MAY 21 1959

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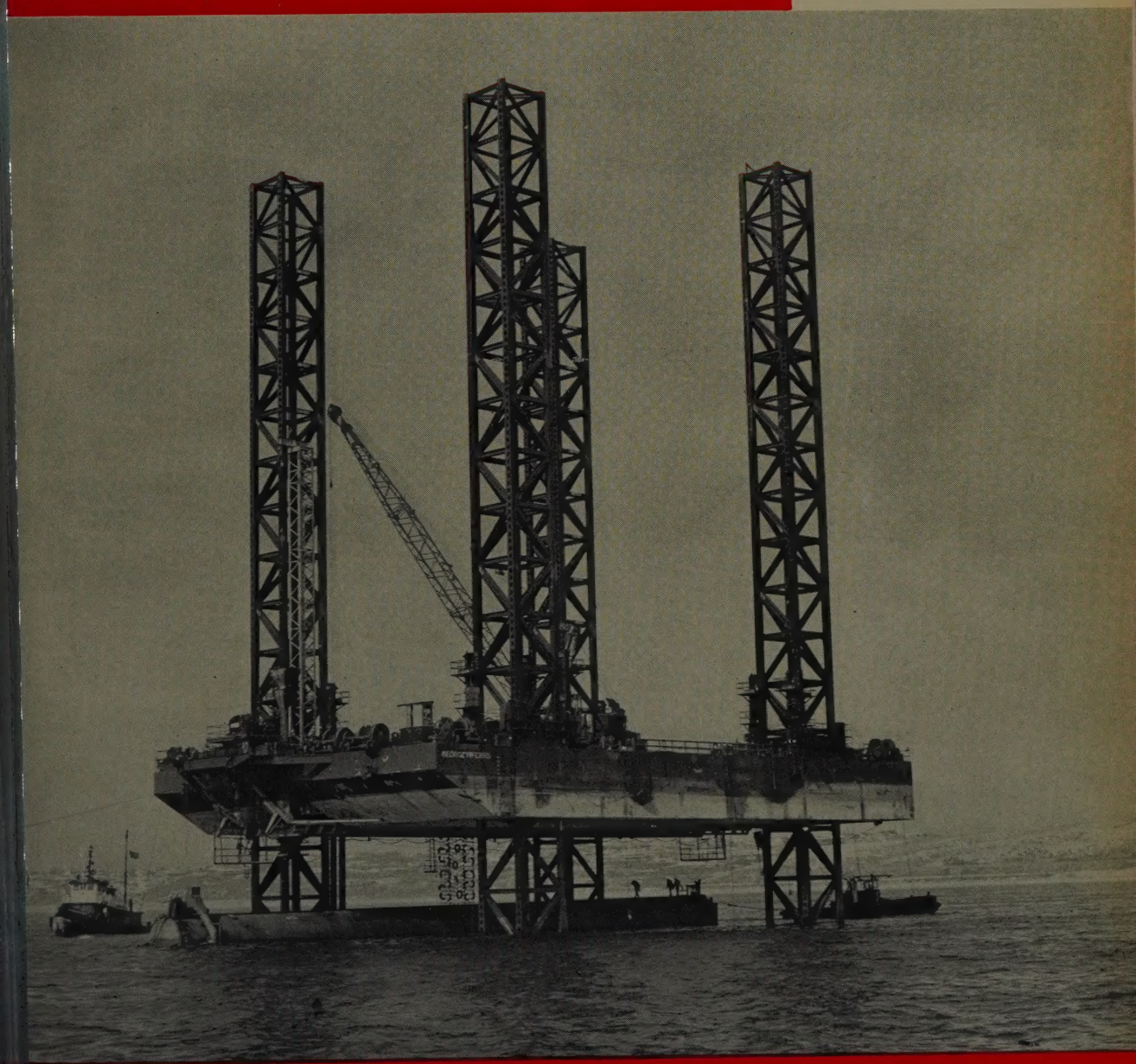

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WESTERN CONSTRUCTION

KING PUBLICATION

MAY
1959
Vol. 34 No. 5

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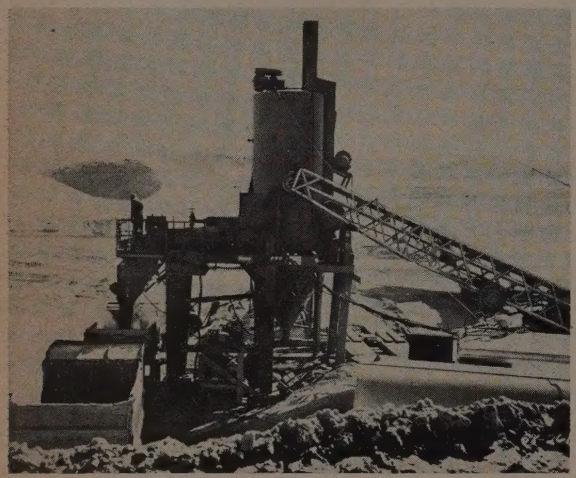
NEW EQUIPMENT

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

Road material plant

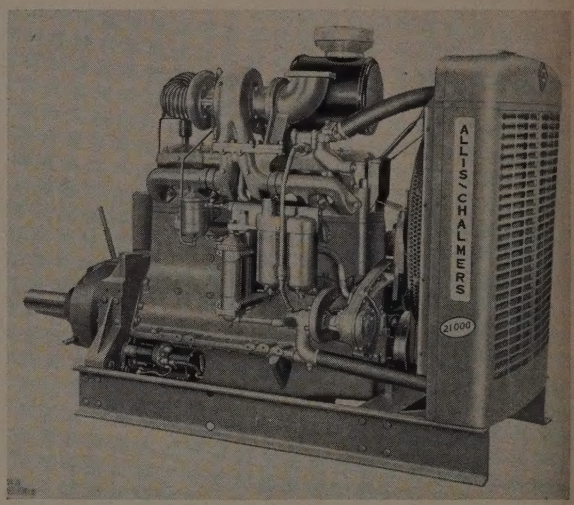
A continuous-flow plant for production of stabilized road materials has been introduced by **Pioneer Engineering, Division of Poor & Company, Inc.** Basic unit consists of a twin-shaft pugmill, a 350-gpm. centrifugal water pump, water meter and spray bars and operator's platform and mounting for power unit, all positioned on a steel skid frame. Unit will mount on legs or running gear with fifth wheel for towing. Desig-



nated Model 425, it has a rated capacity of 425 cu. yd. per hr. and power requirement of 75 to 100 hp. Optional equipment such as aggregate feeder conveyor, truck loading hopper, feeders, oil sprays, can be added as required to produce various stabilized mixes. The pugmill in this unit has a contoured bottom design similar to that used on the company's continuous mix asphalt plants, for thorough mixing and efficiency. *. . . Circle No. 150*

Four new power units announced

Four new engines have been announced by **Allis Chalmers Mfg. Co.,** including two heavy-duty diesels, Models 16000 and 21000, which are 6-cylinder, 4-cycle in-line engines with 5¼-in. bore, and 14.5 to 1 compression ratio. Both weigh about 3,000 lb. Model 16000, naturally asperated, develops 230 hp. at 2,000 rpm. Model 21000 includes turbocharger, and is rated at 340 hp. at 2,000 rpm. Except for supercharging equipment, all parts are interchangeable in the two engines. Used to power big crawler tractors, the two units also are available as stationary power sources. Another pair of engines, G-149 and G-226 are designed for gasoline and a variety of other fuels. The 4-cylinder water-cooled valve-in-head units develop 45 and 67 brake hp. respectively. Features include crater shaped pistons and replaceable wet-type cylinder sleeves. Magneto ignition is standard equip-



ment on both units, and they are available for use with natural or LP gas, kerosene, distillate or tractor fuel. *. . . Circle No. 151*

Economy model in Davis loader

Announced by **Massey-Ferguson Industrial Division,** a new Model Davis 99 Economy Loader is available for the M-F Work Bull 202 and other tractors. The loader has a capacity of 2,000 lb. at half height and 1,500 lb. at full height. The new units, which are 15% stronger than previous models, are designed for contractors who do not require the features of the M-F deluxe models. These deluxe models of Davis loaders

are equipped with down pressure, twin dump cylinders and attaching brackets for the Davis backhoe. The same top quality construction, however, has been built into the new economy line. *. . . Circle No. 152*

(Turn to page 124 for more New Equipment. New Literature can be found on page 116.)

