land. The tax rate, which runs as high as \$10.32, barely provides sufficient funds for general county functions, and any additional tax for road purposes would contribute a very small amount, as well as be a severe additional burden upon the tax payers.

Normally funds for general highway purposes come from three sources, and the amounts received for fiscal year ended June 30, 1956, were: State apportionment of the gasoline tax, \$339,782.36; U. S. Forest timber sales, \$131,902.92; County traffic fines, \$16,736.52. The amount received from the U. S. Forest Service represents an apportionment of 25% of the timber sales from U. S. Forest lands within the county, of which 50% goes to schools and 50% to the Road Department.

County participation in financing the highway program has necessarily been small, but it would not be unreasonable to construe receipts

from U. S. Forest timber sales as an indirect county contribution, inasmuch as if the 75% public lands were on county assessment rolls, a very substantial amount could be made available through taxation.

Income to become available from all sources for highway purposes in the fiscal year 1956-57 is estimated at slightly over \$500,000, and in budgeting this amount to administration costs, maintenance, snow removal and storm damage on 700 mi. of mountainous roads, it naturally has to be spread pretty thin. Anything left over for highway building and improving the county road system depends largely on the severity of winter months and the resulting amount of unusual maintenance required.

It is not unusual for the Trinity County Road Department activities during the winter months to consist almost entirely of repairing of storm damage and of snow removal. During the disastrous storms occurring in December 1955, which were further complicated by severe storms in January and February of 1956, an emergency was created that had to be met head-on and solved without regard to cost and the sacrifice of normal Road Department activities.

For the last six months of the year ended June 30, 1956, over 50% of the expenditures and the Road Department efforts were diverted to storm damage repairs, and restoration work is still going on, and will continue well into 1957. This has seriously interfered with the normal maintenance and construction program, although, fortunately, vital financial assistance has been made available to the county through Federal and State agencies.

At the present time a new problem has been added which will introduce complications in the road system while benefiting the county materially in the way of general income. The U. S. Bureau of Reclamation is starting active construction on the project of building Trinity Dam and



5 products at a time...
crushed, screened and washed
300 tons per hour...
with 35% crush
Minimum labor required...
all electric operation

... that's why Genesee Sand & Gravel Company SELECTED ALL CEDARAPIDS EQUIPMENT

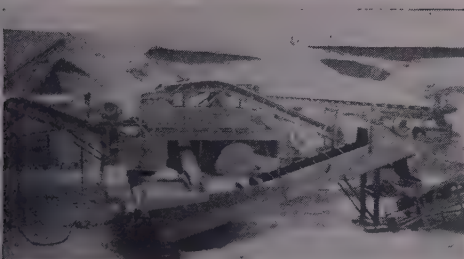
When a producer opens up a new pit, his prime concern is to get into big-volume production fast, with minimum labor... that's why he's mighty glad to have a high-capacity, easily set up plant like this portable Cedarapids Commander — Wash-All combination. 3000 tons a day of five sizes of accurately graded gravel and sand is profitable operation!

For Genesee Sand & Gravel Company's new plant, President Henry Jaeger, Jr. selected a Cedarapids Commander, a Wash-All plant, 5 portable stockpiling conveyors, and a 540-ft. sectional feed conveyor fed by a Cedarapids reciprocating feeder and hopper. The plant is completely electrified and equipped throughout with Cedarapids Motorized Head Pulleys to reduce labor and maintenance requirements.

Genesee moved into the new pit near Genesee Depot, Wisconsin, on October 2. By October 15 they were in production and are now turning out...

Mason sand	8 mesh and under	5%
Coarse sand	1/4" to 8 mesh	50%
Pea gravel	3/8" to 1/4"	2%
No. 1	3/4" to 3/8"	22%
No. 2	1 1/2" to 3/4"	21%

Whether you're an experienced, well-established producer like Genesee Sand & Gravel Co., or just entering the field, you can depend on Cedarapids equipment for the high capacity, low maintenance performance that spells profitable operation in your specific job. Ask your Cedarapids dealer about Cedarapids equipment for your job.



Cedarapids Commander—The completely electric Commander crushing and screening plant in Genesee Sand & Gravel Company's new pit is equipped with spray bars on the screen and a sand screw attachment which delivers mason sand to the sand classifier. All other crushed and screened material discharges into the Wash-All Plant.



Cedarapids Wash-All—Coarse sand and three sizes of gravel are screened and washed in the Cedarapids all-electric Wash-All. The coarse sand is taken out by the twin-screw washer-classifier-dehydrator, while each size of crushed gravel is stockpiled with a portable conveyor. Note Motorized Head Pulleys on all conveyors in the entire plant.

Cedarapids
Built by
IOWA

IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.



THE AUTHOR ready to fly the county plane to deliver paychecks to road crews at the nine district stations. Supplementing the two-way radio system installed two years ago, the plane has proved most efficient in directing the work of crews. Faster delivery of repair parts to remote locations reduces downtime on county equipment.

a long delivery tunnel which will convey this stored water east into the Sacramento River watershed. Details of this major construction project are not part of a story covering county roads, but the indirect effect will be serious in connection with heavy hauling and extensive passenger car traffic on county roads.

In California the portion of the gas tax allocated to counties is based on a formula which includes the factor of vehicle registration and maintained road mileage. Obviously, the funds based on our registration are relatively small, particularly as compared to the size of the area and the average cost of road construction in mountainous terrain. This allocation, based on vehicle registration, is also adversely affected, due to the fact that logging operations tend to be concentrated during summer months in the mountains, and during the winter the loggers and their trucks leave for other areas outside the county. When the registration time arrives in January these trucks are registered in other counties, thereby reducing the registration for Trinity County, even though these trucks and their heavy loads operate on our roads during the summer months.

County road system

The main line of road transportation is the east-west State highway which carries the U. S. 299 designation. This is the highway which extends about 145 mi. from Redding in the upper end of the Sacramento River valley to Eureka on the coast. It is a two-lane surfaced road with secondary characteristics in grade and alignment. The California Division of Highways is gradually improving the poorer sections of this

route, bringing the highway up to modern standards considering the volume of traffic.

State route 36 traverses the county east and west about 20 mi. south of the main route, running 140 mi. from U. S. Highway 99 at Red Bluff to Coast Highway 101 near Fortuna. About 60 mi. of this route is oil-treated earth and the balance improved gravel road. A surfaced connecting highway extends north connecting Hayfork with the county seat. This represents the extent of State highway mileage in our county. It is an aggregate of 200 mi. of two-lane surfaced routes, and 80 mi. of earth roads.

By comparison, the county road system has a length of 700 mi. The routes connect all of the rural communities as well as reaching into lumbering and recreational areas. Comparing this mileage with the total road funds available to the county will indicate that after provision for administration expense and equipment replacement, only about \$500 is available per average mile for construction, maintenance and snow removal. Demands are so heavy that it is next to impossible to secure an adequate part of these funds to carry out a program of stage improvement on the more heavily traveled groups. It is a matter of keeping the roads in service with such improvements as can be carried out with available forces and equipment.

With the exception of about 26 mi. of oiled road, all of the 700 mi. are graveled and the alignment and grades are in a corresponding stage; in fact, it is difficult to draw a definite line between construction and maintenance, as the terms apply to the roads of Trinity County. The prin-

cipal objective is to keep the routes open and in service throughout the year with betterment work confined to easing some of the sharper curves and reducing some of the more difficult grades.

This same problem and its solution applies to the bridges, which for the most part are relatively crude crossings of the numerous small waterways, and on which maintenance and replacement costs are relatively heavy.

Organization

The county is divided into five districts and there are nine crews distributed in strategic places throughout the county. A leaderman is in charge of each crew and there are three general foremen in the next higher level of administration. These three foremen report directly to the road commissioner. As far as funds are available, these crews are supplied with equipment suitable to their operations. The average crew varies considerably depending on the work load and the season. Each crew functions as a complete maintenance unit of crew and equipment. A typical crew would consist of and be equipped as follows:

Personnel: 1 leaderman in charge, 2 heavy equipment operators, 3 truck drivers.

Equipment: 1 tractor dozer, 1 grader, 3 dump trucks, 1 loader, 1 compressor and wagon drill, 1 4-wheel drive truck with snowplow attachment, 1 2-way radio-equipped pickup.

A main shop is maintained in Weaverville, staffed by three mechanics, where major repairs and overhauls are made. Except for stocking of parts in our own organization it is necessary to travel 50 mi. or more by highway to secure replacements or rebuilding facilities. As a result it has been logical to standardize as much as possible on various types and makes of equipment. For tractors and motor patrols, we have standardized on the Caterpillar line.

Purchasing represents the usual problem common with all levels of government, particularly in our efforts to standardize. For purchases exceeding \$2,000.00 for equipment, formal bids are requested with specifications prepared as closely as possible to secure the make of equipment desired. The Board of County Supervisors is familiar with the county road problems and is sympathetic to the need for occasional shifts in the selec-

(Continued on page 66)

with 27-yd. FULLPAK scraper

1. Low, wide Fullpak scraper: 27-cu. yds. heaped, 19.1-cu. yds. struck, 32.5 tons.
2. High-lift apron. Big opening (7'1" high x 10') makes sure anything that goes in will come out!
3. Deflectors on yoke arms, and smooth, wide apron side-arms, prevent trapping of rocks, and other chunky materials that might slow up operations and involve manual clearing.
4. Curved deflector on tail-gate rolls dirt into center of bowl for bigger pay-load.
5. Streamlined bowl has no obstructions to interfere with boiling flow of material.
6. Large diameter cable-drum on apron-hoist permits fast spooling without kinking, increases rope life.
7. Power steering wheel gives easy handling through positive electric control.
8. Cockpit is raised to give operator clear visibility. He can see both load and pusher at all times.
9. Scraper wheels are easily removed, and interchangeable with wheels on prime-mover. Outboard bearings give stable load support.
10. Multiple-disc air brakes, and sturdy brake elements, give quick stopping power, longer service.
11. Heavy cross-tube ties side sheets rigidly together on low, wide Fullpak bowl.
12. Constant voltage transformer provides accurate control at low engine RPM.
13. Quick-release clutch and fast electric-hoist allow rapid bowl "pumping".
14. Large push-plate, of all-welded, reinforced box-type construction, provides big pusher target, keeps contact over uneven terrain.



Brief Specifications for New B Fullpak Tournapull:

Capacity: Tons32.5
Heaped, cu. yds.27
Struck, cu. yds.19.1

Engine: 293 HP Cummins Diesel

Tires (Std.): Four 27 x 33 — 30-ply rating

Speeds: Ten forward 2.6 to 28.4 MPH
Two reverse 2.4 to 3.5 MPH

Steering Angle: 90° left or right

Maneuverability Required for 180° Turn: 39'10"

Control: Fingertip Electric

Brakes: Multiple-disc air brakes with 6552 sq. in. of braking surface

Dimensions:

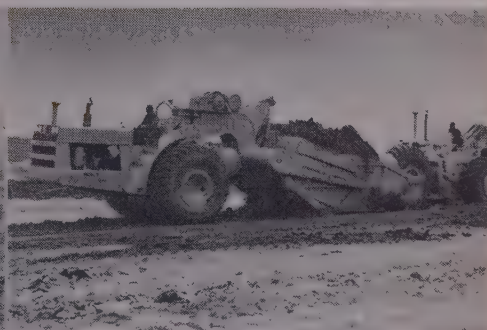
Length44'0"
Width11'8½"
Height12'2¼"
Wheelbase26'10"

Operating Weight (approx. lbs.)68,900

Specifications subject to change without notice.)



High-lift apron — positive ejection: Apron opens 7'1" to speed loading and unloading. Positive forward ejection of load wipes bowl clean of all materials, including mud and sticky clay. Low, wide bowl permits bigger heap, gives low center of gravity, provides greater stability in all working conditions. Smooth, wide side-arms and side-sheets of apron will not trap chunky materials that might hinder loading and unloading operations.



Low, wide bowl — heaps full-capacity, low-void pay-loads fast. Inside bowl is smooth, streamlined — has no reinforcement ribs to hinder dirt movement. Low push-block gives direct-line application of power from pusher to blade. Quick-release clutch, and fast, electric hoist, make possible rapid "pumping" of bowl for speedy loading of loose materials. Wheels inside cutting edge aid in precision grading, permit cutting against bank.

Tournatractor, Tournapull—Trademark Reg. U.S. Pat. Off. BP-1388-G; Fullpak, Adams—Trademark



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT



Giant "jacks" for Hawaiian harbor

Corps of Engineers uses novel French design of tetrapod for precast concrete units to repair breakwater at Kahului. Curved surfaces and interlocking resist waves.

HIGH HOPES are held for a French-designed breakwater repair unit made of concrete which has been utilized in Kahului Harbor on the island of Maui, Territory of Hawaii, where high waves have caused extensive damage for 50 years.

The units are known as tetrapods. Officials of Hawaiian Dredging and Construction Company, of Honolulu, which did the \$1,200,000 breakwater repair job for the U. S. Army Corps of Engineers, are confident they will work.

A tetrapod is shaped like a child's toy jack. Each one used on the Kahului project weighed 33 tons.

Six hundred were used. Already they have withstood pounding waves of two Pacific Ocean storms.

Tetrapods were first used in a successful French North African project. The Kahului project and another at Crescent City, Oregon, are the only ones in this part of the world in which tetrapods are being used. More pods are being placed at Crescent City, but they are only one-half the size of those in the Kahului job.

Tetrapods serve as a reinforcing unit on a breakwater like a bullet-

FORMS were stripped in 5 days from the 33-ton pod. About 16 cu. yd. of concrete was required in each.

proof vest. They are placed on the face where pounding from waves is severest. Whereas rocks of all shapes and sizes have proved unsuccessful in their attempts to hold off water, tetrapods fight it two ways. Because they are rounded and do not present a full surface to the waves, tetrapods allow some water to slip harmlessly through the pattern and dissipate its power. In addition, the waves force the tetrapods to slip together and interlock even more tightly than when they are placed.

By reason of their shapes, the jumbled tetrapods form masses with a very high voids ratio. The total absence of flat surfaces prevents formation of a continuous impermeable revetment such as that produced by rectangular or pyramidal blocks. Sea water passes freely to and from the porous interior of the breakwater, thus avoiding under pressure, which tends to lift impermeable facings at the instant when the storm waves fall back.

Two breakwaters are involved in the Kahului work. One is 2,850 ft. long, the other 2,396 ft. On the longer one only the head was repaired. On the other, the 155 ft. farthest from shore was protected by tetrapods. A channel opening 600 ft. wide is between the two heads. From there, it is 4,000 ft. to shore.

A clamshell was used to remove rocks in the repair areas to a depth of 20 ft. below the surface, in order to provide a base for the tetrapods.



This work, first phase of the project, started June 19, 1956. Now that the tetrapods are in place, only a filling-in of the core behind them—with rock—remains. This is expected to be completed before March 1, 1957.

In the repair areas, tetrapods reinforce the breakwaters for 20 ft. below the surface and 13 ft. above at mean low low water.

A French research laboratory, the Laboratoire Dauphinois d'Hydraulique, designed the tetrapods. From photographs and drawings, Hawaiian Dredging engineers drew plans for steel forms with which tetrapods could be cast.

The primary curing period for each tetrapod was five days. Then the form around it was broken down and each tetrapod lifted by compression from the bottom form plate, and taken to a curing yard for 23 more days.

A standard Tournacrine was used, modified by adding wheels, an "A" frame and counterweights, for better reach, traction and lift capacity.

When cured, the tetrapods were taken by the Tournacrine to the loading site. There, a crane barge lifted them by their ring bolts and placed them on deck or on a barge alongside. Tugs towed both barges to the work sites and kept them in place while work was going on. Only six to eight tetrapods were placed on a barge at a time.

The tetrapods were then lowered into place by the crane. One was put into place every 10 minutes. They were placed as close together as possible. Slopes on which tetrapods may be used range up to 45%.

Kahului is an important harbor at which sugar and other plantation and commercial products are loaded and unloaded. Soon after the original breakwater was built in 1905 more than 100 ft. of the outer end was carried away by storm waves. A Maui railroad company spent \$165,000 to repair it. At the outer end, an arrow-shaped head was constructed of monolithic concrete weighing 300 tons.

The first storm carried it away. Eight-ton armor stones failed. Later, so did 16-ton stones. In 1947, \$500,000 was spent in repairs to ends, roots and centers, but the waves won again. Engineers are confident, however, that the tetrapods are the answer to the problem.

E. C. Gray is vice-president in charge of waterfront engineering for Hawaiian Dredging Co. Robert Palmer is chief of the civil works branch of the Army Corps of Engineers in Honolulu.



FROM casting bed to storage yard, the pods were handled by Tournacrine. This same machine also moved the units from yard to the loading dock. Note the special lifting harness.



PLACED by derrick barge, the pods go into water up to 40-ft. depth and extend 13 ft. above low tide level. Rounded surfaces and interlocking action are two special design features.



WHEREVER YOUR JOB TAKES YOU and whatever the nature of your contract, there's a Yellow Strand Distributor nearby. He's ready to expertly assist you in specifying the proper wire rope for your equipment. If you don't know his name, drop us a line!

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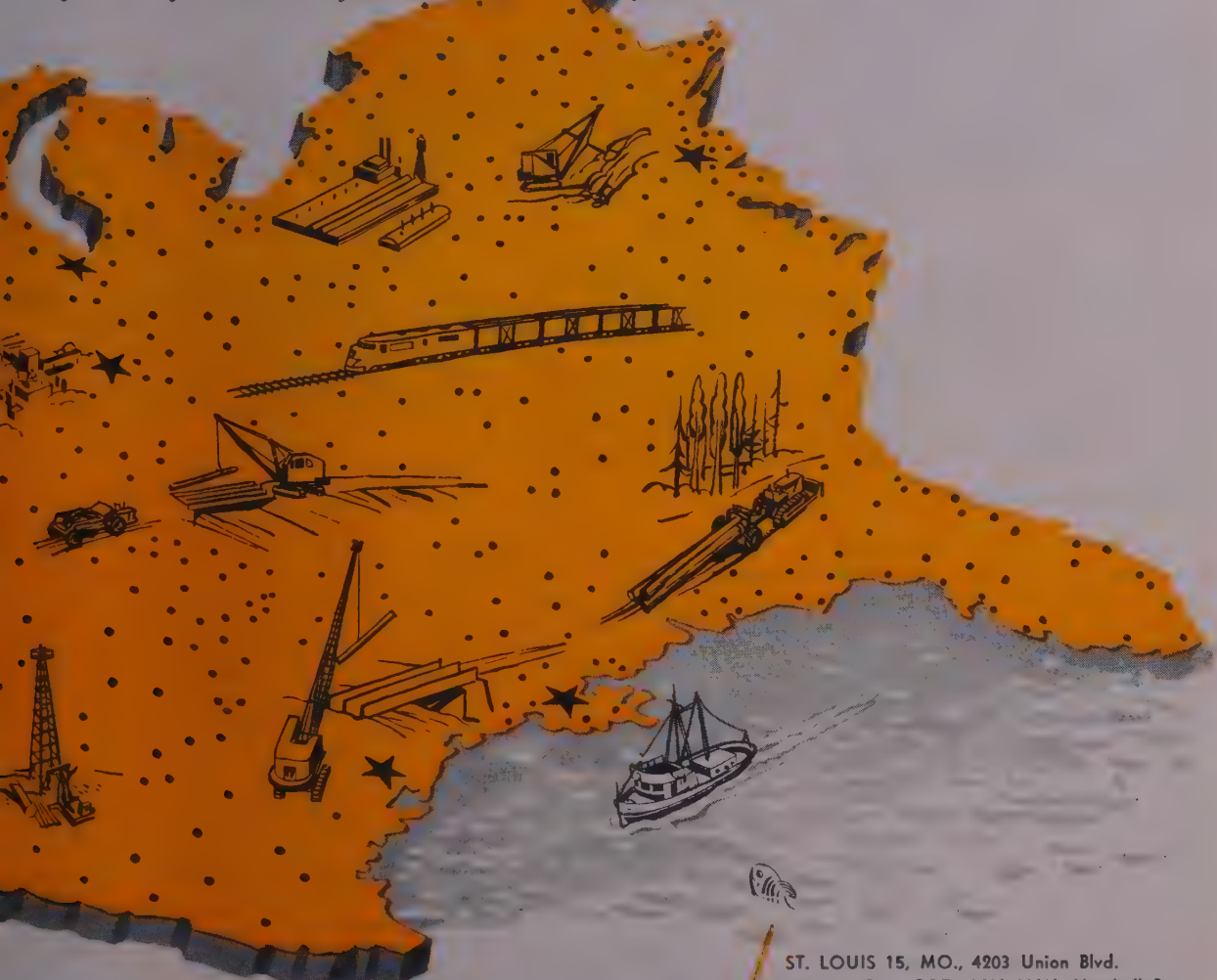
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This nationwide network of distributors, branches and factories is unique in the wire rope industry. It assures you the correct wire rope when you want it!

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HOUSTON 15, TEXAS, 9350 Market St. Road



RUBBLE from pre-1906 earthquake buildings held up excavation on construction of underground exhibit hall. Drilling subcontractor found

a way to drive dewatering wells with high-strength steel caissons made by Kaiser Steel. Deep wells were found cheaper than well-points.

Five wells to drain wet foundation

Rubble from pre-earthquake buildings makes things tough for contractors on San Francisco's underground exhibit hall. Water from underground river controlled by five wells.

CONSTRUCTION of San Francisco's new underground exhibit hall has been complicated by a combination of geological and human history. As if building a foundation in the midst of an underground river wasn't enough of a problem, the "Mole Hall" construction crew has to contend with many relics of old San Francisco.

The \$3,700,000 structure presently being constructed by Theo G. Meyer & Sons for the City of San Francisco will be known as the San Francisco Civic Center Exhibit Hall but it has already been nicknamed "Mole Hall." The hall will lie beneath the present Civic Center Plaza. There will be a direct connection from the hall to the lower level of the Civic Auditorium running beneath Grove St. In this way conventions or trade fairs meeting in the Auditorium will be able to use the new hall for space consuming exhibits.

Some of the peculiar problems of this construction job are due to the geologic history of the site. The whole San Francisco Civic Center lies in the bottom of the area known as the Hayes Valley. The Hayes Valley drains in a northwest to southeast direction and is perhaps 5 or 6 blocks wide over most of its length. The upper rim of the valley is within a few blocks of the San Francisco Presidio, and drainage proceeded to the old Mission Swamp near 8th and Mission Sts. prior to filling operations that have gone on during recent decades.

Over the course of centuries dune sand from further west in the city has been blown into the Hayes Valley. This sand was carried downstream during a long period of valley filling. A report on the Underground Water Supply of San Francisco in 1913 showed on the site of the Civic Center 25 ft. of fill underlaid by 35 to 40

ft. of hard packed fine sand. Below 65 ft. peat or decomposed vegetation was encountered in thin layers. At 90 ft. in some places a stiff blue clay was found that existed early in the period of valley filling. Originally the sand rose a few feet above the subsurface drainage but subsequent filling has brought the surface of the Plaza 16 ft. to 19 ft. above the watertable.

The foundation for the new Exhibit Hall calls for an excavation of more than 30 ft. below the existing surface so special measures were necessary to keep the excavation dry and workable. At first it was thought that well points would have to be driven around the perimeter of the excavation at close intervals. However, Theo G. Meyer & Sons in cooperation with the drilling contractors, Laufenberg Brothers of Berkeley, were able to devise what they consider a much less expensive method of drainage.

Using Earth Drill Inc. truck-mounted drilling rigs Laufenberg drilled 28-in. holes 50 ft. deep in five places along the north and west edges of the excavation. Since it is known from what direction the underground drainage comes, the water is largely intercepted on the "uphill" sides be-

low capacity-adding,

...shock-swallowing Hydro-Spring

tops hose-bursting, frame-mauling, spine-smacking impact!



Whenever you encounter any condition, or employ any action that would cause ordinary front-end loaders to "shudder from shock"—instant-acting, shock-swallowing Hydro-Spring takes over! Exclusive Hydro-Spring cushions impact—reduces the effects of shock forces by 67%, or more—cuts time loss—practically eliminates hydraulic hose failure. Only International Drott gives you Hydro-Spring advantages.

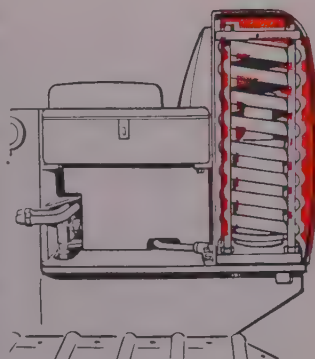
Hydro-Spring, turned on and off, to prove the vital money-making difference between International Drott and unprotected front-end loaders! Measure the job-getting, yard-adding advantages of exclusive triple-power, pry-action break-out and other International Drott exclusives. And see how you can beat a fleet of limited-duty rigs with an *exclusive* Four-In-One. See your International Drott Construction Equipment Distributor for a demonstration.

When you solidly set the Skid-Shovel or Four-In-One in tough material to apply famous bucket-heaping, pry-action break-out—you don't punish the equipment or yourself. Shock-swallowing Hydro-Spring takes over—intercepts "slam-bang" bumps—gentles trouble-causing forces by two-thirds, or more.

Exclusive International Drott Hydro-Spring

is a hydraulic cylinder enclosed in a heavy-duty, locomotive-type coil spring. Shock force displaces oil from main lift cylinders into the Hydro-Spring cylinder—extending it and compressing the big spring to absorb and cushion impact loads.

Owners declare that Hydro-Spring adds a whopping 25% to loader and tractor life—besides boosting production!



International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



INTERNATIONAL

DROTT



BERKELEY TURBINE pumps are handling from 100 to 300 gpm. Water passes through settling trough so that sand will not be delivered into the city's storm sewer system.

fore it enters the excavation. The 28-in. hole was cased with a special Kaiser steel casing and a 16-in. perforated inner lining placed in the hole. The annular space was then filled with gravel. In some holes as much as 65 yd. of gravel was packed in as sand was pumped up through the inner lining. The outer casing was then removed. The pumps are Berkeley Turbine Pumps. These pumps, in constant operation, are currently pumping from 100 to 300 gal. per min. The drainage problem could have been much worse, except for this year's extremely dry winter.

The excavation itself calls for the removal of 140,000 cu. yd. of material. This material is being removed by the use of a Northwest 2-yd. shovel and 18 4-yd. trucks. About 20,000 cu. yd. of earth will be kept on the site for backfill as the contract calls for covering the finished structure with 3 ft. of earth and 1½ ft. of topsoil and restoration of the Plaza to its original condition.

With the water problem under control the contractor still has to contend with the remains of former public buildings and the job of stabilizing the sides of the excavation. The contractor has penetrated three separate layers of paving, evidently laid down at different periods in the city's history.

To stabilize the sides of the excavation during construction 12 in. x 12 in. x 32 ft. Douglas Fir soldier piles are being placed at 5-ft. intervals around the excavation. Lagging is then fastened in tiers between the piles to retain the earth. The piles are placed by first driving a 28-in. steel casing 12 ft. long. The drillers then excavate the first 12 ft. Then bentonite or "drillers mud" is poured into the hole to stabilize the sides of the hole for the rest of the drilling. The piles will be removed at the completion of the job.

In view of the highly saturated soil conditions around the foundation the structural engineering firm of H. J. Brunnier designed a raft foundation. The bottom will be a 3½-ft. concrete slab within which will be a waterproof membrane. This floor slab will be 287 x 374 ft. The membrane will be brought up within the walls to form a continuous waterproof barrier around the structure. In the Exhibit Hall itself 32-in. square reinforced concrete columns will be set 40 ft. on centers. Nine feet square column capitals will support the roof of the hall and the load imposed by the overlaying earth. Ceiling height inside the hall will be 14 ft.

Interestingly, the major problem of the mechanical engineer De Leuw Cather & Co. is cooling rather than heating. Electric power consumption, power consumption by mechanical exhibits that might be present, and the presence of many spectators will, on certain days, produce considerable heating. Since this is an underground

building without the possibility of natural ventilation special measures will be taken to insure proper cooling of the hall.

Excavation which began in Sept. 1956 is expected to be finished in Feb. 1957. Original plans called for completion of the whole project in 18 months, but that was before the old building foundations were discovered. Right now no one is taking any bets on how many raps of the 3½-ton headache ball it will take to break up all the foundations, old manholes and miscellaneous paving in and around the Civic Center Plaza.

Joe Clark is project manager for general contractor Theo Meyer & Sons, with Ed Potts as general superintendent. Architects are Wurster, Bernardi and Emmons, and Skidmore, Owings and Merrill. Structural engineer is H. J. Brunnier and mechanical engineer is De Leuw Cather & Co. Soil investigations were carried out by Hyde Forbes. Drilling contractor was Laufenberg Brothers.

COUNTY PROBLEMS

(Continued from page 56)

tion of the most desirable bidder as compared to the lowest bid.

Communication problems

Next to the scarcity of funds the matter of adequate communication throughout the county road organization has been our biggest problem. Distances and the relative slow speed of travel created problems in directing forces, securing of spare parts, and the exchange of all types of information in emergencies.

About two years ago this problem had become so acute that the supervisors authorized the installation of a two-way radio system in the county. With this facility the office of the road commissioner is in constant touch with all of the nine district headquarters and they in turn are in constant touch with major units of equipment where the crews are at work. The hours of time saved and the increase in efficiency has made this one of the most important expenditures of the County Road Department. Incidentally, the same system of communication is available for the sheriff and other county offices, and has proven invaluable in law enforcement and civil defense activities.

Our radio system permits the exchange of information and important messages but does not modernize the means of personal contact and in-

spection from headquarters. Further, although the need for repair parts can be communicated without delay, it did nothing to improve the time required to get the parts to the right place. After the radio system had been in effect for more than a year, it became increasingly obvious that another step was required if the Road Department was to be increased in efficiency. Direct contact, supervision and daily conferences by the commissioner and the road engineer were essential in the proper direction of the construction and maintenance crews. Whereas our county roads represent extensive mileage because of the circuitous alignment, the air mileage between the county seat and all parts of the area is relatively short. The advantages of communication by plane and the county functions which such a plane would provide were given serious study.

Finally, last September the County Road Department was authorized to purchase a plane. Prior to this purchase a rental plane had been used on many occasions and the advantages were noted. However, the rental rate was necessarily high and when standby time was added at the site, it indicated the advantage in county ownership. The plane is based at the Weaverville airport which is less than one mile from the county road headquarters. The road commissioner and two other county officials are qualified pilots. Although owned by

(Continued on page 82)

BEAVERS — Second annual meeting

President L. E. Dixon presided at the banquet attended by 1,000 men gathered to honor eleven outstanding careers in construction achievement.

THE SECOND annual meeting of The Beavers in Los Angeles on January 17 brought together a thousand men representing the construction industry of these Western States. Contractors and their key executives dominated the meeting, as is proper, with full representation from engineering organizations, equipment distributors and manufacturers of machines and materials. L. E. Dixon, as president of the organization, presided at the banquet meeting and handed out the awards to those leaders of the construction industry honored on this second occasion. "Beavers" were presented to:

Management	Engineering
W. E. Kier	Augustine H. Ayers
W. J. Rohan	Otto W. Peterson
Supervision	Supply
Ben Arp	A. F. Garlinghouse
Edwin M. Whipple	A. J. Gock
Special	
Wm. A. Johnson*	
Samuel D. Sturgis, Jr.	
Robert B. Diemer	

The four men in the categories of construction supervision and construction engineering appeared on the front cover of **WESTERN CONSTRUCTION** last month. Reviews of their careers and attainments appeared in the same issue.

Following the pattern established by the first meeting a year ago, the day started with an informal luncheon at which members and their guests could meet at leisure, renewing friendships and reviewing activities of the past twelve months. Previous to this luncheon the board met and elected officers for the ensuing year.

BEAVER OFFICERS FOR 1957

President: George H. Atkinson, President,
Guy F. Atkinson Co.

Vice President: John A. Kier, Vice President,
W. E. Kier Construction Co.

Vice President: J. M. Sawyer, Vice President
Macco Corporation

Sec.-Treas.: J. P. Shirley, Jr., Vice President,
Gunther & Shirley Co.

Asst. Sec.-Treas.: J. W. Watson, Public Relations,
American Pipe &
Construction Co.

Ambassador of Goodwill: James L. Lovell, E. I. Du Pont
de Nemours & Co., Inc.

The dinner, held in the Biltmore Bowl, was attended by about one thousand members and their guests. Officers occupied the head table and those who were scheduled to receive awards occupied another position of honor in front of the head table. The awardees were made known to those attending the dinner with the distribution of booklets which presented their names and the records of their achievements. This made it unnecessary for the presentation to include the reading of these records and the other seven are printed in full on this page. Following the dinner the gathering adjourned to another room where those who had been honored were available to receive the compliments of their friends and associates.

The third annual meeting of the Beavers will be held in Los Angeles at about the same time next year.

Careers and achievements of the seven awardees, who were not reported in our February issue, follow:

William A. Johnson*

William A. Johnson, one of the founders and the first president of the Beavers, died on May 10, 1956. Will



HONORED at the second annual meeting of The Beavers were: General Samuel D. Sturgis, Jr., Ben Arp, Augustine H. Ayers, W. J. Rohan, Robert B. Diemer, Otto W. Peterson, Edwin M. Whipple, A. J. Gock,

A. F. Garlinghouse, and W. E. Kier. The award to Wm. A. Johnson was made posthumously. Careers of Whipple, Ayers, Arp and Peterson were published in the February issue, page 70.

GAS or ARC

*it's Airco quality for
superior results*

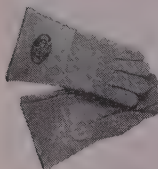


AIRCO HELMETS:

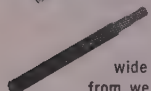
A complete line of welding helmets and face shields including the new hard hat equipped with "helmet blocks" for attachment of welding helmet.



AIRCO HOLDERS: Available in 25 models, jaw and screw types, ranging from 200 ampere holders to the heavy duty model for handling 700 amperes.

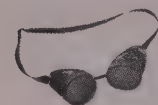


AIRCO GLOVES: The same quality that makes other Airco accessories the best value you can buy extends to welders' gloves and leather sleeves.



AIRCO CABLE AND CONNECTIONS:

Unrivalled dependability, long life and flexibility. Sizes from 4 to 4/0, for wide range of amperages at varying distances from welding machine. Make sure of good connections with Airco ground clamps, cable splicers, Quik-Trik cable connectors and cable lugs.



AIRCO GOGGLES: For gas welding or cutting. Precision made, they afford excellent ventilation with maximum eye protection.



AIRCO CYLINDER TRUCKS: Make your welding and cutting outfit easily portable with an Airco two-wheel hand truck. Strong, rigid, welded steel frame; broad steel platform. Five models offer wheel sizes and styles for every type of surface.



AIRCO SAFETY HATS AND CAPS:

Lightweight, molded of fiber glass and polyester resins to give maximum protection. Available in seven standard colors.

See the new hard hats equipped with "helmet blocks" for the attachment of welding goggles or coverspecs.



AIRCO TWIN-HOSE: Two lines of hose molded into a single, light flexible unit. Close, tight braid permits thicker rubber cover for greater wear resistance.



YOU NAME IT — Airco has it . . . oxygen, acetylene, torches, tips, regulators . . . sparklighters, soapstones, tip cleaners, circle cutting attachments, carrying cases, chipping hampers, brushes . . . all at low prices. Call your Authorized Airco Dealer or nearest Airco office for your arc or gas requirements.



AIR REDUCTION PACIFIC COMPANY

SAN FRANCISCO • LOS ANGELES • PORTLAND • SEATTLE
Bakersfield • Burbank • Emeryville • Fresno • Inglewood
Sacramento • San Diego • Stockton • Tacoma

Western Headquarters for
Oxygen, Acetylene and Other
Gases . . . Carbide . . . Gas Welding
and Cutting Machines,
Apparatus and Supplies . . . Arc
Welders, Electrodes and Accessories

Air Reduction Pacific Company is a division of Air Reduction Company, Incorporated. Principal products of other divisions include: PURECO — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide • AIRCO — acetylenic chemicals • COLTON — polyvinyl-acetates, — alcohols, and other synthetic resins.

Johnson started his career in construction work in 1906 with the McIntyre Cement Company of Riverside, California, and a few years later had formed the Johnson-Shcha Company. He served as president of the National Bank of Riverside from 1918-1922 and after playing an important part in re-establishing the Bank, re-entered the construction field as a principal in the Hall-Johnson



Construction Co. which was the forerunner of Johnson, Inc. In 1922 he purchased controlling interest in the Western Reinforced Concrete Pipe Co. This company merged in 1929 with Bent Concrete Pipe Co. to become American Pipe and Construction Co. Mr. Johnson served this company as president for 25 years and was Chairman of the Board at the time of his death.

Will Johnson was president of Pacific Construction, Inc., the group of Western contractors who built Shasta Dam and he participated as a joint-venturer in many other large construction projects. He was an officer and director of many other companies but he always thought of himself primarily as a builder and in the last year of his life he devoted much of his time to the building of the Beavers organization and to its philosophy. He was a most competent banker, developer and an organizer of rare ability. He had wide social and human interests and served on the Board of Trustees of Pomona College for many years.

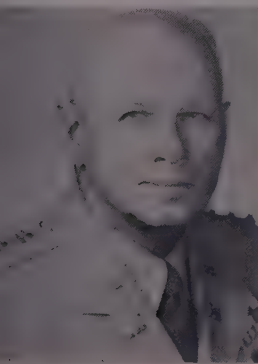
Will Johnson was a natural leader, a man of the most genuine democratic spirit with a loyalty to friends and a kindness to people which were exemplary. His contributions to the heavy construction industry and to the society in which he lived were many and his friends were legion. It is often said of unusual men that "God broke the mold after creating this man." This can be said of Will Johnson.

** Posthumous award accepted by Mrs. Winston R. Fuller and Mrs. Earl G. Corkett*

Samuel D. Sturgis, Jr.

Lt. Gen. Samuel D. Sturgis, Jr., was appointed Chief of the U.S. Army Corps of Engineers on December 1, 1952. He has directed the world's largest and most diversified engineering and construction program and commanded a fighting-building military organization unique among the fighting forces of the globe.

Born in St. Paul, Minnesota, in 1897, Samuel D. Sturgis, Jr., is a third-generation military leader. Both his father and a grandfather were major generals. All three were graduated from West Point. General Sturgis was a pioneer in the use of heavy equipment by combat engineers in World War II. He headed airbase, port and Army construction in 22 amphibious operations in the Pacific from Australia to Japan including the New Guinea, New Britain and Admiralty campaigns; the invasion of Leyte, the conquest of Luzon and the occupation of the Japanese Is-



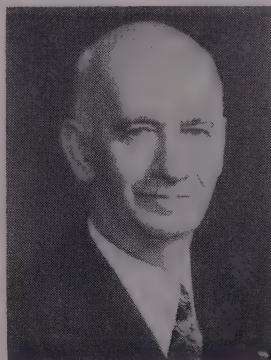
lands. Among his decorations are the Silver Star, the Legion of Merit, the Bronze Star Medal and the Distinguished Service Medal. In peacetime he has directed flood control work on the Ohio, Mississippi and Missouri Rivers and has built U.S. defense bases overseas in Morocco, Saudi Arabia and Greenland. He rose through all grades and unit commands from Second Lieutenant to Lieutenant General and his career is distinguished by the fact that he has held every command that an Engineer officer might typically hold from a platoon to Chief of Engineers.

In directing many outstanding construction projects including the Haines-Fairbanks pipeline and the NIKE defenses ringing American cities, General Sturgis has contributed greatly to the protection and welfare of the nation and has earned his fine reputation in the engineering and construction fraternity.

W. E. Kier

William Ernest Kier was born in 1874 in Illinois. He entered the construction business in 1898 when he joined the J. W. Atkinson Company in Colorado Springs. After eight years with Atkinson he organized his own firm, W. E. Kier Construction Co., and for several years specialized in church building in Arkansas and Kansas.

After Ernest moved to the West Coast in 1912, his brother Elmer joined him as a partner and through the years the Kier Company enjoyed a cordial relationship



with many other leading firms which led to a number of joint operations. To name a few: San Diego Naval Hospital, Coolidge Dam, Grand Coulee Dam, Golden Gate Exposition, Camp Callan, Fort Rosecrans and many others.

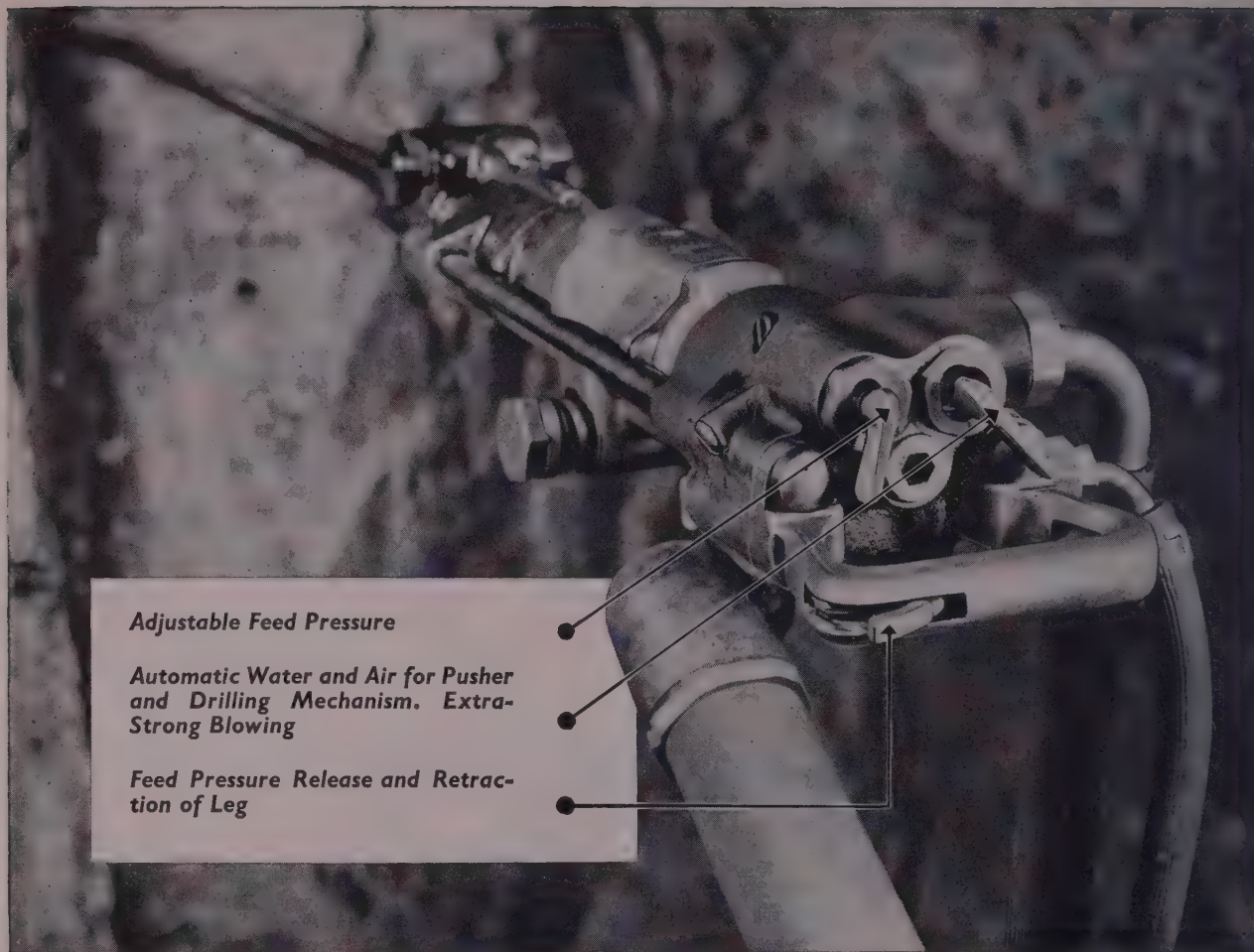
W. E. Kier has spent over 50 years in the active construction business and yet has always found the time to assist worthy benevolent enterprises. He has been

honored by the YMCA, Boy Scouts, churches, colleges and other organizations for his generous contributions of both time and money. Ernest has long been interested in the welfare of his own industry, too, and has been active in the Associated General Contractors of America for many years. He is one of the founder members of the AGC and has served as a Director and a member of numerous committees. Ernest Kier has made many friends in the construction industry. His fair and tolerant attitude, his long and fruitful career, his high principles and his simple virtues stamp him as one of the outstanding figures on the American construction scene.

W. J. Rohan

William J. Rohan was born in Dixon County, Nebraska, and was orphaned at the age of 12. At the ripe old age of 18 he was teaching school after graduating from Nebraska State Normal College. A year later he started his construction career which has continued for over 51 years and brought him to his present position as head of the Winston Brothers Company of Minneapolis.

Bill Rohan, as he is best known by his many friends and associates, has played a vital part in many big do-



Adjustable Feed Pressure

Automatic Water and Air for Pusher and Drilling Mechanism. Extra-Strong Blowing

Feed Pressure Release and Retraction of Leg

RETRACTABLE LEG AND ONE-HAND GRIP-CONTROLS SPEED DRILLING TIME

For years Atlas Copco have been the world's largest manufacturers of pusher leg drills. Since 1937 when Atlas Copco, far ahead of any other manufacturer, introduced their first pusher leg drills, they have continuously improved the design of these drills. Their latest development, the Atlas Copco 'Lion', combines an unequalled ease of operation together with a high drilling rate—both contributing to a higher footage per manshift.

All controls under one hand

The Atlas Copco Lion is the first drill to have all the valves which operate the drill under the control of one hand. *Full control without having to move the hand from the backhead!*

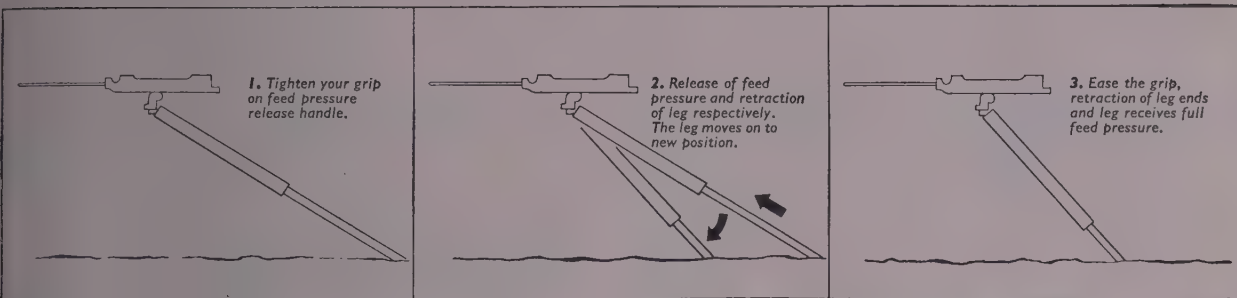
The valves are all easy to operate. By the use of only the fingertips the drill can be started or shut off, the feed can be adjusted to the pressure required, or retracted for an advance, and the extra air-blowing can be brought on to clean the holes.

All the control handles have been designed in such a way that they are well protected. While using them the operator's hand is never near the wall or roof of the drift. The Lion is the first pusher leg drill with controls placed for drifting.

Retractable leg saves time

When the leg has to be moved the feed pressure is easily released by squeezing the hand grip. By further pressure on the grip the leg retracts automatically.

Pusher leg moves forward with drill in full action



When the leg is in the new position suitable for continuous drilling, retraction stops and the feed pressure comes back by loosening the grip of the hand. *All this can be done while the drill is still running.*

This new idea of a retractable leg enables quicker repositioning of the leg and reduces the number of steel changes, thereby increasing footage per manshift. When drilling high holes it is now far easier to alter the position of the leg more frequently in order to maintain an optimal feed angle and feed pressure.

Packed with power for deep holes

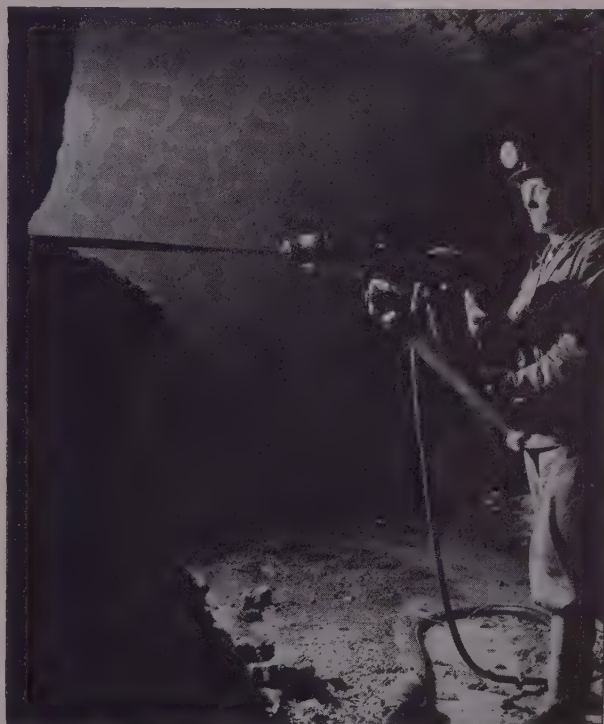
The Lion has a drilling rate at least 30% higher than other rock drills of the same weight. Furthermore, it is designed so that it can maintain its high speed *even when drilling deep holes*. This means quickly drilled deep hole rounds and a faster, steadier advance. You'll also find that the Lion reduces to a *minimum* the gauge wear of the bits in abrasive rock. And owing to the ease with which the feed pressure is released and brought back into action, the Lion is a *handier* drill to work with in fissured rock.

Sandvik Coromant —the right steel for the Lion

All Atlas Copco drills—and this goes for the Lion—have been developed from the earliest stages with Sandvik Coromant tungsten-carbide-tipped integral steels and detachable bits. No drill or steel developed separately could ever give such equivalently high performances as this drilling combination. It is today the most widely used in the world, responsible for drilling more than one billion feet per year.

Free Demonstration! Wire, 'phone or write today to any one of these offices and see the Atlas Copco Lion in action for yourself.

U.S., Atlas Copco Pacific, Inc., 930 Brittan Avenue, San



Without changing the grip of the hand the driller can easily position and control the machine, saving time and reducing fatigue.

Carlos, California. Atlas Copco Eastern, Inc, P.O. Box 2568, Paterson 25, N.J.

CANADA, Atlas Copco Canada Ltd., Montreal Airport, P.Q.

MEXICO, Atlas Copco Mexicana S.A., Apartado 56, Torreon, Coahuila.

The ATLAS COPCO GROUP puts compressed air to work for the world. It is the largest group of companies specializing solely in the development and manufacture of compressed air equipment. It embraces Atlas Copco companies or agents manufacturing or selling and servicing Atlas Copco equipment in ninety countries throughout the world.

Atlas Copco

DSFI

Manufacturers of Stationary and Portable Compressors, Rock-Drilling Equipment, Loaders, Pneumatic Tools and Paint-Spraying Equipment



ings, both as an executive and as an operations supervisor: the firm's harnessing of Montana's Mystic Lake to a hydro-electric program by means of blowing a hole in its bottom and channeling the outsurge through a quarter-mile-long tunnel to the penstock; its record-breaking performance in a pipe-laying joint venture that saw a 20-inch line stretched 225 miles across the Montana Rockies in just

89 days, and his part during World War II on one of the firm's many critical projects, the four-year super effort that earned the Army-Navy "E" in helping to build and operate a shipyard that turned out more than \$254 million worth of invasion-vital LSTs.

Bill keeps in close contact with company operations and the men directing them; he is sympathetic and understanding, and their problems are his problems. His is a policy of their personal interest and development, but never exploitation.

To his business associates this stalwart contractor's word is as good as any contract. His loyalty to his company, his friends and to the communities in which he has pursued his career typifies the positive philosophy which makes the entire construction industry proud of his achievements.

A. F. Garlinghouse

Construction equipment has been the touchstone of A. F. Garlinghouse and the successful career he has enjoyed since opening the doors of Garlinghouse Brothers, Construction Equipment, in 1924. Al Garlinghouse was born in Leadville, Colorado, and educated at the University of Colorado and Stanford University. After graduation from Stanford in 1914 he became resident engineer on highway construction for the California State Highway Commission and was assigned to Division VI in Fresno.



After some years devoted to highway construction he felt the pull of what was to become his prime business interest: the development of construction equipment. The commercial side of engineering appealed to him and he was determined to put his ideas into execution. He left construction work, which at that time was feeling the first stir of motorization, and took a job with Beckwith Machinery Co. in

Pittsburgh where as Sales Manager he introduced many West Coast construction practices to the East.

Al Garlinghouse was always looking for better ways of doing things or solving problems. He and his brother, L. H. Garlinghouse, have developed many aids to construction men and the Garlinghouse name has been closely associated with major construction projects particularly those involving the production and placing of concrete. Known and respected throughout the heavy construction industry, Al Garlinghouse has contributed major assistance in the building of important projects.

Robert B. Diemer

Robert B. Diemer, General Manager and Chief Engineer of the Metropolitan Water District of Southern California, was born in Missouri in 1888, and first came in contact with construction work at the age of 16 years when he started work in his home town mixing concrete for sidewalk construction.

Bob learned more of construction working for the C. B. & Q. Railroad for a year as a yard clerk. Before he graduated from the University of Missouri with the



degree of Bachelor of Science in Civil Engineering in 1911, he spent a year on surveys with the United States Reclamation Service in Nebraska. More construction work, including canals and dams on the North Platte and Riverton projects of the Reclamation Service in Nebraska and Wyoming, required his services from 1911 to 1926. Then for the following three years, his expert knowledge of irrigation was

put to use in Mexico building irrigation works for the Mexican government on the Calles, Don Martin, and Rio Mante projects.

In 1929 he came to Los Angeles to assist on the studies for the Colorado River Aqueduct. This project was recently chosen as one of the Seven Engineering Wonders of the United States and has had Bob Diemer's uninterrupted attention since 1929. He has served the Metropolitan Water District of Southern California in many capacities and has been General Manager and Chief Engineer since January, 1952.

Bob Diemer's leading part in the important work in Southern California has brought honor and the approval of the world to the construction industry.

A. J. Gock

A. J. Gock, formerly Chairman of the Board of Directors of Bank of America (retired November 1, 1954), was born in San Francisco, October 4, 1889.