WESTERN CONSTRUCTION

The Case of the Missing Hard Hats

A WESTERN contracting organization of national prominence recently addressed a letter to *Western Construction* which stated, in part:

"Your magazine is read carefully by many people in our organization, and the text and photographs both in the editorial and advertising pages have considerable influence within the industry. We would like to suggest that definite efforts be made to edit all photographs and illustrations with regard to obvious safe practice which might or might not be demonstrated.

"In one of your recent issues the first 60 pages of the magazine contained 13 or more illustrations showing construction workmen that were not wearing hard hats. Frequently other deficiencies were obvious in the photographs, such as lack of machine guarding, poor scaffolding, lack of eye protection, etc. In defense of *Western Construction*, this pattern exists in other journals as well. The question is, of course, how much control can be exerted over this problem?

"Although this letter might seem to be reaching out to an extraordinary extent in the interests of construction safety, we are sure you know that many of our problems of accident prevention within this industry are involved in the traditional practices of a high hazard industry. An instrument such as *Western Construction* can exert a powerful and positive influence through its editorial policy."

In the West the safety problem is especially difficult. Rugged terrain magnifies the inherent dangers of construction work. Construction men range over larger areas in the West, encountering widely different job conditions and safety considerations. Safety rules and their enforcement often vary from job to job. Inconsistency is a serious foe of safety.

The letter quoted emphasizes the tremendously increased awareness within the construction industry of proper safety practices as compared to years past. The planned safety programs, the thorough job supervision, the awards given by such agencies as the AGC have had a profound effect.

Editors and advertisers are equally strong advocates of promoting safety. The fact that photographs appear in the construction press showing hazardous practices can be charged to carelessness rather than to intention, certainly. The improper photographs most often appear in advertisements, which indicates merely that advertising agencies have far less direct contact with field operations than do editors. For the same reason the frustrating problem of a shortage of good photographs plagues agencies even more than editors.

What can be done? As editors we will redouble our efforts in weeding out photographs, and we will do what we can to urge manufacturers and advertising agencies to do the same. For we all wish to play our full part in sponsoring safety and assisting the contractors who are showing the way.

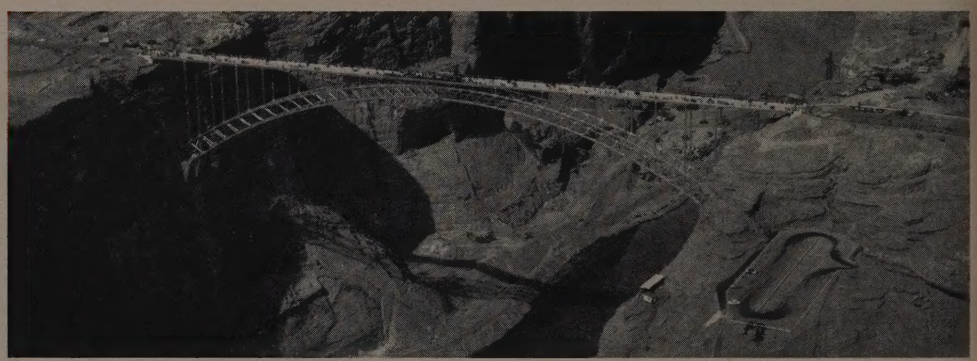
Jim Ballard

Bridges by Yuba

BIG

The world-renowned $63 million Richmond-San Rafael Bridge, crossing upper San Francisco Bay, used some 50,000 tons of steel—most of which was fabricated in Yuba plants in the area, and erected by Yuba field crews, including all the trusses on the 36 spans—each 289 ft.

HIGH



The recently completed Glen Canyon Bridge in Arizona is the world's highest (750 ft.) arch bridge. Completely fabricated and assembled at Yuba's Judson Pacific-Murphy plant, this structure used 4,000 tons of steel, was erected ahead of schedule.

or CREEK SIZE

The Hawkins Bar Bridge lies in a remote mountain area, 8 miles east of Willow Creek in California. Chances are you'll never see it. But it typifies the smaller bridges that have contributed to Yuba's widely recognized leadership in bridge building at its best.

Design • Fabrication • Erection

Yuba specializes in bridges. Witness three typical jobs, shown here—bridges of all types and sizes—the routine and the one-job-in-a-thousand. Regardless of the complexities, Yuba serves you well: with its long experience and high skills required for this exacting work; through all phases of engineering, steel fabrication and erection; from large and well-equipped plants located nationwide; and with a know-how that finds ways to lower costs and make records in ahead-of-time completions. We'll welcome the opportunity of talking with you. Just write, wire or call.

YUBA designs and builds a wide range of equipment for engineered construction:

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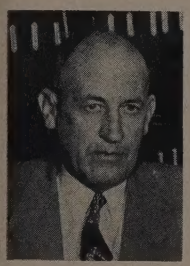
WESTERN CONSTRUCTION

MAY 1959

FLAMING GORGE DAM

A review of design, site conditions, diversion plan, access, and current construction



By GRANT BLOODGOOD
Assistant Commissioner and Chief Engineer
Bureau of Reclamation, Denver, Colo.

IN MAY 1869, Major John Wesley Powell, renowned Western explorer of the Colorado River and its tributaries, wrote in his diary of exploration down the Green River in Utah:

"The river is running to the south; the mountains have an easterly and westerly trend directly athwart its course, yet it glides on in a quiet way as if it thought a mountain range no formidable obstruction to its course. It enters the range by a flaring, brilliant, red gorge, that may be seen from the north a score of miles away.

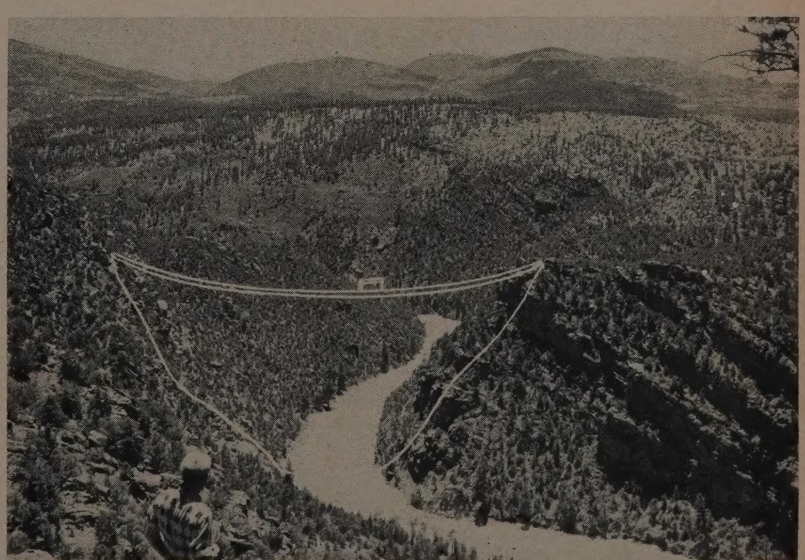
"This is the head of the first canyon we are about to explore —an introductory one to a series made by the river through this range. We name it FLAMING GORGE."