Al Gock joined the Bank of Italy, now Bank of America, on March 1, 1912, at which time he became acquainted with the construction industry by making



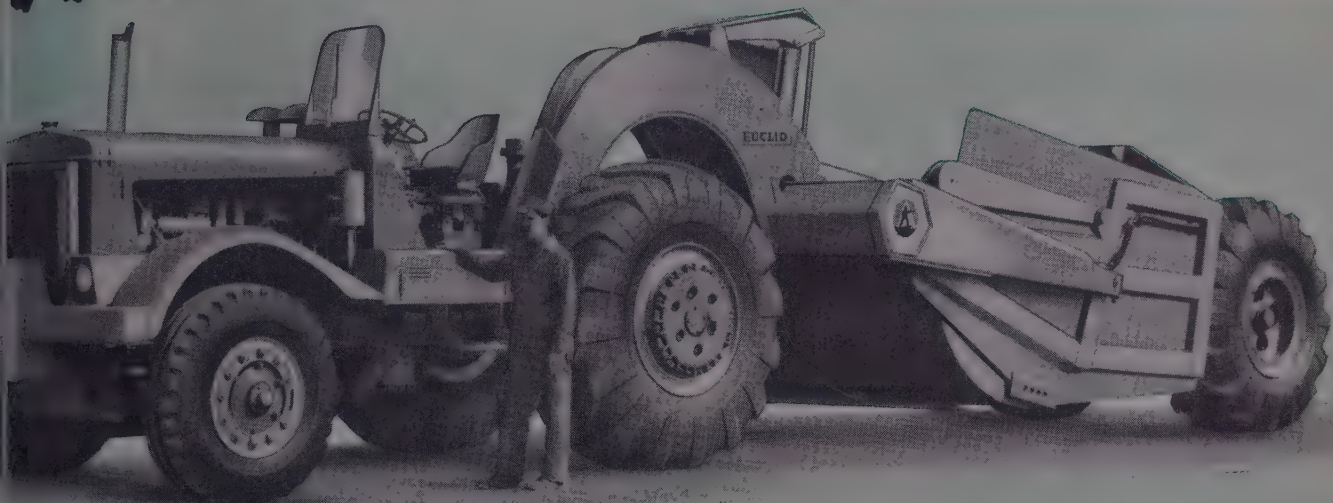
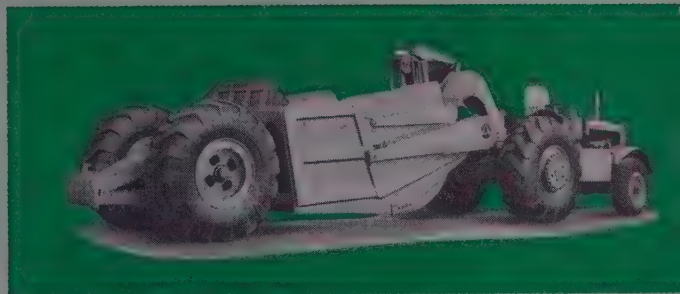
and supervising loans to both prime and subcontractors who were building the Golden Gate International Exposition in San Francisco. Since then, and until the time of his retirement, he has continued to keep in close touch with the construction industry through his work as a member of the bank's General Finance Committee with particular interest in loans made to the construction industry and

also unusually large loans to joint venture contractors.

His experience with so many of the important heavy construction projects in the West has brought him a wide acquaintance, a host of friends and has contributed greatly to the success of many of the outstanding firms and individuals in the industry.

Here's the NEW SS-24 "EUC" SCRAPER

31 Yards HEAPED!



Increased Production for high speed, long haul jobs

Euclid's new Model SS-24 has a struck capacity of 24 cu. yds. . . carries up to 31 yards heaped at 1:1 slope . . . is available with either a 300 h.p. or 335 h.p. engine.

New Allison Torqmatic Drive with four speed ranges provides plenty of torque in lower ranges to meet the requirements of heavy loading and soft fills, yet permits high travel speeds for fast hauls. Shifting under full power without loss of momentum reduces cycle time.

Six wheel design of this SS-24 gives it exceptional stability for long fast hauls. It is equipped with No-Spin differential, Euclid planetary drive

axle and 27.00 x 33 drive and scraper tires (33.5 x 33 are optional). Euclid hydraulic lever control of all scraper operations eliminates downtime and expense resulting from cable breakage. The cutting blade's four sections are interchangeable and reversible, providing straight and drop-center arrangements and longer blade life in any material.

See your Euclid dealer for more information on this big new scraper and the complete line of Euclid earthmovers . . . he can show you why **Euclids are your best investment.**

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



Public Relations for contractors

Colorado Contractors Association presents a committee report on an important subject for every contractor. Definite and workable suggestions are made on improving relations with the general public and contracting agencies.

CONTRACTORS are inclined to talk about public relations in general terms without coming to grips with specific methods that can be applied to daily operations. A committee of the Colorado Contractors Association (a chapter of AGC) reported on this subject of public relations at the annual meeting of the Association in Denver, Jan. 25-26. The report was signed by these committee members: Morris E. Adelstein, chairman; Arlie Bailey, Chris Eastin, M. C. Jacobs, Zimmie Lowdermilk, and Herbert Read.

The completeness, logic and value of the ideas contained in this report make it valuable reading for all contractors of these Western states, as well as the members of their supervisory staffs. The complete report follows:

When an agency sends out requests for bids to build a project, this request attracts the attention of contractors interested in the type of work called for in the advertisement. Bids are received and nearly always the low bidder is awarded the contract. It would seem to the uninitiated that, the letting being over, the low bidder (by the way, not always the successful one) has nothing to do but build the job, receive the remuneration for his work, and be on his way to another job.

Those who have had experience know that it is not as simple as all this. Being a low bidder and the one who builds a job is the first phase of his activities. There are brought into play many factors that govern the success or the failure of the low bidder to come out on a job and have more money in the bank than when he started. The contractor is the only man who will put a price on his job long before he knows what the job is going to cost him.

At the moment, we are not concerned with the merits of his bid, his ability to do the job and come out "whole," the price of material, the hazards and all the things that go to make up those problems concerned with construction. We are primarily concerned at the moment with the

public relations that are so paramount to the success or the failure and the peace of mind of the contractor. Many of the things we will say here are no doubt trite and academic, but nevertheless we think they are very important.

The real meaning of P. R.

Public Relations is a term used rather lightly and many times without knowing what the term implies. For our purpose, we will define Public Relations as that feeling, be it good or bad, that exists between any party or parties involved in something that affects both of them.

To begin with, no one man can build a project unless it be a primitive one with only his own hands and his own skill. It takes many men and many agencies to bring to a conclusion a job that will be satisfactory to all parties concerned. To have cordial relations between all the parties concerned is of primary importance. We are at the moment dealing with the relations that must exist between the contractor and those with whom and for whom he works.

Many agencies ask for bids by invitation and although public funds may be used the awarding agency can confine the list of bidders to a selected or qualified list. You know from your own experience that in many instances good contractors have not been requested to bid, or have been disqualified, not because they are not capable, but because their previous relations with the awarding agencies have been bad. This relationship has been so bad that the agency does not want that particular contractor as party to a contract. So, the first thing that any contractor must do is to establish and maintain a good relationship with awarding agencies, and this can be built up by proper relations between the awarding agency and its representatives. For example, a change in plans may become necessary, due to the fact that an error has been found in the design. Do not

hold up the agency for errors that have been made in the plans. Be reasonable in your request, because sometimes the public may have the memory of an elephant and will remember things that are unfairly done by a contractor. Here is a case where the Golden Rule really can be followed.

P. R. on highway jobs

Working on a highway project involves almost constant contact with the traveling public, unless you are working in an isolated or entirely new location. The public, as we all know, can be very unreasonable. They always think that the road should be built in another place or at another time. If they are inconvenienced, the contractor is to blame. If they wreck their car by being careless, it is the contractor's fault. If the project has proper and adequate signs, a good many times the public will not read them, and if they get into difficulty the builder of the job is at fault. Knowing these things, it behooves the contractor to use extra precautions in placing signs on his project.

In most instances the awarding agency specifies the kind and type of signs to be used, but there is no law or rule that would prevent a contractor from having a few extra ones as well, that would give a little more comfort to the traveling public.

In a recent case where a contractor had posted his job the sign indicated that the next 10 mi. was under construction, and motorists were cautioned to be careful and observe all signs. The sign stated that there were men and equipment working. The traveler, being very conscientious, drove very carefully for these 10 mi. but saw no men and no equipment. The contractor had failed to take the sign off the job when it was finished. A few miles farther on the same traveler came to another project which carried a similar sign—the next several miles were under construction; those using the road should be very careful. Having had the experience that signs meant nothing, the traveler disregarded this sign and it was only a short time until he found that he had failed to make a detour that he should have taken and he was in trouble. His faith and belief in signs was gone. When a sign has fulfilled its purpose,

(Continued on page 83)

Rc

*Prescription for Profit...***EUCLID S-12 SCRAPER***with these pay-off advantages***• CAPACITIES**

12 cu. yds. struck ... 14 yds. heaped 3:1 ... 16 yds. at 1:1 slope.

• EFFICIENT POWER

218 h.p. with 5-speed transmission is geared to working ranges ... top speed loaded is over 21 m.p.h. for fast cycle time.

• MORE TRACTION

Standard No-Spin differential eliminates wheel spin ... 26.5 x 25 tires provide extra traction and capacity.

• HYDRAULIC LEVER ACTION FOR SCRAPER OPERATIONS

Fast-acting, trouble-free ... eliminates downtime and expense of cable replacement. All 4 hydraulic jacks are interchangeable.

• MORE MANEUVERABILITY

Push-pull 90° full hydraulic steering for non-stop turns in 31 ft.

• MORE EFFICIENT, LONG-LASTING CUTTING EDGE

Four sections are reversible and interchangeable for longer life ... adjustable for most efficient loading in any scraper material.

• LOWER MAINTENANCE COSTS

More on the job availability because major components are easily accessible ... clutch and differential can be replaced in 1/3 the usual time for scrapers, transmission in 1/8 the time.

• TOPS FOR DEPENDABILITY AND PERFORMANCE

Pay-off performance proved by contractor preference for "Eucs" ... the fastest growing line of scrapers in the industry.

See your Euclid dealer for more facts and figures and a production cost estimate on the S-12—you'll find that Euclids are your best investment.

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio



MORE VERSATILITY ... 13 yd. (struck)
Bottom-Dump is interchangeable with scraper bowl for flexibility to meet changing work requirements with minimum investment in equipment.

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



PRESTRESSED BRIDGE

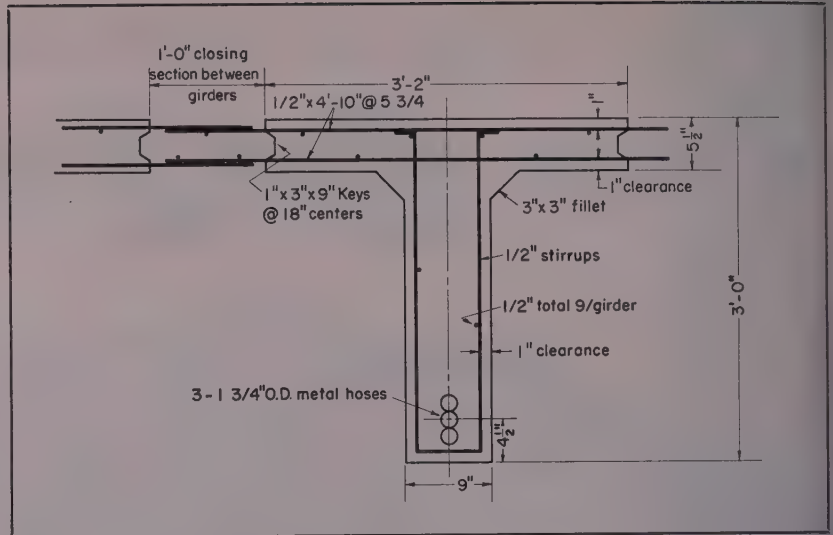
(Continued from page 43)

and $1\frac{5}{8}$ in. for girders simply supported at one end, with a variation of less than $\frac{1}{8}$ in. This difference will be easily taken up by the 2-in. plant-mix riding surface.

Grouting system

To pressure grout the cables the contractor uses a recirculating system which keeps the grout moving and eliminates spillage. The grout consists of neat cement and water mixed in a homogenizer at the rate of $4\frac{1}{2}$ gal. to a sack of cement. The homogenizer has a 1-hp. electric motor powering a 30-in. long shaft which mounts three $4\frac{1}{2}$ -in. blades. The can is 1 ft. in diameter and 30 in. long. The grout is mixed for 2 min. and then dumped into the hopper of a portable grouting machine.

When the cable is filled, the grout is carried from the far end of the girder back to the grout pump hopper through a rubber return hose. When grout begins flowing from the return hose, valves are closed at each end of the girder and another valve near the grout pump is opened to permit grout to short circuit the girder entirely. This enables the grout to keep moving while the hoses are attached to the next cable. The constant motion prevents the grout from



CROSS SECTION of girder at mid span shows design details. The wide web (9 in.) and the relatively few number of hoses (three) made it easy to place and vibrate concrete in the forms. Uniformity resulted in practically no variation in camber.

becoming stiff while the hoses are being reconnected.

Placing girders

The contractor, working 40 hr. a week, has been averaging about 12 girders per week. When 15 or 20 girders are ready, two cranes are brought to the job for erection. The girders weigh 19 tons and are picked up by lifting eyes made of $1\frac{1}{4}$ -in. re-bars cast into the girders 30 in. from

each end. Machined saddles prevent point loading on the lifting eyes. The cranes walk the girders to the erection point. The walks vary from a few feet up to 1,000 ft.

There are two interior diaphragms in each span. These are cast in place and are not stressed.

H. L. Harger is resident engineer for the California Division of Highways, Bridge Department, assisted by R. F. Leon, Superintendent for Maxwell Co. is Truman Hart.

Kiewit-Judson Pacific Murphy win Glen Canyon bridge contract

A \$4,139,277 Bureau of Reclamation contract for a bridge spanning the Colorado River downstream from the Glen Canyon Dam site has been authorized for award to the joint venture of Kiewit-Judson Pacific Murphy of Emeryville, California. The overall Glen Canyon Dam project was reviewed in detail last month in *WESTERN CONSTRUCTION* in an article by Bureau of Reclamation Chief Engineer L. N. McClellan.

The 40-ft. wide steel arch bridge will stand 700 ft. above the river, making it the highest such bridge in the world. Its single arch will be 1,028 ft. long, second only in length to the 1,675-ft. steel arch of the Bayonne Bridge linking Staten Island and New Jersey. The Glen Canyon Bridge, including abutments, will

reach 1,271 ft. across the gorge of the Colorado.

The Arizona Highway Department and the Federal Bureau of Public Roads are contributing funds to assist in the construction of the bridge. These agencies will also contribute to the cost of a permanent road which has been approved as an alternate route of U. S. Highway 89.

The bridge, together with this alternate road which the Bureau of Reclamation is building for immediate access to the site, will make it possible to bring in construction equipment and material. The road will provide access to the potentially great scenic values of the high dam, bridge, and reservoir area, which should become major tourist attractions.

More than 3,500 tons of structural

steel, 250 tons of reinforcing and other steel, and 2,650 cu. yd. of concrete in the bridge abutments and deck will be used in the construction. The roadway will be 30 feet wide and there will be two 4-foot-wide side-walks, one on each side of the roadway. It will take about two years to complete the job.

Two bids were received for the bridge work, with the \$4,408,944 bid of Bethlehem Pacific Coast Steel Corporation of San Francisco, California, second low. The engineer's estimate for the job was \$2,944,750.

The prime contract for the 700-foot-high concrete arch Glen Canyon Dam and Powerplant is expected to be awarded early this spring. Bids on the contract are scheduled to be opened in Kanab at 10 a.m., March 28. A contract for the right diversion tunnel, needed to divert the Colorado River around the dam site during construction, was awarded in October 1956 to Mountain States Construction Co.

Euclid Scrapers and Crawlers are your best investment



Overhung engine type Scrapers of 7, 12, 18 yds. struck capacity

Powered by engines of 143, 218 and 300 h.p., these scrapers have heaped capacities of 9, 16 and 25 yds. Advanced design of Euclid's hydraulic lever action, low bowl and 4 section cutting blade provides fast, easy loading. The 18 yd. model has Torqmatic Drive... all have NoSpin differential and Euclid planetary drive axle... unequalled accessibility of the power train and major components.

Four-wheel Tractor Scrapers

These 12, 18 and 24 yd. scrapers have maximum stability for rough roads and high speed hauls. At 3:1 slope heaped capacities are 14, 20 and 27 yds. A 200 or 218 h.p. engine with 5-speed transmission powers the 12 yd. scraper... drive tires are 21.00 x 25 with 24.00 x 25 optional. The 18 yd. scraper has 300 h.p. with 3-speed Torqmatic Drive... standard tires are 24.00 x 25 with 29.5 x 25 optional... a 17 yd. bottom-dump is interchangeable with the scraper. The 24 yd. scraper has a 300 or 335 h.p. engine with 4-speed Torqmatic Drive and 27.00 x 33 tires... 33.5 x 33 drive tires are optional equipment.



TC-12 Twin-Power Crawler

A completely new concept in tractor design and performance, this Euclid Crawler has two 218 h.p. engines for a total of 436 h.p. There is a separate Torqmatic Drive for each track. Top speed is 8 m.p.h. —change from one speed range to another or to one of the three reverse speeds is made under full power. Planetary drives can be serviced without removing track, frame or drive sprocket. Operating weight, bare, is 62,500 lbs.



Twin-Power "Euc" Scrapers

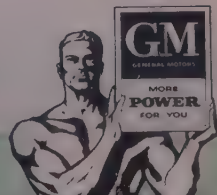
These scrapers have capacities, struck, of 18 and 24 yds. — heaped at 3:1 slope, 21 and 27 yds. Both models are powered by two engines, each with Torqmatic Drive, and have 27.00 x 33 tires with 33.5 x 33 optional. The Model TS-18 has a total of 436 h.p. Tractor of the Model TS-24 has a 300 h.p. engine—scraper wheels are driven by a 218 h.p. engine—a total of 518 h.p. "Twins" outperform other scrapers by a wide margin—they self-load and work under conditions that stop other scrapers.

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EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



Letters . . .

What's wrong with rock jobs?

Dear Sir:

Having spent over 20 years as driller, powder man, equipment operator and foreman on rock jobs, I would like to enumerate some of the practices detrimental to rock jobs that I have seen.

I will start by stating that faulty management is responsible for most of the ills. No matter how well the job is run in the field, the average foreman seldom has control over what type of equipment, powder, or class of personnel he needs. Company policies are set up, or the job manager operates at his own whim, and many times he is a man who never drilled and shot a cubic yard of rock.

On shovels and scrapers many time studies have been made. It is known with great accuracy how many cubic yards such equipment will move under ideal conditions, but how many jobs are worked under ideal conditions? No piece of equipment can operate efficiently in rock that isn't shot properly. So, what happens in many cases? The company spends from \$40,000 to \$150,000 for a shovel and then brings in an old used wagon drill or a few jackhammers with some laborers they have picked up to run them. That doesn't always keep the expensive shovel with the trucks and their crews busy. Idle equipment with their crews, waiting for broken rock, is just plain loss. Sometimes the equipment is moved to other locations, necessitating a moving cost, and throwing the job out of balance.

The drilling and blasting personnel is one of the most important items. Nowadays, very few men make this a profession, so that the class of personnel has gotten very poor. Again, management is greatly to blame. This type of personnel is the first to be laid off, with no thought of where they would staff the next job. The answer the foreman gets when requesting men is "Call the Union." After many costly experiences I don't believe there is a Local anywhere in the country that could staff a good sized rock job with qualified men. As long as drillers and powder-men are associated with laborers in their Union, their skill will always be classed with the pick and shovel men. I have had the experience of breaking in a completely new crew of foreign national-

ists and found that it was much easier and took much less time, to train a shovel runner than it did to train a wagon driller. The men that are first in the line of sequence on the rock job are still in the lowest labor classification.

As to the drilling equipment, the condition in many cases is a sorry situation too. Who orders it? Generally someone who never had his hands on a control lever. If it is the right type for the job, or if the company needed a versatile piece for their various types of jobs, do they consult an experienced rock man? Very seldom!

Then, as to the maintenance of the pneumatic drill equipment. How many contractors have anybody in their shop organization that would know whether a drill was all right inside or not? The cost due to abuse

and mishandling of this type of equipment is often terrific.

Powder and associated materials are other items that are mismanaged, while being very important to the rock job. Usually they are bought by a purchasing agent or the managers—neither of whom would know how to use it. There are many types and grades on the market today, and it takes an experienced man to pick out what is best for any particular job.

All of these things, added up, can either make or break, as the saying goes. The proper personnel, the proper equipment, the proper powder are all so very important—they are the keys to any rock job. If the rock isn't shot properly the rest of the job cannot operate to its full efficiency.

With the new highway program coming up and the tremendous amount of work being let, which will have a higher percentage of rock work on them than the jobs in the past, it seems to me the construction industry will have to make a reappraisal of their drilling and blasting procedure.

W. A. "ANDY" GARRITSON

COUNTY PROBLEMS

(Continued from page 66)

the Road Department, the plane is available for all county departments.

Landing strips are available at all of the nine district stations, and with the two-way radio the ultimate in communication and supervision is provided. If a foreman in the field wants a decision made, a radio call to the headquarters office will generally bring a reply that the commissioner or the engineer will land at an acceptable and convenient airstrip, where he can be met with transportation and be at the site in less than an hour. Or, in the case of a breakdown, radio word naming the required part can be sent to headquarters and the trip by plane made to the nearest distributor and the part flown directly to the site of the breakdown. Lastly, when business trips are required to Sacramento or other parts of the state, such business visits can be concluded in a few hours as compared to an average two-day trip by car.

Although the county plane has been functioning only a relatively few months, it has already demonstrated its many advantages and these will be increased as it is used during all the seasons of the year.

The natural resources and assets of Trinity County are being diverted for the benefit of the people throughout the state. Our water will benefit the central and southern part of the state; our timber is being cut and largely processed outside the county. Industry within the county is negligible, due to transportation problems. This means that the future of Trinity County lies largely as a recreational area and playground for all of California and the whole country to enjoy. Our hunting, fishing and scenery are unexcelled, our vacation weather perfect; in many places our roads tap the entrance to a vast primitive area which is now enjoyed by many vacationists every year, and with the completion of the Trinity River Project, now under construction, we will have even more to attract the tourist.

Most of the 700 mi. of roads and some 150 bridges comprising the county road system are deficient by modern standards. With the roads to be built by the U. S. Bureau of Reclamation in connection with the Trinity River Project, this situation will be somewhat alleviated; however, to improve our roads to the extent that the people of California can fully enjoy all we have to offer will probably require additional State and Federal financing.

Public Relations

(Continued from page 78)

take it down, but not until then.

It would seem that if a road is posted, the sign should indicate what is being done, and when need for extra caution is eliminated the sign should be removed. If this is not done it is certainly one way of discrediting the industry and those who build it.

Reactions of travelers

Here are two examples of letters that are sometimes received by contractors indicating the impression created on a highway project under construction. These letters are taken from our files, and indicate the impact that the contractor's method of handling his work can have on the traveling public. They also go to show that the same organization, depending on who represents them, can create a good or bad impression, as indicated by these letters received by the same company.

The first letter was written by a traveler who was favorably impressed with the public relations of the contractor, and the second one is by one who was not so favorably impressed.

To Whom It May Concern:

I just recently completed a trip with my family which took me through several of the midwestern states. This trip was taken during the summer months, and because of the season, we were obliged to travel over many, many miles of roads under construction.

After traversing several of these construction projects, my family and I began to keep mental track of the various firms performing the work. We were very much impressed by the manner in which your company operated.

As I recall, we had occasion to travel over five projects which were under construction by your firm. At no time were we delayed more than a few minutes; your flagmen were neat and courteous; the project was very well marked and posted; the various warning signs were large and legible; the traveling surface was well maintained; and the equipment looked as if it had just come from a paint shop, it was so clean and well marked.

Travel over "Roads Under Construction" is usually a miserable experience, but your company seems to have changed this to just a slight discomfort. My family and I wish to

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"TRIPLE-S"—Designed for severe service but where weight of bulk material and length of carry do not demand "Super-S" quality. Recommended for crushed stone up to 6" or 8", abrasive ores, etc.

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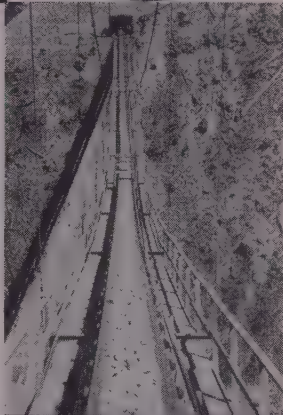
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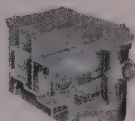
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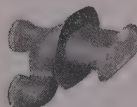
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thank you for the effort you are making in regard to the traveling public. This effort is appreciated by a few, at least, and I am sure that if more companies operated as you do there would be very few "gripes" from motorists.

Yours very truly,
An Appreciative Tourist

Dear Sir:

As a motorist passing through one of your construction jobs, I couldn't help but notice the way the signs had been erected. I say "had been," because most of them were down or partially down. These signs had never been maintained after erection, and the one warning of trucks entering the highway was not in the proper place. Evidently the haul road had been changed, but not the sign. After getting up to where the equipment was working, we were forced to stop and get over on the soft shoulders several times to yield the right of way to your men and equipment. We know that time is of the essence on your jobs, but don't forget that sometimes others are pressed for time also.

When we arrived at your detour, the signs were very poorly erected, and evidently the wind had turned the arrow sign so that we were at a complete loss to know where to go, until one of your men, apparently a flagman, came out of the ditch and told us in no uncertain terms where to go. About this time an unmarked pickup came whizzing down the road, and the driver (a foreman, I believe) asked the flagman what was going on, and an argument ensued over where he had been and why we were not on our way. It gave us a feeling of nobody knowing anything, and not caring a great deal about it, either.

This is written with the thought that you would like to know about it, and I am certain you do not condone such actions.

A Passing Motorist

Importance of the flagman

Another thing that causes a good deal of difficulty between the traveling public and the industry is the fact that in many instances the contractor will pick out an inexperienced and careless person to direct traffic and flag the job. Nothing irritates a motorist more than to ask a flagman for direction and fail to get it, or a flagman who acts discourteously, or a man who is dressed in a slovenly manner and looks more like a tramp than a workman. This certainly does

not create confidence in the people with whom he talks. Possibly the only contact a user of a project has with the contractor is through the flagman, and if this flagman is discourteous, careless and ignorant, it certainly does the contractor or the industry no good. Therefore, it behooves us to be very selective in picking out a man who can handle this important part of a project.

Even though the project is properly signed, and assuming that the flagmen are properly trained, there will still be traffic problems. People will take the wrong detour or drive carelessly and get into trouble. Although it is costly and very irritating to help people out in these cases, the Golden Rule still applies, and it is a good policy for the contractor to be ready and willing to help the traveling public when they get into trouble, if they get stuck or lose their way. It still is a good policy to be helpful.

Referring again to signs, remember, the public is vitally interested in good highways, and since most gas stations have signs attached to the pump saying that 8 to 12 cents is the tax on gasoline, they would like to know where their money goes. It would be interesting to the traveling public to have a sign at the beginning and the end of the job stating the cost of the project so that all may know where some of their tax money goes.

Relations with the union

There is one other thing that I would like to discuss and that is the relationship of the contractor's representatives with the union with which he is working. Sometimes the contractor or his representatives begin to think that the union demands are unfair. But here is a good place to remember the adage, "Whom the gods would destroy they first make mad." Unions are here to stay and we have to deal with them whether we like it or not, and the best thing to do is to try to get along with them.

In a recent case a foreman in anger discharged one of his workers, and all he said to him was, 'You are an agitator for the Union.' This was only seven words. This man who was discharged filed a claim with the Labor Board for \$1,600, and the contractor was very happy in this instance, because his man was guilty, to settle for \$900. This was a very expensive conversation. It cost the contractor \$128.57 for every word spoken to the so-called agitator. Not only that, but all the other men on the job gloated over the situation and thought that

the contractor got what he had coming. This could happen on any man's job and is something that should be avoided.

Relations with the engineer

One of the important things is to create confidence between the contractor and the engineer who represents the agency for which he works. Confidence is created by knowing how to do the job, how to get along with the engineer, and especially by having his own men get along well with each other. It behooves us all to train our men so that if they do have any difficulties they can be ironed out away from the job, or in an office where quarrels are not held before or in the presence of an engineer. If there is linen to be washed it should be washed either away from the job or in some private place, because nothing will destroy more quickly the faith an engineer has in the contractor than conflict among the contractor's own personnel. A relationship that otherwise would be very friendly and carry the badge of confidence can easily be destroyed if this is carried on without exercising proper care.

Community relations

Another thing is the relationship between the contractor and the local community in which he is working. It is not too expensive to occasionally run an ad in a local newspaper. It is in keeping with good practice to invite the publisher of a paper to come out to the job and see what is being done, to tell the story of the project and how it will be built, and especially to emphasize the fact that although the local community may be temporarily inconvenienced, their reward will come when the project is completed. The inconvenience will then be forgotten in the value of the project and its use will long be remembered.

Sometimes you will be asked to participate in community affairs close to the project on which you are working. A good excuse is that you pay in the community where you make your home. This is always a good excuse, but a good many times it is a good alibi. It is well to participate in local activities, such as The March of Dimes, the Red Cross Drive, Polio Drive, and the Community Chest. The cost is not great, and to state it selfishly, the dividends are great and you become part of the community while you are there. I know of a contractor working a long way from his home base who asked

his men to subscribe to the local Community Chest, offering to match the money given by his men. This one act made the local people feel that here was a company that was willing to give part of its earnings to do good. Then when there is a matter of delaying traffic, or causing other inconveniences to the local public, the people are more than reasonable. It is a case of casting bread upon the waters . . . Think this one over.

I have known cases where, after a contractor leaves a community and another one moves in, there is distrust of the men involved. This is due to the fact that the previous contractor has had men with him who left the community owing bills to filling stations, stores, hotels and restaurants. I have known of many instances where a contractor moving into a community has had great difficulty in establishing his honesty, integrity and sincerity, because his predecessor has created in the mind of the public the thought that contractors and/or their men are reprobates. Although a contractor cannot guarantee the payment of all bills incurred by his men he can still be alerted to the fact that this part of his operations should be watched, and he can reduce the hazards of the merchants in a community to a minimum.

Some contractors do not put their name on their equipment, their trucks or their transports. The reason they give is that they do not "want any trouble" with the public. It would seem to me that this is a false premise. I think a man in the contracting industry ought to be proud of his equipment and should not be fearful of putting his name on his equipment and not be afraid that doing such a thing would cause difficulty. On the other hand, if his man and his operators are trained to be courteous, I think it is very helpful to have the contractor put his name on his equipment so that those who are brought into contact with him will commend him and not condemn him.

Insurance

There is one more thing that I would like to discuss with you and that is insurance. All of you carry insurance of many kinds. Primarily it is to protect you from law suits and damage claims, but we must remember that the fact that we carry insurance does not relieve us from seeing to it that the public is protected in a way that is not covered by any policy. We have all heard, in case of

an accident or damage to property, the answer given to a claimant, "We carry insurance," and let it go at that. We must be sure to take care of those things not written in the policy, and that is the building up of a good relationship by the proper handling of claims.

Usually the insurance company is willing to make satisfactory adjustments, and quickly, but perhaps the contractor fails to give the insurance company the proper information at the proper time, and here again is a case of creating ill will between the public or the claimant and the contractor. Try to get a claim settled. Do not ignore it, trusting to some unknown power that all will come out well. Give the thing a boost and you will win the gratitude not only of your public but also of the insurance company.

Why is it that some suppliers of equipment and parts will lean over backwards to get parts to a certain customer and place others low on their list? Sure, he is after business, but there are some men who, in ordering parts, approach the matter in a way that antagonizes the supplier to the extent that he will say, "I'd rather do without his business." Let's hope you are not one of these.

Certainly we can say a lot about the poor public relations that are created by the awarding agency by the public itself, by engineers, and many people and agencies with whom we deal. Books could be written about their lack of cooperation and the poor relationship that they create by their operations, but we are primarily concerned with the contractor at this time. There are many things to do and a long way to go, but if the body is willing to do it we can get people to like us, and in liking us the work we have to do will be rewarding and interesting.

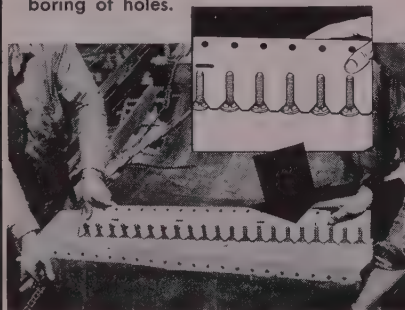
There is something more to add. You belong to the AGC. We all do, for the reason that it will do us good, and it does. The slogan of the AGC is "Skill, Integrity and Responsibility." If we do our work skillfully, if we ourselves set an example of integrity with all the people with whom we deal, and if we see to it that we are responsible for our men—be they operators, flagmen, or men in any category—we are well on our way to have the public like us and that is what we want. It will never do our industry any good to adopt a policy of "the public be damned." This attitude brings nothing but grief to a contractor, and as a result, to the entire industry.

NEW FLEXCO POWER TOOLS CUT APPLICATION TIME IN HALF

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The FLEXCO Power Tool Boring Bit used with electric or air impact tool speeds boring of holes.



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Structural Design Chart—VIII

By THOMAS HARAN, Civil Engineer

THE CHART on the opposite page is a condensation of the author's interpretation of the structural analysis and design requirements for columns of "The ACI Building Code" (ACI 318-51). The symbols and abbreviations are those in current use and in many cases the same as those used in the Code; where exceptions occur they are either indicated on the chart or defined in the following discussion.

The chart is headed by a section which is applicable to all columns. Live load arrangements are indicated for determining moments and axial loads for the design of columns. The definition of pedestals, short and long columns, is given in terms of unsupported heights and least lateral dimensions. Unsupported column lengths are indicated with various requirements for brackets and struts. Minimum bar spaces and cross-section requirements are shown. Minimum space between vertical bars is indicated as $1\frac{1}{2}"$ and $1\frac{1}{2}G$ (G being the maximum size of the coarse aggregate). Data on splices of column bars are given with the alternate of welding noted.

Under Spiral Columns, minimum A_g for design is indicated as a circle or rectangle providing a minimum cover " c " outside the spiral (" c " is in a table on Chart No. 12 to be published in the future). Cross-sections are shown which are not representations of Code requirements but which represent various surfaces encountered in architectural concrete construction. In placing his design column in the architectural section the designer must keep in mind the resistance of the architectural concrete (that which is outside the design section) and keep this resistance balanced on opposite sides of the column if the column is supporting an axial load in accordance with the ACI formula. (This same consideration should be kept in mind when observing other irregular sections shown on the chart.) While symmetrical arrangements of reinforcement are conventional and preferable, unsymmetrical arrangements may be utilized to reduce eccentricities. The section with two small spirals and one large spiral is merely a reminder that the Code does not specify that multi-spiral columns must be of the same diameter spiral.

Under Tied Columns, information is given for splicing vertical reinforcement within the unsupported height of the column, and various specifications for vertical bars and ties are illustrated.

Under Composite Columns, two terminations of columns at footings are shown. The one on the left transmits its load to the footing by bond on the vertical reinforcement (over a length L_D which is in a table on Chart No. 11) plus compression of the concrete and bearing of the metal core on the I-beam which distributes the load across the footing. The illustration on the right transmits the load from the vertical reinforcement to the plate (stiffened with brackets) that acts integrally with the top flange of the I-beam; this I-beam also receives the load from the metal core and distributes the entire column load across the footing grill. The note between the footings is a reminder for the use of brackets to transmit load to the metal core and points out the A_g that is to be used for the spiral column when it is used to transmit loads entering the column.

Under Combination Columns, note that concrete in steel pipes may be any strength whereas that in other combination columns is required to have a minimum ultimate compressive strength of 2 ksi. It is also noted that metal brackets should be used to transmit total loads from each floor to the metal core.

Next month, WESTERN CONSTRUCTION will present the ninth chart of this series—"Structural Analysis and Design of Walls."

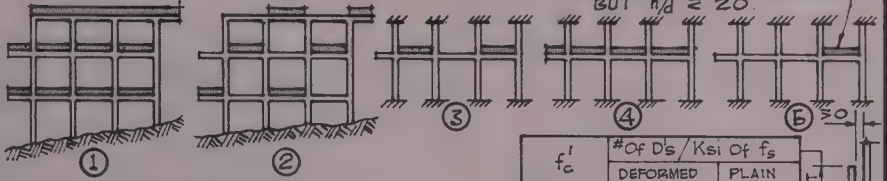
More Power for Northwest

THE ELECTRICAL UTILITIES of the Puget Sound-Cascade region will spend over \$100,000,000 each year for the next 8 years to provide new generation, transmission and distribution facilities, according to a report issued by the Puget Sound Utilities Council. Included in Council projects are Tacoma City Light's Mayfield and Mossy Rock dams on the Cowlitz River; Puget Sound Power and Light's Upper Baker dam and new units of Lower Baker and Snoqualmie; Seattle City Light's Gorge High dam and the Boundary dam on the Pend Oreille River in northeast Washington; and the Chelan PUD's Rocky Reach dam on the Columbia.

A.C.I. COLUMNS

ALL COLUMNS

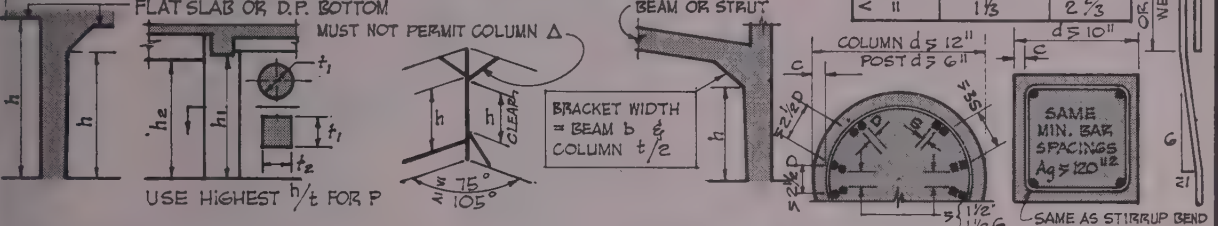
CONSTRUCTION	LL POSITION FOR
	M P
BUILDING FRAME	(5) (1)
FLAT SLAB	(3) (2)
	(4) (1) REDUCED



PEDESTAL $h \approx 3d$ < SHORT COLUMN $h \approx 10d$ < LONG COLUMN h

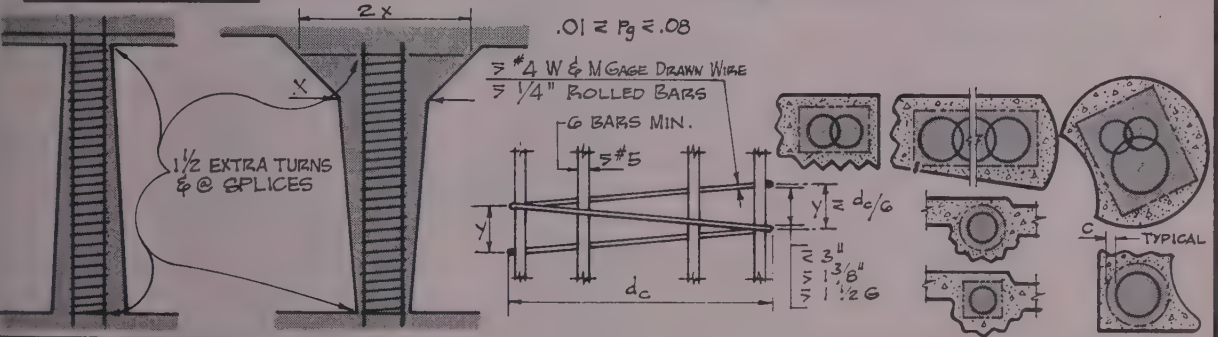
FLAT SLAB OR D.P. BOTTOM

MUST NOT PERMIT COLUMN Δ

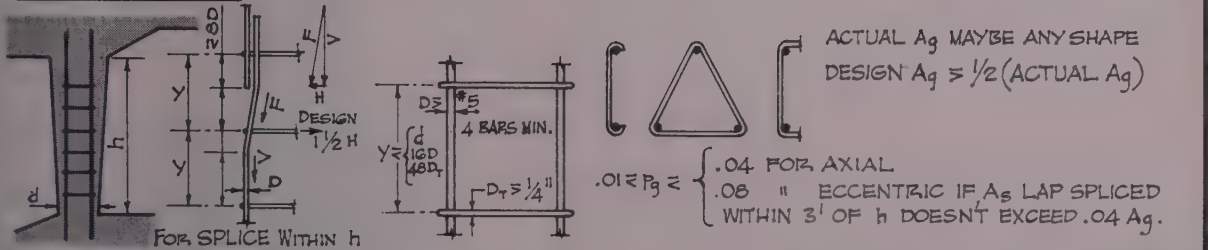


SPIRAL COLUMNS

■ = MINIMUM A_g FOR DESIGN

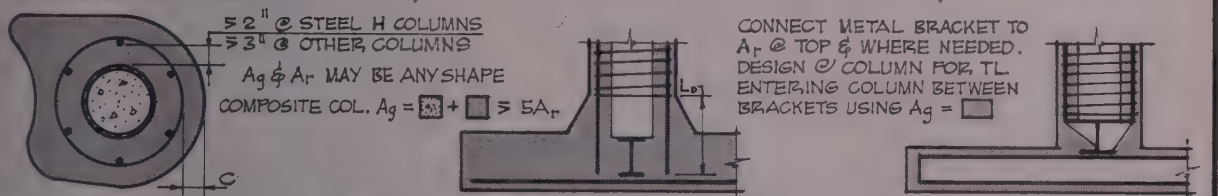


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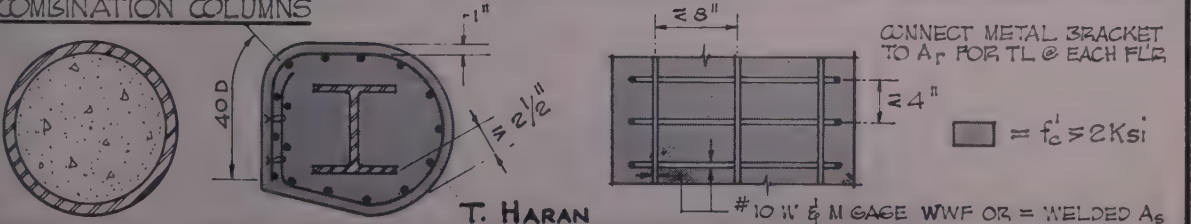


COMPOSITE COLUMNS

(R/C @ COLUMN + C.I. OR STEEL COLUMN)



COMBINATION COLUMNS



T. HARAN

REV. 2/19/66

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

WAGE DISCUSSION TIME—

Spotlight in Alaska as this is being written is on the annual contractor-union wage negotiations. These vital meetings between representatives of labor and management in the construction industry got under way early in February and will determine wage scales for the coming construction season. A committee representing construction firms in the Associated General Contractors will meet with a similar committee representing virtually all of Alaska's major union crafts. These include the teamsters, operating engineers, laborers, iron workers and bricklayers. Other crafts will negotiate individually later. Alaska construction costs, economic conditions and volume of 1957 construction all will be affected by decisions reached at the vital meetings started this month.

ENIGMA FOR BIDDERS—

Outcome of current Alaska labor-contractor negotiations is being eagerly awaited by contractors both in Alaska and in the states. Anchorage-area contractors have complained, some of them rather bitterly, that they are forced to bid on government contracts without knowing what one of their major cost items—labor—will be. If wage demands follow the pattern set in recent years, labor costs will continue to spiral—and this increase will be reflected in the bids made on projects.

COST OF LIVING—A new element appears to have emerged in the annual union-contractor negotiations—the element of taxation. Anchorage unions for a long time have looked with a certain amount of envy at the status of most government employees in Alaska who enjoy a 25% "cost of living" tax free bonus to their salaries. Government workers in Alaska are granted the "cost of living" payments—which add very substantially to their income—because Uncle Sam has long recognized that living costs in the territory are from 25% to 50% above the national average, fluctuating upward and downward from those percentages. Alaskan labor union officials, according to one report to this column, are getting ready to demand that contractors specify that a certain amount of their hourly wage is "basic hourly wage rate" and that the remaining percentage is "cost of living bonus." The next step will be for union men in Alaska to claim deduction on their federal income tax on the basis of the cost of living bonus just as most federal workers now are allowed to do.

ALEUTIAN DEW-LINE EXTENSION—

The U. S. Bureau of the Budget has approved release of funds for extending the DEW-line chain of radar bases to the Aleutian Islands to give the continent radar facilities along a vast new sector. Originally being considered for construction as a "cost-plus" contract undertaking, the government has now decided that bids on a competitive basis will be called and that the Alaska District Corps of Engineers will have overall supervision on construction. The job will cost an estimated \$20,000,000.

DEW-LINE APPOINTMENT—

James L. McNamara, well-known Alaska engineer official, has been named acting resident engineer in charge of construction of the Aleutian phase of the DEW-line project. McNamara has been in Alaska since 1938. He will be responsible for directing construction of the six stations which will be built under supervision of the Alaska District Corps of Engineers.

WHITE ALICE LINK—

The second completed section of the White Alice communications system was delivered to the Air Force on Jan. 19 by the Western Electric Company. The newest segment of the Alaska-wide network provides reliable telephone and telegraph service between Anchorage and Kenai. Delivery of the Anchorage-Kenai section by Western Electric follows turnover to the Air Force of the Anchorage-Middleton Island segment which was placed in operation on Nov. 29 under the direction of the Integrated Communications Services, Alaska (TCSAL.)

TAX PROBLEM—

The city of Nome is puzzled about the question of title to personal property held by a contractor for a federal project. Can personal property taxes be assessed against such property held by the contractor on assessment day? A bulletin issued by the League of Alaskan Cities declares that the answer to this question is "yes." The bulletin states that title to property held by contractors in Alaska rests with the contractor until fulfillment of the contract and the time that the completed project is turned over to the federal agency. The bulletin noted that "sometimes the city loses this legitimate income through contract provisions for advance payment to the contractor. One of the main objectives in the 1957 national municipal policy adopted by the American

Municipal Association at its recent convention in St. Louis seeks to eliminate this unfair practice."

EMPLOYMENT—

As is usual for Alaska at this time of the year, employment is at a low ebb, as is construction activity. However, each month to come, until the summer employment peak, will probably show a perceptible increase in jobs, territorial employment officials declare. Except for recurring demands for technical, professional and administrative jobs, primarily for federal employment, there now are ample workers residing in Alaska to meet all normal employer demands for the next several months. An increase in demand for workers will become more pronounced, however, as the construction season approaches.

ROAD PROGRAM—

A long-range proposed road program is being studied by a special committee of the Anchorage Chamber of Commerce. Present proposals call for a highway from Anchorage to the Kuskokwim River area, and also a highway linking the Bristol Bay area with the main Alaska highway system. Construction of these highways would open up a vast new area of the territory and provide large-scale construction projects for several years. Chamber of Commerce planners are urging consideration of the program on the basis that it is long overdue and badly-needed by isolated Alaskan communities.

AIRPORT PROGRAM—

The Matanuska Valley Airmen's Association has protested to the legislature against alleged inequities in the territorial airport construction and maintenance program, declaring that the emphasis on new airport construction is too great. The group's major complaint is that as a result of what it calls over-emphasis on new construction "many of the hundreds of small fields throughout Alaska have deteriorated to such a point that they are unusable." The group's charge that "not one cent" was being spent on maintenance was denied by Herman Porter, director of the Territorial Department of Aviation. Porter said \$200,000 has been spent on airport maintenance during the last two years.

NIKE WORK—

Construction of the Army's Nike guided missile sites, delayed more than a year by an inter-service feud, will get under way this summer at Eielson Air Force Base near Fairbanks. Contractors have been invited to submit competitive bids on construction of four Nike stations in the Eielson area. All four will have the same construction and are expected to cost a total of about \$10,000,000. The four Eielson sites have been named Site Jig, Site Tare, Site Peter and Site Mike.



Your Wickwire Rope Distributor and our **closer operator** ...ready to help you



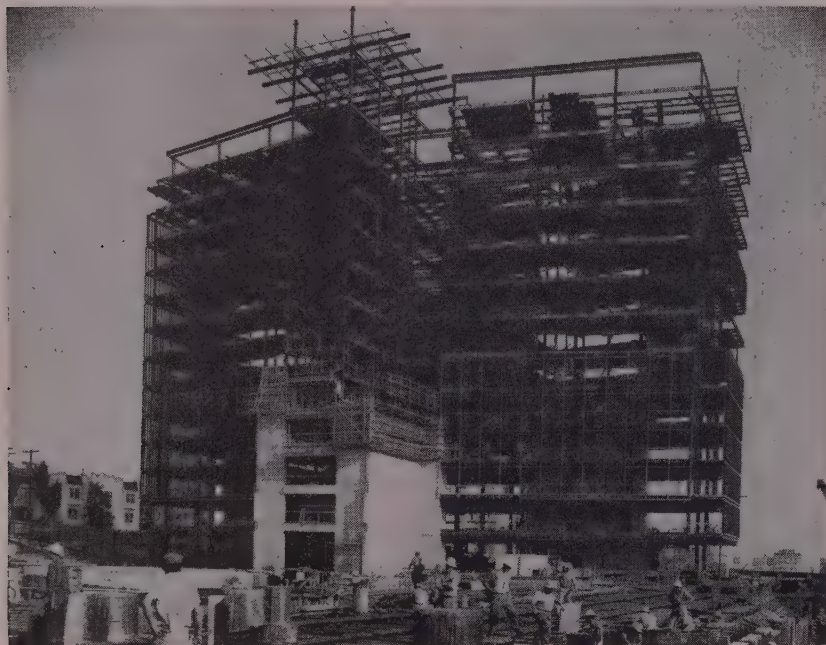
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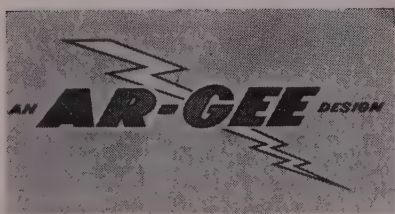
A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION



UNION OIL CENTER SETS FAST PACE

STEEL ERECTION is nearing completion on the Union Oil Center in Los Angeles. General contractor on the project is Del E. Webb Construction Co. The foundation was described in the April 1956 issue of Western Construction, and a 440-ft. pipe jacking operation in the January 1957 issue.

LeTourneau to re-enter earthmoving field



ROBERT G. LeTOURNEAU, who until four years ago was a leader in the earthmoving equipment industry, announced that his firm will re-enter the earthmoving industry in 1958 after a five-year absence.

LeTourneau, in Chicago for the ARBA Road Show, said the machines he will introduce in 1958 will be driven by revolutionary "Electric Wheels," and will be powered by diesel-electric dynamos similar in principle to those found on modern diesel locomotives.

The new equipment will be marketed under a new trade mark—"AR-GEE"—instead of the familiar

"LeT" or "LeTourneau" which for almost three decades has identified LeTourneau equipment.

The new name was chosen to represent the "R. G." of Mr. LeTourneau's name.

The firm will begin immediately to promote the new "AR-GEE" trade

R. G.
LeTourneau



mark and to guard as much as possible against confusion of the names "R. G. LeTourneau, Inc." and the new Westinghouse Air Brake subsidiary, "LeTourneau-Westinghouse Co."

R. G. LeTourneau sold his earthmoving business to Westinghouse Air Brake Co. for \$31,000,000 four years ago. Included in the sale was an agreement that his firm would refrain from building and selling earthmoving equipment for a period of five years, ending May 1, 1958.

Following the sale, LeTourneau moved his firm's headquarters to a 12,000-ac. plant site near Longview, Texas. Since then the company, with some 900 employees, has been developing equipment for such fields as land clearing, off-road transportation, logging, heavy materials handling, offshore drilling, and other fields not related to earthmoving.

The firm will continue its manufacturing activities in these non-earthmoving fields. Re-entry into earthmoving will be handled as an enlargement of the company's present program.

The "Electric Wheel" system

The radically different "Electric Wheel" power arrangement has been proven on the non-earthmoving equipment the firm is turning out at plants in Longview and near Vicksburg, Miss.

This system is used on such machines as firm's "Crash Pushers" (100-ton vehicles used for bulldozing crashed bombers from runways in a matter of minutes) and also the firm's "Landing Craft Retriever" (which rolls out into the ocean's surf on the world's largest tires, picks up a 75-ft. vessel weighing 70 tons, and brings the vessel bodily up onto the shore for repairs).

Briefly, what the "Electric Wheel" system boils down to is a relatively simple arrangement of high-torque electric motors spotted over every machine—geared directly to the insides of each wheel and to all other points where power is needed.

To supply current to these electric motors, a high-horsepower diesel engine is mounted on the machine to drive a.c. and d.c. generators.

Besides achieving high traction and power control, the system also provides brakes with no wearing parts, automatic power proportioning (if one wheel begins to slip its share of power automatically shifts to wheels which are taking hold), and only a fraction of the repair time required by conventional equipment with strictly mechanical drives.



Bureau of Reclamation project on Colorado River— Dredge moves 1,400,000 cu. yd. to straighten channel

THE COLORADO RIVER is now flowing through a new 1.9-mi. man-made channel 5 mi. north of Needles, Calif., dredged by the Bureau of Reclamation to improve channel alignment under the channelization program. This 1.9-mi. channel by-passes the stream around a badly aggraded meandering stretch of the old river bed.

Reclamation's 20-in. hydraulic suction dredge recently cut through to the river from the channel which it has been constructing since last August 16. At the time of the breakthrough, the water surface in the river was three feet higher than that in the dredged channel. A few minutes after the river entered the new channel, the water in the dredged channel had risen to the level of that in the river.

Named after the river in which it was first launched eight years ago, the huge dredge is extending the channelization work upstream. In cutting the 1.9-mi. section, the dredge has headed upstream on a predetermined alignment roughly paralleling the old river bed. At a point some 8,500 ft. upstream from the lower end of the dredged channel where the bank separating the new channel from the river narrowed to only a few feet, the dredge bored through to the river to permit a flow at that time of some 5,000 cfs. to enter the new route.

As the dredge's cutter head chewed away at the earth barrier separating the new and existing channels, its pumps sucked the earth and other material through an 1,800-ft. pipeline to the opposite side of the river where it was discharged to form the channel levee. After the river was turned into the new channel, the pipeline diverted the dredged material across the old river bed to form a dike. The dike closed off the old river section. As the dredge cuts new channels to straighten out, deepen and realign the river, such dikes are thrown across the old river bed to isolate its abandoned sections and dry them up.

The new channel at this point on the river was dredged 180 to 360 ft.

wide with the expectation that the flow of the river will widen it to about 450 feet. The excavation depth varies from 15 to 23 ft. About 1,400,000 yd. of material has been dredged from the channel. Dredging of some 1,500 remaining feet of channel in this area will be completed in February.

The 1.9-mi. channel is the third closed or "bobtail" cut to have been made by the dredge since it was placed in operation early in 1949. The first was a portion of the 11-mi. cut between Needles and Topock, the second, a 2.2-mi. channel about 7 mi. upstream from Needles. The dredge is scheduled to cut another 3½ mi. of channel in 1957. Much of the work on the river this year in the Needles vicinity will be in closing off channel gaps.

EGCA holds fifth annual conference

THE FIFTH ANNUAL convention of the Engineering & Grading Contractors Association was held in Anaheim, Calif., January 24-26. Largest gathering of this association, the members of the seven chapters listened to reports covering various aspects of construction and heard a panel discuss the subject of "Governmental Agencies and the Contractor—Questions & Discussion on Industry Problems Now and in the Future." Meetings were presided over by Raleigh R. Watson, president of the association. D. W. Asher was general chairman of the convention committee.

Organization background

The organization was started in Los Angeles about seven years ago by a small group of contractors. They had common interests in meeting local problems, such as municipal and county ordinances which affect contracting and the always present threat of force account encroachment. Since the founding of the first group in 1949, the organization has extended to San Diego on the south

and to the "North Bay Chapter" in the San Francisco area. Other chapters are now in the process of being organized.

Licensed contractors are eligible for membership with emphasis on those holding licenses in: general engineering, concrete, excavating, grading, trenching and paving, sewers and pipe laying. Membership in the association is recognized by all of the chapters regardless of the home office of the contractor or the location of the project.

Directors of the association at the state level include the president and past president of each chapter. This board schedules a meeting every other month. A statewide convention has been held once a year for the last five years, with the 1958 convention scheduled for the San Francisco Bay area.

State headquarters of the organization are at 725 North Western Ave., Los Angeles. William J. Selman is manager of the chapters in the southern part of the state. Warren R. Mendel (800 S. Bayshore Blvd., San Mateo) is manager of the chapters in the northern part of the state.

Fifth convention program

A feature of the first session was a review of "Health & Welfare Programs" by M. A. Cornell who serves as administrator for one of these major funds.

Problems in force account construction as practiced in Fresno County was reviewed by Erwin W. Meier, who had prepared an analysis of this situation. "Future Development of Sanitation Districts in California" and the potential represented for the construction industry were reviewed by A. M. Rawn, Chief Engineer of the Los Angeles County Sanitation District. Lyman Gillis of the California Division of Highways outlined the effects of the national highway program on present and future operations of EGCA members.

Afternoon panel discussion

A full afternoon was devoted to a panel discussion in which questions were asked of governmental representatives from such agencies as: Corps of Engineers, state highway department, U. S. Navy, County of Los Angeles and municipalities. Questions asked of these individuals covered a wide range of problems and areas of possible misunderstanding between contractors and contract-awarding groups. In each case the representative presented figures indicating the volume of construction work to be anticipated during the coming season.

Affiliate members of EGCA provided the entertainment and hospitality on the two evenings of the convention which concluded with the president's banquet and the installation of officers.

GREAT NEW IDEA in

52 hp

WORK BULL Model 404 with $\frac{5}{8}$ -yd. low-pivoted loader. Like all WORK BULLS, 404 has specially designed industrial front axle and heavy-duty clutch. (Diesel engine is optional.)



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WORK BULL Model 303 with angle dozer and backhoe. Gasoline engine, standard, offers high torque at low speed for better lugging. (Diesel optional.)



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WORK BULL Model 202 with hydraulic-controlled hoe. Most of the WORK BULL attachments can be switched in 5 to 15 minutes in the field — without special gear.



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Davis PIT BULL with $\frac{7}{8}$ yd loader features torque converter, reversing clutches and 5 speeds forward, 5 reverse. In many cases it outworks high-priced, single-purpose rigs.

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Contractors! Industries! Utilities! Profit from this new idea in greater machine utility and efficiency. Get the benefits of low cost attachment interchangeability . . . the high-profit performance of tools matched to power and speed . . . the adaptability of job-matched equipment to replace or supplement high-priced, single-purpose units.

What's more, you enjoy the advantages of a single sales and service source — a complete package — available only in the low-cost **WORK BULLS** line.

New, and built to excel where other wheel tractors fail, **WORK BULLS** pay off in a wide variety of applications . . .

As primary equipment, **WORK BULLS** put former hand work on a power basis . . . efficiently handle scattered, work-and-run assignments.

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Look at this wide choice of integrated WORK BULL attachments!

LOADERS—9 or 11 cu. ft.;
3/8-yd. or 7/8-yd.

BACKHOES—12, 16, 20,
24 or 36" buckets

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FORK LIFTS — 2000 and
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Fork Lift Model 202 has lifting capacity of 1500 lbs at full height, 4000 lbs at half height. Optional mast gives lift heights to 21 ft. Works on or off hard surface.

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Second meeting on construction operations

THE SECOND annual conference on construction operations was held Jan. 25-26 on the Berkeley campus of the University of California. Over 250 were in attendance. The first conference was held last year at UCLA when the subject of scientific management control as it could be applied to the construction industry was discussed. The conferences have been very well received and will be held on an annual basis, with the 1958 meeting to be held in Los Angeles.

This year's meeting was built around the general theme "cost reduction" and speakers approached the subject from many directions

during the course of the two-day conference. Special emphasis was given to the procedures used in business and industry for increasing efficiency, and how these procedures can be adapted to construction operations.

The keynote speaker was Dr. Lillian Gilbreth, world famous as an authority and pioneer in the field of industrial efficiency, who spoke on the nature of costs, and the ways in which the approach of industrial engineering can be applied to reduce construction management costs.

Other speakers who aroused more than usual interest were Paul J.

Stafford, Chief Estimator, Kaiser Engineers, who spoke on progress scheduling and time studies, and Victor De Suvero, manager, Construction Materials Center, San Francisco, who showed how costs could be reduced by the establishment of central clearing houses for information within the industry, in particular the so-called "department store" for building materials where new products of all kinds would be exhibited.

A lively discussion followed the panel on the Owner, Architect, Engineer, Contractor Pre-bid Conference. Panel members were Edgar White, Utah Construction Co.; Grant Gordon, Guy F. Atkinson Co.; John Fitzpatrick, H. K. Ferguson Co.; E. E. Weihe, Weihe, Frick & Kruse, Architects; L. T. Evans, Foundation Engineer; and Col. John Hughes, Continental Service Co. (Bank of America).

Chairman of this year's conference was Paul F. Keim, Professor of Civil Engineering, University of California, Berkeley.

Contract awarded for Flaming Gorge roads

A CONTRACT for the first 7½ mi. of access road to the site of Flaming Gorge Dam in northeastern Utah has been awarded to the Wangsgaard Construction Co. of Logan, Utah, by the Bureau of Reclamation.

Flaming Gorge Dam and Reservoir are major features of the Colorado River Storage Project, authorized by the Congress last spring. The Bureau of Reclamation has had a crew on the site for some months engaged in exploratory drilling and other preconstruction activities. A contract for a tunnel to divert the river around the damsite during construction is scheduled for award in May 1957. The prime contract for the dam is tentatively set for award in December 1957.

Commissioner of Reclamation W. A. Dexheimer said that plans are being considered by the states of Utah and Wyoming and the Bureau of Public Roads for a permanent highway. Such a highway would link Vernal, Utah, with Rock Springs, Wyoming, via the Flaming Gorge Dam. The remaining portion of the access road—to be constructed under another contract yet to be awarded—may be incorporated into this permanent highway.

Bond issue for Richmond sewers

AN \$8,000,000 bond issue was approved at Richmond, California, by a margin of almost 7 to 1 for the construction of extensive trunk sewers and a disposal plant.



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The revolutionary 1957 Clement Bottom-Dump pays off with non-stop round tripping that dumps more tons per hour on road construction jobs. Strong as a bridge, it dumps any material evenly and has batch doors to handle split loads easier.

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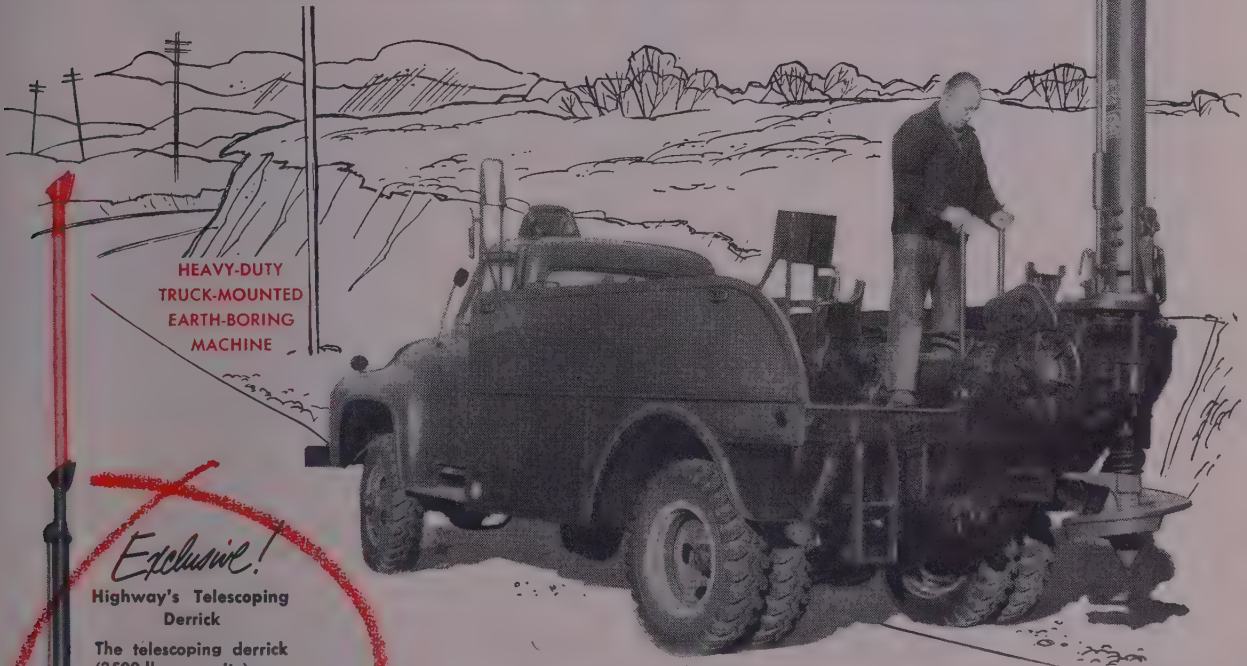
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The telescoping derrick (3500-lb. capacity) can be extended to more than one-half its collapsed length. Available as optional equipment on the Model "HC" machine.

... digs holes 9 to 36 inches in diameter, up to 10 feet at any angle up to 90° angles ... then sets the pole!

Here's the answer to your demand for the most modern earth-boring machine ... digs in any soil, even rock ... does it so easily with simple controls. Designed for tough daily use, the power operated "HC" can be quickly adjusted to dig at any angle up to 90° — auger bar and pole derrick raised from traveling to work position by power. The "HC" requires only 7 square feet of platform space and is light enough to mount on a 16,000-pound G.V.W. truck. The "HC" convenient controls are easily accessible and Highway design provides complete safety for both operator and machine.



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Hawaii Report

By SYD LOVE

Honolulu, Hawaii

THE WATERFRONT—Two contracts were awarded by the Army Corps of Engineers for work on the multimillion-dollar deep water port at Kawaihae on the island of Hawaii. Hawaiian Dredging and Construction Company and James W. Glover, both of Honolulu, submitted a joint low bid of \$666,660 for two causeways and a primary dike and revetment. The government estimate was \$646,680. There were five bidders. Territorial Contractors, also of Honolulu, was lowest among five bidders with a \$13,701 offer for core drilling on the same project. The government estimate was \$23,119. When completed, the project will give the Territory's "Big Island" two deepwater ports. The other is at Hilo. Kawaihae now can accept only barges. Sugar shipments, especially, are expected to increase. Construction of a breakwater is scheduled to start in approximately one year. The President's budget included \$50,000 for advance engineering and design of a second entrance channel to Honolulu Harbor at Oahu. Estimated cost is \$3,460,000, mostly for a floating drawbridge and dredging. The bridge will be between Sand Island, in the harbor, and Keehi Lagoon, near Honolulu Airport. A "second Honolulu Harbor" at Keehi Lagoon has been proposed by George K. Houghtailing, executive secretary of the Honolulu Planning Commission. He wants the parks board to sell its 68 ac. there at \$1.50 a square foot and build the new park wanted for that end of town at a 100-ac. site at Salt Lake, where he said land can be acquired at 46 cents a square foot. Houghtailing believes the new harbor would be deeper and could include tanker facilities. But construction of park at the lagoon site already has started. The first contract went to A. L. Ho at \$279,609 for dredging the lagoon, grading, furnishing top soil and providing water and sewerage systems.

WINDWARD OAHU DEVELOPMENT—Houghtailing has outlined a new master plan for part of the island of Oahu, which is the City and County of Honolulu. It calls for a deepwater harbor and industrial development of windward Oahu in the Kaneohe Bay area. Population of the area is approximately 12,000 persons. Houghtailing thinks it could be 127,000 in 20 years if 100% development takes place. The plan is for a harbor 1,500 x 3,000 ft. almost equal to Honolulu's, and residential and industrial areas. Completion of two

tunnel routes through the Koolau Mountain Range, which divides the island, will cut travel time between shores approximately in half, or to 35 minutes.

MORE DREDGES BOUGHT—Hawaiian Dredging has purchased two dredges from San Francisco Bridge Company for \$1,500,000. President Lowell S. Dillingham said the dredge Moose, now at Alameda on a Navy project, was purchased for \$1,250,000. It will be towed to Honolulu in March by a Young Brothers tug. The portable dredge, Beaver, which will be the first in the Territory, is due soon on a freighter from San Diego. The Moose will replace the W. F. Dillingham, which is at Midway. The Dillingham will move to Kuwait in the Persian Gulf. The purchases give Hawaiian Dredging five dredges.

FIRST INDUSTRIAL FATALITY—Harold Kyung Chan Han, of Honolulu, fell 45 ft. to his death January 8 to become the Territory's first industrial fatality of the year. He was working from an 80-ft. pile driver shaft for Hawaiian Dredging.

HIGHWAYS—Rains slowed bridge construction and drowned hopes for March 1 completion of the \$3,000,000 twin-bore Nuuanu Pali tunnel-highway project on Oahu. William M. Wachter, Territorial highway engineer and Public Works Department superintendent, says traffic will be moving over the 1.2-mi. section by late April, weather permitting. J. M. Tanaka, of Honolulu, is the contractor. The Territorial Highway Department has received approval from the Federal Bureau of Public Roads to complete the approach roads to Wilson Tunnel on Oahu as Federal aid projects. They total almost four miles. The approach roads, plus the 2,700-ft. tunnel and the rest of the Kalihi Valley route, total eight miles. Road work is expected to cost \$4,841,000 and the tunnel, which is being built by E. E. Black, Honolulu contractor, \$6,500,000. A second bore, estimated to cost \$6,000,000, is being planned. The City-County of Honolulu is supervising the tunnel, which is 87.7% completed as far as time goes and 55.5% completed financially. Isemoto Contracting Company was low with a bid of \$399,247 for constructing a 3.4-mi. section on Volcano Road on the island of Hawaii. Volcano Road is a popular tourist drive between Hilo and famed Kilauea

Crater. Wachter has reappointed Harold W. Butzine assistant superintendent. Butzine was originally appointed November 16, 1954, by Ben E. Nutter, Wachter's predecessor. Nutter became chief engineer of the Port of Oakland January 1.

Grapevine Grade to be improved

U. S. HIGHWAY 99, in the section between Los Angeles and Bakersfield, where it leaves the mountains and continues down the well known Grapevine Grade, will be improved to an eight-lane freeway at a cost of about \$7,000,000. Plans call for the construction of 7.2 mi. of four-lane roadway which, when completed, will carry northbound traffic with the existing four-lane freeway relieved to handle southbound traffic.

This project is the largest individual job in Kern County with more than \$12,000,000 allotted by the Highway Commission for work in the county.

Work starts on PG&E gas line

TO COMPLETE a natural gas line loop connecting the towns of the Sacramento Valley, the Pacific Gas & Electric Co. has started work on 83 mi. of pipeline. The project will cost more than \$5,000,000 and is designed to deliver an additional 40,000,000 cu. ft. of gas into the Sacramento metropolitan area.

Contract for the pipeline installation, which will be in 18, 20 and 16-in. size, has been awarded to Engineers Limited Pipeline Co. Completion is scheduled for next summer. Work will include a submarine crossing of the Sacramento River with two 12-in. lines.

Guy H. James is low bidder on Montana water tunnel

ON A LOW BID of slightly more than \$2,000,000 Guy H. James Construction Co. of Oklahoma City will presumably secure the contract for driving a 2.6-mi. tunnel to deliver water from the Canyon Ferry Reservoir to the Helena Valley in Montana. The 7-ft. diameter tunnel will be a two-year job. Completion will make the storage behind the Canyon Ferry Dam available for irrigation and to supplement the present supply for the City of Helena. Additional features of the project will require a pumping plant and more than 30 mi. of canal.

The low bid was considerably under the engineer's estimate which was about \$2,500,000. Second low bidder was a joint offer of Arundel Corporation, L. E. Dixon and Kemper Construction Co. at \$2,490,000.

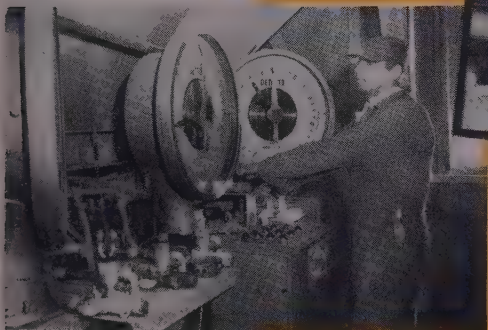
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can keep three
34E Dual Drum
Pavers working

1956 RECORD

Up to 240 Batches Per Hour

23,966 Batches without a major delay or
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Blaw-Knox Automatic Batchers are arranged so the operator always has the dials, monitoring lights and truck within easy view. One switch puts these three automatic aggregate batchers in operation.

Blaw-Knox two-step setup with 150-ton, 3-compartment automatic aggregate batching plant and three 600 bbl. cement bins with automatic, twin batchers.

Take another look at the production records of the Blaw-Knox Batching Setup owned by J. A. Jones Construction Company on an Ohio paving job in 1956. That's the kind of production you would like—not only big volume of up to 240 batches per hour or a batch every 15 seconds but steady day after day production without delays. The contractor's superintendent says this performance assures him that the Blaw-Knox Batching Setup can keep three 34E Dual Drum Pavers working.

Steady, high capacity of Blaw-Knox Batching Equipment has been proved on concrete paving

jobs in all parts of the country. Other features which contractors like about this equipment are the arrangement for switching from automatic to manual operation in the event of a power failure, double cement valves on cement batchers and the ease of servicing the automatic controls. If you are planning concrete paving work be sure to find out about these high production plants, today.

See Bulletin 2488 which shows the many sizes and combinations of Blaw-Knox Aggregate and Cement Bins and Batchers available to you. Your nearest Blaw-Knox Distributor will be glad to give you the whole story or write direct to—



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Construction Equipment Division

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Vagtborg reviews 1956 lift-slab activity

ACCORDING to a report prepared by the Vagtborg Lift-Slab Corporation, as of December 1956 structure: totaling more than 16,000,000 sq. ft. were lifted by licensees of United States Lift-Slab Corp. and International Lift-Slab Corp. as compared with a total of 4,000,000 sq. ft. lifted as of January 1955. Reasons given for the tremendous growth were improved field techniques and the tight supply of steel in 1956.

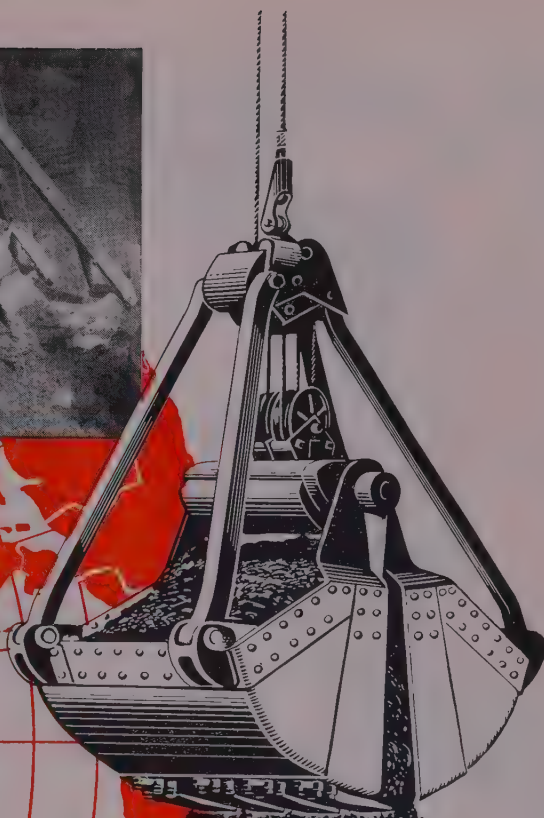
In 1956, the Vagtborg Corp. introduced a wide-head jack adjustable to round or square columns. Fitted to 20-in. square precast concrete columns the new jacks lifted 67 tons each during construction of a parking structure in Oakland, California (Western Construction November 1956, page 28). Other lifts on concrete columns included the Ramo Wooldridge project in Los Angeles and the Aerophysics Corporation Goleta, which utilized round concrete columns fabricated by a unique spinning process. The first lift-slab project in Mexico, built in 1956, also used concrete columns.

The year also marked increased application of prestressed concrete slabs. Particularly noteworthy was the manner in which the William Simpson Co. used both prestressed and mild steel in the same slab during the construction of North American Aviation's new headquarters in El Segundo, California. Conventional steel reinforcement was used in each slab's 30-ft. span, while the 35-ft. span was post-tensioned with wrapped steel cables supplied by Prescor Corp. Bowen and Bowen were engineering consultants.

Another North American Aviation project, the Autometrics Division Building in Downey, California earned still another distinction with 140,000 sq. ft. poured and lifted within one month. General contractor was Diversified Builders, Inc., a division of Macco Corporation, with Vagtborg as the lifting sub-contractor.

Quality as well as speed was improved during the year. Typical was the elimination of the tendency toward a deflection in the center of each slab. A crown is now poured in the center, resulting in a level upper surface when loads are applied.

Definite improvements were made in the use of paper boxes in coffered slab design. Research produced new methods of cross-ply reinforcement and waterproofing which have virtually eliminated box failures. Now designers can count on a perfect waffle-patterned ceiling along with the proved structural and acoustical benefits of coffered lift-slab construction.



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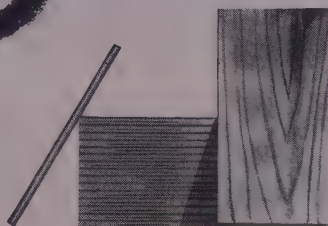


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"Can't get this
dad-burned sliver
o' wood to burn,"

rumbled Paul Bunyan to Babe, the
Blue Ox. A mountain top trembled
and fell, damming up a river. "Babe,
what the cuss do you suppose them
Baxter folks done to this here piece
o' plywood? * She's dry—but she
JEST DON'T BURN!"



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RETARDANT
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(Pressure treated with Protexol)

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plywood, pressure treated with
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Budget allotments for California

APPROPRIATIONS totaling over \$117,000,000 for California were included in President Eisenhower's budget message. In addition, a \$4,000,000 request was made for research on air pollution and control methods.

Largest item presented by the budget proposal is \$54,515,000 to be spent by the Corps of Engineers on fifteen flood control and five navigation projects in the state. This work will include development of the Sacramento River channel at \$2,800,000 with smaller amount allocated for

improvement of the San Joaquin River channel. Flood control for the American and Sacramento rivers totals more than \$6,500,000. About \$5,000,000 will go toward financing present construction on Coyote Dam, now being built by the Corps of Engineers on the Russian River.

The Bureau of Reclamation projects represent a total of more than \$25,000,000 including about \$5,000,000 of loans for distribution systems in the Central Valley project. Almost \$17,000,000 is reserved for carrying forward the Trinity River project and

another \$11,000,000 will go for extensions and improvements in the Friant division of the Central Valley project. A final \$3,600,000 will come from the budget figure to conclude work on the Monticello Dam in Solano County.

New federal budget less for Pacific Northwest

FEDERAL SPENDING would drop slightly in the next fiscal year on Washington and Oregon water and power projects under President Eisenhower's budget proposals. About \$125,000,000 is proposed in the budget for work on projects in the two states in fiscal 1958, compared with about \$133,000,000 in this fiscal year. More than the difference was accounted for by a reduction from the \$47,000,000 being spent in this fiscal year on The Dalles Dam to a proposed \$19,000,000 in the next year. The Dalles Dam is over 70% complete. Sizable increases were recommended for some other projects, including Ice Harbor and Eagle Gorge dams in Washington and Hills Creek and Cougar dams in Oregon.

Atkinson joint venture low on Trinity River Dam

BIDS WERE OPENED Feb. 5 by the Bureau of Reclamation in Weaverville, Calif., for construction of the Trinity River Dam. Seven firms submitted bids. Low with a proposal of \$48,928,100 was a joint venture composed of Guy F. Atkinson (sponsor), M. J. Bevanda, Charles L. Harney, Ostrander Construction Co., Teichert & Co., Inc., and Trepte Construction Co. The earth and rockfill structure will be 450 ft. high.

Awarded late last year was a contract for construction of a Government camp to be used for administrative and construction headquarters during construction of the dam. The contract went to Barry J. Richards Co. on a bid of \$1,576,589.

Morrison-Knudsen has 850 at work on Brownlee Dam

MORRISON-KNUDSEN has about 850 men on the site of Brownlee Dam preparing the foundation in an excavation that reaches 120 ft. below the bend of the Snake River. Trucks have begun the placing of impervious clay for the core of the dam. The clay will be placed at the rate of from 3,000 to 4,000 cu. yd. per day, with the equipment working around the clock. About 500,000 cu. yd. will be required for the core, which will be taken from borrow pits located about 3 mi. from the dam site. The Brownlee project was described in *Western Construction* in September 1956.

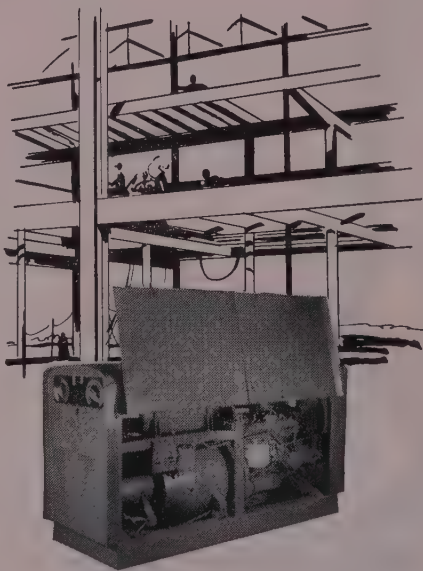
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BIG Sheepfoot Rollers

RANGING FROM 5 TO 20 TONS in weight capacity, there are six models of Southwest Rollers featuring full oscillating double drums and two-piece feet with replaceable tips.



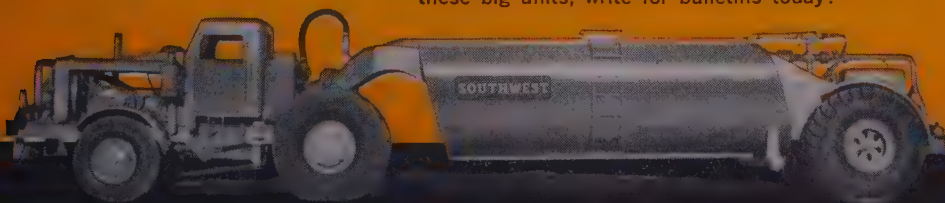
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Aluminum-domed auditorium in Hawaii

AN ALUMINUM-DOMED auditorium, the first structure of its kind ever built, has just been added to the Hawaiian Village Hotel in Honolulu, T. H.

Based on an unusual design which eliminates pillars or any other interior support, the auditorium consists of a huge aluminum shell 49½ ft. high and 145 ft. in diameter. It includes a portable stage and will have a seating capacity of from 1,800 to 2,000.

Designed by the Product Development Department of Kaiser Aluminum & Chemical Corporation, the clear-span dome was erected in record time by the Terminal Steel Company of Honolulu, under the supervision of Kaiser Aluminum engineers.

The design is based to a large extent on principles used in design of aircraft wings. It involves the creation of a spherical structure through the use of aluminum panels and struts.

The panels, which are diamond-shaped and vary in length from 9 to 11½ ft., are geometrically arranged and bolted together at their edges to form a rigid shell. Each panel is curved inward and strengthened with the addition of an aluminum

strut. The panels and struts combine to form an exceedingly strong unit, requiring no additional framework or support.

Principal advantages of the stressed-skin aluminum dome include its low cost. Kaiser Aluminum estimates that the cost of duplicating the Hawaiian Village dome would be in the order of \$4.00 or less per sq. ft. Actual erection of the Hawaiian Village dome (hoisting and installation of panels) required only 20 working hours and a maximum crew of 38 men. Its high strength is another advantage. Structural tests show that the all-aluminum dome can withstand loads of over 100 lb. per sq. ft. Since the dome has no interior columns, it provides a maximum of usable space with a minimum of materials.

Design work on the Hawaiian Village auditorium was started several months ago by Kaiser Aluminum engineers at the corporation's headquarters in Oakland, California. Exhaustive structural tests indicated that the dome was entirely practical and feasible, and able to conform to the most rigid building regulations.

Materials for the dome, including 575 panels and struts, were fabricated at a Kaiser Aluminum plant in

Permanente, California. They were shipped to Hawaii and pre-assembled upon arrival at the job site.

Erection of the dome, while it involved some unusual procedures, moved very fast. A portable mast, 96 ft. tall and equipped with rigging, was set up in the center of the dome's concrete floor. Around this was assembled a section of aluminum panels which was then lifted a sufficient height off the floor to allow another perimeter of panels to be installed. This larger section was in turn lifted, a third set of panels installed, and so on until the entire dome was completed.

The dome was then anchored to 25 concrete piers, spaced around the circumference of the floor. An opening was left around the bottom of the dome to provide for shrubbery and other landscaping.

Castings were used on the inside of the dome to join the diamond-shaped panels together where their corners converged. These were fastened to the panels with Huck lockbolts, a special aluminum bolt which was also used to join the panels along their edges.

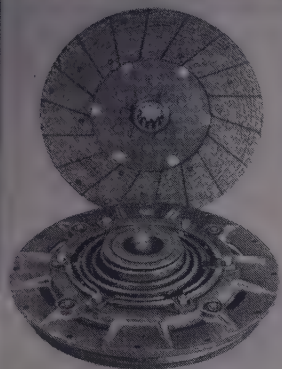
Thiokol, a sealing material, was used to caulk the dome and to make it waterproof.

First concrete for Baker Dam

FIRST CONCRETE is expected to be poured in March on the Upper Baker River Dam being built for the Puget Sound Power & Light Company by Stone & Webster Engineering Corp. The concrete will be part of the construction of a flume that will divert Washington's Baker River while the dam is being constructed. About 2,000 cu. yd. of concrete will be poured each day and a total of 630,000 cu. yd. will be used for the project. The \$27,000,000 dam is scheduled for completion in 1959 and is part of the \$35,000,000 power project for Puget Sound Power & Light Company.

Gorge High Dam ice barrier complete

A 4-FT. THICK, 390-ft. long and 243-ft. deep ice barrier has been completed to the extent that the contractor is permitted to proceed with the excavation for the Gorge High Dam being built for Seattle City Light. This unusual project was described in the Nov. 1956 issue of **Western Construction** on page 30. The Ice Barrier is designed to control ground water flow in the excavation area. The contractor is also working on the intake excavation in the section of the tunnel connecting the new intake with the existing tunnel. About 250 men are at work on the job at present. Completion of the dam and powerhouse modernization is scheduled for 1959.



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Low bids and contract awards

ARIZONA

Kiewit-Judson Pacific Murphy of Emeryville, California, submitted a low bid of \$4,139,277 for Colorado River Bridge, Glen Canyon Unit, Arizona-Utah, Middle River Div., Colorado River Storage Project. **D. M. Bradley & S. R. Dysart**, contractors of Phoenix submitted a low bid of \$109,893 for grading, sidewalk curb and surfacing in the town of Parker, Yuma County. **Isbell Construction Co.**, Phoenix, submitted a low bid of \$103,159 for grading and surfacing northeast of Phoenix in Maricopa County. A low bid of \$166,672 was submitted by **Tanner Bros. Construction Co.** of Phoenix for grading, surfacing and widening Central Street in the city of Phoenix. A \$95,965 bid was submitted by **Arizona Sand & Rock Co.** of Phoenix for grading, draining and surfacing the Yuma-San Luis Highway in Yuma County. **San Xavier Rock & Sand Co.**, Tucson, submitted a low bid of \$257,762 for grading, surfacing and construction of a bridge southwest of Tucson on the Valencia road in Pima County. **Martin Construction Co.** of Tucson submitted a low bid of \$229,827 for grading and surfacing the Sonoita-Mountain View Highway in Pima County.

CALIFORNIA

Five California firms (joint venture) submitted a low bid of \$36,644,556 for construction of Clear Creek tunnel, Trinity River project. Members of the project are, **The Shea Co.**, Alhambra; **Henry J. Kaiser Co.**, Oakland; **Morrison-Knudsen Co.**, Los Angeles; **Macco Corp.**, Paramount and **Raymond Concrete Pile Co.** of Los Angeles. **Ukropina-Polich Kral** of San Gabriel submitted a low bid of \$2,423,496 for construction of 1.9 mi. of freeway together with streets, ramp, and interchanges, overcrossing, pumping plant, retaining walls and a bridge near Lynwood in Los Angeles County. A \$1,987,320 contract was awarded to **A. Teichert & Son, Inc.**, of Sacramento for 5.6 mi. of freeway and construction of four bridges in Sacramento County. **E. L. Yeager Co. & E. L. Yeager Construction Co., Inc.**, and **Bert C. Altfillisch & Altfillisch Co.** and **Lowe & Watson** of Riverside submitted a low bid of \$1,464,735 for 8.5 mi. of grading and surfacing and construction of eight bridges between Needles and west of Colorado River in San Bernardino County. A low bid of \$3,361,359 was submitted by **Winston Bros. Co.** of Monrovia for 5.7 mi. of grading, surfacing a

four-lane highway and construction of seven bridges on the Santa Ana Freeway in Orange County. **Cox Bros. Construction Co.** of Stanton submitted a low bid of \$682,696 for 3.9 mi. of grading and surfacing in Orange County. **Fredrickson & Watson Construction and Ransome Co.** of Oakland submitted a low bid of \$3,685,555 for grading and surfacing 5.8 mi. of a four-lane divided highway and construction of four bridges and one existing bridge to be altered in Placer County. A \$374,690 contract was received by **Oscar C. Holmes, Inc.**, of Redwood City for 5.9 mi. of grading, surfacing and one bridge to be widened and one bridge repaired north of Santa Cruz and Boulder Creek in Santa Cruz County. **Baum Construction Co., Inc.**, of Fresno submitted a low bid of \$356,354 for 3.4 mi. of grading and surfacing between Alamo and Brawley in Imperial County. A low bid of \$221,810 was submitted by **C. B. Tuttle** of Los Alamitos for bridge extension near Riverside in Riverside County. **Guy F. Atkinson Co.** of South San Francisco submitted a low bid of \$5,548,781 for 2.7 mi. of grading, paving, construction of three pedestrian overcrossings, five pedestrian undercrossings, a pumping plant and construction of four retaining walls on Harbor Freeway in Los Angeles County. **Norman I. Fadel** of North Hollywood received a \$977,644 contract for 3.5 mi. of grading, surfacing and drainage facilities north of Big Lagoon in Humboldt County. A \$228,063 contract was awarded to **Rice Bros., Inc.**, of Lodi for 11.4 mi. of grading and surfacing in Inyo County. **Jesse H. Harrison** of San Ardo submitted a low bid of \$613,779 for 5.7 mi. of grading and surfacing east of Tedoc in Tehama County. A low \$226,754 bid was submitted by **Tomei Construction Co.**, Manhattan Beach, for construction of a bridge east of San Gabriel River in Los Angeles County. **M. J. Ruddy & Son**, Modesto, received a \$258,523 contract for 8.4 mi. of grading and surfacing in Colusa County. **Ralph B. Slaughter** of Julian submitted a low bid of \$228,528 for 3 mi. of grading, surfacing and construction of one bridge south of Brawley in Imperial County.

COLORADO

A low bid of \$3,835,957 was submitted by **Mountain States Construction Co.**, **Azores Construction Co.**, **Everett S. M. Brunzell Corp.** of Lakewood (joint venture) for construction of 6 enlisted men's barracks, Fort Carson, Colorado Springs. **James B. Kenney, Inc.**, of Denver, submitted

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267 Yards in 2 hrs.-10 min.

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Equipment: 19-ft. Hoe Boom; $\frac{3}{4}$ -yd. bucket, 40-inch cutting width.

Material: A mixture of clay and shale.

Basement size: 30' x 40' x 6' deep.

Operating cycle: Digging and casting materials behind and alongside the Hoe—a 70° average swing cycle.

Time per digging cycle: 15.4 seconds—4 per minute.

Total time per basement—267 cu. yds. in 2 hours-10 minutes.

Average rate per hour—123 cu. yds. per hour.

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Torque Converter Power Take-Off: (Optional)—abundant power that adjusts automatically to match machine, digging or load conditions... cannot stall; absorbs digging shocks.

"Joy-Stick" Hydraulic Controls: (Optional)—only 2 levers to control all Turntable operations... requires less motion; less effort... reduces fatigue, increases response, output.

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THEW LORAIN® 26

two low bids for road work in Denver and Clear Creek counties: \$282,195 for construction of three structures east and west of Idaho Springs in Clear Creek County and a total low bid of \$217,911 for plans A and B, construction of Holly Street Bridge and approaches, city and county of Denver. **Stephenson Log & Construction Co., Inc.**, of Denver submitted a low bid of \$478,413 for 9.7 mi. of grading, surfacing and structures between Ft. Garland and Russell in Costilla County. **Pioneer Construction Co.** of Pueblo submitted a low bid of \$689,438 for 9.2 mi. of grading, surfacing and structures from Sterling east on S. H. #14 in Logan County. **Smith & Lucas** of Colorado Springs submitted a low bid of \$83,584 for grading and surfacing between Limon and Punkin Center S. H. #71, Lincoln County. A low bid of \$85,099 was submitted by **Mile High Cement Contracting Co.** of Denver for grading and surfacing in the city and county of Denver. A low bid of \$333,682 was submitted by **Graham Construction Co.** of Pueblo for 4.9 mi. of grading, surfacing and structures near the New Mexico State Line in Montezuma County. **Latimer Construction Co.** of Denver submitted a low bid of \$488,248 for 1.9 mi. of widening, grading and surfacing Colfax Avenue, city and county of Denver. The **Branan Sand & Gravel Co.** of Denver submitted a low bid of \$115,728 for widening Federal Boulevard, city and county of Denver.

IDAHO

Arrington Construction Co., Inc., Idaho Falls, received a \$1,119,280 contract to construct the Low Power Test Facility at the U. S. Atomic Energy Commission's National Reactor Testing Station. **Andrew Gladney**, Kentfield, submitted a low bid of \$144,904 for extension of the railroad from the CPP to the Naval Reactor Facility. **Mark B. Garff** of Salt Lake City, Utah, submitted a low bid of \$1,965,480 for construction of a hospital building at Mountain Home Air Force Base. **Wangsgaard Construction Co.** of Logan, Utah, submitted a low bid of \$771,329 for 11.1 mi. of grading, surfacing, removal of culvert and construction of new one on the Clark Hill-Granite Hill section in Bonneville County. **Carl E. Nelson & Co., Inc.**, of Boise, submitted a low bid of \$516,488 for grading, surfacing and construction of two 90-ft. bridges on 1.2 mi. of U. S. 30 North in Pocatello, Bannock County. **Earl L. McNutt Co.**, of Eugene, Ore. submitted a low bid of \$449,938 for constructing roadway and construction of one bridge on 2.3 mi. of U. S. 95 in Adams and Idaho counties.

OREGON

Cherf-Sandkay-Birch of Ephrata, Washington, submitted a low bid of \$1,717,528 for earthwork, lining and 8 structures, Talent Div., Rogue River Basin Project. **Gibbons & Reed Co.** of Portland submitted a low bid of \$1,790,500 for grading the Myrtle Creek-Canyonville section of the Pacific Highway in Douglas County. **J. C. Compton Co.**, McMinnville, submitted a low bid of \$269,505 for grading and paving the Burns Jct. section in Malheur County. A low bid of \$1,137,359 was submitted by **Earl L. McNutt Co.** of Eugene for grading the Oregon Coast Highway in Coos County. **Central Paving Co.** of Independence submitted two low bids for construction of highways in Josephine, Yamhill and Polk counties. A low bid of \$462,550 for grading and surfacing the Louse Creek-Grants Pass, Pacific Highway in Josephine County and \$491,399 for grading and surfacing the Salmon River Highway in Yamhill and Polk counties. **Vernie Jarl** of Gresham, submitted a low bid of \$183,445 for grading and surfacing the Adams-Cayuse road in Umatilla County. A low bid of \$289,226 was submitted by **Calkins Crushing Co.** of Oceanlake, for paving the Wilson River Highway in Tillamook County. **Kuckenberg Construction Co.** of Portland submitted a low bid of \$1,049,843 for construction of the Myrtle Creek-Canyonville section of the Pacific Highway in Douglas County. **Roy L. Houck & Sons** of Salem submitted a low bid of \$560,153 for grading and surfacing the North Santiam highway in Marion County.

UTAH

L. A. Young Construction Co. and **Vernal Sand & Gravel Co.** of Richfield submitted a low bid of \$711,901 for 8.4 mi. of grading, surfacing and construction of one bridge on the Myton-Roosevelt Highway in Duchesne County. **James Reed** of Salt Lake City submitted a low bid of \$763,146 for constructing 7.4 mi. of highway and construction of 2 concrete bridges in Grand County. A low bid of \$555,195 was submitted by **Germer, Abbott & Waldron** of Tremonton for 8.5 mi. of grading and surfacing 1 mi. east of Paria in Kane County. **W. W. Clyde & Co.** of Springville submitted a low bid of \$1,091,369 for construction of 18.6 mi. of highway in Kane County.

WASHINGTON

J. J. Welcome Construction Co. of Redmond received a \$538,225 contract for 4.2 mi. of grading, surfacing

and structures from Pilchuck Hill to North Burn Road in Snohomish County. A \$227,422 contract was received by **Herman Kathman** of Seattle for 2.4 mi. of grading and surfacing in King County. **J. W. Hardison** of Yakima received a \$129,03 award for grading and surfacing portions of county roads in Grant County. **Guy J. Morris** of Seattle received a \$143,941 contract for 2.2 mi. of grading and surfacing the Little Kalama River road in Cowlitz County. **C. J. Painter** of Pasco received a \$97,657 contract for 12.4 mi. of grading and surfacing White Tra roads west and east in Grant County. A \$327,238 contract was awarded to **Alfred De Coria** of Auburn for 1.2 mi. of grading and surfacing in Skagit County. **Anderson Bridge Construction Co.** of Tacoma received a \$396,847 award for construction of overcrossing in King County. **Erland & Blicke** of Portland, Oregon, received a \$1,199,760 contract for 2.8 mi. of grading, surfacing and structures, Megler to Knappton in Pacific County.

WYOMING

Long Construction Co., Inc., Billings, Mont., submitted low bid of \$1,100,886 for rehabilitation of low outlet works and intakes at Buffalo Bill Dam, Shoshone Project. Engineers estimate, \$582,421. **Ashe Brothers Construction Co.** of Riverton submitted a low bid of \$940,600 for earthwork and structures in Faison area and drains in west side area Eden Project. **Eagle Construction Co., Inc.**, of Boise, Idaho, received \$777,000 contract for 4 mi. of grading and surfacing the Snake River Canyon Route, Targhee National Forest in Lincoln County.

ALASKA

Raber & Kief and **B-E-C-K Constructors** of Seattle, Wash., submitted a low bid of \$4,448,000 to construct permanent-type facilities at the Adak Naval Station in the Aleutian Islands. **United General Constructors, Inc.**, of Seattle, Wash., submitted a low bid of \$92,420 for completion of the small boat harbor Valdez Project.

IN LAS VEGAS, Nevada, construction is about 15% complete on a project to improve the sewerage system and increase the size of the disposal plant. The present improvements will handle an estimated population of 120,000. City estimates indicate that growth can expect to reach a 150,000 population by 1970.

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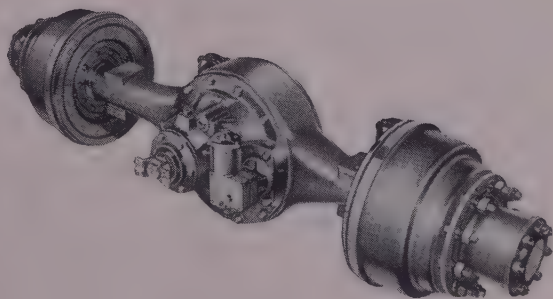
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ENGINEERS on the move

Ronald E. Montgomery, civil engineer with the U. S. Bureau of Reclamation, has been transferred to Flaming Gorge Dam and Powerhouse on the Green River in north-



Ronald E. Montgomery

eastern Utah. He is program engineer under **Wes Behling**, office engineer. **Jean Walton** is project construction engineer here. Before moving to this unit of the Colorado River Storage Project at Vernal, Montgomery was located at Yuma, Ariz., where he was employed in the design section of the Gila Project.

* * *

Incorporation and opening of the offices of Bleifuss, Hostetter and Associates, Consulting Engineers, at 534D H Street, Sacramento, Calif., is announced. Principals of the new firm are **D. J. Bleifuss**, president, formerly chief engineer and director of engineering for International Engineering Co., San Francisco, and **L. A. Hostetter**, vice president, formerly water resources engineer for International Engineering Co. **N. L. Hinkson** is associated with them as consultant. **Gordon H. Klippel**, prominent structural engineer of Sacramento, joined the organization on Jan. 1, and the engineering personnel of a former joint venture was taken over by the new corporation.

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Herbert A. Waterman, assistant construction engineer for the California Division of Highways, is retiring after 38 years with the State.

* * *

Kenneth P. Norrie, consulting engineer of Spokane, Wash., is the newly elected president of Spokane Section, American Society of Civil Engineers. First vice president is

Edwin Nasburg, hydraulics engineer with the Bureau of Reclamation at Ephrata; second vice president is **John P. Esvelt**, consulting engineer, Spokane. **Daren W. Johnson** of the City Engineer's Office in Spokane, was named secretary-treasurer of the organization.

* * *

Sam Hobbs, veteran engineer with the Portland Cement Association, recently retired after 33 years with the organization, the last 29 in the Los Angeles district office. Following receipt of his engineering degree, Hobbs was employed in state highway work and for a private construction company in the East before joining the PCA where he spent four years in the Boston office before coming West.

Well known in engineering and construction circles in this Western region, Hobbs for many years represented the Association on the Pacific

**Sam
Hobbs**



Coast Building Officials Conference (now the International Conference of Building Officials) and he has been active in work on code requirements. He is a member of the American Concrete Institute, an associate member of the American Society of Civil Engineers and of the Structural Engineers of Southern California. Hobbs has written many articles for **Western Construction** and other publications. He expects to continue to write on concrete construction projects and to engage in consulting work.

* * *

Several engineers well known in this Western region have been named to the National Advisory Committee of the Highway Research Board for the AASHO Road Test. They are **Francis N. Hveem**, A.M. ASCE, materials and research engineer, California Division of Highways; **R. E. Livingston**, planning and research engineer with the Colorado Department of Highways; **R. A. Moyer**, A.M. ASCE, research engineer and professor, Institute of

Transportation and Traffic Engineering, University of California; **Arvi S. Wellborn**, M. ASCE, chief engineer of The Asphalt Institute and formerly managing engineer of the West Coast Division at San Francisco; **W. C. Williams**, M. ASCE, State Highway Engineer, Oregon State Highway Department; and **J. C. Young**, M. ASCE, chairman AASHO Committee on Design, an engineer of design, California Division of Highways.

* * *

George D. Clyde, commissioner of interstate streams for Utah, on Jan. 1, resigned the post to assume his new duties as governor of the state of Utah. At one time, from 1935 to 1941, the new governor was dean of engineering at Utah State Agricultural College and later was chief of irrigation and water conservation for the U. S. Department of Agriculture.

* * *

Harvey F. Ludwig has accepted the position of assistant manager of Hycon Aerial Surveys at Pasadena. He resigned his post as chief of the Office of Engineering Resources, Division of Sanitary Engineering Service, U. S. Public Health Service, Washington, D. C., to accept the position in Southern California.

* * *

Emil C. Jensen is the new president of the Federation of Sewage and Industrial Wastes Associations. He is chief of the Division of Engineering and Sanitation of the Washington State Department of Health. For the past several months Jensen had been serving the Federation as vice president, filling the unexpired term of **John W. Cunningham**.

* * *

August R. Butler, civil engineer, has been named director of engineering for Pereira & Luckman, Los Angeles planning, architectural and engineering firm. Prior to coming to Southern California, Butler was director of engineering for the \$350,000,000 U. S. air and naval bases in Spain.

* * *

Appointment of **Fred Glendenning** as a representative of the Portland Cement Association with headquarters in Phoenix, Ariz., is announced.

**Fred
Glendenning**



by **John McNerney**, Los Angeles district engineer of the organization. Previous to accepting the position with PCA, Glendenning was consulting engineer for Maricopa County, Ariz.

Mercel J. Shelton, deputy director of the California Department of Water Resources at Sacramento, was elected chairman of the California Section of the American Water Works Association at its annual fall convention at San Diego. Elected vice-chairman was **Duncan Blackburn**, chief engineer of the Pasadena Water Department. **C. Kenyon Wells**, assistant chief engineer of the Long Beach Water Department, was appointed to the Executive Committee.

* * *

Comdr. V. G. Stevens (CEC) USN, has been relieved as officer in charge of the U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif., by **Comdr. Charles J. Merdinger (CEC) USN**. Stevens' new assignment is in New York City. Merdinger who is assuming command of the laboratory has been in the Naval service since 1937. Most recently he has been public works officer and resident officer in charge of construction at one of the nation's few master jet stations, the Naval Air Station located at Miramar, Calif.

* * *

Raymond Archibald, formerly division engineer of the San Francisco Division, U. S. Bureau of Public Roads, is now located in Seattle, Wash., where he is manager of the West Coast office of the consulting engineering firm of J. E. Greiner Co. at 1411 Fourth Avenue Bldg.

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E. G. "Pie" Johnson of Salt Lake City, Utah, announces his association with the consulting engineering firms of Newville, Koenig & Associates, Los Angeles, Calif., and Morrison-Maierle, Inc., Helena, Mont.

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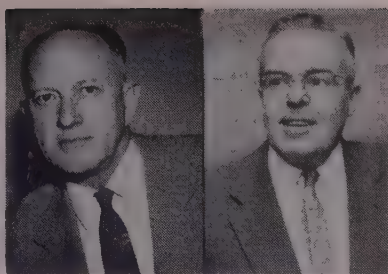
Norman F. McKay, engineer with the Washington Department of Highways, recently left for Bangkok, Siam, where he will be a consulting engineer under **Gen. Lacey B. Murrow**, who with **Robert Breem** has formed a heavy construction company. General Murrow was director of highways for the state of Washington from 1933 to 1940, and the planning of Seattle's floating bridge across Lake Washington was under his direction.

* * *

Frank J. Berthinchamps has been appointed chief of the channel maintenance section of the operations division of the Portland District, Corps of Engineers. He fills a vacancy left by the resignation of **Adam J. Heine**man who left to become concrete engineer on Bocono Dam in western Venezuela.

* * *

Ernest F. Donatic was recently named general superintendent, and **James P. Williams** was appointed manager of engineering and planning at the Kaiser Steel plant, Fontana, Calif.



PROMOTION OF TWO veteran Utah Construction Co. executives was recently announced. Guy V. Sperry, left, was elected vice president and chief engineer, and John M. Horrigan was elevated to secretary. Sperry has been the company's chief engineer in charge of heavy construction projects since 1952, having joined Utah ten years before after 18 years of construction experience throughout the Western states, including 16 years with the Bureau of Reclamation. Horrigan joined the firm in 1921 and has also worked on major projects throughout the country.

Peter H. Vogel of Santa Rosa, Calif., recently joined the City of Richmond, Calif., as an associate city engineer. Chosen for his varied experience in sewer line and treatment plant construction, Vogel will set up procedure for construction of Richmond's new sewer system, will do designing in connection with all sanitary sewer projects, and act as technical advisor for operation of the new plant. During 1954 and early 1955 Vogel was with Utah Construction Co. in Richmond as assistant project engineer for the company's subdivision construction.

* * *

Lyall A. Pardee, who has been acting as Los Angeles city engineer for more than a year, has received permanent appointment to the post, vacant since the retirement of **Lloyd A. Aldrich**.

* * *

Announcement is made of the appointment of **William Andrews** as division engineer of the Bureau of Public Roads with headquarters at Juneau, Alaska. Coming from Fort Worth, Texas, where he was district engineer for the BPR, Andrews replaces **A. F. Ghiglione**, acting division engineer and head of the former Alaska Road Commission. Ghiglione is expected to become assistant to **Charles D. Curtiss**, Bureau commissioner at Washington, D. C. **M. M. Flint** was the first engineer of the newly reorganized Alaska division, but had been in office less than two weeks when he died. Previous to the reorganization, the Alaskan operations were under the supervision of **F. E. Andrews**, Division engineer with headquarters in Portland, Ore.

* * *

Clyde E. Barrett has joined Stone & Webster Engineering Corp as chief office engineer, located at Snoqualmie, Wash., where the company has under construction a power plant

project. Barrett had been with Tudor Engineering Co. for six years and recently was on the Tri-Dam Project at Strawberry, Calif., for Tudor-Goodenough Engineers.

* * *

A new consulting engineering firm, **O'Reilly, Livingston & Associates**, has been formed at Seattle, Wash., as an affiliate of the naval architectural firm of **Philip F. Spaulding & Associates**. The new firm is headed by **Hugh P. O'Reilly**, civil engineer, who returned to his native Seattle after twelve years of engineering activity in California. Principal associate is **Hart Livingston**. Also associated are **Phil Spaulding** and **Larry Glosten** who continue as partners with Livingston in the naval architectural firm. The new organization is set up to furnish complete civil, structural, mechanical, and electrical engineering service for shore-side developments.

* * *

B. A. Weiss, executive engineer and general superintendent of the Imperial Irrigation District in California, plans to leave for Iran to become engineer in charge of the resource development program being carried out there by the Development and Resources Corp. of New York City. Also joining the corporation's staff, working under Weiss' supervision, is **Frederick L. Hotes**, associate professor of civil engineering and irrigation at the University of California, Berkeley.

* * *

Robert J. Wolf has been appointed division manager of Kaiser Engineers, with headquarters at Oakland, Calif.

* * *

Walter Newland, until recently chief, division laboratory of the Bureau of Reclamation, Denver, Colo., has transferred to field work where he is chief inspector for the Bureau on construction of approximately 30 mi. of canals and laterals at Trenton, Neb.

* * *

Paul J. Garber of the Corps of Engineers has moved to San Francisco where he is serving as supervisory engineer in the Western office of Design and Construction of the National Park Service. Garber was formerly assistant chief, Military Design Branch, Omaha District of the Corps, and is a member of the American Society of Civil Engineers.