About 25 mi. downstream from the head of Flaming Gorge and some 90 years after Major Powell's famed passage down the Green River, the Bureau of Reclamation is constructing Flaming Gorge Dam and Powerplant to store the river's water for conservation and power production. The dam, in northeastern Utah about 6 mi. south of the Utah-Wyoming state line and about 20 mi. west of the Utah-Colorado state line, is the second major feature of the Colorado River Storage Project to be started. It was preceded by the 700-ft. Glen Canyon Dam on the Colorado River in northern Arizona, started in April 1957.

Construction of the dam and power plant began in July 1958 under a $29,602,497 contract awarded to The Arch Dam Constructors of Omaha, a joint venture firm comprised of Peter Kiewit Sons' Co., Morrison-Knudsen Co., Inc., Mid-Valley Utility Constructors, Inc., and Coker Construction Co., Inc. The dam is scheduled to be completed in the summer of 1963, and the power plant is expected to be in operation by the fall of the same year.

Project features

Flaming Gorge Dam is a concrete-arch structure having a height of 490 ft. above foundation, a crest length of 1,180 ft., and a volume of 922,000 cu. yd. It is a relatively thin-arch dam; its crest width is 27



LOOKING downstream through the Flaming Gorge Dam site showing the position of the structure and the bend in the canyon that provided the location for the diversion tunnel through the abutment on the right. The dam will be 490 ft. high above lowest point in the foundation.

ft. and maximum base width is 150 ft. Principal quantities of materials required for the dam, spillway, outlets, and power features are shown in the accompanying tabulation. Most of the materials listed will be supplied by the contractor. In addition to these materials, the Bureau will purchase the larger items of special machinery and equipment under separate advertisements to be issued as designs are completed.

Flaming Gorge Reservoir will have a total storage capacity of 3,789,000 ac. ft. and will extend 91 mi. up the Green River, nearly to the town of Green River, Wyo. The reservoir will help provide the long-time regulatory storage needed to permit the states of the Upper Colorado River Basin to utilize their apportioned water and still meet their flow obligations at Lee Ferry, Ariz. (the dividing point between the Upper and Lower basins), under terms of the 1922 Compact of the Colorado River. The 108,000-kw. Flaming Gorge Powerplant will generate a portion of the electrical energy needed in the Upper Basin. Surplus revenue from sale of this energy will assist irrigators in the Upper Basin to repay costs of constructing the participating projects which were authorized by the Congress in 1956 to be developed with the Colorado River Storage Project.

Dam site

The dam site is near the east end of the Uinta Mountains and is within the Ashley National Forest. The lower 25 mi. of the reservoir are largely within the Flaming Gorge and Red canyons, rugged, steep-walled, and inaccessible canyons having average depths of about 1,500 ft.

Bedrock at the dam site, about 25 ft. below the river surface, is a part of the Uinta formation. It consists of quartzite, quartzite conglomerate, quartzose sandstone, and a few thin beds of shale. The shale beds are hard and well cemented with iron oxide and are competent to support the dam. Both abutments are composed of Uinta quartzite and have interlayers of shale, varying from a few inches to 3 or 4 ft. in thickness. The quartzite ranges from moderately hard, coarse material cemented with silica to extremely hard, fine-grained material. Tests indicate the shale is more porous than the quartzite, and foundation treatment by cutoff adits backfilled with concrete may be required for the thicker beds.

In its course through the reservoir area, the Green River meanders in a large half-circle. At the dam site, the river's general direction is southeast, but it makes a 40-deg. curve to the south at the axis of the dam. This curve provides excellent inlet and outlet sites for the diversion and spillway tunnels. Both abutments of the dam rise steeply by steps of vertical ledges separated by gently sloping shelves. A shoulder extends out from the right side, which makes the location particularly suitable for the arch dam.

Dam construction

Open-cut excavation for the upstream portal of the diversion tunnel, the first major construction activity at the dam site, began in September of last year, The 1,100-ft. tunnel is being driven through the right abutment rock. It will be concrete-lined and have an inside diameter of 23 ft. and a diversion capacity of 18,000 sec. ft.; minimum thickness of the lining will be 12 in. The tunnel was holed through early in March; concrete lining is expected to be completed early in June. Diversion of the river through the tunnel is scheduled for mid-September of this year.

Closure of the diversion tunnel will be made in the fall of 1962. During the first stage of closure, stoplogs will be inserted in the upstream section of the tunnel, and the reservoir will fill to the elevation of the intake of two 72-in. river outlet conduits. A conduit, 2 ft., 9 in. square, in the closure structure will bypass nominal river flows to meet downstream commitments during this initial period of minor impoundment. For final closure, the bypass conduit will be closed by a high-pressure slide gate, and the tunnel will then be plug-

FLAMING GORGE DAM, RESERVOIR, AND POWERPLANT

Physical Data

DAM	
Type	Concrete arch
Height above riverbed	450 ft.
Height above lowest point in foundation	490 ft.
Crest length	1,180 ft.
Crest width (width of roadway)	27 ft.
Base width (maximum)	150 ft.
Concrete in dam	922,000 cu. yd.
Crest elevation	6,047 ft.
Maximum discharge through spillways	28,800 cfs.
RESERVOIR	
Capacity	3,789,000 ac.-ft. at normal water surface elev. 6,040
Area	42,000 ac. at normal water surface elev.
Elevation maximum water surface	6,045 ft.
Length	91 mi.
POWERPLANT	
Capacity	108,000 kw.
Number of generating units	3
Capacity of each generator	36,000 kw.
Capacity of each turbine	50,000 hp.

Principal Quantities Required for the Dam, Spillway, Outlets and Power Features

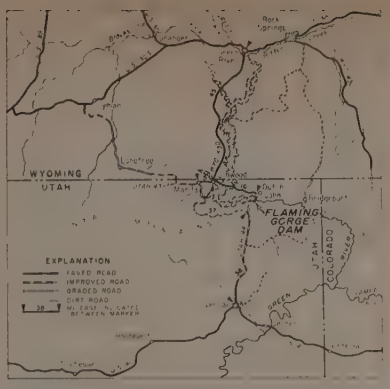
Excavation, common, in open cut, for dam, powerplant, and appurtenant works	106,000 cu. yd.
Excavation, rock, in open cut, for dam, powerplant, and appurtenant works	190,000 cu. yd.
Excavation, all classes, in open cut, for diversion tunnel	12,500 cu. yd.
Excavation, all classes, in diversion tunnel	23,500 cu. yd.
Excavation, all classes, in spillway tunnel	11,500 cu. yd.
Concrete in dam	922,000 cu. yd.
Cement for dam and appurtenant works	600,000 bbl.
Pozzolan	42,000 tons
Reinforcing steel	4,400,000 lb.
Tubing and fittings for grouting contracting joints	126,000 lb.
Tubing and fittings for cooling concrete	715,000 lin. ft.
Structural steel for powerplant superstructure	850,000 lb.
Penstock and outlet pipes	1,560,000 lb.
Penstock fixed-wheel gates	270,000 lb.
Spillway fixed-wheel gates	143,000 lb.
Ring follower gates and hollow-jet valves for outlets	213,000 lb.
Trashrack metalwork	518,000 lb.
All other metalwork required for the dam, outlets, spillway, and power features	2,000,000 lb.
Cranes	463,000 lb.

ged by a concrete plug 62 ft. long.

The dam is to be divided into blocks by radial or transverse contraction joints to confine shrinkage cracks to predetermined planes throughout the mass. As the dam is sufficiently thin, no longitudinal contraction joints are required. The blocks will extend the full thickness of the dam and will average about 50 ft. in width. The contraction joints will be grouted to assure watertightness and monolithic action of the dam and are to be interlocked by keys.

Placement of concrete in the dam is scheduled to begin in June 1960. The contractor will place the concrete in 7½-ft. lifts. The maximum differential in the elevations of adjacent blocks is not to exceed 30 ft., and the rate of placing concrete in any block will be restricted so that not more than one horizontal lift can be placed in 72 hr.

Concrete in the dam will be cooled by river water pumped through a system of 1-in. tubing embedded in each lift of concrete. To obtain initial cooling, river water is to be circulated through the cooling system for 12 days, immediately following placement of concrete around the tubing. About 135 mi. of tubing will be embedded in the concrete. Subsequent to the initial cooling period, the cooling of the concrete will be completed by river water circulated through the tubing during the winter months (thus avoiding the use of a refrigerating plant) until the temperature of the concrete has been reduced to 38 deg.



REMOTENESS of the site is shown by the distance of 63 mi. to the nearest railhead at Green River, Wyo. Access road is from Linwood to the site, a distance of 18 mi. Dutch John is the town built for the project during and after construction.

After the temperature of the concrete has been lowered to 38 deg., the open transverse contraction joints will be filled with grout through a system of embedded piping and outlets. The concrete will be successively cooled and grouted in 60-ft. high lifts. When the proper cooling temperature has been attained and the contraction joints grouted, the cooling tubing will be filled with grout.

To seal seams and fissures in the canyon rock in the foundation and abutment areas, initial low-pressure grouting followed by main cutoff high-pressure grouting will be carried out. The low-pressure grouting, preceding placement of concrete, will be done through holes drilled on 20-ft. centers to a depth of about 25 ft. to form an impervious zone under the upstream portion of the dam. After the concrete has been placed to a sufficient height, holes for the main cutoff grout curtain will be drilled from the floor of the foundation gallery into the formation rock to depths varying from 50 to 200 ft.

A curtain of drainage holes, having depths of from 30 to 60 ft., will be drilled into the foundation rock from the floor of the foundation gallery immediately downstream from the high-pressure grout holes. Formed drain holes to be constructed from the foundation gallery to the crest of the dam will intercept any possible leakage along the 7½-ft. lift planes. Drainage from the foundation gallery will be collected in a sump off the lowest point in the gallery and pumped out of the dam.

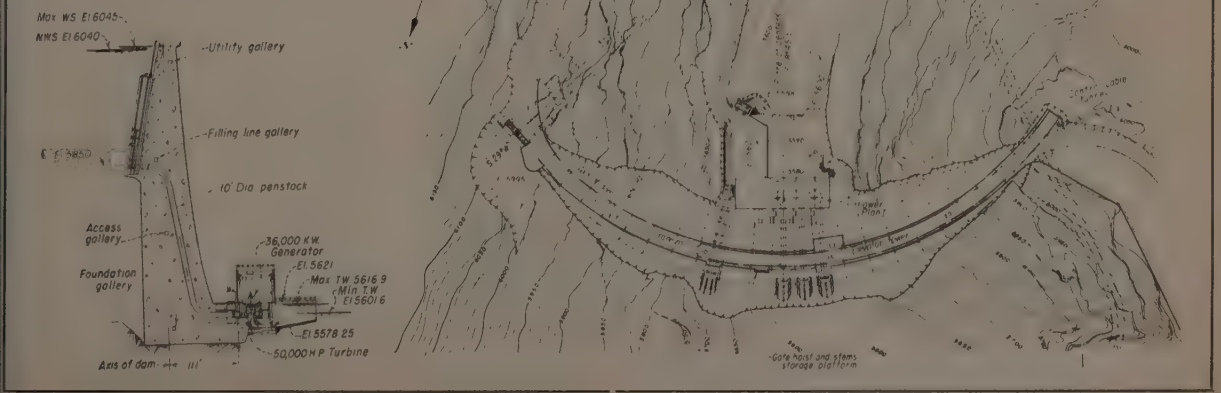
Concrete for dam

Laboratory investigations for the interior mass concrete of the dam indicate that a minimum of about 3 sacks of cementitious material per cubic yard of concrete are necessary to meet design strength requirements of 3,000 psi. at 180 days age. Approximate mix proportions for the interior mass concrete (per cu. yd.) are as follows:

Cementing material (Type II low-alkali portland cement plus pozzolan)	**3 sacks**
Percent pozzolan, by weight of cementing material	**20 - 35%**
Gravel	**2,700 - 2,800 lb.**
Sand	**800 - 850 lb.**
Water	**170 lb.**

Maximum size of aggregate is limited to 6 in. Air entrainment by

PLAN AND SECTION OF FLAMING GORGE DAM AND POWER PLANT



an approved air-entraining agent is required in the specifications.

Seven aggregate deposits in northeastern Utah were explored for possible use in the concrete for the dam. Of these, only the deposit on Henry's Fork, a small tributary of the Green River about 15 mi. upstream by road from the dam, contains sufficient quantities of suitable aggregate.

Specifications for concrete in the dam require that unsound, lightweight particles between No. 8 and 1½-in. sizes be removed from the aggregate by heavy media separation or other effective means, as concretes containing aggregates in these sizes exhibit early surface disfiguration in the form of spalling and popouts in freezing and thawing tests.

Essentially, the heavy media separation process consists of introducing the aggregate into a "heavy medium" having a specific gravity between that of the desirable and the objectionable aggregrate particles. The lightweight objectionable materials float to the surface and can be carried off as a waste product. The heavier aggregrate sinks in the medium and is recovered for use in the concrete.

As petrographic examination indicates the aggregrates to be potentially reactive with high-alkali cement, Type II low-alkali portland cement, in conjunction with a suitable pozzolan, was specified. The pozzolan proposed by the contractor is a calcined shale and is now being tested in the Denver laboratories. Also under investigation are water reducing agents which indicate promise of improving concrete quality.

Powerplant construction

Flaming Gorge Powerplant is to be constructed at the downstream toe of the dam. It will be a reinforced concrete structure 220 ft. long, 100 ft. wide, and 115 ft. high above foundation. The powerhouse will have a reinforced concrete substructure from foundation to the generator floor and a superstructure of steel rigid-frame bents and 10-in. concrete walls. The roof will be built of lightweight precast concrete slabs.

Construction of the powerhouse will be carried out in two stages. First-stage construction, which is scheduled to begin June 1960, is part of the prime contract for the dam and will include placement of 10,500 cu. yd. of structure concrete, 1,500,000 lb. of reinforcing steel, 850,000 lb. of structural steel, and installation of a 150-ton capacity crane. In addition, 1,750 cu. yd. of mass concrete are to be placed beneath the powerhouse.

Second-stage construction, which will be carried out under a separate completion contract, is to begin in the spring of 1962. It includes placement of 3,500 cu. yd. of concrete and 320,000 lb. of reinforcing steel. With the exception of generators, the completion contract, to be awarded after completion of the major portion of the powerplant under the prime contract, will call for installation of powerplant equipment, exposed piping and electrical conduits, architectural finish, heating and ventilating equipment, and other finish work. The generators will be installed by the generator manufacturer.

Hydraulic features

Floodwaters will be passed through a 675-ft. length of tunnel-type spillway extending through the left abutment. The concrete-lined tunnel will have a maximum capacity of 28,800 sec. ft. and will vary in size from 26½ ft. at the upstream portal to 18 ft. at its downstream portal. Part of the tunnel will be inclined at an angle of 55 deg. with the horizontal. Minimum thickness of the tunnel lining will vary from 21 in. at the 26½-ft. section to 15 in. at the 18-ft. section. The spillway intake structure will be controlled by two 16.75 x 34-ft. fixed-wheel gates.