* * *

John L. Merriam, member of the American Society of Civil Engineers, and a former engineering specialist for the Soil Conservation Service at Riverside, Calif., is now living in Saudi Arabia. He is senior irrigation engineer for the Ministry of Agriculture of that country, in charge of setting up an irrigation and drainage section in the Division of Water Resources. Engineering direction is by the Los Angeles firm of **Ralph M. Parsons Co.**

Norman B. Jones has joined The Ralph M. Parsons Co., Los Angeles, as assistant chief structural engineer. A member of the American Society of Civil Engineers, Jones was formerly with the California State Division of Architecture at Los Angeles.

* * *

George E. Warren, president of Southwestern Portland Cement Co., Los Angeles, and a member of the American Society of Civil Engineers, was recently elected chairman of the board of directors of the Portland Cement Association.

* * *

William L. O. Martini recently became city engineer and street superintendent of the city of Glendale, Calif., succeeding **J. C. Albers**.

* * *

Thomas N. Tamburri, a senior highway engineer with the California State Division of Highways at Sacramento, is currently doing research on improved and new methods of design and plan simplification, with the title of assistant engineer of design. Prior to this latest assignment he was in the construction engineering department with the Division in Marin County.

* * *

Changes in the national staff of The Associated General Contractors of America were recently announced from the Washington, D. C., headquarters by Executive Director **James D. Marshall**.

James M. Sprouse has been named manager of the Highway Contractors' Division, succeeding **Archie N. Carter** who had resigned to join **James A. Lindsey, Jr.**, to form the firm of Lindsey, Carter and Associates, consulting engineering firm in Excelsior, Minn. Sprouse will be responsible for the associations' activities in the expanded highway construction program. **Francis E. Twiss**, formerly director of engineering, International Road Federation, has been appointed engineer advisor. **Donald A. Buzzell**, assistant manager of the Heavy Construction and Railroad Contractors' Division, has assumed additional responsibilities and authority in that division.

* * *

J. P. Cagle of A. Teichert & Son, Inc., by unanimous vote was recently elected to the office of president of Associated General Contractors, Southern California Chapter, now located in its new building at 2551 Beverly Blvd. in Los Angeles. To serve with Cagle as vice presidents the following were elected: **J. W. Bernard** of William J. Moran Co.; **D. E. Kelbey** of Alex Robertson Co.; **J. M. Sawyer** of Macco Corporation. **Walter F. Maxwell** of W. F. Maxwell Co. was elected to the office of treasurer. **W. D. Shaw** is manager of the Southern California Chapter.

* * *

Gordon A. Mowat of the A. F. Mowat Construction Co. has been elected president of the Seattle Chap-

ter of Associated General Contractors. He succeeds **Donald L. Clark** of W. G. Clark Construction Co. Those elected to serve with him for the coming year are **John C. Boespflug** of J. C. Boespflug Construction Co., vice president; **Theodore W. Teufel** of George E. Teufel Construction Co., vice president; **John Frodesen** of Farwest Construction Co., secretary, and **Andrew P. Wick** of Wick Construction Co., treasurer. **Colton D. Harper** is manager of Seattle Chapter.

* * *

C. Dean Ramsden is appointed vice president and general manager of Pacific Coast Engineering Co., Alameda, Calif., designers, engineers and fabricators, according to announcement by **Will C. Hall**, president.

* * *

Ralph W. Hutchinson has been elected 1957 president of the Sacramento, Calif., Section of American Society of Civil Engineers. First vice president chosen to serve with him is **Irvin M. Ingerson**, and second vice president, **Frank L. Howland**. **Francis N. Hveem** is junior past president, and the new secretary is **J. C. Obermuller**.

* * *

Charles H. Zweifel is appointed chief engineer of Pacific Coast Engineering Co., Alameda, Calif., designers, engineers and fabricators, according to announcement by **C. D. Ramsden**, vice president and general manager.

* * *

The Fluor Corporation, Ltd., Los Angeles engineering and construction firm, announces the promotion of two executives to a newly created position of manager of projects: **J. T. Tathwell**, formerly chief project engineer, and **F. G. Crawford**, formerly manager of project coordination. All present and future active contracts will be assigned for overall management and coordination to these men.

* * *

Earl Withycombe, assistant state highway engineer-operations, for the California State Division of Highways is retiring Mar. 1 after more than 34 years of service. Promoted to succeed him is **J. W. Trask**, district engineer in charge of District III at Marysville. **Alan S. Hart**, district engineer at Eureka takes Trask's post at Marysville, while **Sam Helwer**, assistant district engineer of District X, Stockton, is promoted to replace Hart.

* * *

Hal W. Birkeland, head civil engineer for Tacoma's Cowlitz River dams, recently resigned and became a partner in the consulting engineering firm of Anderson & Anderson, Tacoma, Wash. Birkeland was appointed to one of the top Cowlitz engineering posts in January 1955. He gained international recognition when he directed development of the

"skimmer system" and other facilities to get fish around the proposed Mayfield and Mossyrock dams. Prior to his work with City Light, he worked on construction and irrigation developments with the Bureau of Reclamation, and with private engineering firms.

* * *

Appointment of **Wentworth I. Lovering** of Eureka, Calif., to succeed **Fred N. Finn** as district engineer at Sacramento for The Asphalt Institute is announced. Lovering takes over the position relinquished when Finn was assigned to the \$14,000,000 AASHO test road project in Illinois. A specialist in bituminous pavements and soil mechanics and a authority on seal coating, Lovering will serve under **B. A. Vallerga**, division managing engineer for the Institute, San Francisco.

* * *

John N. Bills has been appointed executive assistant to **John W. McFarland**, general manager of the East Bay Municipal Utility District, Oakland, Calif. A civil engineer, Bill most recently was construction supervisor for the George S. Nolt civil engineering firm. Previously he served as construction superintendent for S. & E. Pipeline Construction Co., and as staff engineer in plant engineering for Hughes Aircraft Co.

CALENDAR

Mar. 5-7—Western Regional Conference on Increasing Highway Engineering Productivity, Biltmore Hotel, Los Angeles, Calif.

Mar. 5-9—American Concrete Pipe Association, annual meeting Shoreham Hotel, Washington, D. C.

Mar. 11-14—The Associated General Contractors, national convention Statler Hotel, Washington, D. C.

Mar. 11-15—Nuclear Congress, Convention Hall, Philadelphia, Pa.

Mar. 20-22—Road Builders' Clinic at the State College of Washington annual meeting, Pullman, Wash.

Apr. 9-11—American Welding Society, Fifth Welding Show, Convention Hall, Philadelphia, Pa.

Apr. 28-May 5—International Commission on Irrigation and Drainage, third congress, Sheraton-Palace Hotel, San Francisco, Calif.

Apr. 29-May 3—National Material Handling Exposition, Convention Hall, Philadelphia, Pa.

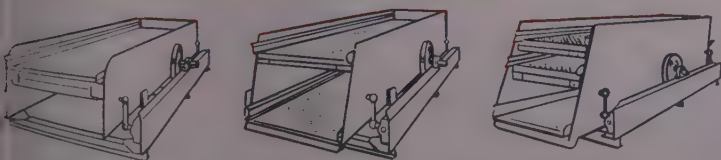
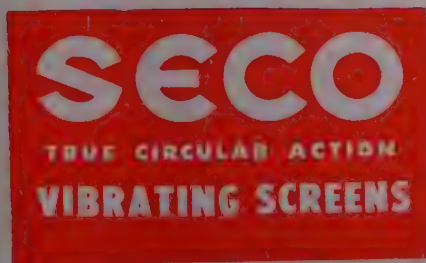
May 12-17—American Water Works Association, annual conference Atlantic City, N. J.

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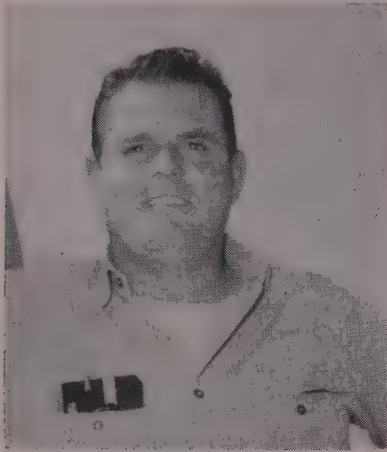
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SUPERVISING the jobs

Stanley B. Wood is project manager on a recent award to Clyde Wood & Sons, Inc., for rehabilitation of harbor facilities and construction of submerged fuel lines at Point



Stanley B. Wood

Mugu, Calif., for the 11th Naval District. Superintending this work of extending breakwater, dredging and submarine fuel line installation is **Robert E. Nutt**. This is a \$1,041,190 project under way since Jan. 1; completion date about Aug. 1. Fuel line work is subcontracted to Hood Construction Co.

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Ralph Kreise, grade superintendent, and **Harold Watts**, plant superintendent, are in charge of work of grading and surfacing 11.9 mi. on the Phoenix-Payson Route, Tonto National Forest in Maricopa County, Ariz. This is a \$275,681 contract being carried out by Isbell Construction Co., who expects to have the job completed about May.

* * *

Wilbur Bradbury is superintending a recent award to Williams & Burrows, Inc., for construction of Santa Clara County Hospital at Santa Clara, Calif. Project engineer on this \$4,557,879 job is **Paul Lutes**. **Richard Zimmerman** is job office manager. Other key men are **Jack Mitchum**, labor foreman, and **Frank Machuda**, project inspector. Contractor started work here last November and expects the job to run until mid-1959.

* * *

J. A. Rightly, project manager, and **Lester Clark**, superintendent, key men for Longenbaugh & Coe, Inc.,

head the list of men on the \$1,136,180 contract for grading 3.2 mi. on the Glorieta-westerly road in Santa Fe County, N. Mex. Others on this job, the first interstate project on U. S. 85, are **Charles Farris**, grade foreman; **Roy Hartman**, crusher foreman, and **Glen Pine**, in the office. Under construction since last December, work is expected to be finished in August.

* * *

F. R. Acton is superintending a grading, gravel and oil job for Taggart Construction Co. in Hot Springs, Wyo. Work is for a 3.1-mi. stretch costing \$693,422 on the Thermopolis-Shoshone road in Wind River Canyon. Other important personnel here are **Gail George** and **Jerry Thayer**, shift foremen, and **George Monighan**, timekeeper.

* * *

Tom Martin, superintendent, aided by **Arnold Powell**, structures foreman, and **Marvin Brown**, hot plant foreman, is in charge of a \$461,308 job of grading and surfacing 4.5 mi. of the Diversion Dam-Dubois road in Fremont County, Wyo. **Stanley H. Arkwright, Inc.**, is the contractor. Job started Jan. 20 and will probably end about the middle of July.

* * *

Otto Baltrusch as general superintendent is in charge of a recent award to Baltrusch Construction Co. for a \$325,839 highway job in Fergus County, Mont., and **Fred Hartson** is superintending the work. Contract covers 13 mi. of grading, gravel surfacing and draining the Hilger-Winifred-Big Sandy highway, involving 404,000 cu. yd. excavation, unclassified; 95,000 mi. yd. overhaul, 83,000 tons $\frac{3}{4}$ -in. crushed gravel, and 4,900 lin. ft. culverts. Other important supervisors on this job are **Robert Erickson**, pipe foreman; **Gene Aarstad**, crusher foreman, and **Crandall Paulson**, mechanic.

* * *

M. C. Beach is superintendent, and **Edward Bernd** and **Gerold Rennels** are foremen on a highway job just starting west of Craig in Moffat County, Colo. **Herron-Strong Construction Co.** is the contractor on this \$628,046 8.8-mi. grading, structures and surfacing job. Work will probably be finished in September.

* * *

Oscar, Seth and Nils Oberg started work last Dec. 28 on the \$7,201,495 award to their companies, Oberg

Construction Corp. and Oberg Brothers Construction Co., for freeway construction in Los Angeles County, Calif. **Nils Oberg** is acting as project manager on this contract covering 4.7 mi. of grading and other construction in the city of Los Angeles on Ventura Freeway, including ten bridges, one pedestrian overcrossing and ten retaining walls. December 1958 is Oberg's estimated completion date.

* * *

R. G. Wallace, project manager, and **J. G. Powers**, project superintendent, are in charge of a recent award to Royden Construction Co. for 4.4 mi. of grading and surfacing on the Yuma-Parker highway in Yuma County, Ariz. Others on the \$213,393 operation, scheduled for completion in April, are **J. M. Donaldson**, office manager, **Ed Imus**, concrete foreman, **Dave Tucker**, grade foreman, and **B. M. Ramirez**, labor foreman.

* * *

Carl Gates, superintendent for Nowers Construction Co., is handling a \$266,479 contract for 3.7 mi. of grading and structures between Nathrop and Kings Corner in Chaffee County, Colo. Other key men are **R. S. Goss**, labor foreman, and **John Schmeir**, equipment. Job started late Nov. 20 and will probably be finished by Mar. 1.

* * *

Bob Echlin, superintendent, assisted by **David Bass**, grade foreman, is in charge of contracts recently awarded to Badger Lync Construction Co. for construction of the Middle Rio Grande Project Schedule 1A, \$146,728, and Schedule 2A, \$93,156, covering earthwork, clearing, and structures, Socorro Units 1 and 2. Started the beginning of November, the job is expected to be finished about mid-March.

* * *

Vern Haisch, project superintendent, and **William O. Murphy**, general superintendent, are in charge of 7 mi. of grading and surfacing of the Towal-West highway in Klickitat County, Wash., for **Murphy Brothers, Inc.**, who received the contract on low bid of \$334,097. Work started mid-December and will continue through summer.

* * *

Ted Carl, project superintendent for Murphy Brothers, Inc., is in overall charge of another grading and surfacing award to this company, Spokane County, Wash., from Deaton to Chattaroy. General superintending of the job is being performed by **William O. Murphy** who expects to have the job finished this spring. Contract price is \$243,671.

* * *

William Rutledge is superintending the building of the Yakima River bridge in Yakima County, Wash., for **Marshall Construction Co.**, headed by **Henry G. Marshall**. Other important

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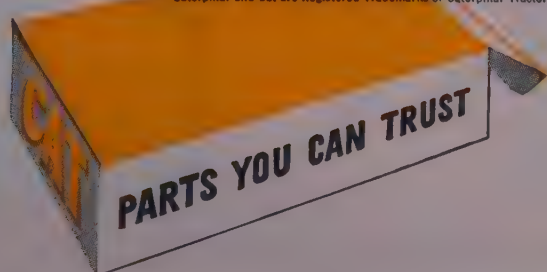


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tant men on this \$324,943 construction are "Chuck" Todd, pile foreman, and Stan Schnell, superintendent of excavation and equipment. December 10 was the starting date, with work expected to continue to October.

* * *

Oran Coalson, project manager, Donald Mosley, general superintendent, and Al Simpson, foreman, are top men on Crowell & Larson's \$189,138 contract for 3.8 mi. of grading and surfacing in San Bernardino County, Calif. Under way since Nov. 30, the work will probably end in March.

* * *

O. R. Smith, general superintendent and engineer, is handling J. F. Schroeder's Sons Co.'s contract for Schedule 1B, costing \$116,265, and for Schedule 2B, \$140,553, on Socorro Units 1 and 2, Middle Rio Grande Project, N. Mex. Contractor started work here Nov. 8 and expects to have the construction completed about Mar. 1.

* * *

Lonnie Lawler, project superintendent, Russ Davis, project engineer, Zel Mullican, structures superintendent, and Bill Kinsella, office manager, head the personnel working for Peter Kiewit Sons' Co. on a \$2,168,770 contract which got under way Nov. 1 and covers 7.2 mi. of grading, surfacing, and construction of a pe-

destrian overcrossing in Ventura County, Calif.

* * *

Lonnie E. Smith is superintending a bridge construction contract recently awarded to Stuart Brothers. Costing \$85,772, work involves grading, surfacing and construction of a 120-ft. bridge near Murphy in Owyhee County, Idaho. The road work is subcontracted to Shay Asslet. With completion date set for June, the job started in January.

* * *

Dennis Cronin, Charles Gjedsted and Karl Heastrup, general superintendent, assistant superintendent, and job superintendent respectively, are the top supervisors for Lowrie Paving Co., Inc., on a recent award to this company for grading and surfacing, traffic signal system and highway lighting on Junipero Serra Blvd. in Colma and South San Francisco, San Mateo County, Calif. This \$196,353 project is expected to be finished in May.

* * *

Hubert Smith, superintendent for G. I. Martin, and his assistant, H. E. Bontrager, is in charge of an \$836,755 project covering 9.7 mi. of grading and surfacing of the Luna Junction-South road in Catron County, N. Mex. Grade foreman is E. V. McBride. Under way since Dec. 1, the job is scheduled for completion in September.

Earl Jordan is supervising a \$260,549 award to James P. Johnson Co. for 4.8 mi. of grading and surfacing of the Talpa-South road, Taos County, N. Mex. Foremen on this job, which got under way in mid-November, are Loyd Baum, grade, and R. C. Cannady, crusher. Job will probably end May 31.

* * *

W. B. Mackey, superintendent for C. A. Reeves Construction Co., is in charge of a \$99,538 contract for grading, draining and gravel surfacing of the Marsh-Glendive highway in Dawson County, Mont. Job started Dec. 15 and is scheduled for completion this July.

* * *

Forrest Hopkins is acting as foreman for John P. Hopkins Co., Inc., currently doing 1.8 mi. of grading and surfacing in Thurston County, Wash., from Mud Bay to Kaiser Road. Job started in November; will end about September. Contract price \$357,024.

* * *

Merlyn Marks is superintending a \$127,396 job for Peter Kiewit Sons' Co. Work lies west of Yreka in Siskiyou County, Calif., and covers grading and surfacing. Other important men on this construction, which started in January, earmarked for June completion, are Lysle Leach, office manager, and Eddie Thiel, master mechanic.

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PROTECTS EQUIPMENT AGAINST WEAR—
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LIFE OF THE OIL DRAIN

The E. L. Yeager Co. is now constructing a Freeway link to Cajon Pass through San Bernardino. Gene Yeager, partner in this concern, says: "Zoildeez helps us hold down maintenance and operational costs. We recommend it to others."

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**INSURE
LONGER
PAVEMENT
LIFE with**

DEHYDRO*

ANTI-STRIPPING ASPHALT ADDITIVE



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IS USED BY THE
MAJORITY OF
WEST COAST
REFINERS**



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Dehydro was used as an anti-stripping additive in the asphalt for this secondary highway built by Los Angeles County. Osborn Paving Company — Contractors.

- 1** DEHYDRO successfully passes state, county and city tests.
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- 3** DEHYDRO is manufactured on the West Coast, assuring a dependable supply source, with second morning delivery to the most distant West Coast area.
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L. W. "Red" Schall, project manager, and Jack Gardner, superintendent, head the personnel for American Engineering & Construction Co. on grading, surfacing and miscellaneous work on 2.9-mi. stretch of the Los Laureles Grade road, east of Monterey, Calif. Foremen Bob Davies and John Hinote, with J. C. Kelly, master mechanic, are also key contractor men on this job, under way since the middle of November, and now in the completion stage.

L. K. McWethy, project manager for Eagle Construction Co., is in charge of \$1,120,447 recent award to this contractor for Glendo Dam and

power plant, on the North Platte River, southeast of Glendo, Wyo. A two-year project, work is expected to get under way this month.

D. R. Dickerson is superintending a \$391,000 job for improvements to the sewage treatment plant for the City and County of Denver, Colo. Carpenter foreman is G. T. Baker. Job has been going since Oct. 15 and will probably be finished the end of June.

O'Neil Jones, project manager, A. M. Stolzenburg, excavation superintendent, and Carl Lowry, gravel superintendent, are top men on a re-

cent award which went to Albert Lalonde Co. On a low bid of \$775,431, Lalonde started grading and surfacing a section of the Crow Agency and Custer Battlefield Monument road in Big Horn County, Mont., with the job scheduled to end about Sept. 15.

H. A. McGagin, general superintendent, L. C. Snell, assistant general, and C. W. Covington, job superintendent, are the top supervisors working for Rice Brothers, Inc., on 1.9 mi. of grading and surfacing north of Stratford and Jersey Ave., Kings County, Calif. Work started on this \$132,760 job on Dec 17; will probably end about mid-May.

Noel E. Gold is supervising a \$427,387 project for Thayne Construction Co. Contract is for drainage pipeline and grading for taxiway and apron at the Salt Lake Airport in Utah, a job which started Jan. 7 and will probably be finished May 15.

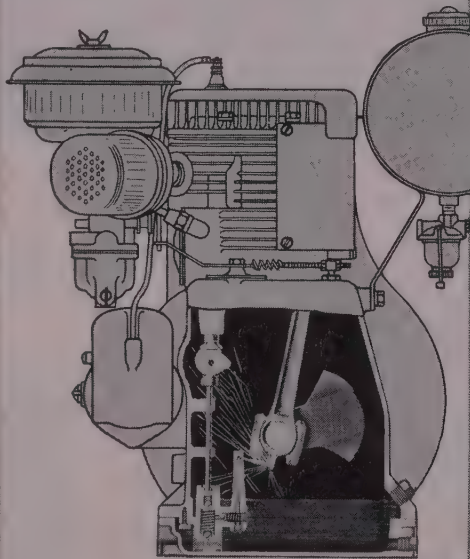
Jack V. Beach has been named to superintend a \$167,844 award to Silver State Construction Co. for construction of a portion of state highway north of Wells in Elko County, Nev. Named as foreman on this job, which starts in the spring, is J. J. Montrose. A. D. Drumm, Jr., owner and general manager of Silver State, has over-all direction of the company's contracts.

Hank Eberhardt is supervising a grading and surfacing contract, with structures, between Durango and Bayfield in LaPlata County, Colo. This is a Northwestern Engineering Co. award in the amount of \$434,900 which got under way Nov. 15, with Emil Christensen assisting as foreman, and Marvin Jensen as field accountant.

Wilbur Bradbury is superintending construction of the 7-story Santa Clara County Hospital addition. Located in the city of Santa Clara, Calif., structure is of reinforced concrete, flat slab, set on modified spread footings, and will house all surgical facilities and the tuberculosis center. Assistant superintendent of construction is Onslow Rudolph. Jack Mitchum is concrete foreman. Architect's representative is Frank Machuda. This \$4,559,800 project got under way last November, and will be finished probably in the spring of 1959.

Thomas N. Beall, project manager, is top man for Arrington Construction Co. which is doing work at the Atomic Energy Commission Reactor Testing Station near Arco, Idaho. The job involves construction of an operating prototype of a ship nuclear propulsion plant costing \$1,858,000. Other important men on this project, which Arrington expects to have finished about June 1, are Robert D.

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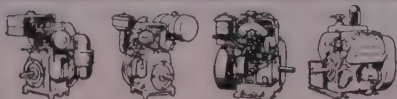
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World's Largest builder of
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Better Performance Depends on Better Features....

Taylor, site manager; **Lyman L. Monson**, superintendent; **John Casto**, field engineer; **John Johansen**, office engineer, and **George Smith**, equipment superintendent.

* * *

Joseph Farrell is supervising a \$1,574,42 recent award to **Gordon H. Ball Construction Co.** for a 1.4-mi. highway construction, including two bridges, near Victorville, Calif. Bridge superintendent is **Al Lindquist**. Other key men on the job, which has been going since Nov. 21 last year, are **Fred Sawyer**, job engineer, **Maury Meadows**, field office manager, and **Andrew Foote**, master mechanic. Work will close sometime in October.

* * *

Earl Barnard, superintendent, and **V. F. "Dan" Boone**, project engineer, are key men on a \$970,629 contract recently awarded to the joint venture of **John Delphia** and **Fred J. Carly, Jr., Co., Inc.**, for 3.7 mi. of grading and surfacing of a 4-lane highway and construction of a bridge in **El Dorado County, Calif.** Work has been under way since the first of December, and is expected to be finished in November.

* * *

John B. Tipton is superintending a highway job for **Gardner Construction Co.**, covering grading and structures on the Valley Highway in **Denver, Colo.** Foremen on this \$1,723,748 project are **Harold Hasse**, carpenter, **Lawrence Rovedo**, steel, and **Harold Wilson**, grading. A year-long job, it will probably end about November.

* * *

R. B. Crookston, project manager for **Wangsgaard Construction Co.**, is in charge of a \$143,912 contract for earthwork, structures, bridge and surfacing of an access road to **Flaming Gorge** in **Utah**. Mechanic superintendent is **R. O. Peterson**; general foreman, **E. J. Munro**; and grade foreman, **Odell B. Anderson**. Job started early in 1956 and will probably be completed about July 1.

* * *

Paul Cross, superintendent, assisted by **Earl Shannon**, is in charge of 5.1 mi. of grading and surfacing on **I. S. 66** in **McKinley County, N. Mex.**, for **Henry Thygesen & Co.**, which started work on this \$1,279,202 construction in November and expects to have it finished by the end of August.

* * *

Al Reimer, concrete superintendent, **Thurman Landrith**, carpenter foreman, and **Everett Wentworth**, grading superintendent, are key men of **Thomas Construction Co.** for erection of a bridge in **Tulare County, Calif.**, a \$229,577 job which has been under way since Oct. 15 and will be finished about April, according to **Thomas**.

* * *

Milton Gracia, project manager, and **Henry Carder** and **Bert Crowe**,

superintendents, are the key personnel on **Madonna Construction Co.'s** \$1,116,474 contract for 3.1 mi. of grading, surfacing and construction of three bridges south of **San Miguel, San Luis Obispo County, Calif.** A year long job, work started Dec. 17.

* * *

Phil J. Dunn is superintending a recent award to **Piombo Construction Co.** and **M & K Corp.** and **Connolly-Pacific Co.** to construct 3.8 mi. of highway including grading, surfacing and erection of seven bridges in **San Bernardino County, Calif.** Other key men on this \$5,103,614 project are **Tommy Thomas**, office manager, **Gino Giampaoli**, master mechanic, and **M. H. Gliggs**, carpenter superintendent. This job started in November and contractor figures to have it finished about August 1958.

* * *

W. B. Berry, job superintendent, and **R. N. Harrington**, job foreman, are key men on 3.6 mi. of grading and surfacing east of **Maricopa, Calif.**, under **T. C. Latham**, administrator for **Dicco, Inc.**, contractor. \$125,567 project started in January and is expected to be finished in April.

* * *

R. B. Crookston, project manager, and **E. J. Munro**, job superintendent, are top men on a \$143,912 job which recently went to **Wangsgaard Construction Co.** for earthwork, structures and surfacing of road to **Flaming Gorge Dam** station, **Flaming Gorge Unit, Colorado River Storage Project, Colo.** Grade foreman is **Odell B. Anderson**. Under way since mid-January, work is expected to end in late June.

* * *

Ray Clark, foreman, and **Jim Silvers**, master mechanic, are key men working on **Ralph B. Slaughter's** contract for 3 mi. of grading, surfacing and construction of a slab bridge in **Imperial County, Calif.** This \$228,528 job has been under way since last Dec. 1 and will probably end this coming July.

* * *

John V. Leone and **George J. Gahm**, superintendents, and **Joe Bubnic**, concrete foreman, are key men for **Dominic Leone Construction Co., Inc.**, on this contractor's \$490,149 job of grading, surfacing, with structures, in **Otero County, Colo.** Job started Dec. 1 and will probably end some time in July.

* * *

Elmer Penner, project superintendent, is in charge of building construction for the Navy at **Point Sur, Monterey, Calif.**, including barracks, administration building, subsistence building, and ten one-story service buildings. **Clarence Ward Construction Co., Inc.**, won the award on a bid of \$1,290,000, started work last December, and expects to finish in September.

Albert H. Powers, Jr., is project manager and **George Slater** is job superintendent for **Ward Construction Co.** and **Alton V. Phillips Co.**, joint venture on the erection of two pumping plant buildings and installation of 11 turbine type pumps, approximately 3 mi. of 30 to 36-in. discharge lines at the **Brewster Flats** unit of the **Foster Creek Division, Chief Joseph Dam Project, Wash.** General superintendent for all **Alton Phillips'** work on the \$847,584 contract is **Alfred J. Hyde**. This is a year long job which started in January.

* * *

C. D. Bisordi, project manager; **R. H. Hayard**, superintendent, and **Don Tallman**, foreman, head the job personnel working for **S. S. Mullen, Inc.**, at the **Eielson AFB** in **Alaska**. Work consists of shoulder stabilization for runway access taxiway, a contract awarded **Mullen** on bid of \$577,590.

* * *

J. Coons, project manager; **Wayne Crawford**, office manager, and **Mitchell Humphreys**, superintendent, are key men for **Morrison-Knudsen Co.**, on a job which got under way in mid-January on the **Oregon Coast** highway south of **Coos Bay, Ore.** Costing \$962,295, the contract covers 7.1 mi. grading of the **Davis Slough-Beaver Lookout** section of the highway. Job is scheduled for completion Nov. 30.

* * *

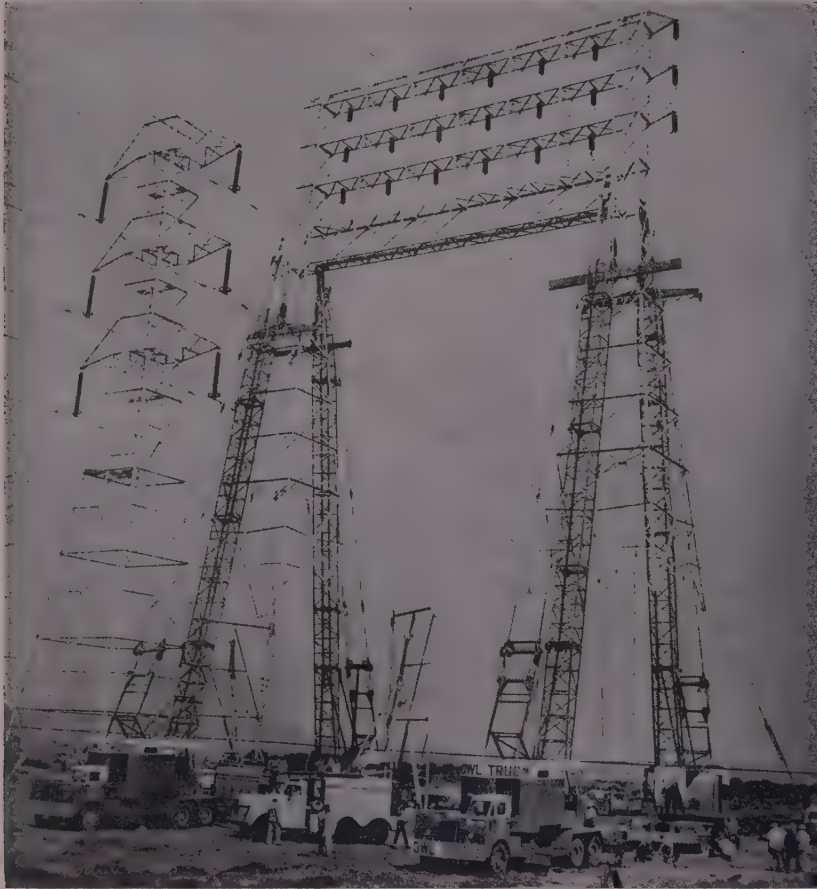
Hank Sather, superintendent, assisted by **Roy Sollie**, foreman, is in charge of construction of a 2-story, 78-bed hospital at **Mount Vernon, Wash.** **Walker & Florence** was awarded the contract on a low bid of \$916,576, started work Jan. 2 and expects to have the job finished the end of the year.

* * *

Russell G. Webster, superintendent, heads the list of job personnel working for **Gordon H. Ball and Ball & Simpson** on their recent award for freeway construction in **Alameda County, Calif.**, costing \$6,419,254. Site of the job is near **Warm Springs Junction**, a 9.9-mi. stretch, including frontage roads, ramp and interchanges, to be graded and surfaced, 14 bridges and a pumping plant. Assistant superintendent is **Frank Fries**. **Hughes O. Davis** and **Richard M. Vail** are the engineers. **Lloyd D. Mosier** has charge of purchasing. **Thelma Webster** has charge of the office, and **Wayne Arnold** is timekeeper.

Grade foremen are **Art Ostrum**, **Wendell Phillips**, **Joe McClary**, **Jay Bostick**, and **John Wilson**. **Al Banducci** is bridge superintendent, with **Frank Sale**, **Del Yost** and **Ira Alseron**, foremen. **Art Covey** is utilities foreman; **Al Pierce** is labor foreman, and **L. Ferdig** is master mechanic. Work got under way the first of January and will be finished in the fall of 1958.

TRICKS of the TRADES



Cranes give Southern Cal. Edison a lift

ONE OF THE BIGGEST lifting operations of the year was carried out recently near Long Beach, Calif., when a 94-ft. transmission tower weighing 77,000 lb. and carrying seven 66,000-volt electrical circuits was boosted 32 ft. in the air for the Southern California Edison Co.

The huge tower, located near the Del Amo approach to the Long Beach Freeway, had to be raised an additional 32 ft. in order to provide more clearance over a railway roadbed which had been raised as part of a flood-control project.

Owl Truck & Construction Co., of Compton, Calif., was called in to undertake the delicate lifting project.

Four Harnischfeger P&H Model

555 35-ton truck cranes, lifting together and synchronized to keep the tower in balance, carried out the job. So accurate were the calculations of the project engineers that the tower's "drift" was no more than a few inches when it was boosted into the air.

Five of the seven high voltage circuits remained in operation during the big lift, and there was no interruption in electrical service to Edison customers.

Thirty-two-foot extensions were moved into place as soon as the tower had been raised to the desired height, and workmen quickly completed the job of bolting them on. The job was completed in one shift.

Stop that wicking

WHEN the unprotected end of a rubber hose is placed in a liquid such as in a barrel of gasoline, "wicking" may occur that will shorten the effective life of the hose. The liquid will travel up the fibers of the reinforcement of the hose by capillary action similar to the action of kerosene traveling up the wick of the old-time kerosene lamp.

The liquid will attack and weaken the fibers for a considerable distance from the exposed end. "Wicking" may even cause the hose end to swell and eventually to fail. According to recommendations of field engineers of the Thermoid Company of Trenton, N. J., the simplest way to overcome "wicking" is to couple a length of metal pipe on the hose end long enough to prevent contact of the hose end with the liquid. The pipe should, of course, be inserted into the hose and not over the outside cover.

Another easy way to avoid "wicking" is to use a standard metal end protector which will seal the end against contact with the liquid.

A third possibility is the use of a liquid neoprene rubber compound which dries in a durable film over the end of the hose and prevents the entry of liquids into the fibers of the carcass.

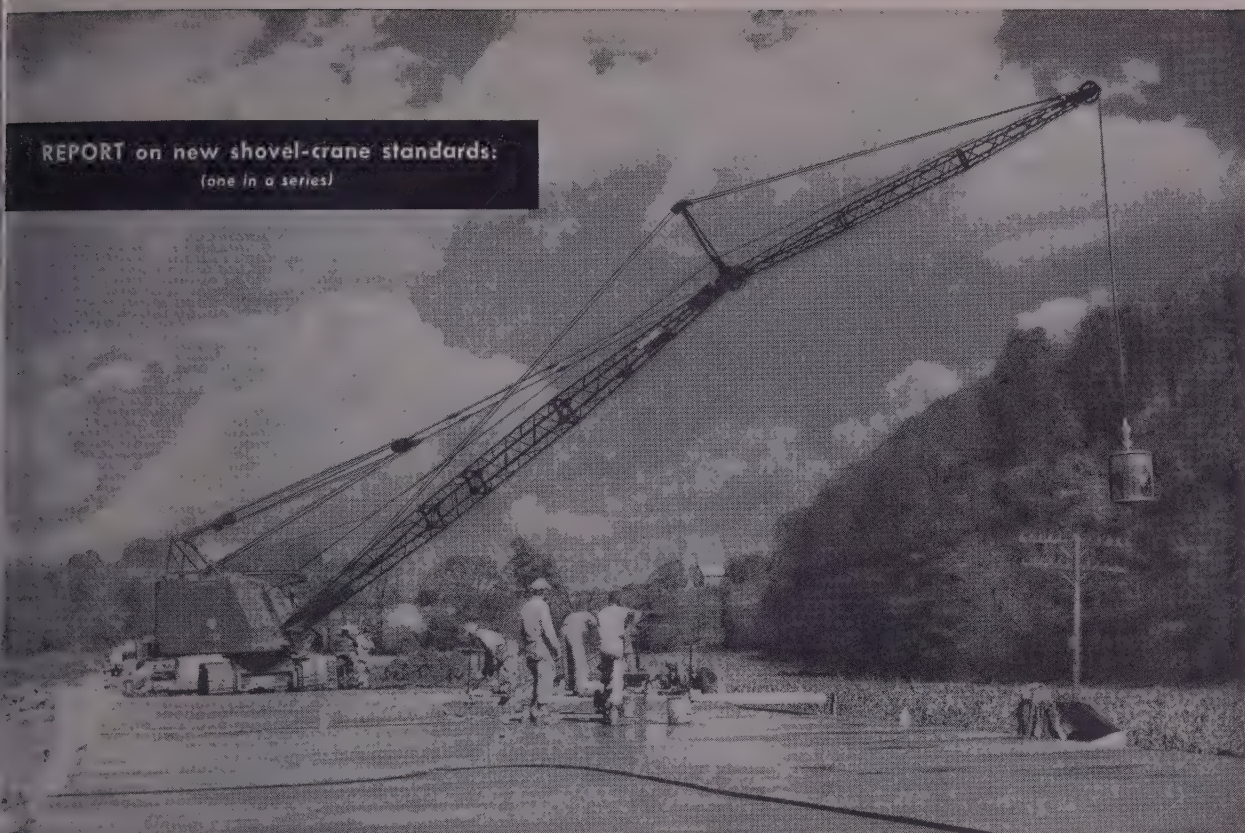
A fourth possibility is dipping the end of the hose in shellac to form a film over the end of the hose. This is only good for water applications and should not be used with strong solvents.

Mobile batch plant well ahead of flash floods

FLASH FLOODS that could wash away a fixed batching plant installation were a threat at the site of the powerhouse construction by the Bechtel Corporation for Pacific Gas & Electric Company on the Feather River, Calif. A gravel bar at the river edge was the logical site for a concrete batching plant because it was the only place with sufficient area for aggregate storage. Yet, with flood danger, the only practical alternative site was a point 110 ft. up the canyon wall off the Western Pacific Railroad right-of-way. A stationary plant there would have required extensive foundations and a major earthmoving job to level an area of sufficient size to store aggregates. The site also would have entailed transit truck hauls under all weather conditions down a steep grade.

Noble-Mobile made the mountainside installation unnecessary. This batching plant on wheels was

REPORT on new shovel-crane standards:
(one in a series)



NEW FEATURES—Link-Belt Speeder shovel-cranes offer many important production-increasing advantages including reversing clutches

for either or both main drums, a third drum and independent rapid boom hoist for power-raising and power-controlled lowering.

Getting bonus power...extra line pull

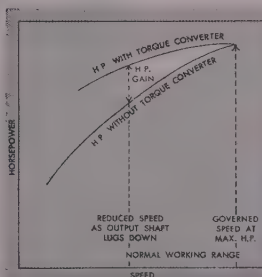
Size for size, Link-Belt Speeder shovel-cranes deliver greater usable horsepower than other machines using the same engines

Engine size alone is not a correct measure of a shovel-crane's actual *usable* horsepower. Thus, it's important to know Link-Belt Speeders deliver more *usable* horsepower or line pull at the drums than other machines using the same engine, yet remain well within engine manufacturers' recommended operating speeds.

Why? A Link-Belt Speeder is designed and built with extra size and strength in shafts, gears, clutches and structural members. It has the strength to fully utilize available engine power.

It's another reason why Link-Belt Speeder shovel-cranes are setting entirely new high standards of efficiency. For complete facts, contact your Link-Belt Speeder distributor or write—Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

14,470-B



TORQUE CONVERTERS are available for all Link-Belt Speeder models, supply power to match the load . . . provide sustained power, increased line pull to maintain high production even with heavy loads and to handle these big loads smoothly, accurately!



POWER HYDRAULIC CONTROLS are operated with the flick of a finger, provide fast, positive response . . . perfect feel of the load for added safety. They're standard equipment on all crawler and rubber-tired models ½ to 3-yd, 8 to 75-ton capacities.

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

put into operation at the river edge as it could be hauled out to high ground on only a day's notice of flood. The mobility permitted scheduled work for 12 months a year so

the 25,000 yd. of concrete that ultimately will be used. The batch is hauled by transit trucks to the construction site only 300 yd. distant. 1,000 yd. of 2½-in., 1½-in., and ¾-



that the job could be completed by 1958. Noble-Mobile saved 70% in installation costs as against a stationary plant and on this project, it normally had to operate only 50% of the working day in order to provide

in. aggregates and sand, hauled by truck from Oroville 25.1 mi. away, are stored in compartmented piles at the site. They are fed by a scoop-loader to a conveyor leading to the plant. The materials are automati-

cally batched and discharged by a conveyor to the transit trucks for the approximate 2-min. haul to the pour ing site.

The project is a semi-outdoor powerhouse designed to withstand the damaging effects of flood. Outside dimensions will be 175 x 116 x 87 ft high. Construction area has been separated from the river course by a low temporary levee around the area for the period of the construction. The foundation of the plant is at the bottom of an excavation to a depth of 51 ft. below the river surface. On completion of the project the river will be returned to its original channel. Thirty-six feet of the powerhouse will extend above the normal river level.

Noble-Mobile is manufactured by the Noble Company, 1860 7th St. Oakland 20, Calif.

New books available

A NEW enlarged and revised book is now available covering examinations given by the State of California for the registration of civil engineers and engineers-in-training. The examinations given between 1941 and July 1949 include the unofficial solutions of the problems by the author. The balance of the examinations from July 1949 to and including June 1956 include the problems only. All options for the civil engineer examinations are included together with the engineers-in-training examination for all branches of engineering. The new book contains 381 lithographed pages. Copies can be secured directly from the author, August E. Waegemann, 2833 Webster St., San Francisco 23, Calif. Price \$7.00 plus tax. C.O.D. orders accepted.

A NEW EDITION of the Bureau of Public Roads' publication "Standard Plans for Highway Bridge Superstructures" is now available.

The 52-page book comprises 11 series of standard plans which furnish details for a variety of types of highway bridge superstructures. Entirely new in this edition are three series for pretensioned precast concrete and five series for structural timber. From the previous (1953) edition, with revised and modernized designs, are series for I-beams, riveted or welded plate girders, reinforced concrete slabs, T-beams, and box girders, precast concrete decks and post-tensioned precast concrete I-sections.

The plans will serve as a useful guide to state, county, and local highway departments in the development of suitable and economical bridge designs for primary, second-

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WARN SELECTIVE DRIVE HUBS

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EQUIPMENT

Automatically
"idle" the front drive
in 2-wheel drive

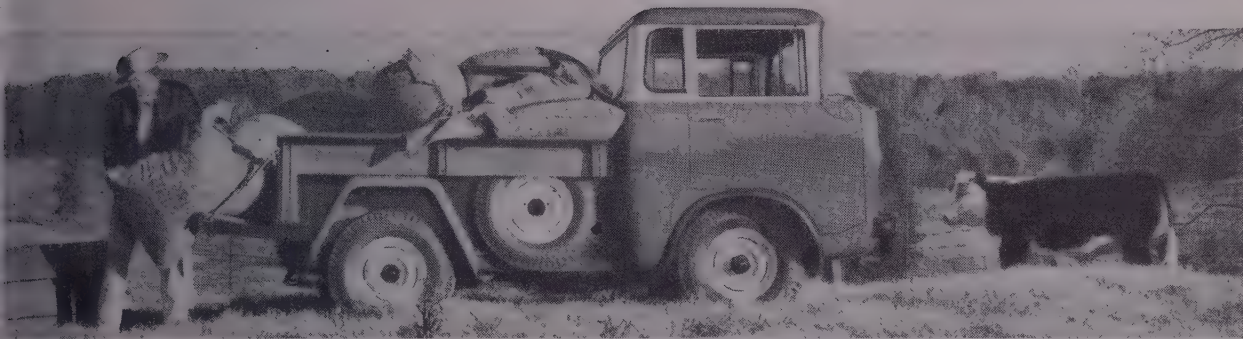
SAVE GEARS, TIRES, GAS!

Warn Hubs make your 4-wheel drive more useful than ever, because they make it into a "free-wheeling" 2-wheel drive, as well as a 4-wheel drive! Use it either way—automatically—as you shift! With Warn Lock-O-matics it always free-wheels in 2 w.d., always engages in 4 w.d., forward or reverse, as you shift. You automatically reduce front end wear, engine load, tire wear in 2 w.d.—there is no drag, gear whine, shimmy. Ask your 4-wheel drive dealer for a free demonstration of Warn Lock-O-matic or Locking (manual) Hubs today, or write. Models for all 4-wheel drives to 1½ tons.

WARN MFG. CO., Riverton Box 6064 - WC3, Seattle 88, Wash.

New capacity!

The completely new Forward Control 'Jeep' FC-150—the first time a 4-wheel-drive Truck has so effectively combined maximum cargo capacity with exceptional maneuverability! New Forward Control design puts a 74" pickup box on an 81" wheelbase. And the FC-150 retains famous 'Jeep' ruggedness and versatility.



New maneuverability!

It's the world's shortest turning 4-wheel-drive Truck! For safer off-road maneuverability, it gives you up to 200% greater forward visibility. Powered by the engine that made 'Jeep' vehicles famous, the new FC-150 provides the extra traction of 4-wheel drive for off-road travel, shifts into 2-wheel drive for highway travel.



New style!

The new look and feel of tomorrow! The FC-150's Safety-View Cab combines beauty with utility. Its new wrap-around windshield is the largest in the 5,000 GVW class. There's plenty of extra leg and head room. Here is new styling, comfort, convenience and safety all in today's most advanced 4-wheel-drive Truck.



New 'Jeep' *Forward Control*
4-Wheel-Drive **FC-150**

...other members of the famous 'Jeep' family:



Universal 'Jeep'



'Jeep' Truck



'Jeep' Utility Wagon

Willys... world's largest makers of 4-Wheel-Drive vehicles

See 'Jeep' vehicles at your WILLYS dealer



BATTERY OF SWIVEL PILERS THROW SAND 90 FT. TO CREATE NEW BEACH

WHEN R. R. Hensler, Inc., Los Angeles, contracted to create a new beach at Playa del Rey, Calif., they tackled the job with a unique arrangement of four swivel pilers made by Stephens-Adamson Mfg. Co., Los Angeles. The pilers are integral parts of a mobile sand handling machine. Sand is trucked to the machine from another site. The truck dump moves up a ramp on the machine and into a steel frame, where it empties into hoppers. The hoppers supply four inclined boom type belt feeders, which in turn supply the swivel pilers.

The pilers have been set up side by side to form a battery of four stationary mounted units. They are not adjustable for angle or distance of throw. When a move is necessary, the entire assembly is simply pulled by tractor. Approximately three moves per week are necessary and the equipment is moved about fifty yards each time. Equipment has been operated 16 hours per day, averaging 2,000 TPH including down-time and time between truck loads. Each piler will handle a maximum of 750 TPH for a total of 3,000 TPH and will throw 90

ary, and urban highways. The drawings give sufficiently complete information so that they approach contract drawings as nearly as practicable.

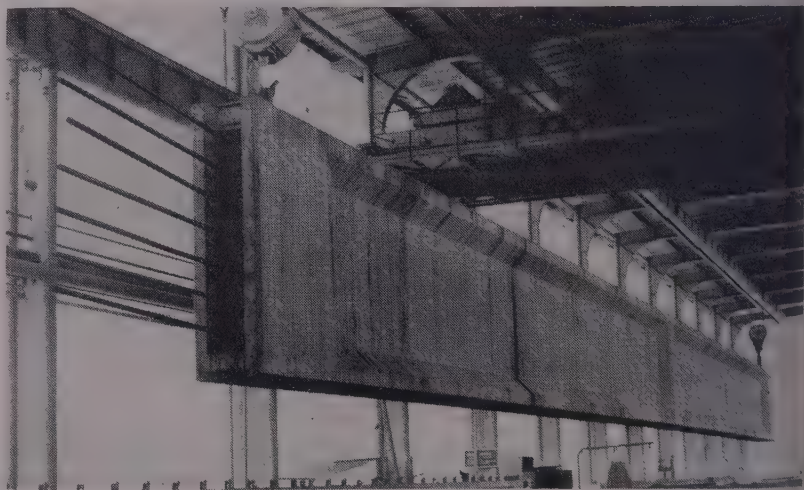
The designs are based on two widths of roadway: 24 ft. with H15-44 live load and 28 ft. with H20-S16-44 live load. The ranges in span lengths, from 11 to 140 ft., are based on the economy and suitability of each particular type of superstructure.

"Standard Plans for Highway Bridge Superstructures" (1956 edition) is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at \$1.75 per copy.

Asphalt in hydraulics

A BOOK now available from the Engineering Experiment Station, University of Utah, Salt Lake City, Utah, brings together for the first time a comprehensive group of articles on the use of asphalt in hydraulic works. The articles contain basic data in design, construction and performance and were presented by the authors at the first Western Conference on Asphalt in Hydraulics. The 248-page book is well illustrated with photographs, diagrams, and tables. There is a total of 19 articles, covering such subjects as a review of asphalt construction in hydraulics in Europe and in the Western United States, laboratory and field studies of various aspects and types of asphaltic canal lining including the relatively new prefabricated lining, asphalt stabilized bases and asphaltic imper-

PRESTRESSED LIGHTWEIGHT GIRDERS FOR SHOPPING CENTER



SIX PRECAST concrete girders, fabricated by Basalt Rock Co., will form the structural backbone for the Bayfair Shopping Center, San Leandro, Calif.

Made of Basalite lightweight expanded shale aggregate concrete, the girders are the largest prestressed lightweight concrete girders of their type ever precast, according to Basalt Engineers, and will be trucked from the Napa plant to the jobsite. Concrete design strength was 5,000 psi.

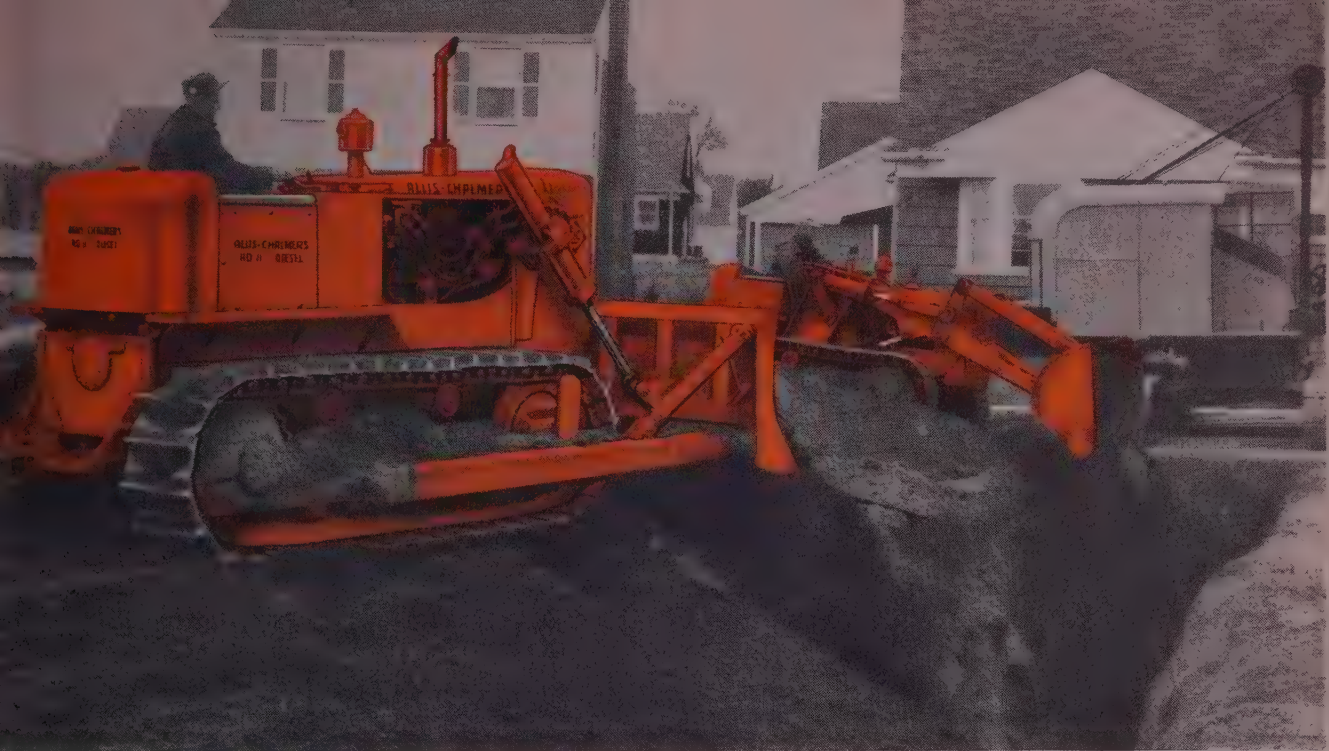
All six girders have an overall length of 76 ft., weigh 16 tons, and are 60 in. high, 16 in. wide, with a 5½-in. web. They will support 30-ft. span Basalt double tee roof slabs, furnishing a reinforced concrete roof assembly of maximum strength and

permanence.

The girders are of two basic types. Three girders, like the ones illustrated, have a span of 75 ft., and are post-tensioned with seven 1½-in. diameter Stressteel rods. Initial prestressing force on these girders was 725,000 lb., with final prestressing force of 551,000 lb., after losses.

The other three girders have a 60-ft. span and a 16-ft. cantilever end, post-tensioned with five 1½-in. Stressteel rods curved to resist both positive and negative bending moments. Final prestressing force, after losses, is 373,000 lb.

Architects for the Bayfair Shopping Center are Victor Gruen and Associates, Beverly Hills. Dinwiddie Construction Company, San Francisco, is the contractor.



ALLIS-CHALMERS ADVANCED DESIGN

turns waste time into work time

You get *extra* money-making *work time* with an Allis-Chalmers crawler tractor on every job—digging, winching, towing, pushing. Built for day's jobs, these crawlers are wheeling out more work in less time than comparable size machines.

Look at the facts

1000-hour lubrication intervals save lube time
Allis-Chalmers tractors start the day with *go*—not greasing. You can operate six months on a 40-hour work basis with just one lubrication of truck wheels, front idlers and support rollers. Designed with Positive Seals and tapered roller bearings, these units are protected from dust, loose sand, soft ground, mud or water. You not only gain *working time*, but save labor and lubricant costs as well. And there's no costly damage from greasing neglect.

Modern shift pattern speeds digging

There's a big timesaver on dozer work. It takes just half the time and effort to change from low forward to

fast reverse with the Allis-Chalmers HD-6, HD-11, or HD-16 transmission. One simple shift of the gear lever does the job. You gain production time—up to 25 percent on actual test—on bulldozing, backfilling and other jobs calling for a short forward-backward cycle.