The outlet works for the dam will be comprised of two 72-in. steel pipes through the dam, reducing to 66-in. at the toe of the dam, and continuing downstream to a valve structure on the left river bank where discharges will be directed into the river channel downstream from the powerplant tailrace. The two pipes will have an average length of about 410 ft. Each outlet will be controlled by a 66-in. ring-follower gate at the downstream toe of the dam and a 66-in. hollow-jet valve at the valve structure at the downstream end of the outlet pipe. Maximum discharge through the pipes will be 4,000 sec. ft.

Access road construction

Principal access to the dam is by an 18-mi. road which has been constructed between Linwood, Utah, and the left abutment of the dam. The first 7.6 mi. of the road and a 435-ft. temporary timber bridge crossing the Green River were completed in May 1957 by Wangsgaard Construction Co. of Logan, Utah, under a $143,912 contract. The same company completed an additional 7.6 mi. of the road in June 1958 under a $504,642 contract. The remaining 2.8 mi. of road, which extends from the new Government community of Dutch John, Utah, to the dam, and a 1.25-mi. service road to the powerplant are under construction by the prime contractor for the dam.

The nearest railhead is Green River, Wyo., a total haul distance of 63 mi. from the dam site. The distance from Green River to Linwood on a bituminous-surfaced road is 45 mi. Haul distance from Vernal, Utah (not a railhead), to the right abutment of the dam is about 45 mi.

Government community

The new permanent community of Dutch John, named after a pioneer settler of the area, is about 2 mi. northeast of the dam site in Daggett County, Utah. An essential feature of the Flaming Gorge Unit, the community will provide housing, facilities, and utility services for both the contractor's forces and the Bureau's engineering employees during construction of the dam and powerplant, as well as personnel who will operate the dam and powerplant after they are completed. Maximum population of the town during construction may reach 3,000.

Dutch John occupies about 160 ac. and is about 800 ft. above the Green River. Streets have been laid out in a curving pattern to conform to the topography. The Witt Construction Co. of Provo, Utah, completed early this year a contract for construction of 50 residences, surfacing of streets and sidewalks, and construction of water distribution, sewage collection, and surface drainage systems for the town.

Personnel

W. A. Dexheimer, whose offices are in Washington, D. C., is Commissioner of the Bureau of Reclamation. The Colorado River Storage Project is in the Bureau's Region 4; E. O. Larson is Regional Director. Jean R. Walton is Project Construction Engineer for the Flaming Gorge Unit; his office is at Dutch John. All designs for the unit are under the direction of L. G. Puls, Chief Designing Engineer of the Bureau.

For The Arch Dam Constructors, Douglas D. Baker is project manager, and Henry C. Scott, project engineer. A tabulation of the unit bids appeared in *Western Construction*, September 1958, page 131.

Record prestressed lift-slab job

Over 300,000 sq. ft. of floor slabs jacked into place for Los Angeles building, new record for floor area. Post-tensioning cables 156 ft. long set new standard for length of floor slab prestressing.

AMONG THE DOZEN major structures going up in downtown Los Angeles is one believed to be the largest building in floor area ever to be constructed by the lift-slab method. The slabs are post-tensioned using cables as long as 156 ft. — perhaps the longest prestressing ever carried out on floor slabs.

The building is the $5,000,000 addition to the District VIII State Division of Highways headquarters at 120 South Spring Street. The addition measures 322 x 156 ft., has five stories and basement, and will have close to 360,000 sq. ft. of usable office space. It will allow centralization of Division of Highway offices now scattered about the city.

James I. Barnes Construction Co., the general contractor, expects to be finished with the project by Nov. 1959, just 20 months after work first started.

For construction purposes the overall area of the building was divided into four parts, each about 75 ft. wide and 158 ft. long separated by spaces 5 and 6 ft. wide. These closing spaces were formed and cast in place at each floor after the slabs were located at the proper elevation.

The steel columns, fabricated by the Apex Steel Corporation, are spaced 28 ft. in each direction.

The sequence of pouring, stressing, and jacking had to be carefully planned because the building completely occupies the site. There is no room outside the site for storage of materials or equipment operations. After excavation of the basement and construction of column and wall footings was completed, Barnes erected 26-ft. high columns on the two easterly quarters of the site. This left the west half of the site open for materials and equipment. Next, the six slabs were cast on the basement floor, one on top of the other, using Hunt's Parting compound to separate them. The casting of the two stacks of slabs was carried on in a weekly cycle. While the reinforcing steel, prestressing steel and electrical and plumbing fixtures were being set for one slab, pouring and curing of the adjacent one was under way. It took a week for the concrete to set sufficiently to serve as a bed for the next slab.

(Continued on next page)

PLACING RE-STEEL and prestressing cables for fourth slab in stack of six is under way. Note collars on columns which will be imbedded in next two slabs. Pairs of holes in columns admit large bolts which temporarily support slabs while columns are extended and jacks reset.

FIRST PHASE of lifting has been completed in background, while in foreground roof slab has been raised to top of first column lift. Note column extensions which ride up on top slab.

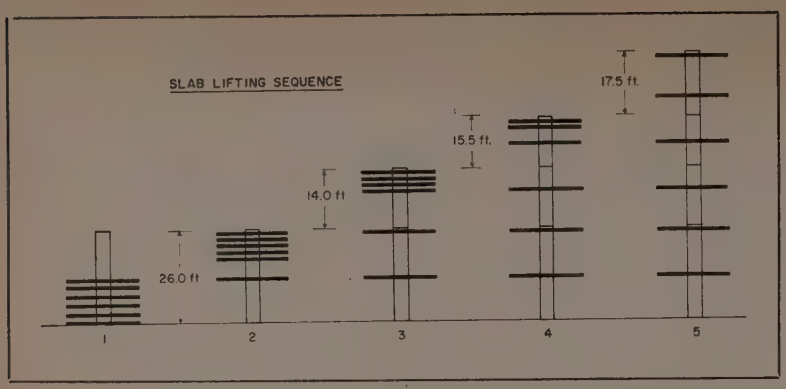


DIAGRAM shows lifting phases. Slabs are jacked to top of columns, leaving lower ones behind at permanent locations. Columns are extended and process is repeated until top is reached.

VAGTBORG JACK is inspected by Gerald Glenn of the State Division of Architecture, and Harold Weaver, superintendent for general contractor James I. Barnes Construction Company.

Concrete for the first two stacks of slabs was placed by a 35-ton Lima truck crane carrying a 1-cu. yd. bucket from a 120-ft. boom.

Lightweight concrete weighing about 110 lb. per cu. ft. was used throughout for the slabs. Theoretical composition of a typical cu. yd. was as follows:

Natural WC sand	1,290.52 lb.
9/16-in. Rocklite	352.71 lb.
1-in. Rocklite	431.56 lb.
Cement	634.50 lb.
Water	300.82 lb.

Type 3LA Pozzolith was used as an admixture to minimize floating of the lightweight aggregate and to make a more workable mix.

Prestressing

Prestressing the slabs was done about seven days after the pour, when the concrete had reached a strength of over 3,000 psi. (The ultimate design strength of the concrete is about 3,500 psi. at 28 days.)

Prestressing was carried out on a subcontract by Blue Diamond Corporation which also handled the fabrication and placing of reinforcing steel. The prestressing system and cables were from Western Concrete Structures. Each prestressing cable contained seven wires and was wrapped with special paper to prevent bonding to the concrete and to provide corrosion resistance.

Jacks used during prestressing weighed only 35 lb., making them easily portable by one man, and had a capacity of 35 tons. The jacks were powered by hydraulic pumps with 10,000-psi. capacity. Jacking was done from both ends simultaneously on the longest cables. Operators kept in touch with each other by telephone so that the stress could be introduced into the cables uniformly. On the shorter cables, stressing was carried out from one end alone.

When stressing of the first two stacks of slabs was completed, the casting and stressing of the remaining two stacks was begun. The operation and sequence was similar, the main difference being that the ready-mix trucks used the tops of the previously poured slabs to deliver the concrete.

Lifting the slabs was carried out by the veteran Vagtborg Lift-Slab Corporation. Each stack contained 18 columns and on the top of each column was placed one of Vagtborg's patented 75-ton hydraulic jacks which lift by means of two long lifting rods. The jacks were operated simultaneously from two central consoles each of which controlled 9 jacks. The first phase of lifting involved raising the 5 top slabs to the top of the 26-ft. columns and tying them off temporarily. The sixth slab was raised to its final position and welded in place. The columns were predrilled with pairs of holes to accommodate large bolts used for the temporary tying off of the slabs. In the temporary position the slabs were separated by a space of 1 ft. 8 in. The jacks were then transferred to the next stack of slabs while the columns on the first stack were extended. The drawing accompanying this article shows the sequence of jacking and extending the columns.

Whenever a slab was welded to a column in its final position a concrete shear wall was built to it to give the overall building framework the necessary stability.

Personnel

The building was designed by the State Division of Architecture under the direction of Anson Boyd, State Architect. Representing the Division on the project is Gerald Glenn.

For the James I. Barnes Construction Company, Harold Weaver is superintendent of construction, assisted by Guy Scarbrough. Pete Beierly is labor foreman.

How to break a tunneling record

By **BOYD C. PAULSON**
Project Manager
Utah Construction Co.
Mammoth Pool Project

NEVILLE S. LONG
Resident Engineer
Southern California Edison Co.

and

A. J. SIMONEAUX
Project Engineer
Utah Construction Co.

BLASTING POWDER is placed by miners in a pattern which averages about 85 holes with a 3-in. center burn. Combination of millisecond and regular delays was found to give the best breakage.

CREWS of the Utah Construction Company set a new record for hard rock tunnels by driving 390 ft. of tunnel in the 6-day week ending on January 31, 1959. This was accomplished at the outlet heading of the tunnel which Utah is driving to carry the San Joaquin River from the Mammoth Pool Dam 8 mi. through the Sierra to the Mammoth Pool Powerhouse.

The Southern California Edison Company's Mammoth Pool Project, estimated to cost approximately $50,000,000, is a part of the Big Creek development 80 mi. east of Fresno, Calif. The project consists of a 440-ft. high rolled earthfill dam, the 8 mi., 20-ft. diameter horse-shoe shaped power tunnel, and a two unit powerhouse with a nameplate capacity of 126,000 kw. Work on the project commenced in Jan. 1958, and is scheduled for completion early in 1960.

Utah is driving the tunnel from five headings and driving was approximately 50% complete when the record was set. The crew at the tunnel outlet under the supervision of Paddy O'Dowd has consistently made the best footage and have had their eyes on a record for some time. Because no two tunnels are exactly the same, the question of who has what record often is the subject of much debate wherever miners gather. The previous record, at least in the opinion of the miners on the project, for a comparable tunnel was set by the Walsh Construction Co. in 1954 on P. G. & E.'s Pitt No. 4 tunnel on California's Feather River at which time a total of 363 ft. was driven in a 6-day work week. Greater distances have, of course, been achieved in smaller tunnels and in similar sized tunnels in soft ground. The granite encountered in the Mammoth Pool Tunnel is generally hard and massive although a few blocky areas have been encountered and very few supports have been required. Needless to say, no supports were required in the week when the record was set.

In an age when too often the aim is to work to minimum standards or to see how little can be done and still hold one's job, it is gratifying to witness a group of men working in the time-honored American tradition of trying to do their job just a little bit better than it ever has been done before. This spirit of striving for continually better performances has always been synonymous with heavy construction in the West and is perhaps best typified by the miners who drive the tunnels so vitally needed for development of the West.

Construction records can be set in two ways. The first method is to plan ahead for the setting of the record and then to concentrate on making the record to a point of leaving much work undone which has to be taken care of later. Such records, while not giving a true picture of the capability of the performance on the job, do have their value as they give targets to shoot at and represent what can be done under ideal conditions. The second type of record is one which comes about as part of the routine operation and is usually followed by further records or at least a continuing production which often approaches the record. Records of this type often result from improvements in equipment such as the concrete placing record which was set at Pine Flat Dam by the Hi-Speed cableway which first made its appearance there. Other records result from a combination of small improvements in equipment, good conditions and a well-planned operation. However, in order to achieve a record, there must be leadership and desire as without these factors, records just don't get broken. The Mammoth

Pool record can be placed in this category.

Much of the credit for the Mammoth Pool Tunnel record must go to the outlet portal superintendent, Paddy O'Dowd. He and his crews made up their minds early in the job that they were going to break this record. It was constantly in their thoughts and their work and progress was such that the breaking of the record was first achieved on a daily basis, then several days would be put together and for eight or ten weeks prior to the making of the record, each week was started with the record in mind. However, ground conditions or equipment failures would prevent a sustained high pace being carried out for a full week. Finally the week came when the ground was uniformly good for six days in a row and no major mechanical breakdowns occurred with the result that the record was broken by a large margin.

Desire and hard work, while essential, are not the only ingredients which are necessary to produce a record-breaking performance. In addition, a careful and continual study of the job must be made. Time studies of the various component parts of each cycle are a part of the normal supervisory program at Mammoth Pool with the results of these studies serving as guides to improved performance. One other feature which cannot be overlooked is the very excellent backing given to the crews on the project by the job warehouse, shop, engineering and office facilities as well as by the project supervision.

Drilling

Gantry jumbos are used in all headings except one, where a main line jumbo is used. The main line has eleven Gardner-Denver No. 93 drifters on tripod jib booms. The gantry jumbos mount ten No. 93 drifters and one No. 123 drifter machine. Compressed air is furnished by a total of eight 1,800-cfm. Joy Sullivan compressors located in three separate compressor houses. Bits in use are Brunner & Lay carbide insert "Rok Bits." All drill steel is prepared and reconditioned in a fully equipped blacksmith shop located near the Rock Creek adit. This shop works under the direction of the two Doyle Brothers, Jack and Daniel W. Stock steel is Bethlehem Pacific furnished by Earle M. Jorgensen Co. Bit and steel usage has been

CAR PASSING is done with "cherry pickers" on the gantry jumbos and motorized carpassers behind the mainline jumbo.

satisfactory to date with the bore faces usually showing a hard granite. There have been times though where headings have advanced through metamorphic areas which result in increased bit wear. Quartzite and Diorite have been the hardest rocks encountered to date.

Blasting

Considerable attention has been given to developing the most economical and satisfactory blasting pattern. Most of these experiments were carried out under the supervision of Utah Construction Company's explosive expert, R. L. Mullen. The pattern which has given the best results has about 85 holes 1⅝ in. in diameter spread around the 3-in. burn pattern. Atlas powder with Hercules primers are being used at all headings. The delay pattern developed gives reasonably consistent breakage with the use of a combination of millisecond delays and regular delay caps.