Unit construction cuts servicing time

No need to remove transmission or engine, radiator, grille, when servicing or removing an Allis-Chalmers master clutch. This unit can be removed without disturbing adjacent parts. This is also true of other main assemblies—final drive gear, transmission, steering clutches, engine and truck frame. You can quickly substitute an assembly and put the tractor to work while servicing the original unit. As a result, hours of *costly service and downtime are saved* because of Allis-Chalmers advanced design.

These are just three examples of Allis-Chalmers timesaving, money-making features. Your Allis-Chalmers dealer can point out many more. See him now for the full story.

See your ALLIS-CHALMERS construction machinery dealer

ARIZONA
B. McGinnis Equipment Company—Phoenix

SOUTHERN CALIFORNIA
Industrial Tractor Sales—Sacramento
Truck & Equipment Sales—Redding
Tractor Co.—Eureka & Willits
Coast Engine & Equipment Company—Berkeley

NORTHERN CALIFORNIA
Joergin Tractor Co.—Bakersfield
Sales & Service Co.—Los Angeles and San Diego

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

MONTANA
Mountain Tractor Company—Missoula and Kalispell
Richland Machinery Company—Sidney
Seltz Machinery Company, Inc.—
Billings and Great Falls

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

OREGON
Haupt Tractor Company—Medford and Klamath Falls
Wood Tractor Company—Portland
Timber Tractor Company—Springfield

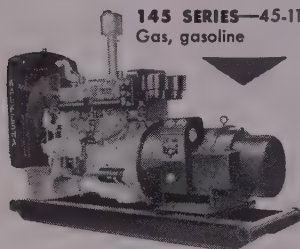
UTAH
Cate Equipment Company, Inc.—Salt Lake City

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

WYOMING
Siuder Tractor & Equipment Company—Casper

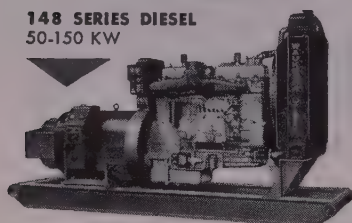
NOW—a complete line of WAUKESHA Industrial ENGINEATORS®

50-700 KW • NATURAL GAS • LPG • GASOLINE • DIESEL

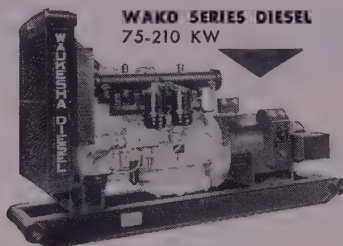


145 SERIES—45-110 KW
Gas, gasoline

A superb line of Enginators—backed by over 50 years' experience in building heavy-duty engines and electrical equipment. For reliable performance on all fuels, these accurately balanced Waukesha engine-generator combination units supply smooth, steady power in continuous, intermittent and standby service.



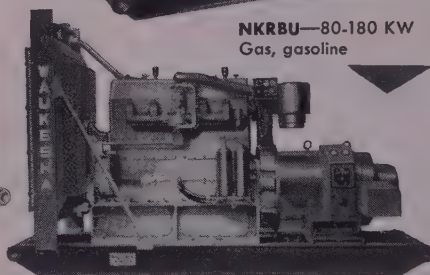
148 SERIES DIESEL
50-150 KW



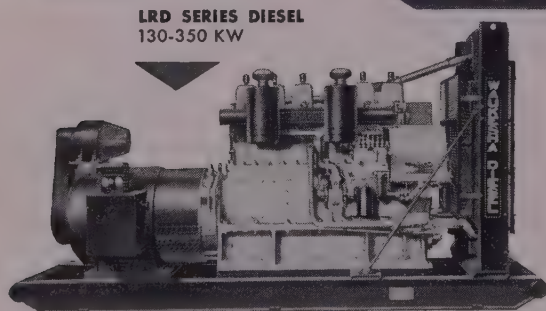
WAKO SERIES DIESEL
75-210 KW



WAK SERIES—75-170 KW
Gas, gasoline

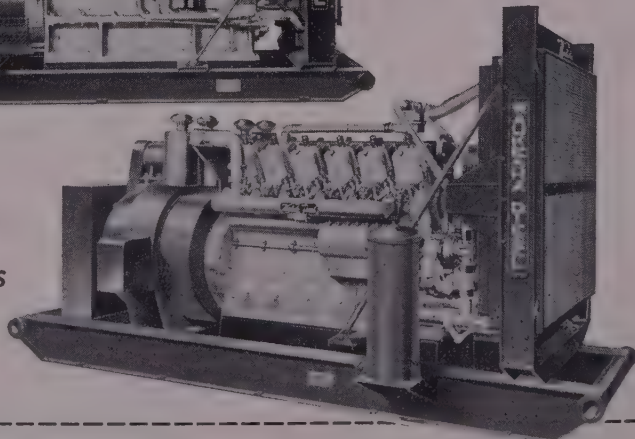


NKRBU—80-180 KW
Gas, gasoline



LRD SERIES DIESEL
130-350 KW

VLR SERIES—250-730 KW
LPG, natural gas, Diesel



WRITE FOR
BULLETINS FOR
THESE AND
OTHER MODELS

333

WAUKESHA MOTOR COMPANY • WAUKESHA, WISCONSIN RAILWAY DIVISION

vious membranes in filtered water reservoirs, the use of asphaltic concrete in washes and channels, and asphalt groins for beach stabilization. The book is priced at \$2.75.

Timber design book

NOW AVAILABLE is a 622-page technical book, "Timber Design and Construction Handbook."

A compilation of technical data on designing and building in timber, the handbook contains all essential basic information needed to develop the best and most economical structure in wood. It is a combination design reference, field manual, and text book, produced for the convenience of architects, engineers, and other designers, and for instructors and students of these professions.

The work was four and a half years in preparation by 26 leading specialists of the lumber, wood products and allied industries. Price: \$12.50.

Complete information on the Timber Handbook and its contents is available from Timber Engineering Company, 1319 18th Street N. W. Washington 6, D. C.

D9 does double duty

THE IDEA of taking the oldest and sickest tractor and retiring it to the fill is beginning to lose its attractiveness. The fill is usually the most congested area on the job, a veritable potpourri of motor graders, engineers, water wagons, pickups, compactors, foremen, inspectors, and on-lookers. The driver of a modern high-speed hauling unit has enough things to dodge without adding an old, slow beat-out tractor.

In order to reduce the number of compacting rigs needed on the fill and to keep them moving fast enough to avoid the fast scrapers, contractor McCammon-Wunderlich has come up with an interesting idea. On a 5,000,000-cu. yd. earthmoving contract adjoining the Carquinez Project in Northern California (Western Construction, Oct. 1956, p. 27-31) they have a Caterpillar D9 pulling Southwest Proctor sheepsfoot and 50-ton pneumatic, in tandem.

The material is a tight, moist, well-mixed clay and sand with excellent compacting qualities (90% compaction is required). The D9 pulls the tandem compactors primarily in 4th gear, in 5th gear on a 3% favorable grade, and in 3rd gear on some sharp uphill turns. The minimum turning radius is about 48 ft., measured outside to outside of compactor marks.

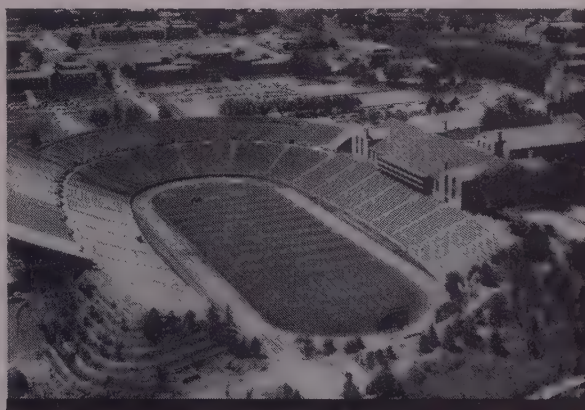
Steel saves time and money at University of Colorado in this unique double-duty football stadium addition



FIVE WEEKS AHEAD OF SCHEDULE! Burkhardt Steel Company, A.I.S.C., erected this addition to Folsom Stadium at the University of Colorado, Boulder, in just 11 weeks using one crane. Seating surfaces (see above) were formed by "Z" bent 3/16 inch USS Steel Sheets fabricated at Burkhardt's Denver plant. Hardwood now covers the seat rows.



THREE ACRES OF CLASSROOMS were built using the stadium seating as a roof! Both the stadium seating addition and the four-floor classroom and shop area (shown above) were constructed for little more than the estimated cost of one of these projects. This economical double-duty structure made wide use of United States Steel Structurals. J. W. Sallada, Denver, was the structural engineer.



THE NEW 15,000-SEAT SECTION to Folsom Stadium raises the total seating capacity to 45,000. Steel seat sections were welded together to provide a water-tight seal to prevent leakage into classrooms below. Architectural Department of the University of Colorado designed the addition with Trautwein and Howard of Philadelphia, consulting architects.

Specify USS—One Source for All Steels

United States Steel Corporation • Columbia-Geneva Steel Division
120 Montgomery Street, San Francisco 6



UNITED STATES STEEL

NEW LITERATURE

For your convenience in obtaining free copies of literature described, the company address is provided with each review

New Hanson truck-mounted units

The new Model 254 truck mounted cranes and excavators are fully illustrated in a new brochure published by **The Hanson Clutch & Machinery Co.**, Tiffin, Ohio. Illustrations show the truck-mounted units in their various forms for such applications as crane, clam-shell, trench-hoe, shovel, pile-driver and magnet uses. Details of boom construction, upper machinery deck, patented hoist and crowd assemblies are pictured. The brochure also contains pictures of in-process units being finished in the Hanson plant, illustrating the modern electronic equipment and the detail of workmanship used in the construction of the cranes and excavators. A copy of the brochure may be obtained by writing to the manufacturer on a company letterhead.

Armco sewer structures

Armco Drainage & Metal Products, Inc., has issued a revised edition of its comprehensive 48-page manual on sewer structures. The book covers such subjects as structural durability, material durability, selection of structures, factors influencing capacity, joints and fittings, and linings for failing sewers. Installation design and reference data are included, as well as seven pages of graphs showing discharge of pipe based on Manning's formulas. Copies are available from the company's Product Information Service, Middletown, Ohio. Write on your official letterhead and ask for Manual CMS-7456.

Brunner & Lay catalog

Brunner & Lay products are featured in a new 20-page catalog, No. 756, which includes carbide rock-bits, drill steels and pneumatic tool accessories such as moil points, sabur points, clay spades, asphalt cutters, etc. Pictures and complete specifications are given for each product, along with suggestions for obtaining best drilling results with Brunner & Lay carbide rock-bits. **Brunner & Lay, Inc.**, 9300 King St., Franklin Park, Ill.

Parsons Trenchliner catalog

Parsons Co. has announced publication of a new 16-page catalog describing the improved Model 155 Trenchliner, featuring a 25% increase

in digging capacity. Photographs and drawings illustrate principal construction and application features of the 155 Trenchliner in general utility work, emphasizing its compact design and versatility. A two-page spread is devoted to a comprehensive breakdown of the unit and its component parts. Copies of the bulletin are available upon request to the **Parsons Co.**, Newton, Iowa, or from any Parsons distributor.

Electric heating for asphalt plants

An informative bulletin on electric heating for free flow of bituminous materials and fuel oil in stationary and portable asphalt plants has been made available by **Hynes Electric Heating Division of Turbine Equipment Co.**, Mountainside, N. J. Catalog A-131 compares asphalt plant heating by electricity, steam and other methods, and concisely explains the advantages of Hynes units. A double-page illustration of a typical asphalt plant, supplemented by a plant flow diagram, clearly shows the application of Hynes Heaters to storage tanks, piping, metering devices, weigh bucket, pug mill and fuel oil system; and the bulletin also includes illustrations of Hynes Heaters for these purposes.

Data on prestressed concrete

Prestressed concrete structural members, manufactured by **Ben C. Gerwick, Inc.**, for piling, buildings, bridges and marine projects are described and illustrated in a series of brochures now available from the manufacturer, 417 Market St., San Francisco. A detailed text concerning the use, advantages and capacities of the members is supplemented by diagrams and specification tables. One of the bulletins illustrates new developments in marine construction with numerous on-the-job photographs.

New scaffolding catalog

Scaffolds and ladders for construction, concrete shoring, plant maintenance and building repairs are explained and illustrated in a new 32-page general catalog published by **The Patent Scaffolding Co., Inc.**, 6931 Stanford Ave., Los Angeles 1, Calif. Erection procedure, technical data, uses and typical installations are given for each of the many types of built-up, suspended and swinging scaffolds. Wood, aluminum and magnesium ladders, as well as aluminum scaffolds are included.

Cat spark ignition engines

How to obtain power economy through the use of spark ignition engines is the topic of "Lower Power Costs," an eight-page booklet published by **Caterpillar Tractor Co.**, Peoria, Ill. Contained in the brochure is a step-by-step explanation of how engine users can determine if spark ignition engines will be more economical in their territory and on their application. One portion of the booklet deals with the design features of the Caterpillar D397 and D375 spark ignition engines. Another section is devoted to the complete line of optional equipment available on Cat spark ignition engines. Write for Form No. D643.

Yale & Towne hoists

The Yale & Towne Manufacturing Co. has announced the publication of a new catalog covering the key features and specifications of its lines of hand hoists, Pul-Lifts and plain and geared hand hoist trolleys. This 44-page booklet contains in addition an article entitled "How to Select the Proper Type of Hoisting Equipment." The book describes in detail Yale's line of lightweight Load King Hand Hoists, Yale spurgear hoists in their many varieties, the Pul-Lift ratchet hoist and trolleys in capacities from ½ ton to 40 tons. For a copy of the bulletin, write to **Yale & Towne Manufacturing Co.**, 11000 Roosevelt Blvd., Waukegan 15, Wis.

Schild Bantam folder

A new four-page illustrated bulletin, describing the crawler-mounted Model C-35 Bantam, has been announced by the **Shield Bantam Co.**, Waverly, Iowa. The new bulletin No. C-101, contains detailed information concerning the latest specifications, features, capacities and application data for the company's crawler-mounted ¾-cu. yd. five-ton crane excavator model. Complete machine specifications are listed, and operating ranges and capacity rating are shown in conjunction with large, easy-to-read charts covering the crane, shovel and back hoe attachments.

Information on diamond blades

Prospective users of Masonry and Concrete Cutting Diamond Blade

ards extra—every trip

**—that's why Maloney Concrete
of Washington, D.C.,
brought their GMC purchases
to 225 with these tandems**

IT'S the same thing the country over. Top contractors and builders are putting more and more Blue Chip GMC's to work—for one simple reason: *These trucks do bigger jobs—do them better—and do them faster—yet cut costs to amazing new lows.*

ENGINEERED FOR RUGGED SERVICE

Every GMC construction hauler is designed and built for the toughest operations: Frames are far stronger than need be. Axles are oversize. There's a choice of extra-husky transmissions. And with that extra "muscle," repair needs are far fewer—repair costs far lower.

EXTRA-POWERED, TOO

GMC power is another cost-shrinker—whether you choose a new short-stroke V8—a high-torque Six—or 2-cycle Diesel. Users report exceptional fuel economy—even when you use the new front PTO* to turn the mixer, too. And—according to these owners—everywhere—you can go as much as *double* the usual mileage between overhauls.

EVERY JOB GOES FASTER

With less shop time, GMC's give you more worktime. Their huge power reserve zooms you up out of the pit faster—shortens trips over the roads. And Safety Power Steering* saves both time and effort—especially in off-the-highway jockeying.

ONE FOR EVERY HAULING JOB

There's a complete range of GMC's in new Blue Chip Money-Maker line. They're the trucks that let contractors shade bids closer—land more business—and *earn bigger profits*—in every kind of construction work. Check *your* particular needs *now*—with your GMC dealer!

**Optional at extra cost*

GMC TRUCK & COACH — A General Motors Division

are offered a pamphlet recently published by the **Clipper Manufacturing Co.**, which explains the terms and names used in the manufacture of Diamod Blades. "Black diamonds" and "secondary abrasives" are fully explained, as are the terms "metal bonds," "grit sizes," "steel centers" and "diamond concentration." Write for pamphlet 1013, to the Clipper Manufacturing Co., Suite 696, 2800 Warwick, Kansas City 8, Mo.

Dust control systems for rock crushing, cement plants

Specially engineered systems of controlling dust in rock crushing and cement plants are described in two new brochures issued by **The Johnson-March Corp.**, 1724 Chestnut St., Philadelphia 3, Pa. Illustrated are important points where the systems, known as Chem-Jet, can be applied. These include the truck dump, primary and secondary crushers, screens, bucket elevators, conveyor transfer points, and storage pile. The folder describes the advantages of the system and how they suppress dust at its source. Details are given about the essential equipment and compound M-R surface active agent used with the system.

Aircair issues folder

A new two-color, four-page folder describing the Aircair process and the use of the Aircair Torch for the cutting, gouging, beveling or grooving of all metals has just been published by **Aircair Co.**, 419 S. Mt. Pleasant St., Lancaster, Ohio. This folder features numerous new applications for the Aircair Torch, and also includes data on Aircair electrodes.

Heavy equipment lubricants

A new bulletin entitled "Keystone Specialized Lubricants For Contractor Equipment" is available from **Keystone Lubricating Co.**, 3100 North 21st St., Philadelphia 30, Pa. Bulletin BU-58 deals with special lubricants for contractor equipment used in earth moving, road building, excavating, dredging, erecting and allied fields. The six-page bulletin describes and illustrates the application of Keystone grease and oil to 24 different types of heavy equipment. Two specification charts are presented giving complete data on "semi-solid" lubricants and on "liquid lubricants."

New spec sheet from Chain Belt

Construction Machinery Division of **Chain Belt Co.** announces the availability of a specification sheet on the new 5½-yd. Adjusta-Wate Moto-Mixer. Better reference, readability and product identification have been achieved through the use of a new format designed with sharp product illustrations and a colorful border

trim. Uniformity in the company's spec sheets has been achieved by presenting each product line in the same format but with a different color in the border trim. For a copy of the new spec sheet, write **Chain Belt Co.**, Advertising Dept., Milwaukee 1, Wis.

Prestressed roof and floor slabs explained in new Leap bulletin

The advantages of prestressed concrete structural products and the methods of making and installing them are subjects of an eight-page brochure recently published by **Leap Concrete, Inc.** Detailed diagrams and loading tables of Leap Double Tee Roof and Floor Slabs are included as well as specifications data. For a copy of this bulletin, AIA file No. 4-E-12, write to Leap Concrete, Inc., P. O. Box 1953, Dept. 2, Lakeland, Fla.

Drott Four-in-One Skid Shovel

Now available is a comprehensive, 16-page brochure describing the Drott Four-in-One Skid Shovels for International crawler tractors. Heavily illustrated with photographs and diagrams, the bulletin gives full information on the design features and applications of the shovels. Detail and cutaway pictures illustrate standard features of the shovel and several action photos show the unit on the job. Special attachments for the Four-in-One Skid Shovels are also shown. For your copy, write to **Drott Manufacturing Co.**, 3126 South 27th St., Milwaukee 15, Wis.

Ranite hardsurfacing rod chart

Publication of a comprehensive comparison chart for selection of hardsurfacing welding materials has been announced by **Rankin Manufacturing Co.**, maker of Ranite. The chart makes it easy for hardsurfacing material users to select the appropriate Ranite rod for their specific application in comparison with other rods available. Listed across the top of the chart are hardsurfacing applications such as build-up, abrasion and medium impact, etc. The first column lists various manufacturers with their products appearing across the chart under specific applications where they are used. Detailed information on the Ranite rod is printed on the reverse side of the chart. The comparison chart, Rankin Form C-3 is available through welding supply distributors or by writing the factory, Dept. R-3, 616 Marengo Ave., Alhambra, Calif.

Spec sheet now available on Worthington air compressors

Specification sheets on four models of Hermetic compressors have re-

cently been issued by **Worthington Corp.**, Harrison, N. J. Covering compressor models 2JF2-2 hp., 2JF2-3 hp., 2JF3-5 hp. and 2JF5-7½ hp., the literature lists specifications, features and illustrates dimensions and performance. For copies, write Advertising & Sales Promotion Dept., Worthington Corp., Harrison, N. J., specifying bulletins Nos. C-1100-S117; C-1100-S118; C-1100-S119 and C-1100-S120 respectively.

Ryerson steel data book

Now available is a revised edition of the 256-page Ryerson steel data book which gives helpful information on machining and fabricating, specifications and tolerances, weights and dimensions, elements and safe loads. Tables, definitions, and general data are also included. A companion book to the Ryerson Steel Stock List, it is of practical value to purchasing agents, engineers and shop men alike. A free copy of the current issue may be secured from **Joseph T. Ryerson & Son, Inc.**, at Box 188, Emeryville Calif.

Phillips engine preheaters

A set of illustrated catalog sheets is now available on the complete line of **Phillips Manufacturing Co.** automotive, truck, and heavy equipment engine preheaters. Included among the heaters illustrated is the new Zero-Start external tank-type engine heater which features universal application to all-liquid cooled engines. Others shown are the standard head-bolt and oil immersion type heaters. Complete specifications are listed and installation instructions are included. For copies write Dept. KP, Phillips Manufacturing Co., Inc., 2816 Aldrich Ave. S., Minneapolis 8, Minn.

Galion telescopic hoists

Publication of a new four-page catalog, describing the complete Galion Allsteel line of telescopic hoists, is announced by **Galion Allsteel Body Co.**, Galion, Ohio. The catalog describes and illustrates various Uni-scope single front mounted and Duo-scope twin front mounted telescopic hoists. Descriptions and specifications cover nine hoist models, with payload capacities from 9 to 34 tons. Profusely illustrated with action, detail and cutaway photos, the catalog also includes matching bodies and payload-adding accessories. Ask for catalog LL-4094.

Monarch hydraulic controls

New literature from **Monarch Road Machinery Co.** includes several bulletins on Monarch's Dyna-Migh Electric Power Hydraulic Controls the Monarch Electric Hydraulic Dyna-Chute for ready-mix trucks and Hy-Lo-Jack and Hy-Lo-Jee Fan Belt Driven Power Hydraulic Controls for snow plow operation. The folders contain general specifications and performance data and

for tough earth-moving jobs . . .



CUTTING EDGES

When you've got an earth-moving job that's mighty tough... when you *have* to have cutting edges that can take rough going—that's the time CF&I Cutting Edges really pay off!

For every CF&I Cutting Edge—whether it's for a scraper, grader, dozer or allied equipment—is carefully made from special analysis steel that's selected for its resistance to abrasion and fatigue, then scientifically hot rolled, punched and inspected to make sure it's perfect.

Next time you need cutting edges, make sure you investigate CF&I Cutting Edges. You'll find that they are available in a wide variety of lengths, widths, thicknesses and hole spacings; flat or curved, with beveled or square ends, and in different finishes. All are the products of CF&I's quality control that's complete from ore through finished product.



CUTTING EDGES

THE COLORADO FUEL AND IRON CORPORATION

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver
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4397



are illustrated with photographs and diagrams. For copies, write to Monarch Road Machinery Co., 1331 Michigan St., N.E., Grand Rapids 3, Mich.

Roebbling Wire Rope Slip catalog

A handsome 54-page illustrated catalog of Roebbling Wire Rope Slings and Assemblies has been published by **John A. Roebbling's Sons Corp.**, Trenton 2, N. J. This book contains information on All-Purpose Slings with tapered sleeve attachments, Roegal cable-laid Slings, Flat-weave Slings, Railroad Slings and Special Assemblies, and Fittings. Complete data are given on dimensions, capacities and instructions on how to order these items. Catalogs are available on request to John A. Roebbling's Sons Corp., 640 South Broad St., Trenton 2, N. J.

Test report on new waterstop

Electrovert Inc., manufacturers of "Durajoint" and "Duraseal" PVC Waterstops, announces the availability of a new Technical Report No. 1 that summarizes the tests made to determine how the design of the cross-section of a waterstop affects the bonding of the waterstop to concrete. This report contains the complete text of the test report submitted by an independent testing laboratory, plus photographs of the test procedures and results. For your copy request "Technical Report No. 1" from Tecon Products Inc., 304 Alaskan Way, Seattle, Wash., Electrovert's representatives in the eleven Western states.

White Metal catalog sheet

A one-piece self sealed Reglet for use in tilt-up and poured concrete construction is described and illustrated in a catalog sheet distributed by **White Metal Products, Inc.**, 5401 Josephine St., Lynwood, Calif. Advan-

tages in installation and service are explained and illustrated by diagrams.

Standard atomizing burners

A new bulletin describing the Standard Model S-H low pressure atomizing burner is now available from **Standard Steel Corp.**, 5001 South Boyle Ave., Los Angeles 58, Calif. Designed for operation with the carefully balanced exhaust system on Standard's asphalt plant dryers, the new burners are said to produce a penetrating and equalization of heat in the dryers heretofore not possible in a low pressure burner.

Field lubricators described

A new catalog illustrating and describing complete, portable field lubricating equipment built for use by contractors has been announced by **Gray Co., Inc.**, 1082 Sibley St. N. E. Minneapolis 13, Minn. This No. 701 Catalog describes in detail Graco Convoy Luber equipment available as complete ready-to-operate units, or as "Job-Planned" field lubricators that the contractor can assemble to fit his particular requirements. Also shown, is a complete selection of lubrication accessory equipment. Detailed, typical "Job-Planned" Convoy Luber diagrams, with complete bill of materials, are illustrated to aid the user in step-by-step planning of his field lubricator.

Hanson issues brochure on crawler mounted units

A new illustrated brochure of its crawler mounted Model 254 cranes and excavators has been published by **The Hanson Clutch and Machinery Co.**, Tiffin, Ohio. Engineering details and features of the model such as the Hanson crowd and hoist clutches and the swing clutch shaft assembly are illustrated and ex-

plained. The brochure shows an exploded view of the friction control mechanism of the independently powered boom hoist. Crawler mechanism, lower bed assembly and the upper turret bed are shown in stripped away pictures so that engineering design is visible. The brochure may be obtained by writing or your company letterhead to the manufacturer.

Detroit Diesel data

Detroit Diesel industrial power units and fan-to-flywheel engines for use in hundreds of standard and special applications are fully described and illustrated in a new brochure just released. Covered are horsepower ratings, dimensions and accessory information on single and multiple-engine models ranging from 56 to 761 rated brake horsepower. Copies may be obtained from Detroit Diesel distributors and dealers or by writing **Detroit Diesel Engine Division**, General Motors Corp., Detroit 28, Mich.

Aluminum designation chart

A chart for converting old aluminum type designations to the new designations now in use has just been published by **All-State Welding Alloys Co., Inc.**, 249-55 Ferris Ave. White Plains, N. Y. The conversion chart is on a single punched sheet 8½x11 in. which includes, as well, six other charts concerning aluminum. These are: Functions of alloying elements in aluminum; Melt and flow temperatures and plastic ranges. Composition of aluminum alloys. Government specifications and aluminum types that meet them; Where and how to use the different aluminum types; Solders for aluminum to aluminum and aluminum to dissimilar metals; melt and flow temperatures, plastic range, strength, avail-

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TANDEM SPREADING of the Asphaltic Concrete speeded the resurfacing work as . . .

Bitumuls and Asphalt Put New Life in Famous Ridge Route on U. S. Highway 99

IN JUNE OF 1956, a contract for one of the largest resurfacing jobs to date was let by the State of California Division of Highways. This contract called for more than half a million dollars of resurfacing on a 41 mile stretch of the Ridge Route (U. S. Highway 99) between Los Angeles and the Kern County Line.

Because various types of existing pavements were involved in this project, the requirements for asphalts and Bitumuls to be used in the resurfacing operations were quite complex. For instance, the job called for 21 miles of multi-lane Asphaltic Concrete resurfacing; 13 miles of sub-sealing, crack-sealing, and priming of old rigid-type pavements ahead of resurfacing; 8 miles of sealing and priming of existing bituminous 4-lane roadway; and extensive shoulder work.

To meet these requirements, the quantities of asphalt and Bitumuls required are impressive; for sub-sealing, 1,700 tons of Grade 10-25 Air Refined Asphalt; for resurfacing, 3,500 tons of 200-300 Penetration Paving Asphalt; for seal and prime work, 140,000 gallons of Bitumuls.

Timing and coordination vital

Successful bidder on the job was Schroeder & Co., Sun Valley, California. Completion of the work was scheduled for January 1957, so speed was essential. Also, close coordination was required between the Engineers on the job and the Field Representatives of American Bitumuls & Asphalt Co. (supplier of all bituminous materials) to assure accurate timing and delivery of specific types and quantities of these materials.

On the old rigid-type pavements,

slabs were drilled and sub-sealed with Air Refined Asphalt. Cracks and joints were filled and sealed.

Asphaltic Concrete (Paving Asphalt mixed with 1/2 inch to 3/4 inch maximum-size aggregate) was plant mixed and trucked onto the job where it was spread in two lifts, to provide a uniform 3 inch thickness. Using two spreaders equipped with special shoulder extensions, this mix was placed to a full width of 37 feet in a single pass.

The existing bituminous pavement required only a 1 inch overlay of Asphaltic Concrete, as opposed to 3 inches specified over the rigid-type section. Ahead of the placement of this 1 inch thickness, Bitumuls Slurry Seal was used to seal and prime the old surface.

All asphalts from a single source

This job, because of its unusual size and many complexities, provides an excellent example of the ability of American Bitumuls & Asphalt Co. to deliver a full line of asphaltic products to meet every need; and to furnish the on-job field-service that can often mean the difference between profit and loss. Whether your next project is a resurfacing operation or new construction, check with our office nearest you for all your asphalt requirements.



BITUMULS SLURRY SEALING ahead of resurfacing on the existing bituminous roadway.



American Bitumuls & Asphalt Company
200 Bush Street
San Francisco 20, Calif.

UNIT MODEL 510

THE NEW UNIT *Challenger* ... as a DRAGLINE



NOTHING BUT THE BEST! There's no substitute in the $\frac{3}{8}$ -yard excavator field for EXPERIENCE. UNIT has it! UNIT knows what you need in a $\frac{3}{8}$ -yard machine . . . knows how to engineer the power, over-all performance-superiority and economy of operation for the jobs you want to do profitably with a $\frac{3}{8}$ -yard dragline, clamshell, crane or trencher. The New UNIT CHALLENGER proves this with such features as: Self-aligning Hook Shoes... Force Feed Lubrication... Full Floating Trunnion-Mounted Tapered Drums . . . Torque Converter, etc.

See the many other new features illustrated and described in UNIT CHALLENGER Bulletin C-800. Write for your copy of this bulletin.



UNIT CRANE & SHOVEL CORP.
6421 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

Geared to boost your earnings!



able forms and applicability to various production processes. Requests may be addressed to the company or to any All-State distributor.

Model 40 engine generator sets explained in new bulletin

Bulletin 1083 describing the improved Model 40, stationary, portable and trailer mounted engine-generator sets, designed to meet all NEMA and AIEE specifications, is now available from the White Diesel Engine Division of the **White Motor Co.**, 1401 Sheridan Ave., Springfield, Ohio. Dimension drawings, photographs and charts explain the various generating sets. Other features of the bulletin include Control Equipment, Automatic Starting and Custom-Made Sets. Pertinent information pertaining to the Model 40 Superior Diesel Engine is also included.

Dalzell Rigging Co. issues new brochure

An informative 20-page brochure, full of illustrations and interesting case histories, describes the services and facilities of **Dalzell Rigging Co.** Typical jobs undertaken by the 33-year-old firm are cited along with the general approach and policies of the company. For a copy of the brochure, write on your company letterhead to Dalzell Rigging Co., 1505 62nd St., Emeryville, Calif.

Technical bridging report

Of interest to designers is a technical bulletin, published by the **Steel Joist Institute**, which reports on the effect of various types of bridging on the behavior of open web steel joists, short-span series. The 15-page illustrated bulletin describes in detail results of an extensive test program which indicates that in open web steel joist construction continuous horizontal bridging is the most satisfactory single type, holding the compression chords in line and adding stability to the entire system while adequately transferring loads. A copy of this technical bulletin, No. 1BR, may be obtained from the Steel Joist Institute, Du Pont Circle Bldg., 1346 Connecticut Ave. N. W., Washington 6, D. C.

Orton products described

A new six-page brochure describing the Orton Diesel Wrecker and the Combination Wrecker, Pile Driver and Bridge Derrick, has been released by the **Orton Crane & Shovel Co.**, 608 South Dearborn St., Chicago 5, Ill. The bulletin describes the advantages of the application of modern handling and control devices to heavy cranes of 75-ton to 250-ton capacities. Also described is the multi-purpose crane, a combination machine which can be used for wrecker purposes and as a bridge derrick.

JOHN DEERE *Mobile Work Units*

**DO SO MANY JOBS
SO WELL**



John Deere 4-roller crawler tractor (30 engine horsepower) leveling around new housing development. Owner: F. D. Sperry Co., Burlingame, California.

Excavating . . . building . . . landscaping . . . whatever the job, you can depend on John Deere power to get it done when it should be done, and at rock-bottom costs.

With a modern, work-eating John Deere Tractor (crawler or wheel-type) you have a highly mobile unit that will do a man's work at boy's wages. For nearly 40 years John Deere-built tractors have earned a world-wide reputation for this big daily work capacity at low costs for fuel, oil, and maintenance.

Job-matching equipment makes short work of excavating, backfilling, clean-up and landscaping, solves materials-handling problems, digs footings, sewer, gas, and power trenches, and septic tanks. Compact design of tractor and equipment enables you to get into those tight places which are inaccessible to larger units.

Consult with your John Deere dealer . . . his name is in the classified directory . . . to see how John Deere Tractors and equipment can cut time and labor costs on your building jobs.

Crawler-Loader—the little giant that's heavy on work output, light on your pocketbook.



No. 47 Mower on "420" Utility



Hydraulic Fork Lift on "420" Utility



No. 61 Dozer and Scarifier-Scraper



"420" Crawler with Dozer on Trailer



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Please send me your latest literature on the John Deere Crawler and Utility Tractors.

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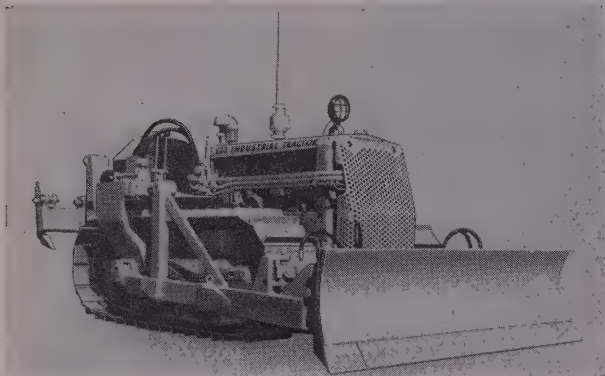
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NEW EQUIPMENT

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

Shepherd makes industrial version of Cat D2 for small earthmoving jobs

A new, small, heavy-duty earthmoving crawler, the 233 Industrial Tractor, recently was made available by **Shepherd Machinery Co.** of Los Angeles. The Caterpillar dealer is the developer of this new machine. The 233 Tractor is the 933 powered industrial version of the



Caterpillar D2. Basic features incorporated in the 233 Industrial Tractor are a 50-hp. Caterpillar Diesel Engine, an angling dozer blade which operates hydraulically 25 deg. each way, a hydraulic three shank Ateco Ripper, in-the-seat dozer and ripper controls, 24-volt direct electric starting, heavy closed-type drive sprockets, a 933 transmission featuring low dozing speeds and five roller track frames 10½ in. longer than standard. For further information, write Shepherd Machinery Co., 3400 So. San Gabriel River Parkway, East Los Angeles 22, Calif.

Teale announces hydraulic truck-mounted crane

A new Truck-mounted Crane which mounts on any truck from 1½ tons up has been announced by **Teale & Co.**, 1417 North 52nd St., Omaha, Neb. Requiring only a truck operator for loading and unloading, the Versa-



Lift Model 400 Crane lifts from 3,500 lb. (with standard 16-ft. boom) to 7,000 lb. (with 8-ft. boom) and swings in full 360-deg. circle. Completely hydraulic, the unit is powered by direct PTO driven hydraulic pump. An easy-to-use operator's panel with "valve" and engine controls

provides complete range of lift and movement speeds for all types of loads. A "cushion-valve" protects boom and cable if load is dropped and caught, and the hydraulic "limits" system is designed to guard against overload.

Small concrete mixer for IH 300 tractor

This Fast-Hitch Universal Transmix, mounted on an International 300 Utility tractor is a profitable time and labor saver on concrete jobs. Tractor maneuverability and floatation of large rubber tires permits ready operation over ungraded construction sites to the point that



handling of concrete in wheelbarrows can be largely eliminated. The mixer operates from the tractor's complete independent power take-off which operates whenever the engine is running. By mixing and agitating while the outfit is being moved about the job area, time is saved in the placing of concrete for foundations, sidewalks, and building repairs. The drum is driven by friction from an extension shaft that attaches to the independent PTO shaft of the 300 Utility. The barrel is dumped by the tractor's Hydra-Touch system. **International Harvester Co.**, 180 North Michigan Ave., Chicago, Ill.

Heavy-duty Wagner tractor has dual controls

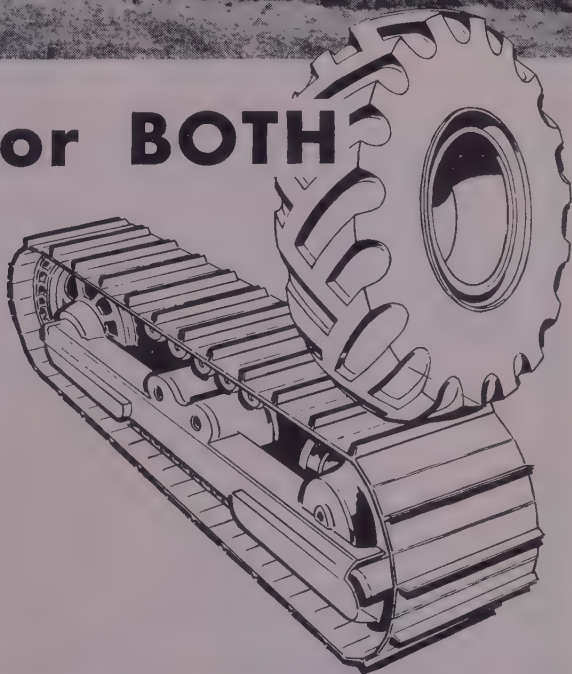
A new 40,000-lb. Wagner tractor featuring dual controls with a reversible driver's seat is under production by **Wagner Tractor, Inc.**, 8027 N.E. Killingsworth, Portland 10, Ore. In order to change direction, the operator





There's a place for BOTH

Work problems today demand modern equipment that can do specific jobs faster and at lower cost. Tournatractor is a modern tractor designed to take advantage of... *power, traction, speed and mobility*. It does not offer as much drawbar horsepower at speeds below 2 miles per hour as do track-type tractors of equal engine horsepower. But, if your job conditions are such that you can capitalize on *speed and mobility* — with a machine that delivers comparable traction at present day speeds, we suggest you consider the *new* LeTourneau-Westinghouse Tournatractor. The cost is 10% below that of track-type tractors with torque converters and comparable engine horsepower.



Before you buy — EVALUATE

- 1 — Your demands for power
- 2 — Requirements for traction
- 3 — Advantages of speed
- 4 — Need for mobility

After giving careful consideration to all of these factors when selecting a tractor, questions in regard to your specific application may still be in your mind. The best way to dispel all doubt about the qualifications of any tractor is to see it perform on your job.

We will be happy to arrange the demonstration of a Tournatractor on your job, to prove that this rubber-tired tractor has the *speed and mobility* that can pay off for you. Call or write today. No obligation!



Tournatractor—Trademark Reg. U.S. Pat. Off. CT-1145-G-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
 A Subsidiary of Westinghouse Air Brake Company
 WHERE QUALITY IS A HABIT



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(YOUTZ-SLICK METHOD)

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- Comply with all leading specifications
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TO BE SURE . . .



USE THE FINEST!

TECHKOTE COMPANY

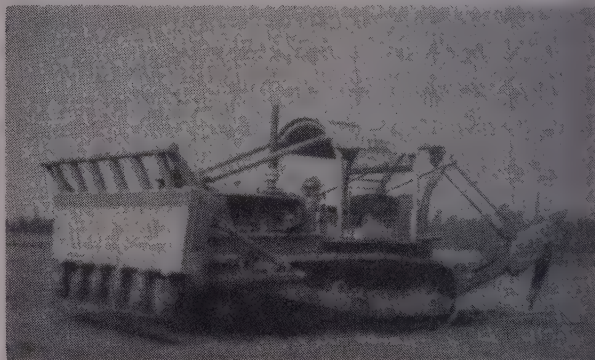
INCORPORATED

600 Lairport Street, El Segundo, California

simply turns the seat around. The fact that he does not have to back up is an added safety factor. Four large rubber-tired wheels are flexed so that they may operate on different levels while maintaining an even weight on each under four-wheel drive. It is more than a single purpose machine, the company points out, since it may carry a dozer blade, a scraper, compaction rollers or wagons. It can self-load scrapers without the aid of a second machine as a pusher. When compaction wheels replace rubber wheels the needlessness of turning becomes an even more important factor.

Fleco announces new land clearing equipment

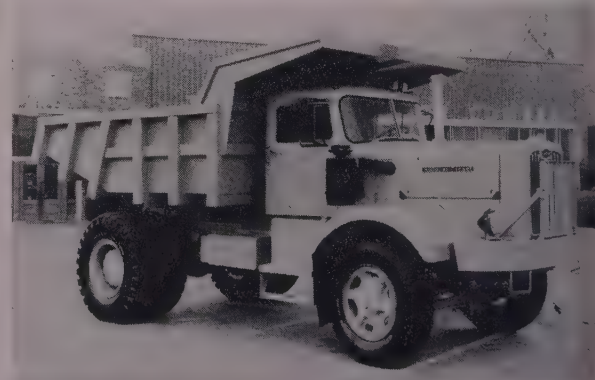
Among the new products announced by Fleco Corporation is the Fleco D9 Rake built to match the power and strength of the Cat D9 tractor. This rake stands 6 ft. 4 in. high and 14 ft. 6½ in. wide, and is designed



to push out trees, brush, stumps and rake material into dirt-free piles. Another recent Fleco development is a Fleco rake for Caterpillar No. 977 Traxcavators which fits on the lift arms of the Traxcavator, taking the place of the bucket. Shown here is a Cat D7 tractor equipped with a Fleco Treecutter, heavy-duty Fleco Cab Guard and Fleco Pull Stumper. The Fleco Treecutter slices off trees up to 14 ft. at ground level. Mounted at the rear of the D7, the Fleco Pull Stumper is operated independently of front mounted equipment on tractors equipped with double drum cable control units. Fleco Corporation, Jacksonville, Fla.

New Autocar planetary rear dump truck

Now in production at the Autocar Division of The White Motor Co. is a new off-highway rear dumper, the Autocar Model AP-15, equipped with a planetary gear



drive rear axle and a 10-speed transmission. The AP-15 rear axle is equipped with planetary reductions in each outer rear wheel hub to reduce torque loads on the differential and axle shafts. The AP-15 Cummins NHE diesel, rated at 200 bhp., is designed to haul rated payloads of 15 tons at speeds up to 39 mph. at its governed engine speed of 2,100 rpm. An NT Turbo-diesel, rated at 250-hp., is optional. The unit comes equipped with a

HEAVIEST-DUTY, LARGEST GPM HYDRAULIC SYSTEMS AVAILABLE
EASILY OPERATED...FAST CYCLING...

HOPTO[®]

DIGGER • SHOVEL • CRANE



Gives you MORE
WITH BACKHOE
OR SHOVEL BUCKET

Put a man on a HOPTO and he's *twice* the money-maker! HOPTO's effortless 20-second cycles... HOPTO's *new*, more powerful triple tandem pump and split hydraulic system... and HOPTO's fast switch from backhoe to shovel give you *more* for your money... *more* for your time! Get the facts on HOPTO—new and better than ever!



30 SECOND SET-UP!
Independently controlled hydraulic outriggers level and stabilize unit... from operator's seat... in thirty seconds!



HOPTO 360-57-90 takes a half-yard bite, is the only unit with a 360° continuous swing, and cycles fast with backhoe or shovel bucket. Mounts on truck or carrier.



HOPTO 185 SPR gives you an integral built digger-shovel-crane on rubber. Handles up to 30" bucket. Rolls to job-site at highway speeds.



HOPTO 190 SPC, the complete unit model that packs real work-capacity on tracks in a mobile, compact unit that gets in anywhere... even on marshy soils.

HOPTO 200 DTM-57-72 mounts on any 2-ton or larger truck, handles up to 30" backhoe or shovel.

HOPTO 80 CTM mounts on a crawler tractor, handles up to 30" bucket, cuts costs by using power you now have.

*SPECIFICATIONS					
MODEL	SWING	REACH	DIG- GING DEPTH	LOADING CLEARANCE BACK-SHOVEL HOE BUCKET	
360-57-90	360°	30'	20'-0"	15'-6"	16'-10"
200 DTM-57-72	200°	19'	13'-6"	11'-6"	9'-3"
190 SPC	190°	17'-2"	11'-3"	9'-3"	9'-7"
185 SPR	185°	17'-2"	11'-3"	9'-3"	9'-7"
80 CTM	180°	14'-6"	10'-0"	7'-1"	7'-5"

*180° BUCKET TILT ON ALL MODELS



One of the twelve HOPTO models is tailor-made for you. Write stating your needs and complete information on the unit to fit your requirements will be promptly forwarded.

BADGER MACHINE COMPANY
WINONA, MINNESOTA DEPT. T

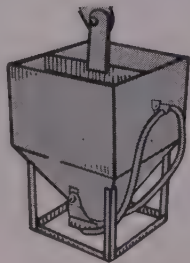
NEW SIMPLE CONTROLS

An hour's practice and a handyman can safely handle a HOPTO! Four handy levers control boom and bucket; two separate levers give individual control of each outrigger for fast leveling and stabilizing from operator's seat... in half a minute!





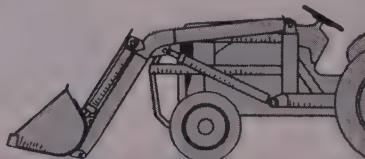
Henry's new Strato-Boom with material fork lifts 170 bricks, 32 blocks, or a fully loaded wheelbarrow up to any point as high as 20 feet. Saves time and labor on any masonry job. A Salina, Kansas, contractor reports that by using this machine one tractor operator kept 20 masons supplied with bricks. Fully automatic—works from tractor shovel controls—attaches easily to most Henry Tractor Shovels.



Concrete-Mortar Hopper

Attaches quickly to Henry STRATO-BOOM . . . takes mortar, wet concrete right up to job. One-third cubic yard capacity.

Write today for free photo-literature



See your nearest Henry dealer.



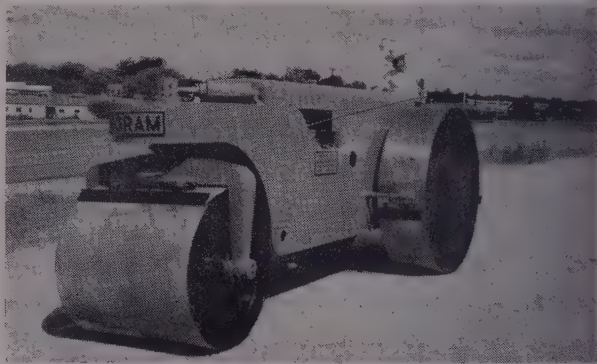
"You can do it BETTER with a HENRY!"

SALES AND SERVICE FROM COAST TO COAST

10-cu. yd. scoop-end rock body, with a double-acting hydraulic hoist providing a 70-deg. dumping angle. The AP-15 is the first and smallest member of a projected planetary series of off-highway rear dumpers. Full information available from the Autocar Division, The White Motor Co., Exton, Pa.

Simplified controls on new Ingram roller

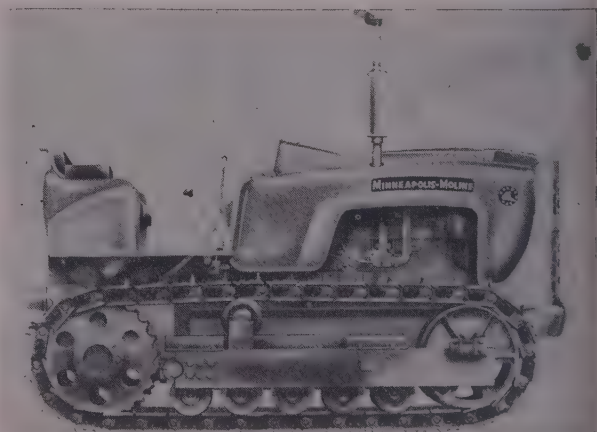
Acme Iron Works announces production of a new 12-ton Ingram roller equipped with "Reverse-O-Matic" drive. This drive permits no-stop power-shifted reversing with just one lever controlling both the speed and



the direction of the roller. With "Reverse-O-Matic," the roller can be shifted into reverse while moving forward, with no delay for stopping, clutching, or shifting gears. It is a completely sealed-in oil unit which requires no maintenance and no adjustments, and there are no clutches to replace. It is said to furnish smooth, shockless power which reduces engine wear and prolongs the life of the other power transferring mechanisms. For full information, contact Acme Iron Works, San Antonio, Tex.

Minneapolis-Moline announces "Golden Kat" line

Just announced is the first of a completely new line of crawler tractors to be designed and built by Minneapolis-Moline in its own plants. Tentative name for the new crawler tractors is the "Golden Kat" line. Now available is the new "Golden Kat" in the 57-engine bhp. class with either diesel or gasoline engine. Major engineering ad-



vancements include a five-speed sliding gear transmission, and a torque converter working in conjunction with a reverse shuttle gear. The new MM crawler will be powered by MM's recently announced 206-cu. in., high turbulence, valve-in-head engine. Tracks for the



Lima Type 604 lowering pile into position on the Manahawken Bay Bridge, Ocean County, N. J.



Lima Type 604 dredging sand from single-cell cofferdam prior to driving piling.

LIMAS proved to be everything Brann & Stuart wanted in heavy-duty precision-type cranes

Says *Amos Rogers, Jr.*, president of Brann and Stuart, Philadelphia, Pa., "We purchased our first Lima machines in 1950, and they proved to be everything we were looking for in heavy-duty precision-type cranes. In 1952 we purchased two additional Lima rigs, and, right now, we have a fleet of eight Limas, made up of 2 Lima 34's, 2 Lima 34-T's, 3 Lima 604's and 1 Lima 703-SC.

"Our operating people like the Lima ease of operation, and they have proved very economical to run. Our distributor has given us excellent service on these machines whenever we have needed it."

Brann and Stuart's contract calls for construction of 16 piers and 2 abutments for the Manahawken Bay Bridge job, Ocean County, N. J. The work involves building large cofferdams for founding these elements. It is here that the Limas, with their high maneuverability, come into use, dredging the sea bottom to the necessary depth. Read what Mr. Rogers has to say about how they are performing: "It is on this type



Lima Type 34-T (left) and two Type 604's, part of the Brann and Stuart Company's team of eight Limas.

of work that our Lima machines really excel for us. You may be sure we have been very well pleased."

This contractor's experience is typical of many others—get to know Lima quality, and you'll want more of them working for you. It will pay you to get complete details on the Limas with capacities best suited to your job requirements. Call your nearby Lima distributor today, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Distributors

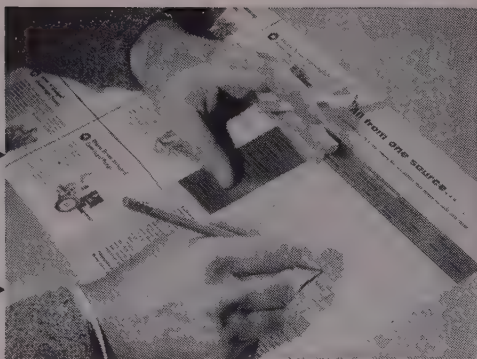
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Feenaghty Machinery Co.	112 S. E. Belmont Street, Portland 14, Oregon
Feenaghty Machinery Co.	600 Front Street, Boise, Idaho
Smith Booth Usher Company	2001 Santa Fe Avenue, Los Angeles 54, California
Modern Machinery Co.	4412 Trent Avenue, Spokane 10, Washington
Acme Iron Works	540 Culebra Avenue, San Antonio, Texas
Cascade Industrial Supply	4560 Highway 99 South, Redding, California
Shriver Machinery Company	1756 Grand Avenue, Phoenix, Arizona
N. C. Ribble Co.	1304 North Fourth Street, Albuquerque, New Mexico
Bay Cities Equipment, Inc.	2792 Cypress Street, Oakland 7, California
Bay Cities Equipment, Inc.	1178 West San Carlos Street, San Jose, California
Farris-Moritz Equipment Company	1095 South Jason Street, Denver, Colorado
McGaraghan Supply Company	529 Broadway, Eureka, California
Evans Engine & Equipment Company	4300 11th Avenue, Northwest Seattle 7, Washington
Heiner Equipment & Supply Co.	501 West 7th, South, Salt Lake City, Utah
Hall-Perry Machinery Company	902 Central Avenue, Billings, Montana
Hall-Perry Machinery Company	812 East Iron Street, Butte, Montana
Hall-Perry Machinery Company	1116 15th Street North, Great Falls, Montana
Hall-Perry Machinery Company	127 East Main Street, Missoula, Montana
Reno Equipment Sales Company	1700 West Street, Reno, Nevada



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Contractors Get This!

New idea in "job-applied" pump selection shows ways to speed construction projects—keep "on schedule"—by moving more water more efficiently, *job after job!*

Handy chart inside lists operations you perform regularly—matches them up with pumps that do those jobs better, faster, at lower cost. Get a Barnes Construction Pump Selector from these distributors:



5701

Central Equipment Co., Berkeley, Calif.

The C. H. Jones Equipment Co., Salt Lake City, Utah

Larson Equipment Co., Los Angeles, Calif.

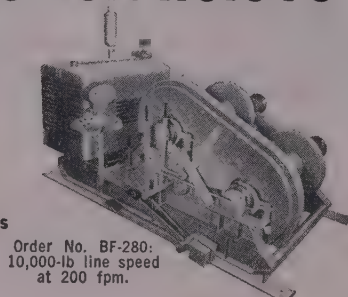
Lowry Equipment Co., Redding, Calif.

The Rix Co., Inc., San Francisco, Calif.

Write Department L-37 for details

Electric, Gas or Steam Drive BAND FRICTION HOISTS

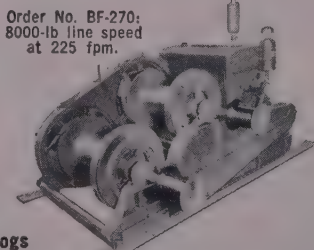
- Reversible for wear
- Non-burn lining
- "Face forward" friction and break levers
- Anti-friction bearings



Order No. BF-280:
10,000-lb line speed
at 200 fpm.

LIGHT... COMPACT... RUGGED!

Meet your hoisting needs *precisely* at lowest possible cost. Take advantage of our long experience in modifying and re-combining standard parts to meet individual hoisting requirements.



Order No. BF-270:
8000-lb line speed
at 225 fpm.

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SUPERIOR-LIDGERWOOD-MUNDY CORPORATION

Main Office and Works—SUPERIOR, WISCONSIN
New York Office—7 Dey St., New York 7, N. Y.

new crawler are available in 10-, 12-, and 14-in. widths, and with 42- or 52-in. treads. A new and simplified steering system consists of a combination clutch and brake unit mounted on the high-speed differential shaft and operated by the same lever. Minneapolis-Moline is also developing a line of crawler tractor equipment, including front end loaders, scrapers, rippers and scarifiers, and dozers of both straight and angle styles. Distribution will be handled through a nationally established industrial dealer organization. **Minneapolis-Moline Co.**, Box 1050, Minneapolis 1, Minn.

Stow "Twin-Beam" Screed for precast slabs

Just introduced by **Stow Manufacturing Co.** is a revolutionary Twin-Beam vibrating screed for the precast field and especially suited for sidewalk work. The only screed that has two beams, it has the effect of making two passes at once. The vibrating head trans-



mits vibration evenly to the two beams so that as the screed is pushed along, the first beam strikes off the concrete and the second beam gives it a final finish. The Stow Twin-Beam is available with either one-hp. electric motor or a 2½-hp. gasoline engine which drives a 2½-in. vibrator head at about 5,000 vibrations per minute. The motor or engine is isolated from the screed's vibration by rubber mounts. Handles on either end are isolated also from the screed's vibration by rubber mounts. The steel shod beams are available in lengths up to 6 ft. **Stow Manufacturing Co.**, 56 Shear St., Binghamton, N. Y.

Truck engine drive offered on Transcrete Mixers

As an addition to their regular line of Transcrete Truck Mixers, **Construction Machinery Co.** has just introduced a new series of TED (Truck Engine Drive)



Transcrete Truck Mixers. Features of the new units include Floating Drive which protects drum drive from damaging loads inherent in truck mixer operation, and automatically compensates for the reaction of the loaded drum and flexing movement of the truck frame. A power-

800

more tons per day
of incineration for
BALTIMORE, MD.



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stoking floor

PITTSBURGH • DES MOINES *Incineration Plants*

Matching Baltimore's civic growth, this great new 800-ton Pittsburgh-Des Moines Incineration Plant is the city's second large PDM unit. Employing mechanical stoking for its four furnaces, the new plant has operated steadily beyond rated capacity from the first day in service. *Send for our latest Modern Refuse Incineration Brochure.*



PITTSBURGH • DES MOINES STEEL CO.
Plants at PITTSBURGH, DES MOINES, SANTA CLARA, FRESNO, and CADIZ, SPAIN

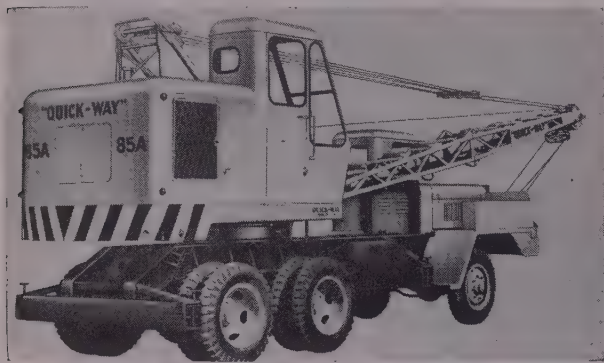
Sales Offices at:

PITTSBURGH (25).....3420 Neville Island	DES MOINES (8)....921 Tuttle Street
NEWARK (2)....219 Industrial Office Bldg.	DALLAS (1)....1225 Praetorian Building
CHICAGO (3) 1224 First National Bank Bldg.	SEATTLE.....528 Lane Street
EL MONTE, CAL.....P. O. Box 2068	SANTA CLARA, CAL. 627 Alviso Road
MADRID, SPAIN.....	Diego DeLeon, 60

connector using multiple V-sheaves with five long-life, steel core V-belts is provided. Large diameter drive shaft tubing contained in flexing mounted center bearing eliminates shaft vibration. Standard off-the-shelf automotive parts are used in the shaft assembly to insure reliability and low maintenance costs in the TED Mixer. The new TED Transcetes are available in 5 to 7-cu. yd. capacities. For further information, write Construction Machinery Co., Waterloo, Iowa.

"Quick-Way" reveals new crane shovels

Three new power crane-shovel models have been announced by the Quick-Way Truck Shovel Co. One, the "Quick-Way" model 85A, is a truck-mounted 4/10-cu.



yd., 8½-ton convertible crane shovel. "Quick-Way" model 105AC is a crawler mounted version of the 5/10-cu. yd. model 105A. The Company will also offer the "Quick-Way" 85AC, a 4/10-cu. yd. crawler mounted shovel. Features of the new 85A shown here include an oversize powertrain, oversize clutches; one piece floor frame, heavy duty swing table gear and hook rollers.

The main hoist and haul back drums are mounted on a single, accessible shaft with sealed anti-friction bearings. Complete information on all three models is contained in catalogs available from the company, Dept. 187, 2401 East 40th Ave., Denver 5, Colo.

Design changes on Badger ¼-yd. Hopto unit

The addition of another truck-mounted Hopto Digger to its line of hydraulic backhoes and shovels is announced by Badger Machine Co. of Winona, Minn. The



new machine is the Model 200 DTM57-72. It can be mounted on any two-ton truck or larger and is completely hydraulic in operation. The Model 200 DTM57-72 features a split hydraulic system powered by a Continental F-226 Engine. A triple tandem pump delivers 72 gal. of oil per min. to a split valve bank. This is designed to give a more efficient, faster and cooler operating hydraulic system. A redesigned dipper stick has increased the digging depth to 13½ ft., a ground reach of 19 ft., and a backhoe height of 11½ ft.

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● The McCarthy Vertical Auger Drill cuts drilling time in earth, clay, compacted sand and gravel, hard pan, shale, sandstone and rock as much as 40%. Rugged construction permits you to drive 2 to 24-inch augers to depths of as much as 125' faster than any other drill. Get the facts on the powerful McCarthy today. See how you can complete shot hole, exploration drilling, foundation holes, dewatering operations, well drilling, highway construction and heavy contract work faster than ever before. The versatile, vertical McCarthy gives you more than any other drill. Write for Bulletin M-100 now. Let us show you how you can turn new profits on your drilling job.



McCarthy Vertical Auger Drill Model 106-24



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Seattle 4, Washington

OREGON

Clyde Equipment Company.....1631 N.W. Thurman St.,
Portland 9, Ore.

MONTANA

Montana Powder & Equipment Co...123 E. Lawrence St.,
Helena, Montana
Hall-Perry Machinery Co.....802-812 East Iron St.,
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Contracting Equipment & Supply Co...Broadway, N. E.
(707), Albuquerque, N. M.

ARIZONA

Western Machinery Co...820 N. 17th Ave., Phoenix, Ariz

UTAH

Western Machinery Co.....2300 S. Main St.,
Salt Lake City 15, Utah

NEVADA

Sierra Machinery Co. Inc...307 Morrill Ave., Reno, Nev

ALASKA

The Carrington Co...91 Columbus St., Seattle 4, Wash



Normal work-range of 1.4 to 6.5 mph speeds grading, as Adams 550 handles 70% of grader work on 60-day, 255,000-yd. cut-and-fill road project.

You don't have to baby it", SAYS GLENN F. OLSON

That was what the President of A. Olson Construction Co. said as he discussed the reasons why his Marshall, Minn., Company depends on an Adams 550 to handle their tougher grading assignments.

Adams is a good machine . . . a rugged machine", said President Olson, "you don't have to baby it! 550 has the weight and power to handle heavy work fast."

8 1/2 miles of cut-and-fill

Olson Construction Co. was awarded the contract to rebuild and regrade 8 1/2 miles of Minnesota State Highway 67, east of Clarkfield, Minn. To improve sight-distance and widen traffic lanes, the contractor cut, filled, and graded road's profile, widened roadway and shoulders, and finish-graded for 1 1/2" of lacktop surfacing.

In this 255,000-yard project, Mr. Olson estimates his company's Adams 550 handled 70% of all grader work — another grader only 10%. Besides the graders, Olson's dirtmoving spread included 4 scrapers, 2 pushers, compaction rollers, and auxiliary equipment.

Weather challenges grader

The Adams grader leveled and maintained fills receiving up to 800 yds. of scraper-dirt per hour. Dirtmoving proceeded during rainy weather that made the fill hard to

work — tough to drive through. Working closely behind unloading scrapers, the Adams spread dirt for compaction by rollers. On fills kept smooth by the Adams, scrapers were able to spread on-the-run . . . cut cycle-time, hauled extra pay-yards.

In addition to blading the fill, the Adams grader maintained haul roads up to 3000' long. Roads continually rutted and chewed-up by heavy-equipment traffic were graded and kept smooth for high-speed dirtmovers. After cut-and-fill work was done, "550" graded the road-surface, graded and sloped shoulders, cut drainage ditches, also bladed slopes of side-borrows in preparation for replanting.

Works fast, maneuvers fast

Grader operator Emil Gilbertson likes to operate the "550". He gets a lot of satisfaction working at "just right" power and fastest practical speeds. Adams constant-mesh transmission gives him a range of 8 full-power forward speeds (2.2 to

25.2 mph), and 4 reverse (1.8 to 13.2 mph). With Adams broad range of power and speed, Gilbertson blades rapidly, maneuvers and backs-up fast, "highballs" between jobs . . . finds it easy to produce a big volume of precision work.

Operating ease

Emil enjoys a lot of features on his Adams not found on other graders. For instance, with 6'4" cab ceiling-height, he can stand and work machine comfortably. Rubber engine mounts isolate engine vibration . . . save wear-and-tear on Emil and his machine. Clutches, linkage, and controls operate smoothly and positively on roller, or ball bearings. A foot accelerator, and service brakes on both transmission and wheels, make handling easier, surer, safer.

If you want maximum output from your dirtmoving "team", you'll find it pays to add an Adams grader to your fleet! Phone or write for a demonstration on your job.

Select best size Adams for your work:

POWER-Flow 660 — 190 hp diesel* with torque converter	30,200 lbs.
Model 660 — 150 hp diesel*	30,050 lbs.
Model 550 — 123 hp diesel*	26,370 lbs.
Model 440 — 104 hp diesel*	24,080 lbs.
Model 330 — 80 hp diesel*	23,020 lbs.
Model 220 — 60 hp diesel	15,500 lbs.

Traveloader — High-speed, heavy-duty, self-propelled, belt-type loader. Loads trucks from windrows or stockpiles. Rear or side delivery (with optional cross-conveyor). 55 hp gasoline or 60 hp diesel, 16,800 lbs.

*Choice of Cummins or GM engines. Note: Weights shown are usual working weights.

Adams, POWER-Flow — Trademark AG-32-H-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

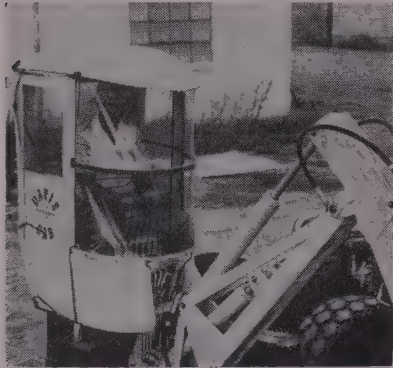
WHERE QUALITY IS A HABIT

Towmotor fork lift trucks

Four new models with lifting capacities ranging from 6,000 to 11,000 lb. make up Towmotor Corp.'s new Pace-Maker line of fork lift trucks. The new models are available in gasoline, diesel and L-P gas powered units, and feature precision power steering and fast automatic transmission. Other new features include advanced styling, functional body design providing greater driving comfort and easier accessibility to engine and parts, adjustable off-center seating to assure maximum visibility and new engines of increased power. **Towmotor Corp.**, 1246 E. 152nd St., Cleveland 10, Ohio.

Cab protection on Davis backhoe

Cab protection for the operator of the Davis Model 185 backhoe is now available at Davis Products dealers. The lighthouse-type window, made of non-breakable and shatter-proof clear plastic, gives the operator full vision at all angles of operation. Side



curtains and doors are easily removed for warm weather use. The Davis cab fits on the seat and footrest assembly so that it revolves with the boom. The cab is formed of flat steel for maximum strength, and is covered with heavy, durable duck canvas. **Mid-Western Industries, Inc.**, 1009 South West St., Wichita, Kan.

New Symons ties cut costs in low wall forming

Introduction of the two new base ties that eliminate the need for nails and save on labor in low wall grade beam forming has been announced by **Symons Clamp & Manufacturing Co.**, 4249 Diversey Ave., Chicago 39, Ill. One tie is designed for use with its wood forms and the other for its magnesium and steel frame forms. Ties plus wedges are all that is required to secure forms at the top and bottom. The top ties can be reused indefinitely and the bottom ties are below grade and not exposed. Ties are available in multiples of a half inch from four through 30 in. The recommended work load for the magnesium and steel-ply tie is 1,500 lb. and for the wood-ply tie, 2,000 lb.

Cook Bros. announces frameless semi trailer

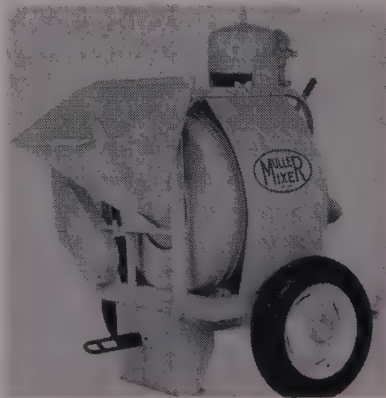
A new frameless, front mount hoist, semi-dump trailer has been introduced by **Cook Bros. Equipment Co.**, 3334 San Fernando Rd., Los Angeles 65, Calif. Called Stabilift, the trailer hauls a legal payload



of 20 tons in most states. To increase the payload, the Stabilift eliminates the trailer frame, uses lightweight rugged steel and a new lightweight hydraulic system. Maximum stability is obtained with "tricycle" suspension and by the immobilization of the trailer springs during the final critical period of the dumping cycle. High maneuverability is achieved by using the power of hydraulic hoist with the power of the tractor for traction. The dump body of the trailer is braced by a welded steel channel placed midway up the body side. Damage to the upper roll of the dump body by clam or shovel loading does not affect the efficiency of the Stabilift dump body.

Non-tilting concrete mixer by Muller

Muller Machinery Co., Inc., Metuchen, N. J., announce the addition of a new non-tilting concrete mixer to their line. The drum is 36 in. diameter by 27 in. wide, with a capacity of $3\frac{1}{2}$ cu. ft. of mixed concrete, plus 10% overload. The roller track is of the channel type. Drum rollers and countershaft bearings are "Sealmas-



ter." The charging hopper is equipped with a sliding gate with a large opening permitting fast charging. The discharge opening is 14 in.

and the one-piece discharge chute is 25 in. high to facilitate loading into wheelbarrows. The mixer has a Briggs & Stratton engine, rated at 4.5 hp. at 2,700 rpm. Bulletin A-32 is available from the manufacturer, containing full details.

Minneapolis-Moline introduces new industrial tractor series

A completely new series of industrial tractors for highway and general construction has been announced by **Minneapolis-Moline Co.**, Box 1050, Minneapolis 1, Minn. First of the new series now available is the



new Model 445 Industrial Wheeler, powered by a 57 brake-horsepower engine. Features of the model include integral power steering, transmission with 10 speeds forward and two reverse, extra heavy industrial axles, large selection of hydraulic pumps, over-all heavy-duty construction, transmission and engine, 12-volt electrical system, and three-point hitch for tools. For full control of any combination of industrial and construction equipment, MM provides on the MM 445 Industrial Wheeler a large selection of rear-mounted constant running hydraulic pumps which are driven directly from the engine fly wheel and are completely enclosed. Attaching equipment including loaders, backhoes, dozers, scrapers, mowers and compressors.

90-ton capacity trailer

Of interest to movers of heavy equipment and machinery is the announcement of Talbert Trailer's new 90-ton capacity Model TDW-90-R low-bed trailer which provides over-the-front-end or over-the-rear-end loading by means of Talbert's patented removable gooseneck and removable rear axle assembly. Construction of the rear axle assembly features full width solid bar axles as Hendrickson T-900 tandem unit (90,000 lb. rated capacity). Standard specifications call for a deck length of 24 ft. but additional deck length is available on special order. Overall length is 45 ft. 9 in. and overall width is 10 ft. 3 in. Tire size is 14.00x24-ply. For further information, write **Talbert Trailers, Inc.**, 7950 West 47 St., Lyons, Ill.

and now...



THE NEW JOY RP-125 **AIRVANE** COMPRESSOR

THE *Smoothest* 125 CFM ROTARY PORTABLE YET

CONTRACTORS: Want a small portable that starts easy, runs smooth, and keeps on running? Here it is—the Joy 125. And here's why:

THERMAL BY-PASS OIL CIRCULATING SYSTEM—provides immediate lubrication and temperature control under *all* weather conditions.

SPLINE COUPLING—a direct drive system that does away with clutches for most efficient power transmission.

COMPACT BODY AND FRAME—easy to move from job to job—tows easily at highway speeds . . . low center of gravity keeps the 125 stable over rough job locations—and, although it's compact, there's plenty of room inside for easy maintenance.

Find out more about the smoothest 125 rotary on the market . . . see your Joy Distributor or write to **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: **Joy Manufacturing Company (Canada) Limited, Galt, Ontario.**

WSW C 6479-157

JOY

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Write for free bulletin 157-25



PORTABLE AND SEMI-PORTABLE AIR COMPRESSORS • ROCK DRILLS • WAGON DRILLS • DRILL BITS • BACKFILL TAMPERS • SPADERS
DIVING BREAKERS • SHEETING DRIVERS • DRIFTERS • PORTABLE HOISTS • FANS AND BLOWERS • PORTABLE SAFETY LIGHTING

Improving wire rope service with

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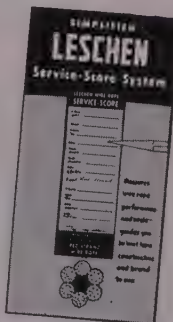


How to prove wire rope performance for yourself

There is a difference in wire rope—in types, in constructions, in brands. And using the right rope every time can easily reduce rope costs by 10% to 20% or more.

How do you know which rope is right? First, get good advice. Leschen field men, distributors and Leschen's engineering department can help you make the best choice. Second, prove it out with easy-to-use Leschen Service-Score stickers. They tell you right on the job how you're doing—help you make accurate comparisons.

Keep the score—see the results—and you'll use more Red-Strand Wire Rope. See your Leschen man or write Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis 12, Missouri.



Leschen engineering advice and Service-Score Stickers are yours for the asking. Write for fact-folder.

HKP

**LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.**

Wain-Roy introduces backhoe for Payloader tractor shovels

A new back hoe designed for use with the new Models HH and HU, four-wheel drive Payloader tractor-shovels is being manufactured by the Wain-Roy Corp., Hubbardston, Mass. The 1/4-yd. capacity back hoe is a completely independent unit and replaces the Payloader bucket quickly and easily by attaching it to the boom arm by only two pins and



the hydraulic hose connections. The unit digs and dumps at a radius of 190 deg., enabling it to work in congested areas. With a digging depth of 12 ft. 4 in., it will reach to a depth of over 13 ft. and load to a height of over 9 ft. Powerful down pressure and breakout force are provided by twin boom cylinders. High speeds on retraction of the dipper stick complete its faster operating cycle. The bucket comes in standard widths of 14-, 18- and 24-in. and Bellhole widths in 14-, 18-, 24-, 30-, and 36-in.

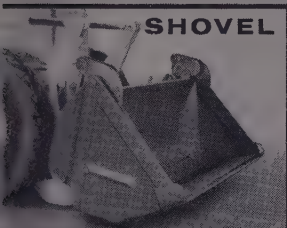
Low cost portable field lubricator

A new, low cost, portable field lubricator designed to be carried in pick-up trucks or trailers has been announced by Gray Co., Inc. The Graco unit is ready to operate, complete with two dispensing hose reels, high pressure and low pressure Fire-Ball pumps, 7.5-cfm. air compressor and tool box. The complete unit is mounted on a steel frame with hardwood skids for easy and fast loading on truck. For further information, write Graco Co., Inc., 1082A Sibley St. N.E., Minneapolis 13, Minn.

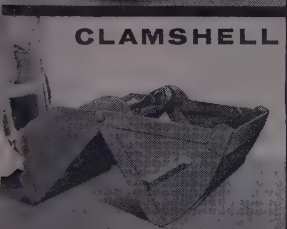
Remote control for Jetcrete

A new remote control hook-up is now available for the "Jetcrete" machine used for pneumatically applied concrete, air placement of refractory materials, and lining of cupolas. First, the hopper of the "Jetcrete" is filled with the necessary materials. Then, the remote control unit is set within easy reach of the nozzle man who operates the controls for stopping and starting the gun. This remote control unit eliminates the need of a gun tender and considerably reduces cost of operation. It is designed to be used with the electric mott

Exclusive with **PAYLOADER®**



SHOVEL



CLAMSHELL



SCRAPER



BULLDOZER

DROTT 4-in-1 Bucket helps you do more jobs

The Frank G. Hough Co. is pleased to announce that another valuable attachment has been added to those available exclusively for "PAYLOADER" tractor-shovels. This is the Drott 4-in-1 bucket which, coupled with the power and mobility of the current line of 4-wheel-drive "PAYLOADER" tractor-shovels, gives them greater performance on many jobs, and the ability to handle many operations that usually require special machines.

More than ever before, you get more tractor-shovel when you buy a "PAY-LOADER", because you get more tractor-shovel performance and more versatility. They have power-transfer differentials—an exclusive "PAY-LOADER" feature that maintains effective traction on mud, gravel, ice and snow. They have no-stop power-

shift transmissions and torque converters . . . planetary final drives . . . power steering and 4-wheel power brakes. They have the exclusive bucket motion with 40° tip-back and powerful pry-out action that enables them to dig more, carry more and deliver more . . . to outperform any comparable tractor-shovels.

Your "PAYLOADER" Distributor is anxious to demonstrate what these "PAYLOADER" tractor-shovels and Drott 4-in-1 buckets can do for you.

THE FRANK G. HOUGH CO.

707 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAY-LOADER" models with Drott 4-in-1 Bucket as checked:

☐ model HO 2¼ yd. ☐ model HH 1½ yd.
☐ model HU 1 yd.

Name _____

Title _____

Company _____

Street _____

City _____

State _____

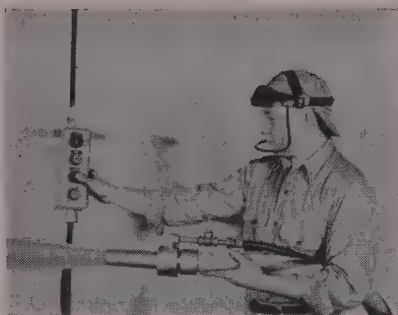
44



PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY





One-man vibrator by Viber Co.

A new UniViber, plug-in electric vibrator for vibration of concrete is announced by the **Viber Co.**, 726 S. Flower St., Burbank, Calif. Basic design of this one-man vibrator includes motor housed in the head, flexible casing used as handle and switch located in the casing in easy reach of



the operator. In addition, UniViber's compact design makes it easy to transport in the trunk of a car and particularly handy for small pours. UniViber head is available in two models—Model IM3R with Viber-patented replaceable rubber lip and Model IM3, housing with steel nose. A universal type motor, produced by Viber, may be plugged into any standard 115 volt AC or DC source. No special frequency is needed. Motor is cooled by concrete.

powered "Jetereter" models; 240 with 5 cu. yd. per hour capacity and the 240 modified with 6.5 cu. yd. per hour capacity. Control unit operates on 110 volts. Made by **Engineered Equipment, Inc.**, 1001 Linden Ave., Waterloo, Iowa.

Wax coating speeds snow removal

A hard, slick wax which permits snow to slide off plowing equipment easily has been developed by **Pennsylvania Refining Co.**, 2660 Lisbon Rd., Cleveland 4, Ohio. Penn Drake Snow Plow Wax is brushed or sprayed on the moldboards and wings. It is recommended for such other snow removal equipment as snow loaders, rotary plows, dump boxes and the like. Other advantages of using the wax are said to be that it prevents piling and overloading. One gallon of the special compound is said to be enough to cover 300 sq. ft. and one application will last through a day's operations.



Eimco Corp. introduces 105 front end loader

Eimco Corp. announces production of its 105 front end loader, which is designed as a companion piece to the Eimco 105 Tractor-Excavator. Both are attachments to the Eimco tractor. The front end loader will operate in 9 ft. 6 in. head room. It has a high pivot point on the bucket, in full extended position, so that although the dumping height is 11 ft. 6 in., it can reach over a 14-ft. bin, hopper or railroad car to discharge

its load. Features of the new unit include built-in shock valves for both directions of operation of lift and dump cylinders in the hydraulic system, hardened pins and bushings at all joints, and torque-converter and Uni-drive transmission. Maximum load and lift at ground level is 25,000 lb. and maximum lifted load to full height is 15,000 lb. For full information, write **The Eimco Corp.**, 634-666 South Fourth St., Salt Lake City 10.

Vulcan Differential-Acting hammer

The Vulcan Iron Works Inc. has announced production of a versatile and mobile Portland Differential-Acting pile hammer designated the



DGH-100. The hammer is fully automatic in operation, small enough to carry in a jeep and operates with compressed air or steam. Just over 4 ft. long, it delivers a rated striking energy of 386 psi. Total weight with impact plate is 786 lb. Further information available from **Vulcan Iron Works, Inc.**, 327 N. Bell Ave., Chicago, Ill.

International approves Shawnee backhoe-loader combination

The Shawnee Manufacturing Co. has announced that its Shawnee Loadmaster loader model LM-90 and its model D-90 "Chief" backhoe have been approved for mounting on the IH W-400 industrial tractor. The Loadmaster lifts 3,500 lb. to 9-ft. dumping height and has double-acting hydraulic cylinders and chrome plated rods. The "Chief" backhoe digs to 14 ft. deep with actual reach below surface of 15 ft. It reaches horizontally 20 ft. and has exclusive "push-pull" design. **Shawnee Manufacturing Co., Inc.**, 1947 Topeka Ave., Topeka, Kan.

Rockland lightweight rake

Rockland Allied Equipment Co. announces production of the Rockland BRR brush and root rake designed for clearing and piling brush, roots and small trees. The





HYSTER ANNOUNCES

the all-new

D4 HYDRAULIC BACKHOE

Designed and engineered to outproduce all other tractor-mounted hoes

COMPARE THESE PERFORMANCE BENEFITS

then see a working demonstration

Designed specifically for Caterpillar-built D4 Tractors.

Develops approximately 4 tons digging force at the teeth and *balanced* by tractor weight to use it all.

Simultaneous swing and hoist at full hydraulic pressures from separate pumps.

Large hydraulic capacity for continuous, all-day operation without overheating.

Track-type tractor mobility retained by exclusive patented equalizer arrangement.

Hyster's hoe, mounted on a Caterpillar D4 Tractor, will go anywhere to get at the tough jobs. It gives you all the advantages of a combination excavator-bulldozer with full track-type tractor mobility. Handles all kinds of utility trenching and digging jobs at low cost. Everything about this rugged machine is engineered for performance far beyond the capacity of other hydraulic backhoes.

Call your Caterpillar-Hyster® Dealer for demonstration.

HYSTER COMPANY

**D4 BACKHOE MAKES MORE
JOBS "ONE MACHINE" JOBS**

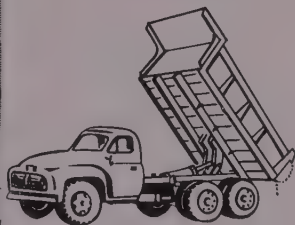


Caterpillar is a registered
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"Job Insurance" FOR HEAVY-DUTY HAULING



Marion builds a complete line of underbody hoists (top illustration) and telescopic hoists (bottom illustration); standard, medium and heavy duty dump bodies. The photo shows an MFR 80, 8 cubic yard body with horizontal and vertical side bracing; an HD-10S double arm underbody hoist is used for dumping.

MARION HEAVY-DUTY BODIES & HOISTS

Marion heavy duty bodies and hoists are designed for performance, dependability and long life to give you the most in results for your money.

First quality materials and workmanship . . . simple design . . . heavy duty construction mean increased payloads with minimum down time. It will pay you to compare! You'll then know why profit-conscious owners all over the world insist on Marions for all types of hauling and dumping operations.

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MARION, OHIO, U.S.A.

SEE YOUR MARION DISTRIBUTOR AND SAVE!

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Truck Body Company
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Los Angeles 23, California

Ruckstell California Sales Co.
2985 Ford Street
Oakland 1, California

Ruckstell California Sales Co.
452 West Yolo
Fresno, California

Woeber Auto Body & Mfg. Co.
4950 Jackson St.
Denver 16, Colorado

Pacific Body Builders, Inc.
1812 N. E. Grand
Portland 12, Oregon

Alley Manufacturing
Route No. 4 (West on U. S. 10)
Spokane, Washington

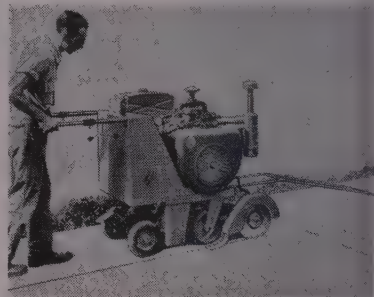
Washington Truck Equipment, Inc.
3626 Airport Way
Seattle 4, Washington

Erwin H. Johnson, Inc.
Box 1831, 1101 3rd St., N.W.
Great Falls, Montana

lightweight BRR rake is manufactured for all size crawler-type tractors, and can be purchased through most authorized Allis-Chalmers, International-Harvester, Oliver and Terratrac dealers. For full detail write to **Rockland Allied Equipment Co.**, 3778 West Colonial Drive, Orlando, Fla.

Concrete saw cuts 20 ft. per min.

Engineered Equipment, Inc., Waterloo, Iowa, announces a new model concrete cutting saw that is designed to cut at any speed desired from 10 in. to 20 ft. per min., and can use 12 to 20-in. diameter blades by merely changing the guard size. The saw is available in 15, 25, and 36-hp Wisconsin air-cooled gas engine



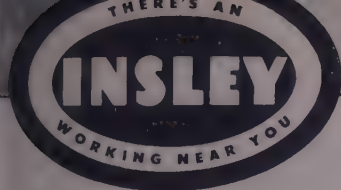
manual or self-starting. The engine is mounted on the frame instead of the arm which, according to the manufacturer, prevents tilting of the machine, making possible placement of the motor so the weight is over the blade providing better alignment of the blade with cut. Complete information is available from the manufacturer.

Relief for boiler breakdowns

A new mobile steam generator manufactured by **Clayton Manufacturing Co.**, El Monte, Calif., offers prompt temporary steam service wherever needed. The mobile unit



drives up to the desired location and flexible connections are made in a few minutes' time. Within five minutes steam pressure up to 150 psig. is available, with from 10 to 100 hp. The new mobile unit will be offered on rental basis from regional dealers.



On a sewer project

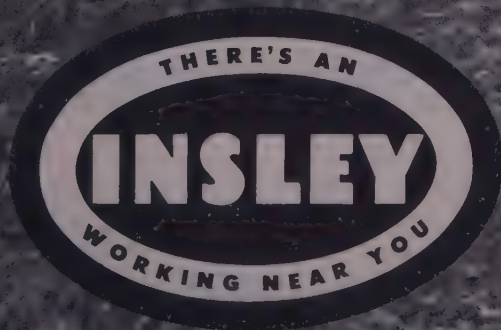
The Insley type WB is recognized as a proven performer by contractors everywhere. Insley's proven design characteristics give the contractor a dependable machine—simple to service, easy to maintain. The WB is convertible to all front-end attachments and available with crawler, Maxi self-propelled carrier, and lorry mountings. Gasoline, diesel or electric power.

**LET YOUR INSLEY DISTRIBUTOR
SHOW YOU AN INSLEY AT WORK**

*For additional information, write the Insley
Manufacturing Corporation, Indianapolis, Ind.*

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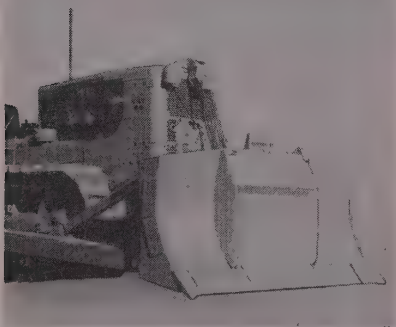


Protective coat for plywood forms

Development of a new protective finish for plywood forms used in concrete construction has been announced by **L. Sonneborn Sons, Inc.**, 404 Fourth Ave., New York 16, N. Y. Called Form-Saver, the new finish is described as a blend of synthetic resins in fast-evaporating solvents. It is free of grease, wax, oil, shellac or varnish. Form-Saver does four important jobs, according to Sonneborn chemists: protects and preserves plywood forms against deterioration; materially reduces rubbing costs by preventing grain raising; cuts the cost of painting by as much as 25%, because it leaves the concrete surface smooth and free of oil stains; and reduces investment in forms because it allows forms to be used over and over again merely by restoring with new applications.

Shepherd modifies push dozer for Caterpillar D9 tractor

A push dozer modification kit designed specifically for push loading and pit dozing is now available for



the Caterpillar D9 tractor. According to the manufacturer, **Shepherd Machinery Co.** of Los Angeles, the modified blade which is one foot narrower than the standard 9S bulldozer, improves maneuverability and expedites loading in close quarters. The Shepherd 9S dozer modification retains the structural advantages of long outside push arms which transfer their load directly to the track frames eliminating transfer of shock through engine frames, tractor structure and sprocket shafts. A new M344 Shepherd push cup is available for the modified 9S. For further information, contact Shepherd Machinery Co., Los Angeles 22, Calif.

Rock drilling crawler reduces drilling time by 30%

A new rock drilling crawler designed to reduce drilling time as much as 30% has been announced by **Thor Power Tool Co.**, 175 North



State St., Aurora, Ill. The new rig, designated the MM-2 Drillcat, is entirely self-propelled with drill, mast

and air power mounted for one-man operation. The new machine consists of Thor's 105M Drifter Rock Drill and the BW-2 Wagon Drill Mast mounted on the crawlers and is equipped with twin, reversible 7½-hp. air motors. For added maneuverability and ease of operation, the rig also has a hydraulic boom to raise or lower the drilling mast with little effort on the part of the operator. The Drillcat performs the same vertical, horizontal and angle rock drilling operations as the Thor Wagon Drill.

Crane Hook Block provides greater head room

A Crane Hook Block for mobile crawler and rubber tire cranes which affords new maximum lifting



limits is being manufactured by **The Upson-Walton Co.**, 12535 Elmwood Ave., Cleveland 11, Ohio. Called the Max-Lift, the new block is much shorter than many of the conventional Crane Hook Blocks, yet is built to withstand severe operating conditions. Five to 30-ton capacities are available in six different models. The Max-Lift Block has roller or bronze thrust bearings, which reduce the danger of twisting and damaging the hoisting lines and permits loads to be positioned easily by one man.

New lubricants for construction equipment

Announcement of a new and improved gear lubricant has been made by **Lubrication Engineers, Inc.**, of Fort Worth, Tex. These new products, 509 and 510 Multi-Purpose Gear Lubricants, were developed to offset new problems of gear lubrication which have been brought about because of higher torque and pressure values which major equipment manufacturers have incorporated into most modern day equipment. According to the company, these new products will substantially reduce excessive wear of pinion and ring gears, and they are reputed to reduce gear lubricant consumption.

Diamond portable surge bin

Added to the Diamond line of products for the aggregate producer is a portable bin designed to provide greater continuity of operation for any type portable crushing and screening plant. The 11-cu. yd. hopper of the bin serves to receive the material produced by a plant and load it into trucks by means of its 36-in. wide conveyor at the rate of

7 yd. in less than one minute. The surge bin is clutch-controlled from platform or ground, has a 9 ft. 5-in. clearance under the head pulley, and is equipped with an air cooled engine with fluid coupling. Construction throughout is heavy without affecting portability. **Diamond Iron Works**, 4834 S. Halstead St., Chicago 9, Ill.





Cord plies spirally applied in
opposite directions, for highest flexibility

BUILT LIKE A TIRE...

it's the U.S. Royal Cord Air Hose!

Built like a tire—and *tough as a tire*, with a special construction found in no other air hose:

- *Exclusive.* Two counter-spiralled plies of tough special cord floated on resilient rubber for outstanding strength, shear resistance and flexibility.
- Braided cotton breaker ply anchors the tube to carcass *permanently*.
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U. S. Royal Cord Air Hose has a very high hydrostatic value, with a minimum of contraction or elongation. It is so tough and flexible that it needs no cribbing, can be run over repeatedly by heavy machines without harm. The "hose that's built like a tire" is obtainable in continuous lengths from any of our 27 District Sales Offices, or write Mechanical Goods Division, United States Rubber Company, Rockefeller Center, New York 20, N. Y.



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ALL-NEW MASTER TURN-A-TROWEL HAS POWER BLADE ADJUSTMENT

"This sure beats workin'", said one operator after he'd tried the all-new Master "Powermatic" 34" trowel. "I've never had it so easy in my life . . . or done a better job."

No wonder he likes it. He pushes or pulls a knob and *engine power* tilts the combination blades to float or finish.

Know what that means? He gets exactly the job he wants, faster and easier.

He doesn't have to "fight" this trowel, either. The Master's only 14" from the slab to the *top* of the engine . . . has the *lowest center of gravity* of any power trowel. Wobble's a thing of the past. And the direct drive puts *all* the engine's power to work.

You'll like the all-new Master, too. The *automatic* clutch that let's the Briggs & Stratton engine get to operating speed before engaging the blades. The "dead man" control that *idles* the engine when you let go the handle. The stationary guard ring. They all make troweling easier and better.

The all-new Master in 34" gasoline-drive is now ready. Three or four blades, whichever you prefer. *Power blade-adjustment, direct drive, lowest center of gravity* and other new features make it your best buy. You'll like it. See it at your distributors or write us for full details.

MASTER

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POWER EQUIPMENT COMPANY Denver, Colorado

SHRIVER MACHINERY COMPANY Phoenix, Arizona

SIERRA MACHINERY COMPANY Reno, Nevada

WEST COAST MASTER, INC. Los Angeles, California

WORTHAM MACHINERY COMPANY Casper, Cheyenne, Newcastle, Riverton, Rock Springs and Sheridan, Wyoming

Dotmar rotary brush cutter-chipper

The new Dotmar Rota-Kut Rotary Brush Cutter and Chipper has been introduced by Dotmar Industries, Inc., 502 Hanselman Bldg., Kalamazoo, Mich. This unit is designed for mounting on any small tractor and is powered through the power take-off by a shaft to the gear box on the ro-



tary cutter. The cutter blade revolves at high speed and will cut off brush and saplings up to 2-in. diameter. Blade has offsets with additional chipper blades bolted on which chop up brush into short pieces after cutting them down. The unit slides on runners, adjustable for height, and cuts within 1/2 in. of the ground, if desired. It is raised off ground for road travel.

New transistorized leak detector

Detection of hidden leaks in water and oil pipe lines is made easier with a new transistorized M-Scope leak detector produced by Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif. Use of five miniature hermetically sealed transistors makes it possible to pro-



vide several times more amplification of the leak sounds than in previous models, reduces battery drain, and makes possible a more rugged and compact unit. A built-in battery test circuit is included for easier maintenance. Weight complete with leather carrying case is 7 lb. as against an average of 30 to 35 lb. for conventional type units.



NOW It's A FLEET OF 31 TRACTOMOTIVE TL-12 TRACTOLOADERS

Photo Courtesy E. F. Craven Co., Greensboro, N. C.

for the North Carolina State Highway & Public Works Commission

...pling to keep the roads of North Carolina in top shape the job of a fleet of TL-12 Tracto-Loaders — 31 in all! "We like their all-round ability," says the North Carolina State Highway Maintenance Department. The TL-12's load crushed stone, sand, gravel or topsoil as needed. Pick up and load excess material pulled from ditches and ditches. Handle general utility work — such as loading pipe and drums of oil.

You not only get your money's worth from the TL-12's ability to do many jobs well . . . you save money on every job because these 11½-yd excavator-loaders work faster, and there's less maintenance.

Every load is a big load with the tip-back bucket and smooth, positive hydraulic torque converter drive. And

you go forward or reverse simply by pulling or pushing a lever — no shifting. You place material right in the center of the truck, too — no tires protruding ahead of the cowl to rob you of valuable reach . . . no wasting time leveling load.

And here are real trouble-savers! Dump cylinders are out of the way and out of the dirt. Hydraulic system has double filter protection with both screen and magnetic filters.

But get the full story from your Allis-Chalmers construction machinery dealer. Let him show you why

TRACTO is a sure sign
of modern design

SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

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

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

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

OREGON
Haupt Tractor Company—Medford and Klamath Falls
Wood Tractor Company—Portland
Timber Tractor Company—Springfield

UTAH
Cate Equipment Company, Inc.—Salt Lake City

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

WYOMING
Studer Tractor & Equipment Company—Casper

Continuous drilling rig

An entirely new self-propelled, rotary drill unit has been developed by **Drilling Accessory & Manufacturing Co., Inc.**, for use in highway, airport,



pipeline, and other types of construction projects where continuous blasting or drilling is needed. The Blastholer has been so designed that the operator sits and rides through all drilling and moving operations. The compressor is used for blowing the hole. No other air is required as the compressor is of sufficient capacity to

rapidly remove cuttings from the drill hole, with pressures to 50 lb. Holes of $2\frac{1}{4}$ to $3\frac{1}{8}$ in. can be drilled depending upon the size of Kelly used. For further information regarding the Blastholer, contact Drilling Accessory & Manufacturing Co., Inc., P.O. Box 5768, Dallas, Tex.

Many features provided on Fairfield portable 40-ft. concrete conveyor

The Fairfield Engineering Co. of Marion, Ohio, has announced the model 618B Portable 40-ft. Concrete Conveyor. The 618B features a concrete swiveling chute, a belt wiper, a concrete hopper, and can be obtained with head end control for starting and stopping the belt. The belt is 18 in. wide and runs on triple troughing type idlers. A self-cleaning foot pulley is located at the foot end. Capacity of the unit varies with the slump of concrete used and discharge heights. Twenty-four yards of concrete per hour can be poured at a discharge height of 16 ft. The unit can be raised to 26 ft.

Shawnee hydraulic backhoe

A completely new hydraulic backhoe for light tractors has been announced by **Shawnee Manufacturing Co., Inc.**, 1947 N. Topeka Ave., Topeka, Kan. Named the "Warrior,"



the machine digs slightly more than 12 ft. below ground surface and has a full swing of 170 deg. through three 120-deg. quadrants of operation. Shifting from one quadrant to another can be performed from the operator's position. The new machine utilizes Shawnee's exclusive push-pull principle which produces digging power of over 48,000 lb. at the bucket teeth. The unit is designed so that the whole unit can be installed or removed from the tractor in a matter of minutes and is adaptable for mounting on all popular makes and models of light industrial tractors.

Jay introduces Model 12 water blade

An accessory for the compaction of hot mix asphalt has been added to the Jay 12 line to fill the need for patching of streets, cross cuts and hard to get at places. Designed to completely eliminate sticking and pickup of material, this blade spreads an even flow of water over the tamping shoe area and is controlled by a foot lever while the machine is in working position. The water blade can be installed in a matter of minutes and is presently available as optional equipment for all Jay 12 tampers. **Jay Company**, 168 Hosack St., Columbus, Ohio.



Littleford develops dryer and feeder

Newest addition to the Littleford line of blacktop road equipment is a combination Portable Trail-O-Dryer and Dual Feeder Bin intended to fill the need of contractors for a small, low cost aggregate dryer. The Model 25T Trail-O-Dryer has a capacity of 15 tons per hour based on a removal of 5% free moisture and at a 310-deg. F. discharge. It will produce up to 25 tons per hour when drying aggregate for stockpile mixes or when moisture content is very low.

The Littleford Model 5T25 Dual Feeder Bin has a capacity of 5 tons; a division in the bin provides for two $2\frac{1}{2}$ -ton compartments. Two, separate, fully-adjustable gates permit variable proportioning of two different aggregates. A reciprocating feeder is designed to discharge directly into the inlet end of the Littleford Trail-O-Dryer, thus eliminating the requirement of a cold elevator. **Littleford Bros.**, 460 East Pearl St., Cincinnati, Ohio.

Cedarapids adds largest screen

A new 60-in. x 16-ft. triple deck screen has been added to the line of Cedarapids Horizontal Vibrating Screens manufactured by **Iowa Manufacturing Co.**, Cedar Rapids, Iowa. The new screen, largest in the Cedarapids line, is designed for high capacity in heavy-duty applications in stationary crushing and screening plants. The horizontal position of the Cedarapids screen is said to provide as much as $12\frac{1}{2}\%$ more screening area than an inclined screen of the same length because the level position of the screen cloth openings permits more material to pass through each opening. For complete information, write the manufacturer

TREMENDOUS RIPPING TEAM



GREENVILLE RIPPER and INTERNATIONAL TD14, TD18 or TD24

The tremendous power of the IH TD14, TD18 or TD24, plus the 10,000-pound Greenville tractor-mounted rock ripper shatter rock and packed earth for easy scraper loading. On many jobs explosives, shovels and trucks are eliminated.

LIVE SWIVEL ACTION

Shanks swivel 15° in either direction . . . follow tractor like a trailer. Points have live action that shatters rock like a jack hammer.

RUGGED POWERFUL SHANKS

Scientific contour gives extra strength at strain points and pulls points down deep . . . rocks roll out and clear of headframe. Made of tough, heat-treated, manganese-moly steel. Mount one, two or three shanks as needed.

Put this power-packed team to work for you. Your IH dealer can give you the facts. Let him show you how you can save as much as 25% on any earth or rock moving job.

POSITIVE CONTROL

Double-acting hydraulic system provides fingertip control and puts full tractor weight on points for fast, deep penetration.

DRAWBAR TAKES PULL

The ATECO drawbar replaces the tractor drawbar and drawbar brackets. Clevis is accessible with ripper installed.

RIP AT ANY DEPTH

Easily adjusted to permit settings as deep as 24". Points are always at most desirable angle for best penetration and splitting action. Points are easily replaced.

WRITE FOR Greenville Bulletin IH-156. It gives complete data on the Greenville-Ateco ripper.



GREENVILLE

STEEL CAR COMPANY

ATECO DIVISION
Greenville, Pennsylvania

"WE'RE TURNING OUT THE FINEST MATERIAL IN TEXAS!"

... Plant Is Operating Beautifully!"

Says Bill Boorhem, Production Manager of Wesco Materials Corp., Dallas, Texas, whose New Circle #1 Plant is their Second to be equipped with EAGLE Washing-Classifying-Dehydrating Equipment!

Yes, when a successful firm like Wesco installs a second round of Eagle Equipment at a new plant you can be sure they are right and that the equipment is right.

The Eagle Complete Washing-Classifying-Dehydrating Section at Wesco's Circle #1 Plant consists of a 20' Water Scalping-Classifying Tank with power-operated bleeder valves and triple compartment collecting-blending flume, a 36" dia. x 25' Double Screw Fine Material Washer-Classifier-Dehydrator and a 36" dia. x 25' Single Screw unit, producing concrete sand and mason sand. A 36" dia. x 30' Log Washer processes gravel for specification aggregate. Output averages 2500 yds. per day.

46% of Eagle installations are re-orders by satisfied customers. Plan your first installation today! Reap the benefit of Eagle's field experience and specialized engineering services.

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Brown-Bevis Industrial Equip. Co., Los Angeles, Calif.; Coast Equipment Co., San Francisco, Calif.; Balzer Machinery Co., Portland, Oregon; Intermountain Equip. Co., Boise, Pocatello, Ida.; Spokane, Wash.; Keremi Tractor & Equip. Co., Cheyenne, Casper, Wyo.; The Long Co., Salt Lake City, Utah; H. W. Moore Equip. Co., Denver, Colo.; Jack Sahlborg Equip. Co., Seattle, Wash.; Shriver Machinery Co., Phoenix, Ariz.; Sierra Machinery Co., Reno, Nev.; N. C. Ribble Co., Albuquerque, N. Mex.; Western Construction Equip. Co., Billings, Missoula, Great Falls, Bozeman, Mont.

EXPERIENCE, PROGRESS, SERVICE, SINCE 1872

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FINE MATERIAL
WASHERS



WATER SCALPING—
CLASSIFYING TANKS



COARSE MATERIAL
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LOG WASHERS



"SWINTER"
DREDGE LADDERS



COMPLETE
DREDGES



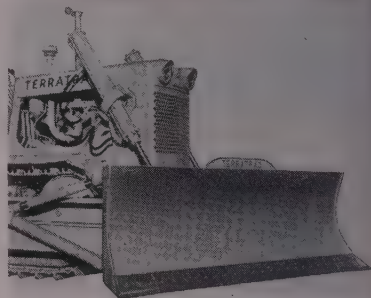
BREAKER
BALLS

McKiernan-Terry pile hammer leads offer high strength, easy transport

A new and complete line of pile hammer leads is now available from McKiernan-Terry Corp. of Dover N. J. The structures, for attachment to crawler and truck cranes, feature all-welded tubular sections that give high strength and rigidity with minimum weight. Five basic lead types are available, to which additions and variations can be made to suit particular customer requirements. The new McKiernan-Terry leads are sectionalized for easy transport and erection.

Case-TerraTrac crawlers announced

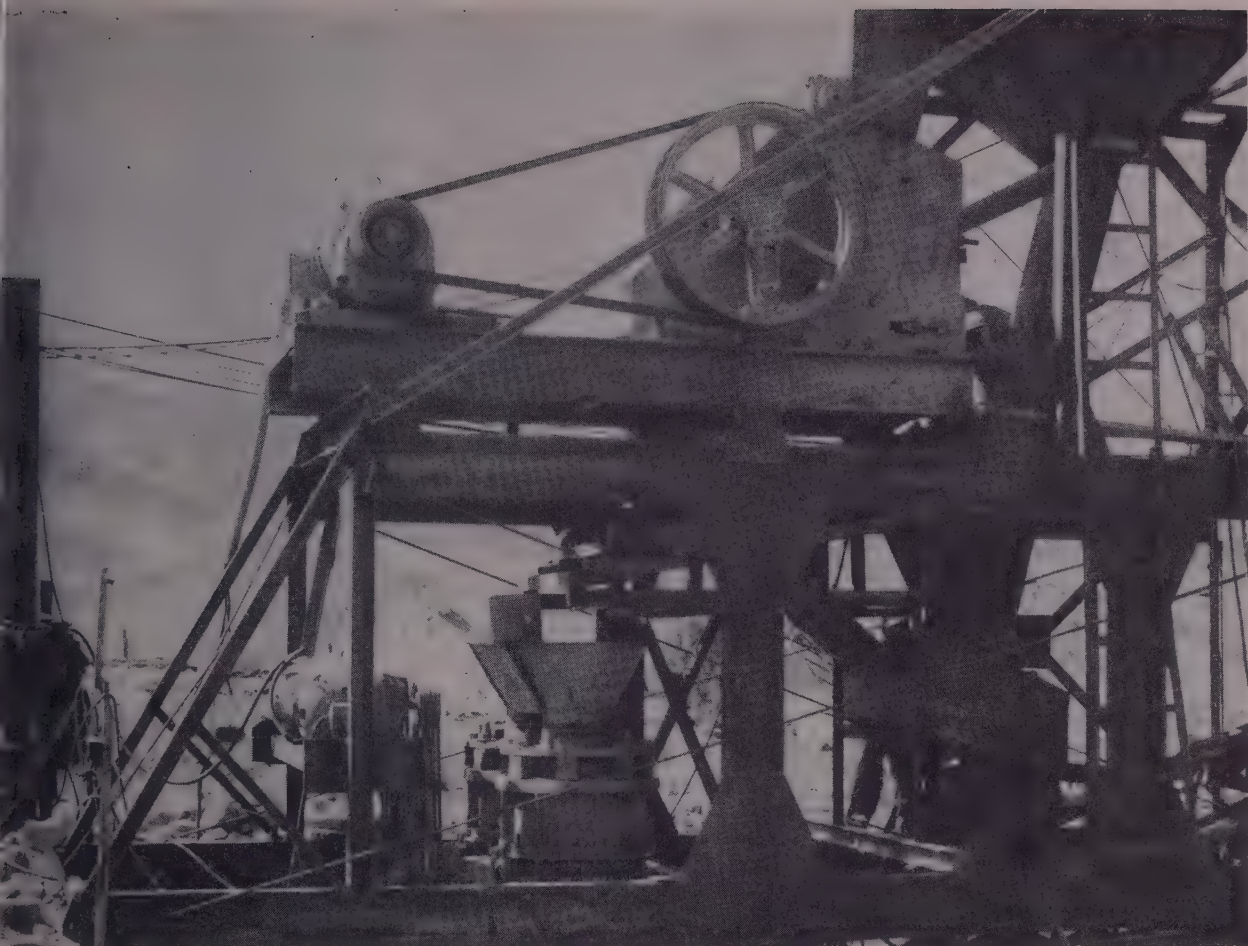
Introduced recently were the new Case-TerraTrac crawlers in the 80 and 100-hp. class. Heading the list of technical advances on Models 800 and 1000 is the new counter-rotating Terramatic power-shifting transmission which provides independent power control of each track both as



to speed and direction. This, combined with torque converter drive "non-stop" forward and reverse speeds, foot or hand-operated hydraulic controls, and power brakes is designed to almost double crawler tractor working speeds. Other outstanding features include a new automatic lower track wheel lubrication system, and torsion bar track suspension and oscillation which assures full oscillation of either track, while maintaining the cutting edge of the dozer or loader parallel with the ground. A complete line of matching equipment is available for the units. J. I. Case Co. Racine, Wis.

Worthington adds front end power take-off to truck mixer line

A two-speed, right angle gear drive for front power take-off and power tower mid-transmission has been made available by Worthington Corporation, Harrison, N. J. The new design incorporates a pair of multiple disc clutches, running-in-oil, for two speed operation which enables drivers to shift from drum mixing speed to agitating speed without shifting gears. Suitable drives for front end



how Kue-Ken® Crushers make short jobs profitable with knock-down plant

Setting up his plant quickly and getting high production rate permits this operator to take on short jobs and make them profitable. Kue-Ken provides the means. His 36" x 10" jaw crusher, two 18" gyratory crushers, conveyors and vibrating screen are rapidly assembled on steel frames and bolted together. Plant capacity is about 100 tons per hour minus $\frac{3}{8}$ ". Rig is quickly dismantled and moved to next job. Kue-Ken operates inexpensively. Jaw plates outwear those of other crushers at least 5 times, power consumption is far less, breakage from overload is eliminated by automatic fly-wheel release that is quickly reset. Filtered oil lubricates the mechanism in a sealed, dust-free crankcase to prevent wear.

WRITE FOR CATALOG

STRAUB MFG. COMPANY, INC., 8381 Baldwin, Oakland, Calif.