Mucking

Mucking is done by Goodman Conway 100-1 machines loading 8-cu. yd. side dump cars manufactured by Miners Foundry Co. Car passing is accomplished using "cherry pickers" on the gantry jumbos and motorized carpassers behind the mainline jumbo. Three "California switches" as well as several permanent passing tracks are used for shuttling trains so as to keep the mucking operation on a continuous basis.

Ground conditions

Underground conditions generally have been good with about 190 steel supports (supplied by Commercial Shearing & Stamping Co.) having been installed. Blocky ground has been stabilized by the use of roof bolts (supplied by Colorado Fuel & Iron). Approximately 500 have been used to date in 29,400 ft. of tunnel.

Underground water has hampered operations at times. The maximum flow encountered to date was approximately 6,000 gpm. which had to be pumped from the downstream heading at Rock Creek. In the three months since this underground water was first drilled into, the flow has reduced to less than 600 gpm. Subsequent to the setting of the record at the outlet portal, additional water has been encountered and the total water flowing from this heading was approximately 6,000 gpm. during the latter part of March, however, as this is an upstream heading, this water does not have to be pumped.

Communications

Because of the long road distances between the three operating bases, logistics and communications were one of the main problems which had to be solved in order to get the job functioning in a satisfactory manner. It is 16.7 road miles from the outlet portal to the Rock Creek Adit and an additional 25.2 mi. from the Rock Creek Adit to the Shakeflat Adit. The communications program has been solved by the installation of transistor short wave radios in job vehicles and offices with an additional radio installation at the Purchasing Office, which is maintained in Fresno. Because of the extremely mountainous country in which the project is located, a repeater station was installed on a nearby mountain top to assist in providing effective radio communications. Telephone communication between the three jobsites is provided over a ground laid cable installed by the Edison Company and outside telephone communications are provided via this cable.

Personnel

Utah's project personnel include: Boyd C. Paulson, project manager; Steve Wilmoth, general superintendent; Al Simoneaux, project engineer; H. W. Johnson, business manager. Portal superintendents are "Heavy" Holman, Jack Robertson and Paddy O'Dowd. C. A. Banks is master mechanic and John Burke is electrical superintendent.

Inspecting the tunnel for Bechtel are Homer Castonia and Frank Landers. The tunnel, along with the rest of the project, is supervised by Harold A. Barber, project engineer, and Neville S. Long, resident engineer for the Southern California Edison Company.

ORMS GIVE LOWEST
ON ELEVATED HIGHWAY

In carefully planned sequence of operations, prefabricated shoring towers were positioned, screw-jacked to required height. Deck form sections were then crane lifted into position.

High density overlaid plywood concrete form panels give over 50 re-uses, cost less than .007¢ per sq. ft. of form per pour.

"THE EXTRA RE-USES we got from overlaid plywood more than offset its greater initial cost," says George Krenkel, project manager for Johnson, Drake & Piper, Inc., contractors for this 1.55-mile long 8-lane elevated highway.

"Even after giving upwards of 50 re-uses, a large percentage of the panels were salvaged for additional use on other jobs," Mr. Krenkel reports. "Besides being more economical in terms of cost per use, overlaid plywood creates much smoother concrete and is easier to strip and clean."

On the job over 50,000 sq. ft. of 5/8" overlaid plywood was used for deck slabs, columns and guard rails. Prebuilt 8' x 20' and 8' x 22' deck forms were supported by ingenious prefabricated shoring towers which were leap-frogged as pouring progressed. Screw jacks were used to raise towers to required heights. Stripping was accomplished simply by lowering jacks until the forms came free.

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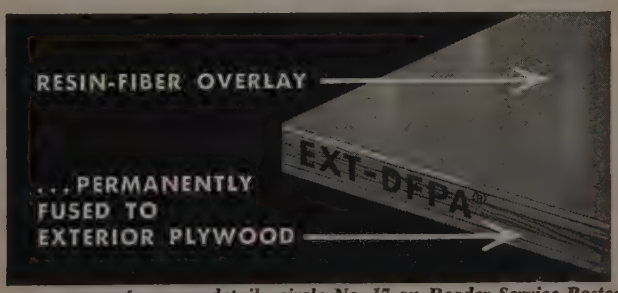
HIGH DENSITY OVERLAID FIR PLYWOOD is a premium concrete form panel intended for jobs that require ultra-smooth concrete surfaces and/or many re-uses (up to 200 re-uses may be obtained with properly designed and constructed forms). Base panel is EXT-DFPA® Exterior plywood.

Standard concrete form grades are: *Interior PlyForm®* with water-resistant glue for multiple (up to 10-12) re-uses; *Exterior PlyForm®* (waterproof glue) for up to 25 or more re-uses.



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Self-contained rock drill for use in remote areas

INCREASED NEED for tapping the natural resources of the West's mountain areas has focused new attention on power tools suitable for exploratory and preliminary development work in rough back-country terrain. Contractors and industry concerned with this increasing problem can learn many a helpful equipment lesson from the one group which has long and intimate experience in this type of mountain work — the U. S. Forest Service.

Mechanical equipment for its extensive trail improvement function has become a virtual economic necessity for the Forest Service in recent years. Its labor costs have risen right along with those of industry; and, over the years, its nucleus of skilled old-time trail builders has been to some extent replaced by young summer-work-only students. As a result, the U. S. F. S. has been quick to test each likely piece of new equipment.

IMPROVEMENT over older methods, drill takes steel up to 13 ft., can go through hardest rock.

Whether it was first to fully utilize portable gasoline-powered chain saws may be debatable, but certainly these are now basic, commonplace tools with the Service. A later development, also no longer new in the U.S.F.S., is the "Merry Packer" . . . favorite lingo for single or tandem-wheel trail buggies powered by one-cylinder gas engines. When existing trails permit their use, these utility vehicles enable a two-man team to steer a 200-lb. load over difficult terrain with minimum effort and time loss.

Newest back-country tool proved out by the Forest Service is one which has particular application interest to contractors — a lightweight, completely self-contained portable rock drill. Termed the "Cobra" by its Swedish designers, it is a compactly-designed 53-lb. unit which can be readily backpacked to any work site.

Performance characteristics are extremely well suited to Forest Service needs. Using drill steels up to 13 ft. long, the unit will drill in hard granite at a rate of 6 to 8 in. per min., drilling some 100 ft. of hole on a single gallon of gasoline. Its production capabilities are a considerable improvement over the previous double-jack, sledge-driving a hand-held chisel bit.

The Cobra drill was first introduced on the U. S. market in early 1957, and tested in several Western forests by the U.S.F.S. that same season. Last year, the drills were operative in national forests in seven Western states and with several governmental bodies in the Alaskan wilderness.

A typical user—actually the first Forest Service unit to field test this self-contained rock drill in 1957 — was the Stanislaus National Forest of central California.

In this forest alone of 1,720 sq. mi.—more than 1½ times the area of Rhode Island—are deep canyons, rivers, forests and mountains which attracted more than 1,500,000 visitors in 1958. The 240 mi. of improved back-country trails which it maintains seem pitifully few, until it is realized that one 30-mi. trail-building job can be a two-to-three-year project because of the limited work funds, manpower and work season.

ROCK DRILL weighs only 53 lb., enabling one man to carry it easily over rough terrain.

Two of the new Cobra drills were part of the equipment sent with a 10-man Stanislaus trail crew this past summer into the Emigrant Basin, a primitive area of 8,150 elev. more than 20 mi. beyond the last road.

Working the July-through-October season permitted by snow conditions, this team reconditioned 7 mi. of trail to U.S.F.S. standards of a 2-ft. tread and maximum 15-deg. grade in the four months. Records show they drilled approximately 4,000 ft. of blast holes in granite with the gas-powered units. In trail work, most shots are individual and a 10-hole round is a maximum; average depth drilled was 12 in. with ¾-in. steels. Total operating cost for the season was less than 9c a foot—including drill steel, gas and oil, spare parts, and a post-season complete overhaul.