KUE-KEN® CRUSHERS "CRUSHING WITHOUT RUBBING"

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England

DEALERS:

SEATTLE, WASH. Washington Machinery Co.
SALT LAKE CITY, UTAH. Lund Machinery Co.
SAN ANTONIO, TEX. Closner Equipment Co.
PORTLAND, ORE. Contractors Equipment Co.
LOS ANGELES, CALIF. Garlinghouse, Fremont
PHOENIX, ARIZ. Stapley's
DENVER, COLO. Union Supply Co.
CASPER, WYO. Moss Equipment & Supply Co.
VANCOUVER, B. C. Universal Equipment Co.

power take-off, split shaft, or mid-transmissions are offered. According to the manufacturer, one of the major advantages is the interchangeability of parts between the right angle gear drive and the standard type transmission.

Heltzel portable aggregate plant

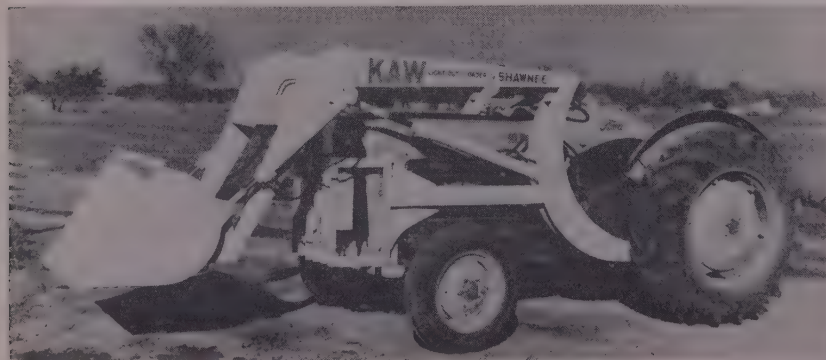
A top production, portable aggregate plant designed especially for highway contractors has been announced by **Heltzel Steel Form & Iron Co.**, Warren, Ohio. This Heltzel Type 200 Batchmaster provides a capacity of over 200 tons with high speed twin aggregate batchers for batch-truck batching and up to 8-yd. batchers for truck mixer batching.



The Type 200 has a smaller counter-part in Type 100 Batchmaster that has a capacity of 100 tons. Both these plants are designed to go up fast, dismantle easily into sections that can be transported over existing highways without special permits.

New utility loader for Ford and Ferguson tractors

A newly designed utility loader, termed the "Kaw" loader, has recently been marketed by the **Shawnee Manufacturing Co.**, 1947 North Topeka Ave., Topeka, Kan. The new loader has a 10-cu. ft. roll-back bucket actuated by twin 2-in. double-acting



Hanson revamps equipment for civilian use

A revamping and broadening of its line of power shovels, cranes and trench hoes is announced by **Hanson Clutch & Machinery Co.** which has again turned its facilities to civilian output after producing for the armed forces. Shown here is the 20-ton crane with magnet attachment. It is

readily convertible to ¾-yd. shovel or trenchhoe. A major feature of this crane is the operator's independent control of all operations including the power boom hoist. A catalog sheet describing the new model TM-654 crane is available from the company, Tiffin, Ohio.

Lightweight air-cooled compressors

Lightweight air-cooled compressors in a compactly-designed medium-capacity range have been added by the **U. S. Atlas Copco Companies** in a continuing expansion of their compressor sales-and-service divisions. Models in the new CT series include the 45-hp. CT-4 developing 175 cfm., and the 75-hp. CT-6 delivering 340 cfm. Skid-mounted, their weights of 1,300 and 1,900 lb. respectively make them especially suitable for construction projects where water either is unavailable or

too costly to be used for machine cooling. Both models are two-stage single-acting types which develop their rated capacities at only 970 rpm. Illustrated literature on the new CT compressors is available from Compressor Division, Atlas Copco Pacific Inc., 930 Brittan Ave., San Carlos Calif.

Graybar introduces electric plants

Graybar Electric Co. has made available a complete line of gasoline LP gas and diesel engine driven power plants. Produced by **Winpower Manufacturing Co.** of Newton, Iowa, the sets are available from 400 watts through 100 kw. Graybar is also prepared to quote on diesel power plants up to 600 kw. Lightweight construction, compact design and medium speed operation are features of the new Graybar line. The engines are manufactured by Briggs and Stratton, Wisconsin, or Continental. Ten kilowatt or smaller units are available with portable mounting including dollies, highway trailer units and carrying handles. All units are direct connected engine generators. Literature available.

Mercury clutch on cement finisher

Superior Cement Tool Corp. of Lynwood, Calif., has recently made the Mercury Clutch standard equipment on their line of cement finishing machines. The clutch releases completely the moment the motor is slowed below operating speed. It provides load-free starting and smooth load pick-up as the motor is accelerated.



BID LOW *with help like this . . .*

MOST POWER PER YARD . . . most power per pound in its class

MOVES FULL LOADS AT FULL SPEED

WIDE OVERLAP IN GEAR RANGES... for easy shifting, smooth acceleration

CURVED BOWL BOTTOM . . . offset cutting edge . . . for fast, full loading

HIGH APRON LIFT . . . positive, clean ejection

This is the Allis-Chalmers TS-360 . . . a motor scraper that has proved it can help you handle big, tough jobs on rubber . . . profitably. As bidding gets tougher, be ready with the best . . . TS-360's. See your Allis-Chalmers construction machinery dealer.

ARIZONA

Neil B. McGinnis Equipment Company—Phoenix

NORTHERN CALIFORNIA

Industrial Tractor Sales—Sacramento
Shasta Truck & Equipment Sales—Redding
Aikins Tractor Co.—Eureka and Willits
West Coast Engine & Equipment Company—Berkeley

SOUTHERN CALIFORNIA

San Joaquin Tractor Co.—Bakersfield
Shaw Sales & Service Co.—Los Angeles and San Diego

IDAHO

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

MONTANA

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

NEVADA

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

OREGON

Hauptert Tractor Company—
Medford and Klamath Falls
Wood Tractor Company—Portland
Timber Tractor Company—Springfield

UTAH

Cate Equipment Company, Inc.—Salt Lake City

WASHINGTON

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

WYOMING

Studer Tractor & Equipment Company—Casper

ALLIS-CHALMERS

Engineering in Action

News of DISTRIBUTORS



ON HAND to welcome guests at the new branch of Cummins Service & Sales, located at 1105 South Greenwood Ave., Montebello, Calif., were, left to right: *George Hedstrom*, branch manager; *J. R. Neal*, general manager of the company; *William Steed*, Southwest regional manager of Cummins Engine Co., for which Cummins Service & Sales is Southern California distributor; *J. H. Flanagan*, president, and *Syd B. Cook*, vice president, of the distributor organization.



WILSON D. PATTERSON, left, regional vice president of The White Motor Co., congratulates **William A. Sutton**, center, and his son **William R. Sutton**, co-owners of Sutton Truck Sales, Sacramento, Calif., at the official opening of their new 5-acre plant. Sutton is the newly-appointed distributor for White, Autocar, and Freightliner in the Sacramento territory.

Interstate represents Thew Lorain

Interstate Tractor & Equipment Co. of Portland and Eugene, Ore., has been appointed Thew Lorain distributor for the entire state of Oregon and the five river counties of southwest Washington. The Thew Shovel Co. manufactures a complete line of shovels and cranes from $\frac{3}{8}$ -yd. capacity up, both crawler and rubber-tired.

Concrete Tie & Anchor news

Alden "Bill" Smith, a veteran of more than 20 years in the construction specialty industry, has joined the staff of Concrete Tie & Anchor Co., Los Angeles, Calif. Also recently an-

nounced by the construction specialty house is their appointment as exclusive distributor in the Southern California area for Fry Reglet Corp., Bremerton, Wash., as well as for a multi-pronged steel plate manufactured by Acme Steel Co., Chicago.

Buran opens additional branch

Buran Equipment Co., Oakland, Calif., recently opened a branch in Norwalk, Calif. Located at 13900 Norwalk Blvd., the new facility is in charge of Fred A. Perdue, branch manager. The addition gives Buran statewide coverage for Clark Equipment Co., Benton Harbor, Mich., manufacturer of Michigan tractor

shovels, truck cranes, crawler cranes and shovels, motor scrapers and Turbo-Dozers.

Feenaughty takes on two new men

Two new sales representatives have been added to the Spokane, Wash., branch of Feenaughty Machinery Co.: Ben Jones and Homer Tillengreen, according to announcement by Troy E. Bockstruck, branch manager.

New accounts for Montana firm

Tulsa Winch Division, Vickers, Inc., Diamond Chain Corp., and Cutler-Hammer, Inc., are three new lines recently acquired by Great Northern Tool & Supply Co., Billings, Mont.

Management changes at A. H. Cox

George H. Jamison recently resigned as president of A. H. Cox & Co., Seattle, Wash. He will continue to serve on the Board of Directors. At the same time, John Widrig announced his resignation as vice president and secretary. He was elected chairman of the board and will act as executive consultant for the company. The new president is E. E. Dionne, and the following were elected vice presidents: Kyle Hesse, in charge of rental machinery; Bill Martin, in charge of construction machinery sales; Scott Jamison, in charge of crane and shovel sales. Other officers chosen are Jim Kinkead, secretary; Gene Lamb, treasurer, and Lyle Ellert, director.

Seattle firm adds five new lines

Five new accounts have been added by Washington Machinery Co., Seattle, Wash. They are Hiab hydraulic truck cranes, Pionjar rock drill and breaker, Flygt pumps, Model X-ray diamond drills, and MB Swedish tungsten carbide rock drills.

Miller expansion in Montana

Miller Machinery Co., Missoula, Mont., has added to its sales force and is expanding its sales facilities to represent Clark Equipment Co.'s Construction Machinery Division (the Michigan line) throughout the entire state of Montana. The new sales personnel are Clifford A. "Red" Brown, Kalispell; George F. Flaherty, Great Falls; and Russell L. Mills, Billings.

Western Machinery man promoted

Announcement is made by Western Machinery Co., Phoenix, Ariz., of the promotion of Les Hall from parts manager to the post of service supervisor.

C. T. Irwin succeeds Bob Raef

Robert H. Raef, salesman covering the Pasco area for Intermountain Equipment Co. of Spokane, Wash., died suddenly of a heart attack. He had been in the employ of Intermountain for the past five years.

**SLASHES MAN HOURS . . .
MULTIPLIES PROFITS!**



**GOLDEN
POWERLINE**

WHEELERS

beat your schedules . . . beat your costs!

When you put a man on a Minneapolis-Moline POWERline Wheeler, you can rewrite old cost schedules, slash job time, add a healthy boost to your job profits! These wheeled powerhouses are rated to out-work and out-perform *anything* in their power class. Here's why:

In an MM Golden Powerline Wheeler, you get a heavy-duty engine built with greater lugging capacity, more *torque with slower engine speed* for longer parts life! And to make that engine lug at top capacity, you get Ampli-Torc transmissions to *double* pull-power on the go, with Ampli-Trac 3-point hitch action for an

automatic traction boost. On PTO, MM's straight-through drive gives you power straight from the crankshaft. Where hydraulic power has to carry the load, these MM Wheelers offer a full range of *direct-powered* hydraulic pumps. These MM engineered features mean greater work-capacity, more work done in fewer man hours . . . *at lower cost!*

Any way you look at an MM Wheeler, you see new advantages *built to pay off!*

Put these advantages to work on your own job-site! !

There are
SIX
work-hungry
wheelers
in



THE
**GOLDEN
POWERLINE**

SEE YOUR  DEALER

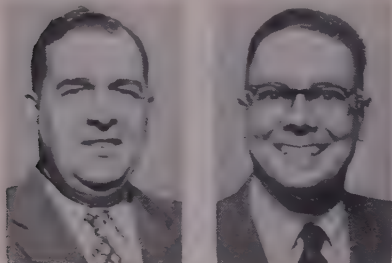
If you're planning a new equipment purchase any time in the next year—*now* is the time to see your MM dealer. Ask him to give you the plain profit facts on the Golden POWERline . . . *on your job . . . in black and white!*

MINNEAPOLIS-MOLINE
INDUSTRIAL POWER DIVISION • MINNEAPOLIS 1, MINNESOTA

Clayton T. Irwin, who has been with the firm for nearly nine years, has replaced him.

Additions at Air-Mac

Air-Mac, Inc., Seattle, Wash., who recently acquired the P & H line of shovels and cranes and the Chain Belt Co. line, has added two men to



its expanded construction division. They are Bob Madden and Sig Olney, who were formerly with Conrad Creim Co. Air-Mac is currently enlarging their display area for both new and used equipment.

Miller named to advisory council

A. H. Miller, president of Rix Co., Inc., 582 Sixth St., San Francisco, has been appointed a member of the Le Roi Distributors' Advisory Council. The council is composed of nine Le Roi construction equipment distributors and five Le Roi personnel. The Rix Co. is Northern California distributor for Le Roi, a division of Westinghouse Air Brake Co., manufacturer of portable air compressors, Tractairs, and construction air tools.

MANUFACTURERS

Blauvelt named v.p. of Byers

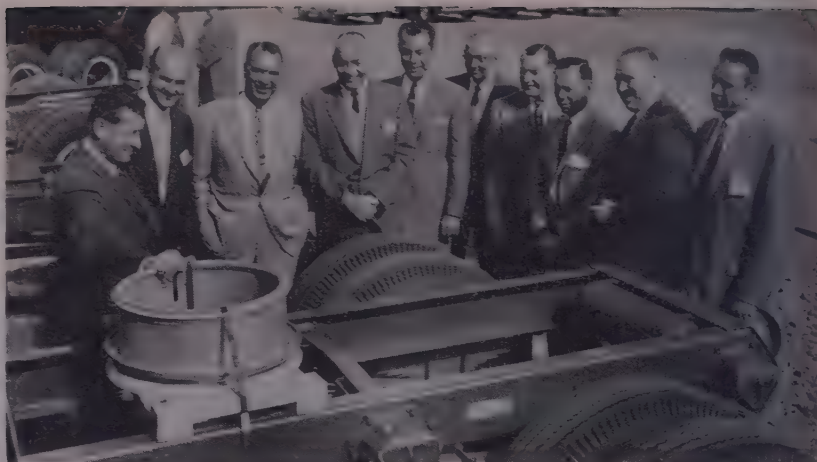
A. C. Lundgren, president of Byers Machine, Inc., Ravenna, Ohio, subsidiary of The Thew Shovel Co. of Lorain, Ohio, announces the election of General Manager W. W. Blauvelt to the office of vice president.

U. S. Steel appointments

E. E. McKeen of Piedmont, Calif., has been appointed to a newly created position of general erecting manager for United States Steel's American Bridge Division with headquarters in Pittsburgh, Pa. Also announced is the appointment of George W. Faulkner of Whittier, Calif., to succeed McKeen as erecting manager for the 11 Western states. He will be headquartered at San Francisco.

Pettibone Mulliken broadens line

Pettibone Mulliken Corp., Chicago, announces the acquisition of Mercury Manufacturing Co., which has been in business in Chicago for



WESTERN MANAGERS of The White Motor Co. inspect and discuss the new diesel-powered White 3000TD during the two-day White Management Conference recently held in Cleveland and attended by key White personnel from the entire country and Canada. The Western group included (l. to r.): *Wilson D. Patterson*, vice president in charge of the Pacific Coast Region; *O. K. Sievert*, White Freightliner coordinator; *Howard Strother*, Los Angeles branch manager; *Rod Clarke*, Portland territory manager; *Ken Strother*, Los Angeles branch manager; *Dick Cochran*, Denver branch manager; *Dave Collins*, Portland branch manager; *Larry Lynch*, Denver territory manager; *C. E. "Griff" Griffin*, Portland territory manager, and *Fred Ragan*, San Francisco branch manager. *Jack Phillips*, San Francisco territory manager, who also attended the conference, is not shown.

nearly 50 years. Mercury manufactures tow tractors, electric lift-trucks and trailers.

Twin Disc sales appointments

N. F. Adamson, vice president-sales, of Twin Disc Clutch Co., Racine, Wis., announces two appointments in the general sales department. R. A. Harmon has moved up from district sales supervisor to manager—district sales. Paul J. Dement has been appointed dealer sales supervisor.

Changes in Thermoid sales

Russell W. Chaffin was recently appointed general sales manager of the Industrial Rubber Division, Thermoid Company, Trenton, N. J.



Chaffin



Sand

Chaffin has been active in the rubber industry for more than 20 years and prior to his latest appointment was Western Division sales manager with headquarters in San Francisco. Succeeding him as sales manager at San Francisco is Oswald J. Sand, who has been with Thermoid for more than 10 years and has had extensive experience in the distribution and sale of industrial rubber products.

Lebus top level appointment

American Hoist & Derrick Co. of St. Paul, Minn., announces that John W. McEvoy has been appointed vice president and general manager of the Lebus Manufacturing Co., a new wholly owned subsidiary of American Hoist & Derrick Co., located in Longview, Texas.

Link-Belt expansion

More than doubling Link-Belt Co.'s present manufacturing facilities in the Los Angeles area, the company plans to build a new plant in Montebello to replace its present facilities. It is expected the Montebello plant, 10 mi. east of downtown Los Angeles, will be in operation late this year. The company also recently announced from its headquarters in Chicago the acquisition of the Detroit Power Screwdriver Co., manufacturer of power-driven screwdrivers.

New sales manager named at KSM

Anthony Maladra has been appointed sales manager of KSM Products, Inc., Stud Welding Division Merchantville, N. J. He has been associated with KSM for more than six years.

New Victor plant

The new Victor Equipment Co. Alloy Rod & Metal Division, plant at Norwalk, Calif., represents approximately 40,000 sq. ft. of the most up-to-date facilities for the manufacture of hardfacing rod and other products. Every modern innovation and equipment will not only vastly increase production, but will enable Victor to meet demands on time.

Atlas Copco produce world's lightest motor drill

From Atlas Copco, the world's largest manufacturers of pneumatic rock-drilling equipment, comes an entirely new motor drill. It is the Atlas Copco *Cobra*, backed by 50 years' experience of rock-drilling equipment, and developed after extensive field tests.

Weighing a mere 53 pounds, the Atlas Copco *Cobra* is undoubtedly the lightest, handiest motor drill ever brought out. (The usual weight of a motor drill is around 80 pounds.) Yet despite its low weight the *Cobra* is able to put up a *higher footage* under actual working conditions than other, *heavier* motor drills. It is powerful, robustly constructed and, above all, *100 per cent self-contained!* One man can carry it and start it up *anywhere*.

New exclusive drill features

The Atlas Copco *Cobra* has 100 per cent air flushing from the built-in compressor. As no exhaust gases are used for flushing, troublesome decarbonizing is eliminated. Another *first-ever* feature is the free-wheeling mechanism for easier starting and more rapid steel changes. The *Cobra* also incorporates a unique new method of automatic rotation of the drill chuck, a floatless carburettor enabling drilling up to a 45 degree incline and a pull-type starter. The *Cobra* drills 100 feet to the gallon, has a drilling rate of 26 feet per hour, and can drill holes up to 13 feet in depth.

The right steels for the Cobra

The *Cobra*—like all Atlas Copco drills—has been developed for use with *Sandvik Coromant* steels, the world's most widely-used integral drill steels. This, of course, adds considerably to the performance of the *Cobra*. *No drill or steel developed separately could possibly give such equivalent high results.* Atlas Copco drills fitted with *Sandvik Coromant* steels have proved an unbeatable drilling unit, responsible for the drilling of no less than one billion feet each year.

World-wide sales and service

The Atlas Copco Group embraces Atlas Copco companies or agents manufacturing or selling and servicing Atlas Copco equipment in ninety countries throughout the world. For further details of the equipment featured here, contact any of the addresses shown below.

U.S. — Atlas Copco Pacific, Inc., 930 Brittan Avenue, San Carlos, California, Atlas Copco Eastern Inc., P.O. Box 2568, Paterson 25, N.J.

CANADA — Atlas Copco Canada Ltd., Montreal Airport, P.Q.

MEXICO — Atlas Copco Mexicana S.A., Apartado Postal 56, Torreón, Coahuila.

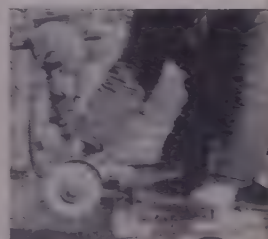


Motor Drill and Breaker in one!

The *Cobra* converts to breaker in minutes. Only three small parts to change. Reconversion just as quick.



Easily carried anywhere! Perfectly-balanced carrying handle. Molded quick frame for transporting cross-country.



Grinder driven from the Cobra! A specially light drill steel grinder, powered through the crankshaft, can be supplied if required.

Atlas Copco

Manufacturers of Stationary and Portable Compressors, Rock-Drilling Equipment, Loaders, Pneumatic Tools and Paint-Spraying Equipment

James Wiggs heads Arizona office

James A. Wiggs has been named sales representative at Phoenix, Ariz., for Kaiser Steel Corp. He will head the Phoenix office serving customers throughout Arizona. For the past six years Wiggs has been with Kaiser Steel's southern district sales office in Los Angeles.

Sherman Products' new division

Sherman Products, Inc., Royal Oak, Mich., has organized a division in its sales department to investigate and develop new products, and announces the promotion of William F. Beckman to the newly created post of vice president and director of marketing with expanded duties including supervision of the new division.

Permanente promotes three

James C. Reilly has been appointed manager of industrial relations of Permanente Cement Co. and its subsidiary, Kaiser Gypsum Co., Inc., making his headquarters in Oakland, Calif. Harry G. Smith has been named labor relations representative for the new Southern California plant and for a second new plant planned for New Mexico. Leonard R. Flicker has been appointed coordinator of safety for all Permanente Cement and Kaiser Gypsum facilities.

Prescon Corp. doubles capacity

The Prescon Corporation, one of the nation's top producers of steel wire tendons for stressing concrete, has doubled the production capacity of its main fabricating plant at Corpus Christi, Tex. Located at 905 Navigation Blvd., the expansion means the plant will be able to produce prestressing tendons utilizing 1,320,000 ft. of steel wire per month.

CIMA elects McKenrick v.p.

Robert P. McKenrick has been elected to the office of executive vice president of the Construction Industry Manufacturers Assn. McKenrick has long been associated with sales in the Blaw-Knox Co., where in 1956 he was made vice president and general manager of the Construction Equipment Division at Mattoon, Ill. In the CIMA organization he will have as his assistant Carl G. Allen who has had wide experience in organizational work in Chicago.

Truck Crane joins Anthony Co.

Negotiations were recently completed for the purchase by Anthony Company, Streator, Ill., of Truck Crane, Inc., Chicago, Ill. Truck Crane manufactures a hydraulic truck crane of 5,000-lb. capacity. Plans call for the transfer of all manufacturing, sales and service functions to the main plant at Streator.

New sales manager announced

Appointment of V. David Demarest, Jr., as sales manager has been announced by Petersen Engineering Co., Inc., Santa Clara, Calif., manufacturer of the Pengo line earth augers and tension wire stringing equipment.

Waco buys Midwest Concrete

Waco Manufacturing Co., Minneapolis, Minn., announces the purchase of the assets of Midwest Concrete Form Co. of Forest Park, Ill. The merger provides a new line of forming panels to complete a full line of heavy and light pressure pouring panels for light and heavy construction. The new company will be known as the Waco Concrete Form Manufacturing Co.

Kaiser transfers Peake to Oakland

A. L. Peake has been appointed assistant manager of Kaiser Steel Corp.'s central district sales office in Oakland, Calif., succeeding Mark Anthony, recently named assistant to the vice president and general manager of Kaiser Steel. Prior to this appointment Peake was assistant manager in the southern district sales office in Los Angeles.

Permanente establishes new division

Permanente Cement Co. has established offices in the National Oil Bldg., 609 South Grand Ave., Los

New Automatic Front Engine Power Take-Off

The new Willard "Mixomatic," incorporating Fordomatic transmission with front engine power take-off provides more profit by faster operation and greater production per operator.

Willard "Mixomatic" does for the transit mixer what the same type of automatic transmission has done for trucks and passenger cars.

It gives close control of concrete flow and ease of operation.

Use of standard automotive parts assures reliability and availability of service everywhere.

Check all the features of these big 5 to 7 C. Y. Willard Truck Mixers. Write for complete information and prices. Dealers everywhere.



Features

Standard automotive parts used throughout drive line... service available everywhere.

New hopper design for faster charging.

3-way quick shut-off water valve.

New splash guards protect drum.

New, simplified FEPTO*

1. 2 speed gear box with sprocket and take-up for drive chain are easily accessible.

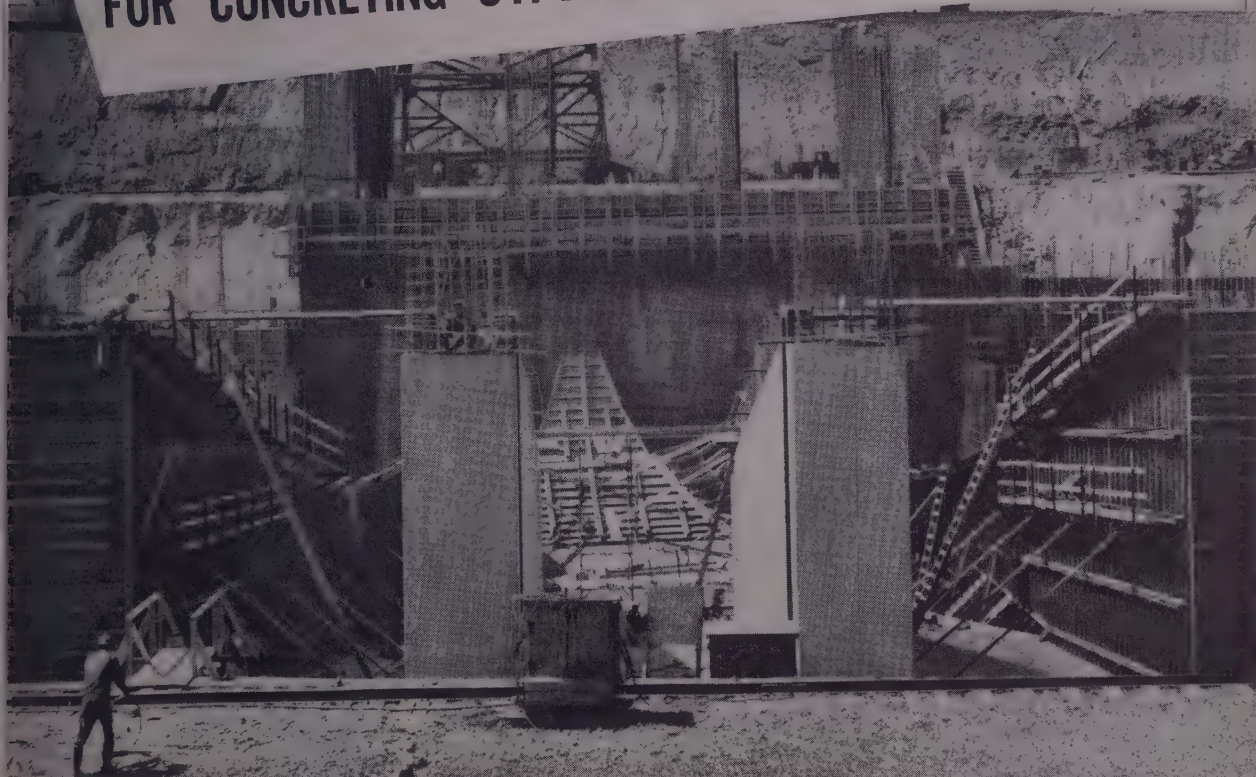
2. Front engine power take-off drives the drum through standard Spicer automotive drive line and Fordomatic transmission. Two mixing speeds and four discharge speeds give maximum flexibility. Two levers, throttle and transmission, simplify control of drum discharge operation.

*Front engine power take-off

Willard Truck Mixers

Manufactured in Los Angeles and Galion, Ohio • Member: T.M.M.B.
WILLARD CONCRETE MACHINERY CO.
11700 Wright Road, Lynwood, (Los Angeles County) California

STEEL FORMS PROVE FAR SUPERIOR TO WOOD FORMS FOR CONCRETING ST. LAWRENCE SEAWAY PROJECTS



BLAW-KNOX time and labor-saving STEEL FORMS surpass 12-month wood forms yardage in one summer season!

TWO concreting methods used on the St. Lawrence Seaway Project's Barnhart Island Power Dam showed significant differences between the use of steel forms and wood forms. Working a 12-month season on half of the dam, the contractor using wood forms was well ahead of the contractor responsible for the other half in yardage placed by the spring of '56. Last May, starting a "summer-season" schedule, B. Perini & Sons, Inc. utilized the speed and labor-saving advantages of Blaw-Knox Steel Forms to catch up with *and surpass* the wood forms users in concrete poured before the onset of cold weather last fall.

Here are a few of the reasons why Blaw-Knox Steel Forms have proved to be far superior on the Barnhart Island Power Dam:

- Steel forms mean speed! Perini could get one complete use of each set of steel forms every 3 weeks, as compared to a possible 7-week cycle on the wood forms.

- Piers, walls, roofs and the rear elbows of draft tubes can be formed and poured in low lifts. Forms can be moved quickly along from unit to unit of the dam, in a fast cycle of re-use.

- Designed specifically by experienced Blaw-Knox engineers for the exact configurations and construction joints of this structure, the steel forms saved the time and labor of building wood forms to fit each pouring phase.

Blaw-Knox Steel Forms engineers are backed by over 40 years' practical experience in solving concreting problems on dozens of big projects such as Chief Joseph Dam and The Dalles project, as well as many of the other lock and dam structures of the St. Lawrence Seaway. *You can put that experience to work for you.* Whether your job is a big dam, tunnel, bridge, or small sewer, be sure to call in the Blaw-Knox Steel Forms Consultation Service in the preliminary planning stage for the simplified, fast forming that increases your profits by reducing time and labor costs.

BLAW-KNOX COMPANY

STEEL FORMS DEPARTMENT • BLAW-KNOX EQUIPMENT DIVISION

P. O. BOX 1198 • PITTSBURGH, PA. • PHONE STERLING 1-2700



**BLAW-KNOX STEEL FORMS
CONSULTATION SERVICE**

Angeles, Calif., for the staff of its new Southern California Division. In making the announcement, James K. Beatty, vice president in charge of sales, said the new 2,500,000-barrel cement manufacturing plant at Lucerne Valley, Calif., is scheduled to begin production early this year. The new division will be headed by C. W. "Pete" McKinley with the title of Southern California division sales manager. He will be assisted by Frank Barker.

Raymond makes Moss a director

Announcement is made of the election of Donald W. Moss as a director of Raymond Concrete Pile Co., international foundation and construction firm, New York, succeeding Rear Admiral Kirby Smith, CEC, USN (ret.), who resigned. Associated with the company since 1936, Moss succeeded Admiral Smith as vice president in charge of domestic sales in March 1953.

Bethlehem top salesmen retire

Bethlehem Pacific Coast Steel Corp. announces the retirement of its two top salesmen in Seattle, Wash., after a combined service to the company of 84 years. Harold E. Gray, Seattle district manager, and H. Carroll Foxworth, senior salesman, were honored by some 75 fellow employees at a recent dinner. H. H. Fuller, president of the steel com-



NEWLY APPOINTED sales personnel representing Dresser Manufacturing Division on the West Coast, l to r.: *Gerald Melone*, representing the Northern California district, with headquarters in San Francisco; *C. R. "Bob" Keiser*, Southern California, headquartering in Los Angeles, and *Fred Frey*, serving the Northwest users of Dresser pipe joining and repair products from Portland, Ore.

pany, and S. S. Cort, vice president in charge of sales, added their tribute to the two sales leaders.

U. S. Steel promotes Montross

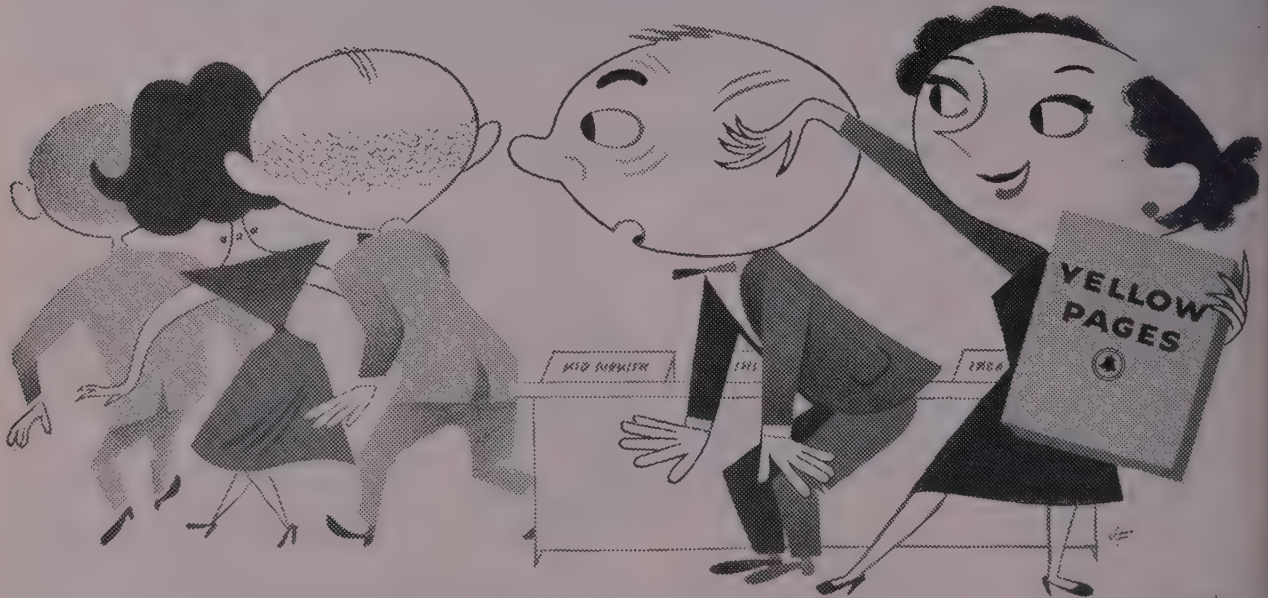
H. B. Montross, Jr., has been promoted to manager—heavy products sales for U. S. Steel's Columbia-Geneva Division. He will continue his headquarters in San Francisco, where he has been manager of product and market development since 1953. Montross succeeds John E. Mattos, recently made manager of sales in charge of manufacturing accounts in the Southern sales district.

S. K. Wellman names sales manager

Robert C. Brigleb has been appointed sales manager of the replacement sales department of The S. K. Wellman Co., filling a vacancy left by the retirement of Thomas A. Novotney. In addition, James E. Clegg will move from Philadelphia to Cleveland to become assistant sales manager.

Hough names two asst. sales mgrs.

G. A. Tamblyn, sales manager of The Frank G. Hough Co., Libertyville, Ill., announces the appointment of Robert L. Knox and Herman R.



Dismiss your panel of experts

You won't need them. For whatever you need—from abrasives to zippers—the Yellow Pages will tell you where to call.

Look in the Yellow Pages whenever any business problem comes up. The chances are you'll find a complete list of qualified people eager to help you.

You'll find it fast in the YELLOW PAGES





Thermoid helps assure performance of versatile "SPREAD-MASTER"

In surfacing roads or airport runways, this self-propelled Power Spreader, produced by Flaherty Mfg. Co. of Pocatello, Idaho, applies as much as 150 tons of abrasive aggregate an hour! Because continuous uniform conveyor operation is a must to prevent seams or streaks, Flaherty chooses Thermoid Conveyor Belting.

The two 20" belt conveyors are equipped with tough, durable Thermoid 4-ply Belting, specially selected for the work to be done.

There's a Thermoid Belt for every type of material handling problem. Because each belt is specifically designed for the job—you're assured longer wear, less downtime, fewer replacements.

Thermoid

Thermoid Company
Trenton, New Jersey
Nephi, Utah

Make Thermoid your choice,
too, for Multi-V Belts . . .

. . . and Hose manufactured
with your needs in mind

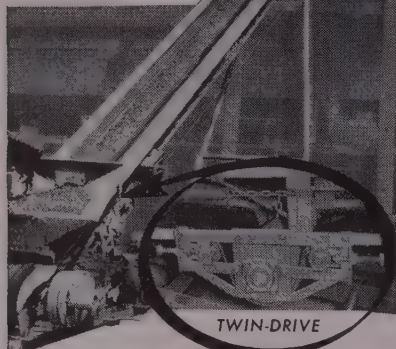


Your Thermoid Distributor
can help you select the
right Conveyor Belt, Hose
and Multi-V Belts to lower
your operating costs.

MULKEY

TWIN-DRIVE* BELT CONVEYOR

*Pat. Pending



**Handles . . . CONCRETE,
GRAVEL, WIDE MATERIALS**

MULKEY

CHAIN & FLIGHT CONVEYOR

**Handles Brick,
Blocks, Lumber,
Wide Materials**



Self-Aligning
Sealed Bearings

SAM MULKEY CO.

Box 270 • Lee's Summit, Mo.

SEE US FOR A DEMONSTRATION

C. P. CONCRETE EQUIP. CO., Inglewood
ROOFMASTER PRODUCTS CO., Los Angeles
CONTRACTORS EQUIP. & SUPPLY CO., Fresno
RICKER MACHINERY CO., Oakland
SOUTHERN EQUIP. & SUPPLY CO., San Diego
CRAMER MACHINERY CO., Portland
UNIVERSAL EQUIP. CO., Seattle
GENERAL MACHINERY CO., Spokane
ARNOLD MACHINERY CO., INC.,
Salt Lake City, Boise, Idaho Falls
WESTERN MACHINERY CO., Phoenix
CONTRACTORS EQUIP. & SUPPLY CO.,
Albuquerque
THE UNIVERSAL CO., Denver
EDWARD R. BACON CO., San Francisco,
Sacramento, Fresno, Oakland



THE ASPHALT INSTITUTE, College Park, Md., at a recent New York board meeting elected first and second vice presidents by geographical divisions, four in the Western area. Seated, l. to r.: **C. Wayne Barbour**, president of Allied Material Corp., Oklahoma City; **T. F. McGarey**, Cities Service Oil Co., New York City and **C. V. Kiefer**, Shell Oil Co., San Francisco. Standing: **J. M. Lackey**, Mole Refineries, Inc., Roswell, N. Mex.; **Phil C. Coyle**, Standard Oil Co. of Ohio, Cleveland; **Frank E. Widger**, The Texas Co., Chicago; **G. L. Farnsworth**, Husky Oil Co., Cody, Wyo.; **D. Hugh Jenks, Jr.**, Ashland Oil & Refining Co., Ashland, Ky. and **Edward J. Barnes**, Macmillan Petroleum Corp., Los Angeles, Calif.

Brown as assistant sales managers. Knox will have charge of distributor sales, and Brown will assume direction of manufacturers sales.

Steel company moves after 20 years

After serving Oregon steel users from their offices in the Pacific Building for twenty years, Bethlehem Pacific Coast Steel Corp.'s Portland sales staff recently moved to new quarters at 1010 S. W. 14th Ave. In discussing the steady growth of the sales organization, L. S. Kuhn, district manager of sales, commented that the expanded staff and new facilities are designed for the best possible service to Bethlehem Pacific customers in the Portland area.

Bill Kind named LeT-WESCO rep

Appointment of W. T. "Bill" Kind as district representative for Le-Tourneau-Westinghouse Co. in the Pacific Northwest is announced. In his new position, Kind will have charge of a territory which includes Washington and Oregon, the northern panhandle of Idaho, a small section of Northern California, British Columbia, and Alaska. Distributors with which he will work are Western Tractor & Equipment Co., Seattle; Loggers & Contractors Machinery Co. of Portland and Eugene; Vancouver Equipment Corp., Ltd., Vancouver, and Bashaw Equipment Co. of Anchorage.

D-A names Arizona representative

Appointment of Robert C. Fashbaugh as district representative for Arizona is announced by D-A Lubricant Co., Inc., Indianapolis, Ind. Fashbaugh, who lives in Phoenix, has had a number of years of experience in the field of heavy-duty lubrication.

Ryerson builds Spokane facilities

Newest improvement at the Spokane, Wash., steel service plant of Joseph T. Ryerson & Son, Inc., is an office building containing 4,500 sq. ft. of space. It forms an integral part of the plant, located at North 207 Frey. St. Roy M. Bialkowski, plant manager, states that the improvement has resulted in increased plant capacity because the former offices have been turned into warehouse space.

Outstanding small business selected

Standard Steel Corp., Los Angeles Calif., was named the "most outstanding of successful small businesses" at a recent breakfast given in their honor by the Los Angeles Chapter, National Association of Cost Accountants. From a small plant established 53 years ago, Standard Steel Corp. has expanded to a corporation whose products are widely known throughout the United States and in many foreign countries. President Robert S. Burns accepted the plaque honoring his company.

Lang organizes new company

The Lang Company, Inc., has been organized as a separate operating company. The organization of the new firm was made to individualize a rapidly expanding operation and to better serve the construction industry. Located at First South & Second West in Salt Lake City, Utah, no changes in personnel have occurred. H. A. Christiansen is manager. Parts manager is Dewey Dewsnap, and service manager, George Wood.

Merger of subsidiary companies

Paul Hardeman, Inc., constructors-engineers, announces the merger of its various subsidiary companies.

Rugged Kolman 202 Scalps Out Oversize with Ease

KOLMAN MODEL 202 CONVEYOR

This pile of heavy boulders couldn't daunt the low priced Kolman Model 202 Conveyor-Screen Plant.

The built-in reciprocating plate feeder in the feeder-hopper combination protects the belt from damage and provides a constant flow of material. The 24" conveyor belt delivers the gravel containing a high percentage of oversize boulders to the 7'x42" Kolman single-deck vibrating screen equipped with a 6" square-opening screen cloth.

This Model 202, owned and operated by the Jefferson County Highway Dept., Jefferson County, Colorado, meets the demand for a low-cost conveyor stout enough to carry a large single or double-deck screen and feeder-hopper combination in a completely portable plant. They have found it takes all the punishment that is dished out to a portable plant — and costs less money to buy and operate.

The rugged "box-type" construction of the Model 202 gives unusual strength and rigidity for such low prices. The sides are of fabricated $\frac{3}{8}$ " steel plate formed into a channel 16" deep with 2" legs. A steel belt cover completely covers the top, giving additional rigidity and completely encasing the return belt to prevent material from working in to cause belt damage.

The under-slung power unit provides easy access for operation and servicing. Self-cleaning tail pulley, bar type head pulley, ball bearings throughout and heavy truck axles and tires are included to give it the biggest combination of fine features to be found anywhere in the low price field.



(Above) Shovel loads hopper on this 40'x24" Model 202 Conveyor with 7'x42" screen on scalping job in Jefferson County, Colorado.



(Left) Feeder-trap or feeder-hopper combination is integral part of Model 202 Conveyor and single-deck screen folds under so complete plant can be moved without disassembly.

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HOENIX—Equipment Sales Co., 720 S. 19th Ave.
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RESNO—Allied Equipment Co., 1824 Santa Clara
LOS ANGELES—Brown-Bevis Industrial Equip. Co.,
6550 E. Washington
OAKLAND—Spears-Wells Machinery Co.
ACRAMENTO—Sacramento Valley Tractor Co.
COLORADO
DENVER—Faris-Moritz Equipment Co.
IDAH0
OISE—The Sawtooth Company, 1115 Grove St.
MONTANA
UTTE, BILLINGS, GREAT FALLS and MISSOULA—
Hall-Perry Machinery Co.
NEW MEXICO
ALBUQUERQUE and FARMINGTON—J. D. Coggins
Company

NEVADA
ELKO—A-D Machinery Co., 251 W. Commercial St.
OREGON
PORTLAND—Contractors Equipment Corporation
UTAH
SALT LAKE—Rasmussen Equipment & Supply Co.
WASHINGTON
SEATTLE—Air-Mac, Inc., 3838 4th Ave. South
WYOMING
CHEYENNE, CASPER, ROCK SPRINGS and SHERIDAN
—Wortham Machinery Co.
ALASKA
FAIRBANKS, ANCHORAGE—The Carrington Co.

Western Representative
S. A. MADRID
1729 32nd Ave., San Francisco 22

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KOLMAN Manufacturing Co.

5670 W. 12th St. Sioux Falls, S. D.

Send literature on following:

- ☐ 101 Heavy Conveyor
- ☐ 202 Junior Conveyor
- ☐ Vibrating Screens
- ☐ Traps ☐ Feeders

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Make your money earn real profits for you by investing in EFCO Steel Forms for your concrete construction. Original cost is low. Lifetime steel faces should never need replacing.

Owners of EFCO Forms are furnished form erection drawings without cost. These forms are adaptable to wide use, including construction of house foundations, and other large and small form requirements. They are easily and quickly assembled, and can be moved economically from job to job.

Although EFCO Steel Forms are available only on a purchase basis, other forms from Economy are available on a rental basis. Write Economy Forms Corporation, H. P. Station, Box 128, Des Moines 13, Iowa, for catalog and full address of office serving your area.

Other offices are in St. Louis, Mo.; Kansas City, Mo.; Lincoln, Neb.; Minneapolis, Minn.; Ft. Wayne, Ind.; Milwaukee, Wisc.; Chicago, Ill.; Cincinnati, Ohio; Cleveland, Ohio; Metuchen, N. J.; Rochester, N. Y.; Springfield, Mass.; Waltham, Mass.; New York, N. Y.; Washington, D. C.; Decatur, Ga.; Charlotte, N. C.; Dallas, Texas; Tulsa, Okla.; Houston, Texas; Los Angeles, Cal.; Oakland, Cal.; Denver, Colo.

into the parent company. The companies whose activities will now be carried on under the name of Paul Hardeman, Inc. are J. B. Gill Co., Wall Cryogenics, Inc., Climate Conditioning Corp., Systems Engineering Co., and Electronetics Corp. The firm's home office is in Los Angeles.

Top level appointment

J. Burke Long has been named a director and vice president in charge of sales promotion and expansion of Wagner Tractor Co., Portland, Ore. He was formerly president of the Mixermobile company with headquarters at Los Angeles, as wholesale distributor of Mixermobile products east of the Mississippi. Long plans the establishment of a larger dealer system for Wagner four-wheel drive tractors.

Expedited service in Northwest

In charge as Union Wire Rope Corp.'s district manager for the past few months, Eugene C. Hinken has completed plans for expediting service from the Portland, Ore., warehouse to distributors and users of standard and special purpose wire rope and slings in the states of Oregon, Washington, western Idaho and western Montana.

Hammond named district manager

Appointment of E. Weston Hammond as manager of the Los Angeles

district offices of Worthington Corporation is announced. Formerly a sistant manager, he takes the place of J. G. Murphy who has been named a special representative of the corporation.

Thos. Lenihan made C.I.T. head

Thomas E. Lenihan has been elected president of C.I.T. Corporation, industrial financing subsidiary of C.I.T. Financial Corporation, and



Thomas E.
Lenihan

announced by Arthur O. Dietz, president of the parent company. Lenihan succeeds Sydney D. Maddock who has assumed the position of chairman of the executive committee. Lenihan joined C.I.T. in 1928 and has spent his entire business life with the company.

Euclid Western office moves

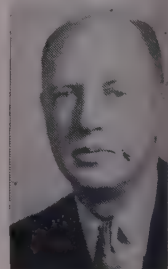
The Western regional office of Euclid Division, General Motors Corp., has moved to new offices in the Dorado Building, 360 Twenty-second St., Oakland, Calif., with M. H. Johnson, Western regional manager, and W. B. Dickerson, district representative now headquartered here.

Quick-Way promotes Heffron

Daniel S. Heffron has been elected vice president of the Quick-Way Truck Shovel Co., Denver, Colo. Well known in the construction equipment field, Heffron has been director of sales for Quick-Way since 1944 when he came to Denver from Chicago, where he was vice president of Midland Refractories Co.

Gerlach made general sales manager

Appointment of Lewis T. Gerlach as general sales manager of Kenworth Motor Truck Co. is announced by R. D. O'Brien, vice president and



Lewis T.
Gerlach

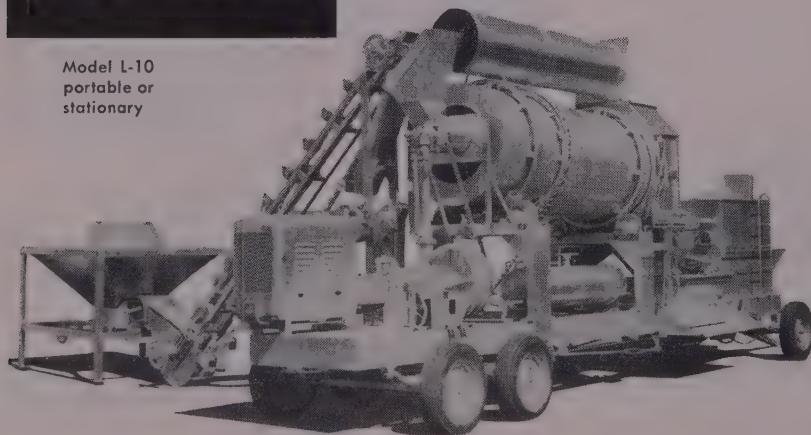
general manager of the Seattle Wash., truck manufacturing firm. Gerlach succeeds O'Brien on the latter's advancement to general manager. Serving as assistant general sales manager in charge of distrib-



Model L-10
portable or
stationary

NEW ASPHALT PLANT

\$13,500 (f.o.b. factory)



20 tons per hour hot mix capacity

Batch type 1000 lb. pug mixer with air-controlled gates. Has built-in asphalt heating kettle, reciprocating plate aggregate feeder. 50 hp engine or 30 hp electric motor. Write for catalog and name of nearest dealer. White Manufacturing Company, Elkhart 15, Indiana.

ONE MAN LOADS . . . ONE MAN OPERATES!

FOR HIGH PRODUCTION AND LOWEST OPERATING COSTS—

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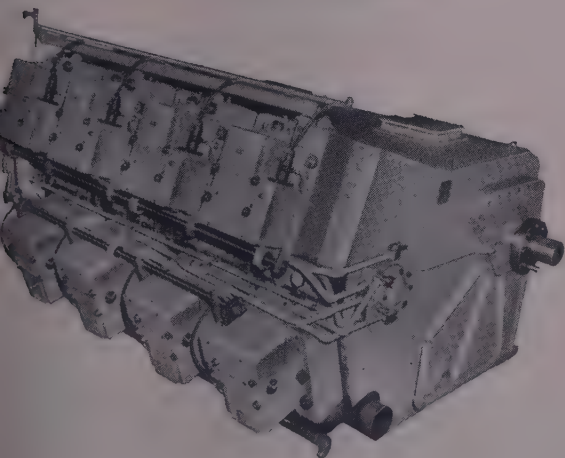
PAGE 700

SERIES
SINGLE DECK WALKING DRAGLINE

3 models
5 to 15 cubic
yard capacities



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**DRAGLINE-PROVED PAGE
HORIZONTAL V-TYPE DIESEL**



The Page Engines powering 700 Series Draglines are designed specifically for dragline work . . . to work longer, at lower cost, with less downtime and maintenance than any other engine. Big bearings, big pistons, a short, stiff crankshaft and slow (450 RPM) speed are only part of the story of why many Page Diesels are still producing maximum horsepower after 20 years of operation. Bulletin WDS-155 has full details.

Page 700 Series Draglines are rugged, compact, work-horse machines. They are designed and built with the fastest practical hoist and swing speed to reduce cycle time and increase yardage.

The Page 700 Series Dragline is proof that a fast, efficient, medium-sized machine will consistently outperform larger, but slower machines in virtually every kind of digging.

In addition, initial investment for a Page 700 Series Walking Dragline is considerably smaller, and operating and maintenance costs are lower. *Want more details? Write for Bulletin WDS-155 today. There's no obligation.*

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CLEARING P.O.—CHICAGO 38

Page

**Automatic Dragline
Buckets
Walking Draglines**

W-2001

If it's a PAGE... It DIGS

LUBRIPLATE No. 630-AA LUBRICATES ABOUT EVERYTHING



LUBRIPLATE No. 630-AA is practically a universal grease type lubricant. It was developed to meet industries' need for "simplified lubrication" . . . one lubricant to effectively satisfy a great number of requirements. LUBRIPLATE No. 630-AA has a smooth, stable consistency, a wide temperature range, possesses high film strength, fine adhesive properties and is water repellent. It satisfies most lubrication requirements, thus eliminates the need for a different lubricant for each application in many cases.

**REGARDLESS OF THE
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LUBRIPLATE
LUBRICANTS WILL
IMPROVE ITS OPERA-
TION AND REDUCE
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Newark 5, N. J. or Toledo 5, Ohio

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Hendrie & Bolthoff Co., Denver, Colo.
Sawtooth Company, Boise, Idaho
Paul Roberts Co., Pocatello, Idaho
Industrial Lubrication Supply Co., Eugene, Ore.
Moty & 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.
Northwater Company, Spokane, Wash.
Campbell Industrial Supply Co., Tacoma, Wash.
Dodge-Yakima Supply Co., Yakima, Wash.
Fleck Brothers, Ltd., Vancouver, B. C., Canada
Wilkinson & McClean, Ltd., Calgary, Alberta, Can.

LUBRIPLATE
THE MODERN LUBRICANT

tor sales since July 1955, Gerlach has been with Kenworth continuously for more than 20 years.

John W. Stang, Sr., dies

John W. Stang, Sr., president of John W. Stang Corp. of Los Angeles, Calif.; Tacoma, Wash.; Omaha, Neb., and New York City, one of the foremost wellpoint authorities of the United States, suffered a fatal heart attack last Dec. 1. Born in Philadelphia in 1900, Stang entered the construction equipment industry as a youth. For many years he enjoyed outstanding success in pioneering and selling newly developed heavy construction equipment. In 1940 he established the corporation bearing his name. He was a member of The Moles, a charter member of The Beavers, and an associate member of the American Society of Civil Engineers.

Galion has new training center

The training program of Galion distributor personnel has a new look and an increased effectiveness with the completion of the new sales and service training center building at The Galion Iron Works & Mfg. Co. in Galion, Ohio. The intensive training program is in charge of W. R. Troyer.

New Northwest sales manager

David P. McCarthy, Jr., has been named Yale hoist district sales representative for the Pacific Northwest territory, according to announcement by Frederick E. Rau, hoist sales manager of The Yale & Towne Manufacturing Co., Philadelphia, Pa. He will make his headquarters in Seattle, Wash.

Redmond made director of sales

D. J. Redmond has been appointed as director of sales of Hercules Galion Products, Inc., with responsibility for sales activities of the corporation's Hercules Steel Products Co., Galion Allsteel Body Co., Uni-steel Body Co. and Hydro E-Z Pack Co. divisions.

Engineering appointment

Appointment of William T. Stonehouse as sales and service engineer for the mining, crushing and process machinery division of Nordberg Manufacturing Co. is announced by D. A. Cheyette, division vice president and general manager. Stonehouse has his headquarters in the company's San Francisco office and will work in the various states assigned to this office.

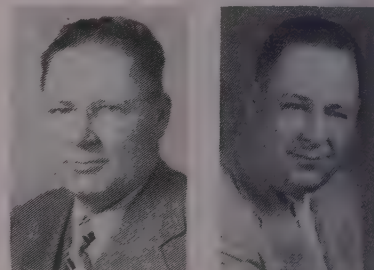
Trailmobile appointments in West

Trailmobile, Inc., Berkeley, Calif., announces three new appointments. Peter DeSantis, sales representative with the Los Angeles Branch, has been promoted to Southern manager, Industrial Fleet Sales, West Coast Division. Walter Skrondal, who be-

came associated with Trailmobile in 1950 as sales office manager, since then becoming sales representative assistant branch manager, and field sales representative, now become Northern manager. Raymond Sorcini, former salesman at Sacramento has been named resident sales representative in Phoenix, Ariz., maintaining offices at 2214 N. 27th Ave. He has a background of more than 10 years in the trailer business.

Minneapolis-Moline expansion

Major expansion of sales operations and staff at Minneapolis-Moline Co. is announced, with the appointment of a national sales staff headed by E. A. Henry, manager of the firm



Henry

Hansen

industrial power division. David J. Hansen, Jr., has been appointed sales manager in charge of dealer sales while George W. Balch has been appointed regional sales manager. Minneapolis-Moline has increased the number of models of utility and industrial wheel-type tractors, engine and power units and is adding a line of crawler tractors; also a line of pumps and irrigation equipment.

Keeping abreast of progress

Roy W. Johnson, executive vice president of The Republic Supply Co. of California, recently announced that three company vice presidents were among the 89 executives at the sales-manager level or above attending a course in management for industrial distributors sponsored jointly by the Harvard Graduate School of Business Administration and the National and Southern Industrial Distributors Association. In speaking about the Harvard course, Johnson said that "Modern business management as a profession has become as exacting as that of an engineer. The executive must constantly study to keep abreast of progress and experience in his line."

A-C elevates Boyd Oberlink

Boyd S. Oberlink, group vice president of Allis-Chalmers Manufacturing Co., has been elected to the firm board of directors. He was elevated to his present position as group vice president in January 1956. Prior to that he was vice president and general manager of the Construction Machinery Division.



"Going places fast" describes El Cerrito Readymix of Decoto, California. Providing a big assist is its new fleet of 7 Cal-Rex Moto-Mixers.

Sticklers for top concrete quality, El Cerrito studied them all. Cal-Rex got the nod—not only for the built-in quality control of these modern mixers, but also for Cal-Rex's extra speed features that hike profits.

Western-built strictly for Western needs, these higher income mixers offer more advantages for your operation—Rex FEPTO for one. This Front End Power Take-Off wraps up a host of money-saving features in a simply engineered system.

The mixer drum is front-engine driven, so you cut fuel and service costs. At the same time, you get assured concrete quality every trip because mixer power is delivered from the *front* of the engine crankshaft. Drum rotation is remarkably constant since it is independent of truck gear train and road speed. With Rex FEPTO, special trucks aren't needed.

REX FEPTO out front for advantages

You can have Rex Front End Power Take-Off with choice of a Rex 202 heavy-duty, two-speed transmission—or Rex 101 automotive type with four drum speeds. Both reverse. Electric drum disconnect clutch gives push-button declutching of drum when you need the full engine output to climb a tough grade or wade through mud. You get instantaneous control for curb and gutter, thin-wall work, etc.

Before you buy any mixer, be sure you get all the Cal-Rex advantages. Call, write or visit your Cal-Rex distributor. CHAIN Belt Company, 7601 Telegraph Rd., Los Angeles 22, Calif., RAymond 3-5227.



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Foster's Rental Service provides the steel-sheet piling you need—when you need it for your job. Depend on immediate shipments of the exact sections and exact lengths from Foster's nationwide warehouse and field stocks. Foster's Rental Plan gives you low fixed expense, provides an extra advantage in bidding. Write for catalogs.

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Air Reduction Pacific expands

An increase in the capacity of the air separation plant at Seattle, Wash., of Air Reduction Pacific Co., a division of Air Reduction Co., Inc., is announced by H. P. Etter, president of the West Coast company, tripling the plant's present capacity. The Seattle district of Air Reduction Pacific is under the supervision of L. A. Hamilton, vice president.

Shepard is Gar Wood div. mgr.

M. L. Shepard is division manager of Gar Wood Industries, Inc., Richmond, Calif. He succeeds D. J. Byrd.

Caterpillar expansion

Plans to build a 500,000-sq. ft industrial engine plant have been announced by H. S. Eberhard, president of Caterpillar Tractor Co. The Peoria firm also announced that it will construct a new research center and general offices building. These facilities will be located on a 1,100-ac. site just north of downtown Peoria. This construction forms an important part of Caterpillar's overall building program, estimated to cost in excess of \$200,000,000 for the next three years.

Lynn Chapman goes to Danville

Lynn Chapman, Hyster Company, formerly of the methods engineering

department, Portland, Ore., factory has been transferred to the position of supervising methods engineer at the Danville, Ill., factory.

Top level promotions

Appointment of John G. Holstrom to the newly created position of vice president of engineering and research and development for all divisions of Pacific Car & Foundry Co. was re-



Holstrom



O'Brien

cently announced in Seattle, Wash., by Paul Pigott, president. Pigott also announced the election of Robert D. O'Brien to a vice presidency to succeed Holstrom in charge of the Kenworth Motor Truck Co. division of the firm. O'Brien has been general sales manager at Kenworth.

Personnel changes at IH

H. T. Reishus, vice president, Construction Equipment Division, International Harvester Co., Chicago recently announced some personnel changes in this division, among them the transfer of H. C. Barlow to manager of the Western region, covering parts of Idaho, Washington, Utah and Montana; and the placing of responsibility for the activities in California, Arizona and Nevada in the hands of H. W. Bibler.

Ideal Cement expands in Calif.

First step in the plant construction program of the Ideal Cement Co. at Redwood City, Calif., was recently taken when an order was placed with F. L. Smith Co. for two new kilns. Engineering is now under way on a \$3,000,000-bbl. cement plant to be constructed alongside the company's present plant in Redwood City.

New manager at Thew division

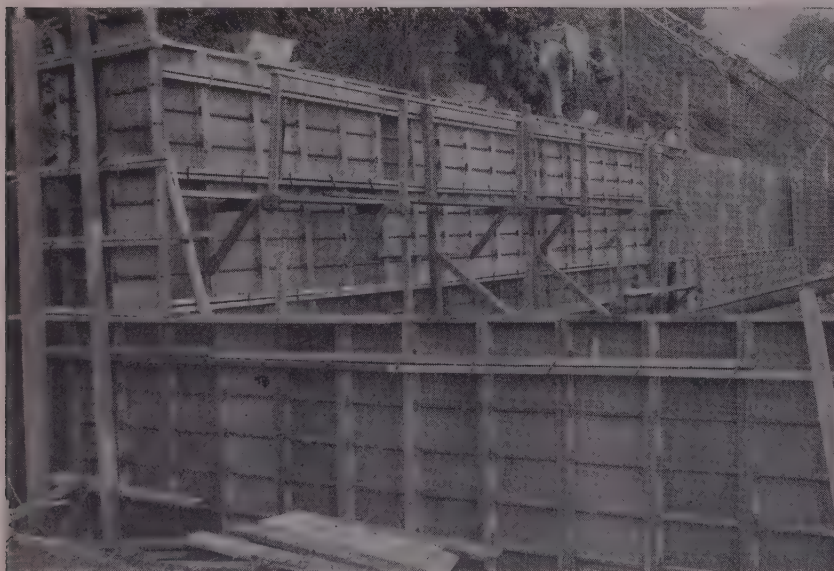
Don L. Douglass, formerly part sales manager of the Thew Shovel Co., Lorain, Ohio, has been appointed manager of the parts division in Elyria, Ohio. Douglass replaces A. W. Wagner who has tentative plan for moving to the West Coast.

Barber-Greene expansion

Barber-Greene Co. of Aurora, Ill. announces two significant plant expansion projects. A completely new manufacturing facility is now under construction near De Kalb, Ill., and it is anticipated that it will be in full

(Continued on page 194)

Advertisement



Symons Forms Help Build Retaining Wall

James H. MacFarland Contractor, San Francisco, California, used Symons High Strength Forms with steel cross members on 12" centers to build retaining walls for petroleum storage, Crissy Field, The Presidio. This heavy duty form is recommended for pouring concrete walls with pressures up to 1,500 pounds per square foot. Its weight averages just 5 pounds per square foot. Symons Forms are not confined to a single type of application. They can be used on any type of general construction job and on any height wall. Frequent tests prove that no other method of forming can do a more efficient job.

Symons Representatives and Engineers can help you with any forming problem and will train your men to do a fast and excellent job. Symons Forms can be rented with purchase option.

Symons Clamp and Mfg. Company, 634 Williams Street, San Leandro, California.

Phone: Lockhaven 9-9159

"Best for handling big rocks,"

says Cosmo Constr. Co., President

WHILE building an interchange to connect U. S. Highways 33 and 66 with the Oklahoma Turnpike at Tulsa, Cosmo Construction Co., Tulsa, Oklahoma City, ran into soft shale and clay, plus 12' layers of drill-and-blast rock and solid limestone. In the worst cut, which was 41', excavators even uncovered a vein of coal.

To move these tough materials from the cuts, Cosmo brought in 3 shovels, 4 crawlers, 2 graders (one an Allis-Chalmers), and three 22-ton capacity Tournapull Rear-Dumps. The Rear-Dumps profitably handled all the material moving on this 400,000-yd. job.

Rear-Dumps take rock "beating"

The seams in layers of limestone created unforeseen difficulties, and contributed to making job exceedingly tough for Cosmo. The clay and shale took the "bite" out of dynamite blasts. So, extra blasting was necessary and fragmentation was poor. A crane,

equipped with a ball, had to break the big, hard-to-handle rock fragments down to size for the dipper, so shovel operator could pile a good load into the Rear-Dumps.

Low rear-entry and 8'9" wide-bowl made Rear-Dumps an easy target for fast shovel-loading. Triple-layer, all-steel floor of Rear-Dump body was particularly important on this job, because it could safely withstand pounding of heavy big-chunk rocks dropped by shovel.

"Right equipment can lick any job"

Rear-Dumps' ability to travel fast, at speeds up to 32 mph, was a big asset in speeding hauls. Although hauling conditions were tough, these Rear-Dumps continuously maintained good production. For instance, working a 1½-mile cycle, they hauled about 1500 cu. yds. of coarse, blasted material per day out of one 34' cut. According to Cosmo President, Clyde L. Ottinger, "LeTourneau-Westinghouse Rear-Dumps are best there are for handling large rocks

and for long hauls." He added, "Good supervisors and the right kind of equipment can lick any job." Cosmo seems to have plenty of both!

Rear-Dumps . . . good heavy-duty haulers

For those big hauling jobs ahead, investigate Tournapull Rear-Dumps. They're top production haulers that can work profitably in rugged terrain or adverse weather conditions to give you more daily work output. Available in 3 sizes to fit your particular jobs: 11, 22, and 35-ton models. Write for details on these outstanding heavy-duty haulers.

Front-wheel drive and big 4-wheel air brakes let operator back Tournapull Rear-Dump safely to edge of dump area. Finger-tip switch activates electric hoist motor that raises and lowers body under positive 2-way control. As bowl swings below and behind rear wheels, to 66° dumping angle, it unloads rocks safely . . . prevents load from rolling forward against wheels.



Wide bowl provides easy target for shovel operator . . . speeds up shovel-loading and greatly reduces spillage. Low rear-entry into bowl lets shovel swing in and out at low dumping heights, also permits loading big boulders from dipper top with minimum effort or danger.

Adams—Trademark, Tournapull — Trademark Reg. U. S. Pat. Off. CB-1022-M-9



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company
WHERE QUALITY IS A HABIT

UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—10 miles roadwork in New Mexico.

New Mexico—Chaves County—State. A \$178,428 contract was awarded Harry Trotz for construction of 10 mi. of highway east of Hagerman.

(1) Harry Trotz.....	\$178,428	
(2) Longenbaugh & Coe, Inc.....	179,683	
G. I. Martin.....	181,619	
Jack Adams.....	182,688	
	(1)	(2)
Lump sum	Removal of old structures.....	\$ 500.00 \$1,000.00
Lump sum	Removal of obstructions.....	500.00 1,000.00
Lump sum	Clearing & grubbing.....	14,700.00 10,000.00
129,900 cu. yd.	Excavation—unclassified.....	.21 .24
680 cu. yd.	Excavation for pipe culverts.....	1.50 1.00
9,115 M gal.	Watering.....	.75 .50
210 hr.	Rolling (tamping roller).....	7.00 10.00
415 hr.	Rolling (pneumatic tired).....	5.00 5.00
160 hr.	Rolling (steel tired).....	6.00 7.00
790 hr.	Fifty (50) ton roller operation.....	10.00 12.00
160 hr.	Mechanical tamping.....	5.00 4.00
246,614 sta. yd.	Station yard overhaul.....	.01 .01
41,530 ¼ mi. yd.	Quarter mile yard haul.....	.05 .05
117,310 ton mi.	Ton mile haul.....	.04 .07
3.2 mi.	Obliterating old road.....	300.00 100.00
8,400 lin. ft.	Contour ditches.....	.10 .05
5 ea.	Cattle guard—24 ft. roadway.....	2,100.00 2,600.00
4,580 lin. ft.	Galvanized barbed wire fence.....	.22 .20
1 ea.	Gates—Texas type.....	10.00 10.00
8 ea.	Bracing.....	10.00 15.00
108 ea.	Right-of-way markers.....	8.00 8.00
1 ea.	Stand. Fed. aid proj. markers, Type I.....	100.00 50.00
36 ea.	Treat. tmbr. warn. posts refi. (6 in. dia.).....	8.00 6.00
40,200 ton	Controlled gradation sub-base.....	.60 .60
25,650 ton	Base course.....	.77 .77
1,345 bbl.	Bituminous material, Type MC-1.....	5.50 6.00
1,010 bbl.	Bituminous material, Type 120-150.....	6.00 6.00
1,760 ton	Cover material.....	4.00 3.50
34 cu. yd.	Class "B" concrete for cut-off walls.....	50.00 50.00
59 cu. yd.	Grouted rock retards.....	20.00 20.00
1,078 lin. ft.	Culvert pipe—24 in. diam.....	6.25 6.00
654 lin. ft.	Culvert pipe—36 in. diam.....	10.50 11.00
108 lin. ft.	Culvert pipe—42 in. diam.....	13.50 14.00
310 lin. ft.	Culvert pipe—48 in. diam.....	16.50 16.00

HIGHWAY—Grading and surfacing at Mesa Verde Park.

Colorado—Montezuma County—Bureau of Public Roads. Hinman Bros. Construction Co. was awarded a \$320,803 contract for grading and base surfacing of 3 mi. of Mesa Verde Park entrance road.

(1) Hinman Bros. Construction Co.....	\$320,803	
(2) Northwestern Engineering Co.....	346,799	
Colorado Construction, Inc.....	349,826	
E. J. Rippey & Sons.....	428,026	

	(1)	(2)
Contingent sum	Miscellaneous force account work.....	\$10,000.00 \$10,000.00
20 ac.	Clearing and grubbing.....	300.00 400.00
10,000 cu. yd.	Stripping and storing topsoil.....	.35 .72
120,000 cu. yd.	Unclassified excavation.....	.62 .72
450 cu. yd.	Unclass. excavation for structures.....	2.00 4.00
450,000 sta. yd.	Overhaul.....	.01 .02
14,000 cu. yd. mi.	Overhaul.....	.15 .30
6,900 cu. yd. mi.	Replacing topsoil.....	.95 1.00
2,400 units	Watering of embankment.....	3.00 3.00
550 units	Watering of base course.....	4.00 4.00
Lump sum	Prov. and maint. wat. plant or plants.....	3,915.00 1,200.00
650 hr.	Rolling of embankment.....	9.40 12.00
150 hr.	Rolling of base course.....	10.00 10.00
33,000 ton	Subbase material crushed gravel or crushed stone base.....	2.10 2.10
18,000 ton	Course, Class 2, Grading D-1.....	2.55 2.55
60,000 sq. yd.	Processing bituminous base.....	.12 .12
61,000 gal.	M.C. cutb. asph., Grade 0, 1, 2 or 3.....	.25 .25
6,000 gal.	R.C. cutback asphalt, Grade 1 or 2.....	.27 .27
4 cu. yd.	Conc. Class A (air-entrained conc.).....	135.00 125.00
938 lb.	Low-alkali cement.....	.54 .40
55 cu. yd.	Struct. steel—furn., fbr., & erected.....	80.65 110.00
170 lin. ft.	8-in. C.G.S.M. culvert pipe.....	2.95 3.00
1,322 lin. ft.	24-in. C.G.S.M. culvert pipe.....	7.00 8.00
244 lin. ft.	36-in. C.G.S.M. culvert pipe.....	12.75 14.00
92 lin. ft.	60-in. C.G.S.M. culvert pipe.....	30.00 28.00
110 lin. ft.	29 in. x 18 in. arch culvert pipe.....	6.70 8.00
62 lin. ft.	58 in. x 36 in. arch culvert pipe.....	20.00 22.00
7 ea.	24-in. metal pipe end sections.....	48.00 50.00
2 ea.	36-in. metal pipe end sections.....	130.00 140.00
4 ea.	29 in. x 18 in. met. pipe arch end sect.....	53.75 50.00
2 ea.	58 in. x 36 in. met. pipe arch end sect.....	170.00 170.00

90 sq. yd.	Grouted rubble gutter.....	13.50 30
650 lin. ft.	Combination conc. curb and gutter.....	3.45 3
750 sq. yd.	Bituminous sidewalk timber guide posts with reflector.....	2.30 4
170 ea.	Strips (treated), Type 1.....	6.75 8
10 ea.	Barrier posts (treated).....	10.65 15
140 units	Turf shoulders.....	47.00 44
50 hr.	Road grader.....	14.00 15
300 hr.	Tractors.....	17.00 15
16,000 sq. ft.	Remove metal cribbing.....	.60

HIGHWAY—Grading and base surfacing in Wyoming.

Wyoming—Teton County—Bureau of Public Roads. A \$631,452 contract was awarded Etlin E. Peterson for one mi. grading and surfacing in Grand Teton National Park.

(1) Etlin E. Peterson.....	\$631,452	
(2) Chas. M. Smith.....	648,406	
Long Construction Co., Inc.....	775,937	

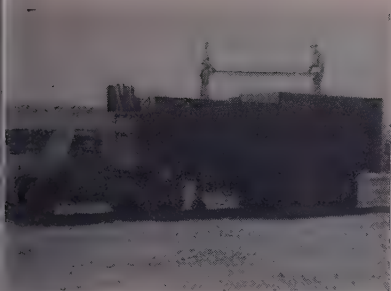
	(1)	(2)
Cont. sum	Miscellaneous force account work.....	\$ 3,000.00 \$3,000.00
13,000 cu. yd.	Stripping and storing topsoil.....	.65
55,000 cu. yd.	Unclassified excavation.....	.675 1
3,000 cu. yd.	Unclassified excavation for structure.....	12.00 15
340,000 sta. yd.	Unclass. excav. for borrow, Case 1.....	.675 1
45,000 cu. yd. mi.	Overhaul (1,000 ft. free haul).....	.02
	Special overhaul of borrow (1,000 ft. free haul).....	.20
13,000 cu. yd.	Replacing topsoil.....	.80
Cont. sum	Obliteration of old roadways to be paid for as earned.....	2,000.00 2,000.00
1,000 unit	Watering of embankment.....	1.50 1
600 unit	Watering of base course.....	2.00 2
Lump sum	Prov. and maint. wat. plant or plants.....	1,000.00 1,000.00
500 hr.	Rolling of embankment.....	13.00 9
160 hr.	Rolling of base course.....	10.00 7
19,000 ton	Subbase material.....	.95 1
18,500 ton	Crushed gravel or crushed stonebase course, Class 2, grading D-1.....	1.40 2
64,000 sq. yd.	Processing bituminous base.....	.16
65,000 gal.	M.C. cutback asph., grade 0, 1, 2 or 3.....	.23
7,000 gal.	R.C. cutback asph., grade 1 or 2.....	.30
1,567 cu. yd.	Concrete Class "A" (air-entrained concrete low-alkali cement).....	82.00 76
331 cu. yd.	Conc. Class "S" (low alkali cement).....	82.00 52
161,100 lb.	Reinforcing steel.....	.16
564,700 lb.	Struct. steel—furn., fabr. and erc.....	.24
1,482 lin. ft.	Railing.....	10.00 10
300 lin. ft.	18 in. C.G.S.M. culvert pipe.....	7.00 7
224 lin. ft.	24 in. C.G.S.M. culvert pipe.....	8.00 9
8 ea.	24 in. metal pipe end sections.....	60.00 40
1,620 lin. ft.	Combination conc. curb and gutter.....	4.50 3
1,400 lin. ft.	12 in. treated log curb.....	6.00 3
650 sq. yd.	Concrete sidewalk.....	7.00 7
1,300 sq. yd.	Bituminous sidewalk.....	3.00 2
40 ea.	Timber guide posts with reflector strips (treated), Type 1.....	10.00 10
80 ea.	Barrier posts (treated).....	10.00 5
4,800 cu. yd.	Furn. and placing loamy topsoil.....	3.00 1
160 unit	Turf shoulders.....	54.00 25
Lump sum	Removal of Old Snake River Bridge.....	14,000.00 7,300.00

HIGHWAY—Roadwork and construction of four bridges

California—San Mateo County—State. Chas. L. Harney, Inc., was awarded a \$1,583,505 contract for 2 mi. grading and paving and construction of four bridges.

(1) Chas. L. Harney, Inc.....	\$1,583,505	
(2) L. C. Smith Co.....	1,608,464	
Guy F. Atkinson Co.....	1,750,749	
Piombo Construction Co.....	1,805,555	

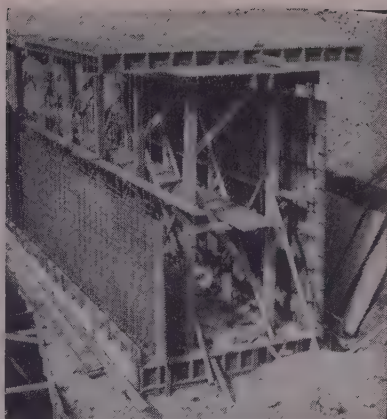
	(1)	(2)
54 ea.	Portable timber barricades.....	\$ 50.00 \$ 25.00
Lump sum	Remove pipe railing.....	1,000.00 500.00
15 ea.	Remove & reset. mail boxes.....	10.00 10
26,000 lin. ft.	Remove traffic stripes.....	.12
8 ea.	Remove & backfill inlets.....	50.00 60
277 cu. yd.	Remove concrete.....	24.00 12
4,800 sq. yd.	Remove concrete pavement.....	1.00
Lump sum	Clearing and grubbing.....	7,800.00 20,000.00
Lump sum	Dev. wat. sup. and furn. wat. equip.....	53,700.00 43,900.00
9,500 M gal.	Applying water.....	1.00 1
125 000 sq. yd.	Compacting original ground.....	.05



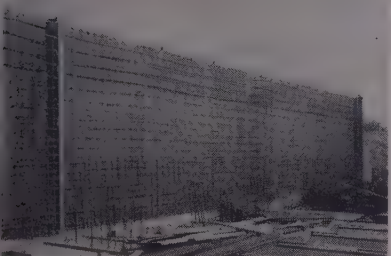
STORAGE—Absence of wooden or metal frames permits stacking up to 7500 sq. ft. of panels on a truck.



LARGE THEATRE in Alaska—Note minimum alignment and bracing.



CONCRETE CULVERT—All Ply panels used 11 times in covering the 336 ft. length.



STACKING DESIGN—Simplifies stacking the forms at job site. All Ply's weigh less than 5 psf.



FOUNDATION—Erects fast . . . two men only on inside; no liners on outside.

SUPERIOR ALL-PLY FRAMELESS PANELS CUT FORMING TIME

Unique Combination Clamp and One Blow of a Hammer Does Three Separate Jobs

In all types of concrete form work, from residential to large industrial projects, contractors have reported the versatility and substantial labor saving of Superior All-Ply panels.

The panels are of 1½" plywood, without a metal or wooden frame, yet providing great strength and rigidity.

A unique 3-way Combination Clamp (*the only working part*) is the secret of All-Ply's superiority . . . It does 3 separate jobs with one blow of a hammer: (1) Locks the panels; (2) Secures snap tie head, which acts as both spreader and tie; (3) Secures and

draws up liners, which generally are required on one side only.

Weighing less than 5 lbs. per sq. ft., standard ALL-PLY panels come ready for use with Superior Snap Ties.

Panels come in standard sizes of 2 x 4, 2 x 6, and 2 x 8 ft. . . Also special corners and fillers as required.

On your next forming job, discover the convenience and labor saving of All-Ply panels . . . *for complete details request a copy of our 12-page catalog.*

SUPERIOR CONCRETE ACCESSORIES, INC.

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

PACIFIC COAST PLANT
2100 Williams St., San Leandro, Calif.

NEW YORK OFFICE
1775 Broadway, New York 19, N.Y.



Million ELEMENTARY SCHOOL—Plywood face and rigid locking of forms by Combination Clamp insure clean, true surfaces.



ONE BLOW of hammer locks panel, secures snap tie, holds liner.



ALL PLY PANELS come in 3 standard sizes: 2 x 4, 2 x 6 and 2 x 8 ft.

125,000 cu. yd.	Roadway excavation.....	.53	.51	ea.	Additional unwatering.....	15,000.00	25,000
790 cu. yd.	Roadway excavation (bridge).....	2.00	2.00	CHANNEL DREDGING			
9,500 cu. yd.	Structural excavation.....	2.50	3.00	72,000 cu. yd.	Channel excavation, common....	1.50	3
6,000 cu. yd.	Structural backfill.....	4.70	4.18	22,500 cu. yd.	Channel excavation, rock.....	3.00	6
7,100 cu. yd.	Ditch and channel excavation.....	1.15	1.00	FOUNDATION EXCAVATION, DRILLING & GROUTING			
136,000 ton	Imported borrow.....	1.04	1.00	500,000 cu. yd.	Excavation, common.....	.95	1
108,000 ton	Imported subbase material.....	1.04	1.20	310,000 cu. yd.	Excavation, common, in excess of		
9,000 ton	Imported top soil.....	1.65	1.20	500,000 cu. yd.	Excavation, rock.....	4.50	4
17,500 sq. yd.	Preparing roadside areas (roadside development).....	.065	.09	250,000 cu. yd.	Excavation, rock, in excess of	1.00	2
44,000 sq. yd.	Mix., spread, and compact. cem. tr. subgrade.....	.24	.25	40,000 cu. yd.	Excav., rock, under powerhouse draft tubes below elevation 245	2.00	2
99,000 sq. yd.	Mix., spread and compact C.T.B....	.30	.25	8,600 sq. ft.	Line drilling.....	.43	1
8,500 bbl.	Portland cement.....	4.50	4.50	2,000 sq. yd.	Special excavation clean up.....	5.05	7
150 ton	Asphaltic emulsion (cur. sl., pnt. bdr. and sl. ct.).....	38.00	45.00	700 bag	Portland cem., Type II, for grout	3.50	1
45 ton	Liquid asphalt, MC-2 (curing sl.)...	38.00	48.00	300 bag	Portland cem., Type III, for grout	4.02	1
30 ton	Liq. asph. SC-1 (pr. ct. & pen. tr.)...	38.00	44.00	1,000 bag	Placing grout.....	3.00	2
890 ton	Paving asphalt (P.M.S.).....	6.35	6.00	120 ea.	Minimum payment for pump connection and pressure grouting.....	10.00	10
17,800 ton	Mineral aggregate (P.M.S.).....	6.35	6.00	1 lump sum	Scaling.....	20,250.00	7,500
100 sq. yd.	Placing P.M.S. ditch lining.....	2.00	1.00	1 lump sum	Mobilization and demobilization of grouting equipment.....	9,450.00	3,000
280 ton	Screenings (seal coats).....	7.50	6.50	POWERHOUSE SPUR TRACK AND ACCESS ROADS			
10,300 cu. yd.	Class "B" concrete (pavement).....	17.00	17.50	2,600 cu. yd.	Excav., rock, for spur track and access roads.....	2.35	1
10,000 ea.	Pavement tie assemblies.....	.60	.60	133,700 cu. yd.	Excav., com., for spur track and access roads.....	.80	
890 cu. yd.	Class "A" concrete (structures).....	58.00	40.00	226,700 cu. yd.	Compacted random fill.....	.27	
Lump sum	Cl. "A" conc. (bridges) (2,360 cu. yd.)	120,000.00	127,500.00	50 hr.	Additional rolling.....	15.00	20
128 lin. ft.	Concrete railing.....	8.50	9.00	286,000 cu. yd.	Random rock fill.....	.27	
35 lin. ft.	Rubber waterstops.....	3.00	3.00	2,000 cu. yd.	Sand filter.....	3.38	
105,000 lb.	Bar reinforcing steel.....	.13	.12	3,000 cu. yd.	Gravel filter.....	3.38	
Cont. sum	Bar reinf. steel (bridges) (388,000 lb.)	40,000.00	43,500.00	144,500 cu. yd.	Semi-compacted fill.....	.14	
2,010 lin. ft.	Furn. treated Douglas fir piling....	2.00	1.95	17,700 cu. yd.	Gravel stabilization.....	1.35	1
7,500 lin. ft.	Furn. Douglas fir piling.....	.90	.82	POWERHOUSE, SPILLWAY, NON-OVERFLOW DAM SECTION FISHLADDER AND FISHWAY PUMPING PLANT			
2,565 lin. ft.	Furn. conc. piling (driven type)....	3.50	4.00	35,500 lin. ft.	Drill, for and grout, anchor bars	.81	18
4,575 lin. ft.	Conc. piles (cast-in-drill holes)...	6.00	9.00	34,930,000 lb.	Steel reinforcement, interm. grade	.14	
151 ea.	Driving piles.....	85.00	100.00	42,000 lb.	Steel reinforcement, struct. grade	.14	
Cont. sum	Struct. steel (Marsh road overcrossing) (260,000 lb.)	43,000.00	48,000.00	570,000 bbl.	Portland cement.....	5.20	48
Cont. sum	Furn. struct. steel (Henderson underpass) (290,000 lb.)	53,200.00	55,000.00	150,000 cu. yd.	Concrete mass.....	15.78	16
31,700 lb	Misc. iron and steel.....	.45	.30	144,000 cu. yd.	Conc., mass in exc. 150,000 cu. yd.	9.50	2
Lump sum	Pumping plant metal work.....	1,300.00	1,000.00	253,000 cu. yd.	Concrete, structural.....	15.78	28
Lump sum	Clean, and paint struct. steel.....	8,300.00	9,000.00	17,250 cu. yd.	Con. struc. in south shore fishway	55.25	62
2,200 cu. yd.	Cl. "B" conc. (curbs, gutters and sidewalks).....	37.00	34.00	20,900 cu. yd.	Con. struc. p/house fishway chan.	55.25	75
23 ea.	Survey monuments.....	28.00	20.00	970 cu. yd.	Concrete for temporary lining in generator bays 4, 5 and 6....	43.75	110
750 cu. yd.	Broken conc. riprap.....	11.50	9.00	HIGHWAY—Nine miles of roadwork in New Mexico			
270 cu. yd.	Class "B" conc. (channel lining)....	36.00	33.00	New Mexico—Rio Arriba County—State. A \$515,829 contract awarded to Brown Contracting Co. for construction of 9.406 mi. of high and bridge structures.			
2,390 lin. ft.	Metal plate guard railing.....	4.00	3.95	(1) Brown Contracting Co.....	\$515,829		
320 lin. ft.	Salvage guard railing.....	.40	.65	(2) Wayne A. Lowdermilk, Inc.....	515,932		
700 lin. ft.	Reconst. galv. guard railing.....	1.30	1.15	O. D. Cowart.....	569,774		
464 lin. ft.	Steel railing.....	9.00	8.00			(1)	(2)
Lumps um	Pedestrian overcrossing railings....	12,000.00	10,000.00	Lump sum	Removal of old structures.....	\$12,000.00	\$22,500
210 ea.	Mkrs., horiz. refl. units & guide posts	7.00	6.50	Lump sum	Removal of obstructions.....	2,500.00	500
21,900 lin. ft.	72 in. chain link fence.....	1.70	1.70	261,800 cu. yd.	Excavation—unclassified.....	.43	
450 lin. ft.	36 in. casing pipe.....	42.00	50.00	1,245 cu. yd.	Excavation for structures.....	2.00	
60 lin. ft.	54 in. casing pipe.....	70.00	75.00	6,149 cu. yd.	Excavation for pipe culverts.....	1.50	
2,000 lin. ft.	12 in. R.C.P. (std. str.).....	2.50	3.00	10,902 M gal.	Watering.....	.50	
260 lin. ft.	15 in. R.C.P. (std. str.).....	2.80	3.50	366 hr.	Rolling (tamping roller).....	11.00	
300 lin. ft.	18 in. R.C.P. (std. str.).....	4.00	4.25	743 hr.	Rolling (pneumatic tired).....	5.00	
3,500 lin. ft.	24 in. R.C.P. (std. str.).....	6.00	5.80	444 hr.	Rolling (steel tired).....	7.00	
80 lin. ft.	24 in. R.C.P. (extra str.).....	6.80	7.00	1,203 hr.	Fifty (50) ton roller operation....	7.00	
180 lin. ft.	42 in. R.C.P. (std. str.).....	16.00	17.5	930 hr.	Mechanical tamping.....	7.00	
300 lin. ft.	51 in. R.C.P. (std. str.).....	23.00	19.50	271,300 sta. yd.	Station yard overhaul.....	.02	
16 lin. ft.	51 in. R.C.P. (extra str.).....	26.00	25.00	139,100 1/4 mi. yd.	Quarter mile yard haul.....	.05	
164 lin. ft.	60 in. R.C.P. (std. str.).....	28.00	25.00	0.4 mi.	Overlating old road.....	500.00	408
60 lin. ft.	60 in. R.C.P. (extra str.).....	69.00	100.00	600 lin. ft.	Contour ditches.....	5.1	
360 lin. ft.	12 in. C.M.P. (16 ga.).....	3.85	3.10	42 cu. yd.	Mortar rubble masonry.....	70.00	60
40 lin. ft.	18 in. C.M.P. (16 ga.).....	5.20	5.00	900 lin. ft.	Untreated piles for bank protection	4.00	
86 lin. ft.	21 in. asb. bonded C.M.P. (16 ga.)...	7.50	6.50	615 cu. yd.	Rock for bank protection.....	10.00	
7 ea.	12 in. automatic drainage gates....	45.00	40.00	2,540 lb.	Wire fabric for bank protection....	.30	
3 ea.	24 in. automatic drainage gates....	110.00	100.00	460 cu. yd.	Excavation for bank protection....	2.00	
2 ea.	Remov. & reinstal. auto. drain. gates	60.00	50.00	19,950 lin. ft.	Galvanized barbed wire fence.....	.18	
900 lin. ft.	8 in P.M.P. underdrains.....	2.40	2.25	31 ea.	Gates—Texas type.....	10.00	2
1,400 cu. yd.	Filter material.....	7.20	5.00	2 ea.	Gates—standard type.....	40.00	5
19 ea.	Adjust. manholes & inlets to grade.	44.00	40.00	428 ea.	Bracing.....	8.00	1
Lump sum	Finishing roadway.....	3,400.00	2,500.00	676 lin. ft.	Galvanized woven wire farm fence.	.25	
Lump sum	Drainage pumping equipment.....	10,000.00	8,700.00	346 ea.	Right-of-way markers.....	7.00	
Lump sum	Pump house electrical equipment....	2,000.00	2,100.00	1 ea.	Stand. Fed. aid proj. mrks., Type I	60.00	
Lump sum	Sign frames and sign standards.....	2,000.00	2,000.00	461 ea.	Treated tmbr. warn. posts, refl. (6 in diam.).....	7.00	
Lump sum	Highway light. & illum sign systems	24,000.00	25,000.00	28,000 ton	Controlled gradation sub-base.....	.75	

DAM—Ice Harbor Lock and dam

Washington—Walla Walla and Franklin Counties—Corps of Engineers. C. J. Montag & Sons, Inc., Carl M. Halvorson, Inc., McLaughlin, Inc., Austin Construction Co., and Babler Bros., Inc., received the contract for construction of Ice Harbor Lock and Dam in Washington on a joint venture bid of \$29,475,396. All work is to be completed by Jan. 1, 1959. The following are selected abstracts of the most important bid prices.

(1) C. J. Montag & Sons, Inc.....	\$29,475,396
Carl M. Halvorson, Inc.....	
McLaughlin, Inc.....	
Austin Construction Co.....	
Babler Bros., Inc.....	
(2) Guy F. Atkinson Co.....	\$34,246,324
Ostrander Construction Co.....	
SNAKE RIVER CONTRACTORS.....	\$44,537,708
A Joint Venture consisting of:	
Peter Kiewit Sons' Co.....	
Morrison-Knudsen Co., Inc.....	
Henry J. Kaiser Co.....	
Mid Valley Utility Constructors, Inc.....	
Condon-Cunningham Co.....	

COFFERDAM UNWATERING

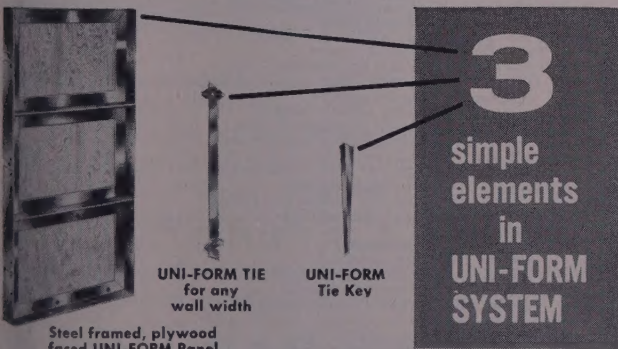
	(1)	(2)
Lump sum	Furnish, install and operate initial pump, facilities of 10,000 gpm. capacity.....	\$425,000.00
ea.	Furn., install and operate additional pumping facilities.....	\$375,000.00
		20,250.00
		4,000.00

reduce forming costs...

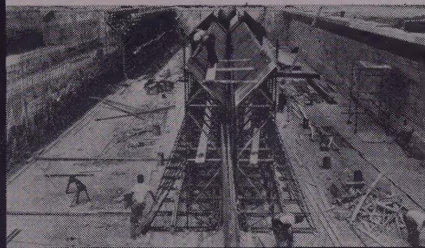
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**UNI-FORM
PANELS**

Whether you're bidding on a sewage treatment plant, industrial building, highway bridges, overpasses or abutments, heavy foundations, circular tanks or a warehouse, UNI-FORM Panels will give you the lowest all around forming costs.

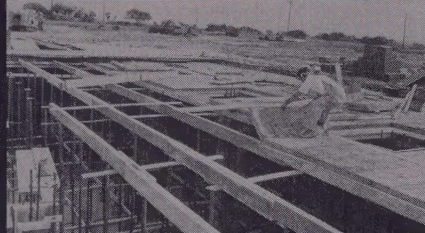
Why? UNI-FORM Panels can be erected faster, using less labor and material because the three basic elements of the UNI-FORM System—Panel, Tie and Tie Key provide simple mechanical assembly into any type of form. Unique system of attaching the minimum aligning lumber required reduces labor by 50% . . . pre-engineered techniques for handling pilasters, corners, stepped footings, columns, battered walls assure fast job progress.



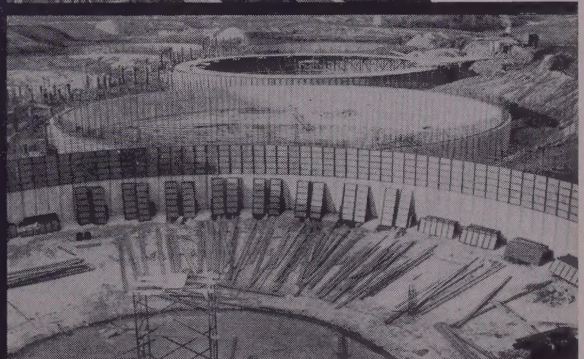
INTERESTED? Get the catalog and complete details on the UNI-FORM System today. Send us a set of plans for our recommendations. You will be money ahead, and there's no obligation.



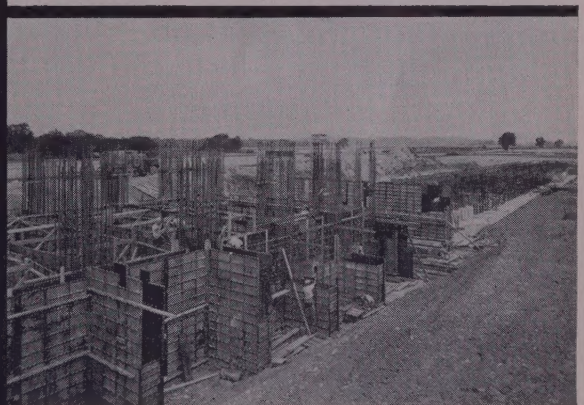
Sewage
Treatment
Plant "Y" Walls



Slabs



Circular Walls



Heavy Industrial Foundations

P1500

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Concrete Form Specialists Since 1912

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Leckhaven 2-2051
Enterprise 1-0132

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Redwood 2-8900

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13210 S. Figueroa Ave.
Axxminister 2-0231

BALTIMORE, MD.

1020 N. Kresson St.
Dickens 2-0240

HOUSTON, TEX.

2314 Preston Ave.
Capital 7-9204

ATLANTA, GEORGIA

1401 Howell Mill Rd., N.W.
Trinity 6-8126

206 lin. ft.	Bevel 1½":1	23.00	23.40
3 ea.	Corr. metal culv. pipe—72 in. diam.	24.00	24.90
	Bevel 1½":1	300.00	450.00
	3-way concrete headgates		
BRIDGE ITEMS			
625 cu. yd.	Excavation for structures (bridges)	10.00	10.00
151.01 cu. yd.	Class "A" conc. bridge superstruct.	84.00	77.75
197.55 cu. yd.	Class "A" conc. bridge substructure	84.00	76.75
12,632 lb.	Structural steel	.35	.35

1,190 cu. yd.	Concrete Class "A"	65.00	65.00
282 cu. yd.	Concrete Class "B"	50.00	45.00
190 cu. yd.	Concrete Class "D"	40.00	44.00
684 lin. ft.	Reinforced concrete bridge railing	8.50	8.50
356 lin. ft.	Aluminum bridge railing	16.00	17.00
354,000 lb.	Steel reinforcing bars	.14	.14
2,600 lb.	Structural carbon steel	.40	.40
320 lb.	Cast steel	.50	.50
8 ea.	Bridge drains	75.00	80.00
40 lin. ft.	Downspouts	7.00	6.00

HIGHWAY—Grading and surfacing in Utah

Utah—Summit County—Bureau of Public Roads. R. M. Jensen was no bidder at \$142,443 for construction of 4.333 mi. of U. S. highway in Utah

(1) R. M. Jensen	\$142,443
(2) Engineer's Estimate	139,483

HIGHWAY—Grading, paving and bridge structures

Washington—King County—State. Erickson Paving Co. was awarded an \$826,545 contract for construction of 3.261 mi. of highway and bridge structures.

(1) Erickson Paving Co.	\$826,545
(2) Northwest Construction Co.	837,728
J. P. Surace Construction Co.	881,063

	(1)	(2)
80 ac.	Clearing	\$160.00
47 ac.	Grubbing	160.00
934,470 cu. yd.	Common excavation incl. haul of 600 ft.	.225
1,235 cu. yd.	Com. trench excav. incl. haul of 600 ft.	1.00
3,000 cu. yd.	Strip, borr. & surf. pit incl. haul of 600 ft.	.25
133,600 unit	Overhaul	.40
580 cu. yd.	Excav. of unsuitable founda. matl. incl. haul	.50
3,965 cu. yd.	Structure excavation	2.00
824,780 cu. yd.	Embankment compaction method B	.02
80 hr.	Smooth wheeled power roller	6.00
442 hr.	Pneumatic tired roller	6.00
552 hr.	Mechanical tamper	6.00
18,250 lin. ft.	Slope treatment Class "A"	.12
3,270 lin. ft.	Slope treatment Class "B"	.10
257 sta.	Finishing roadway	15.00
440 M gal.	Water	2.25
75 cu. yd.	Gravel backfill for foundations	5.00
370 cu. yd.	Gravel backfill for drains	6.00
21,830 ton	Selected roadway borrow	.95
7,640 ton	Crushed stone surfacing to course	2.25

CEMENT TREATED BASE MIXED IN PLACE

74,640 ton	C.T.B. aggregate	1.45
44,950 sq. yd.	Mixing cement treated base	.18
2,880 bbl.	Portland cement	5.05
48 ton	Emulsified asphalt SS-1	60.00

LIGHT BITUMINOUS SURFACE TREATMENT METHOD A

47,280 sq. yd.	Preparation, construction, finishing	.05
115 ton	Asphalt cement MC-3	48.00
1,010 cu. yd.	Furnishing & placing crushed cover stoner	3.90

TYPE 1-1 ASPHALTIC CONCRETE PAVEMENT

9,390 ton	Class "B"	6.80
13 ton	Asphalt cement for tack coat	60.00
12,590 sq. yd.	Preparation of untreated roadway	.05
140 cu. yd.	New fine mineral aggregate	3.90
14 ton	Asphalt cement MC-3 prime coat	48.00
66 ton	Furnishing mineral filler	25.00

OTHER ITEMS

5,855 lin. ft.	Asphaltic shoulder curb	.50
11,110 lin. ft.	Asphalt lined roadway ditch	1.00
1,725 lin. ft.	Asphalt lined spillway	2.00
700 lin. ft.	Cement concrete gutter	2.50
60 ea.	Precast traffic buttons	3.00
15 cu. yd.	Concrete Class "C"	90.00
104 cu. yd.	Concrete Class "E"	30.00
20,880 lb.	Steel reinforcing bars	.15
270 lin. ft.	Galvanized conduit pipe 1½ in. diameter	1.10
1,955 lin. ft.	Perf. bit. ctd. corr. metal drain pipe 8 in. dia. #16 ga.	2.30
650 lin. ft.	Plain conc. culv. pipe 12 in. diameter	1.70
2,085 lin. ft.	Std. reinf. conc. culv. pipe 18 in. diameter	4.60
417 lin. ft.	Std. reinf. conc. culv. pipe 24 in. diameter	6.69
1,183 lin. ft.	Bit. ctd. corr. metal pipe 8 in. dia. #16 ga. Type #2	2.40
662 lin. ft.	Bit. ctd. corr. metal pipe 12 in. dia. #16 ga. Type #2	3.00
234 lin. ft.	Bit. ctd. corr. metal pipe 18 in. dia. #16 ga. Type #2	4.20
285 lin. ft.	Bit. ctd. corr. metal pipe 18 in. dia. #14 ga. Type #2	4.80
464 lin. ft.	Bit. ctd. corr. metal pipe 24 in. dia. #14 ga. Type #2	6.25
330 lin. ft.	Bit. ctd. corr. metal pipe 30 in. dia. #10 ga. Type #2	11.85
804 lin. ft.	Plain conc. or v.c. sewer pipe 4 in. diameter	.60
270 lin. ft.	Galvanized iron water pipe ¾ in. diameter	.90
2 ea.	Manholes under 10 ft.	250.00
19 ea.	Catch basins	110.00
1 ea.	Concrete inlet	75.00
318 lin. ft.	Standard beam guard rail	3.50
76 ea.	Reinforced concrete roadway markers	7.00
220 ea.	Guide posts	3.00
1,570 cu. yd.	Loose riprap Class "A"	4.20
38 cu. yd.	Hand placed riprap	25.00
10 cu. yd.	Sack riprap	35.00
est.	Flagging est. \$750.00	

BRIDGES

1,400 cu. yd.	Structure excavation	3.00
Lump sum	Shoring and cribs	6.00

	(1)	(2)
36 ac.	Clearing and grubbing	\$450.00
66,600 cu. yd.	Unclassified excavation	.74
620 cu. yd.	Unclassified excavation for structures	4.90
12,900 cu. yd.	Unclassified excavation for borrow, Case 1	.60
69,000 sta. yd.	Overhaul (1,000 ft. free haul)	.03
5,500 cu. yd. mi.	Spec. overhaul of borr. (1,000 ft. free haul)	.25
4,200 lin. ft.	Furrow ditch	.15
70 unit	Roadside cleanup	15.00
1,120 unit	Watering of embankment	2.00
420 unit	Watering of surface course	2.00
Lump sum	Prov. and maint. water plant or plants	500.00
340 hr.	Rolling of embankment	8.50
125 hr.	Rolling of surface course	8.50
16,500 ton	Subbase material	.95
14,400 ton	Cr. grav. or cr. st. surf. crse., Class 2, gr. B	1.10
30 cu. yd.	Conc. Class "A" (air-entrained low-alkali Type II cement)	100.00
450 lb.	Reinforcing steel	.20
1,590 lin. ft.	24 in. C.G.S.M. culvert pipe	6.50
288 lin. ft.	36 in. C.G.S.M. culvert pipe	12.00
68 lin. ft.	60 in. C.G.S.M. culvert pipe	28.00
330 lin. ft.	Rem., clean & stockpile salv. culvert pipe	5.00
78 ea.	Tmbr. guide posts with warn. refl. (treated)	8.00

HIGHWAY—Grading and paving in California

California—Sacramento County—State. A \$536,124 contract was awarded McGillivray Construction Co. for 2.2 mi. of grading and paving with plant mixed surfacing on cement treated base.

(1) McGillivray Construction Co.	\$536,124
(2) Granite Construction Co.	584,851
A. Teichert & Son, Inc.	647,750
Brighton Sand & Gravel Co.	695,637

	(1)	(2)
Lump sum	Removing existing bridge	\$2,530.04
Lump sum	Clearing and grubbing	3,072.72
Lump sum	Dev. wat. sup. & furn. wat. equip.	5,643.85
5,850 M gal.	Applying water	.75
80,000 sq. yd.	Compacting original ground	.069
63,500 cu. yd.	Roadway excavation	.50
3,000 cu. yd.	Structure excavation	2.64
2,150 cu. yd.	Structure backfill	2.94
900 cu. yd.	Ditch and channel excavation	1.30
2,220,000 sta. yd.	Overhaul	.006
18,600 ton	Imported subbase material	1.80
4,750 ton	Untreated base	2.23
76,000 sq. yd.	Mix. spread. & compact C.T.B.	.465
8,900 bbl.	Portland cement	4.67
33,400 ton	Mineral aggregate (C.T.B.)	1.67
100 ton	Asphaltic emul. (cur. sl. & fog sl.)	49.47
12 ton	Liquid asphalt SC-2 (prime coat)	37.91
770 ton	Paving asphalt (P.M.S.)	26.64
15,000 ton	Mineral aggregate (P.M.S.)	3.63
16 sq. yd.	Placing P.M.S. downdrains	1.24
230 ton	Sand cover (cur. sl. & pr. ct.)	4.27
310 cu. yd.	Class "A" conc. (structures)	80.20
36,300 lb.	Bar reinforcing steel	1.443
53 ea.	Drop inlet frames and grates	86.73
1 ea.	Special steel grating	123.90
2,150 cu. yd.	Cl. "B" conc. (curbs, gutters and sidewalks)	33.45
130 ea.	Curb dowels	.62
160 ea.	Roadway monuments	8.05
11 ea.	Survey monuments	8.05
230 cu. yd.	Broken concrete riprap	13.85
47 ea.	Horiz. refl. units & guide posts	7.43
1,000 lin. ft.	New property fence	.50
12 ft. prop. fence gates		61.95
16 in. R.C.P.		6.02
1775 lin. ft.	18 in. R.C.P.	7.40
660 lin. ft.	48 in. R.C.P.	19.28
54 lin. ft.	24 in. C.M.P. (14 ga.)	9.74
66 lin. ft.	60 in. C.M.P. (10 ga.)	36.61
54 lin. ft.	6 in. perf. metal pipe underdrains	2.63
30 lin. ft.	Entrance tapers for 8 in. metal pipe	43.37
91 lin. ft.	8 in. C.M.P. downdrains	2.66
16 lin. ft.	Salv. and relay C.M.P.	6.20
20 lin. ft.	42 in. x ½ in. welded steel pipe	30.55
4 ea.	4 in. asbestos-cement pipe	3.72
11 ea.	48 in. automatic drainage gates	371.70
1 ea.	Salv. automatic drainage gates	49.56
113 lin. ft.	Reinstal. salv. auto. drain. gate	123.90
116 lin. ft.	6 in. vitrified clay pipe	3.47
2 ea.	8 in. vitrified clay pipe	3.84
38 ea.	Precast manholes	229.22
27 ea.	Adjusting manholes to grade	37.17
10 ea.	Salv. cast iron gutter drains	6.20
	Reest. cast iron gutter drains	6.20
	Finishing roadway	1,491.75
175 1 in. ft.	Raised traffic bars	2.66
	Traffic sig. & hwy. light. sys.	41,184.36

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Kraemer also appreciates Strong-Arm hoist design. At work on a highway project near Hurley, Wisconsin, his trucks get in and out fast . . . dump safely in any ground conditions, even on slopes. Matched in any capacity, these hoists and bodies spell maximum fleet-profits! Call your Gar Wood-St. Paul distributor, or write direct to Customer Service Dept., Gar Wood Industries, Inc., Wayne, Mich.

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LORAIN MC-4 MOTOCRANES (2) (3/4 yd.—
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LORAIN 80, 1 3/4 yd. Shovel Front
LORAIN 79, 1 1/2 yd. Shovel Front
LORAIN 40/50, 3/4 yd. Shovel Front
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LORAIN 50, (2) Hoe Fronts
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MANUFACTURERS

(Continued from Page 186)

operation by fall. Simultaneously, the
company's plant at Toronto, Canada,
is being expanded by the addition of
some 43,000 sq. ft.

Chain-action reorganization

Four promotions in Goodyear Tire
& Rubber Co.'s industrial products
division recently became effective,
resulting from the election of Sam
DuPree, the division's general man-
ager, to vice president of the firm.
Appointed to new posts are O. A.
Schilling, sales manager; H. R. Com-
stock, assistant sales manager; R. E.
Chapman, manager, Central Region,
and R. E. Mercer, manager of hose
sales. Schilling had been manager
of industrial products department;
Comstock had been Central sales
manager since 1950; Chapman had
been manager of the hose sales de-
partment; and Mercer was assistant
manager in the same department.

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panding industry. The new center
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Universal Form moves to new plant

Universal Form Clamp Co. of Los
Angeles has closed its doors at 5
So. Western Ave., and moved to
13210 So. Figueroa in Los Angeles.
The new plant will be three times
larger and will provide added fa-
cilities to speed up service to contri-
butors in the Southern California area.
The company has been a leader in
manufacturer of products for the
concrete construction industry for
the past 45 years, including Uni-form
panels, form ties, concrete special-
ties and reinforcing bar supports. Man-
office and factory is located in Cal-
cago.

Mann heads Leschen Wire Rope

Emmett H. Mann has been named
vice president and general manager of
Leschen Wire Rope Division, H. C.
Porter Co., Inc. Until his present ap-
pointment he held a similar post with
the Alloy Metal Wire Division, having
joined the division seven years
ago as a sales engineer.