A portable grinder which operates off the drill itself, taking its power through the crankshaft, enabled the crew to keep its steel sharp right at the job.

Use opportunities for this lightweight rock drill among construction companies, and industries doing mountain exploratory work

New!

Owner: J. J. Struzziery Co., Dedham, Mass

1 cu. yd. excavator • 30-ton truck crane
25-ton crawler crane • 30-ton Maxi crane

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such as electric power utilities, appear to be widespread. Drilling test holes or for isolated rock blasting where compressed air is not available, or is expensive and time-consuming to provide for limited needs, are ideal applications. A variety of standard tools can be substituted for the drill steel, including spades, tampers, pavement breakers, etc., to convert the unit into a multi-purpose utility piece.

Detailed information on the Cobra drill is available from the San Carlos (Calif.) headquarters of Atlas Copco Pacific or its Western branch offices.

Other manufacturers and distributors of equipment and supplies of all types would do well not to overlook the vastly-increased program of the Forest Service. A federally-financed 5-year "Operation Outdoors" modernization and expansion program now getting under way would more than double expenditures on recreation areas in the national forests to an average of $17,000,000 annually.

The West's share of this materially increased spending is certain to be large. Of the 180,000,000 ac. of national forest land in 38 states, Alaska and Puerto Rico, more than 75% is contained in the 98 such forests to be found in the 11 Western states alone.

It is a seldom-recognized fact that recreation has become the nation's third largest industry. Tourist expenditures topped $24,000,000,000 in 1955, the last year for which figures are available — and the national forests carry a major share of this outdoor recreation use.

FOREST SERVICE personnel watch a demonstration of the light, self-contained, gas-powered drill. Drilling position can vary up to 45 deg. Pulley-type starter is visible in photo.

Western national forests alone, for example, attracted nearly 40,000,000 recreational use visits in 1957—and "Operation Outdoors" is gearing these facilities to accommodate an expected 66,000,000 visits by 1962. Recreation now is a particularly important product in the West's economy, and it will be increasingly so in the years ahead.

Building contracts rushed in Alaska

CONTRACTOR CREWS working with supervisors of the U. S. Army Engineer District, Alaska, are ahead of schedule in over $7,000,000 of construction at Fort Richardson and Elmendorf.

Two contract firms are doing the work, Miller Brothers and the Lease Company. Rapid progress comes from teamwork between District supervisors and project crews. Both firms are 30 to 60 days ahead of schedule.

Lease Company is pushing ahead two facilities for the U. S. Air Force at Elmendorf — an Enlisted Airmen's Service Club and an addition to the Officers Open Mess. Both are expected to be completed this summer about 60 days ahead of the construction deadline.

Miller Brothers (M-B) is the contractor on the U. S. Army family housing project at Fort Richardson — a large job costing $5,895,451 to provide 155 family units on the base. The units are slated for completion September 30 and are expected to be ready 30 days ahead of time.

The Service Club at Elmendorf is a T-shaped two-story building, 60 x 200 and 60 x 100 ft. The contract cost of construction is $768,575.

The addition to the Elmendorf Air Force Officers Open Mess is a concrete one-story structure measuring 100 x 160 ft. The cost is $738,714.

More family housing being built under contract with the District is slated for completion this summer in the Fairbanks area military bases and along the Haines-Fairbanks pipeline. Manson-Osberg has the $4,402,871 contract. Workmen are building a commanding officer's unit, 25½ duplexes for field grade officers and 44 eight-family units at Ladd and Eielson. A six-family structure is under construction on the pipeline at the Alaska-Canada border; a five-family unit is under way at Donjek.

All work is either on schedule or ahead of it, officials say.

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PRODUCTION was speeded in the dozing of loose beach sand and by using two Cat D8's teamed up side by side. About 1,750,000 sq. yd. of finished grade had to be prepared.

Moving 8,000,000 cu. yd. for an island runway

Off the California coast the Navy builds a 9,300-ft. runway on an uninhabited island. Contractors meet transportation problems and complete grading in 15 months.

CONSTRUCTION of military airports often presents unusual situations, but contractors found some new ones in building a 9,300-ft. runway for the U. S. Naval Air Facility on San Clemente Island off the coast of California. The runway will be used by aircraft furnishing aerial gunnery and control practice to Naval ships undergoing training. First, the contractors had to bring in everyone to work on the project —the island is uninhabited except for military personnel. The Navy uses it as a target for shore bombardment practice. Second, San Clemente lies 63 mi. off San Diego, and every machine, part and drop of fuel had to be hauled out by boat. Third, materials to work varied from heavy clay through loose beach sand to hard andesite rock.

Contractors on this $6,373,000 grading project are CHAD-J.V., a joint venture of Cox Bros. Construction Co., J. E. Haddock Ltd., Arundel Corporation and L. E. Dixon Co.

CHAD-J.V. moved 8,000,000 cu. yd. of material, bringing 1,750,000 sq. yd. to finish grade. Grade was prepared for a 9,300-ft. runway 200 ft. wide, flanked by a 75-ft. taxiway. In all, a site 11,300 ft. long by 850 ft. wide was prepared, with a 63,000-sq. yd. parking ramp. Paving will be accomplished under a later contract.

The runway was built largely on fill, rises 183 ft. above sea level. Most of the material was cut from one half of the taxiway and the parking ramp; the remainder borrowed. Earthmoving equipment was divided into five spreads—high-speed scrapers, crawler-drawn scrapers, rock spread, compaction and finish grade. Most of the material is being moved by 11 Cat DW21-No. 470 Tractor scrapers, push-loaded by a D9 and 4 D8s, tandem pushing in the loose sand to speed production. The D9 also rips before the scrapers to speed loading. For shorter hauls, CHAD-J.V. used 2 D8s pulling No. 491 scrapers, pushloaded by another D8.

A D9 and a D8 ripped andesite rock for shovel loading. Rock too tough for ripping was blasted by drills on twin booms, powered by a 600-cfm. Gardner-Denver compressor, mounted on a D8. An 80D Northwest 2½-yd. shovel loaded broken rock into two DW21-PR21 rear dumps.

On the fill, 90% modified AASHO was achieved under four 60 x 60 Southwest sheepsfoot rollers and a Hyster Grid roller, pulled by three D8s. Two more D8s with RU scrapers worked the fill. Extensive watering of the sand was required to reach compaction. Two Euclid and three GMC water trucks were used on the fill. Blending was accomplished with a Towner offset disc and Towner harrow.

Three Caterpillar No. 12 Motor Graders brought the fill to finish grade, followed by an Atlas land plane pulled by a Euclid tractor.

Capt. A. D. Hunter, CEC, USN, the Eleventh Naval District Public Works Officer, is in charge of the work. He was assisted by Capt. G. E. Fischer, CEC, USN, as resident officer in charge of the contract until his detachment. Capt. Fischer was succeeded by Capt. Jack J. McGaraghan, CEC, USN, who is currently the resident officer in charge. Capt. McGaraghan will represent Capt. Hunter in completing the contract. Superintendents for CHAD-J.V., the contractors, were Robert C. Reif, general; R. T. de Bolt, excavation; and Eric L. Dagseth.

TOUGH andesite rock was readied for blasting by twin drills powered by a 600-cfm. Gardner-Denver compressor, mounted on a Cat D8. Some of the rock was ripped by a D9, which doubled as a pusher to help load D8s pulling Cat No. 491 scrapers in the broken rock.

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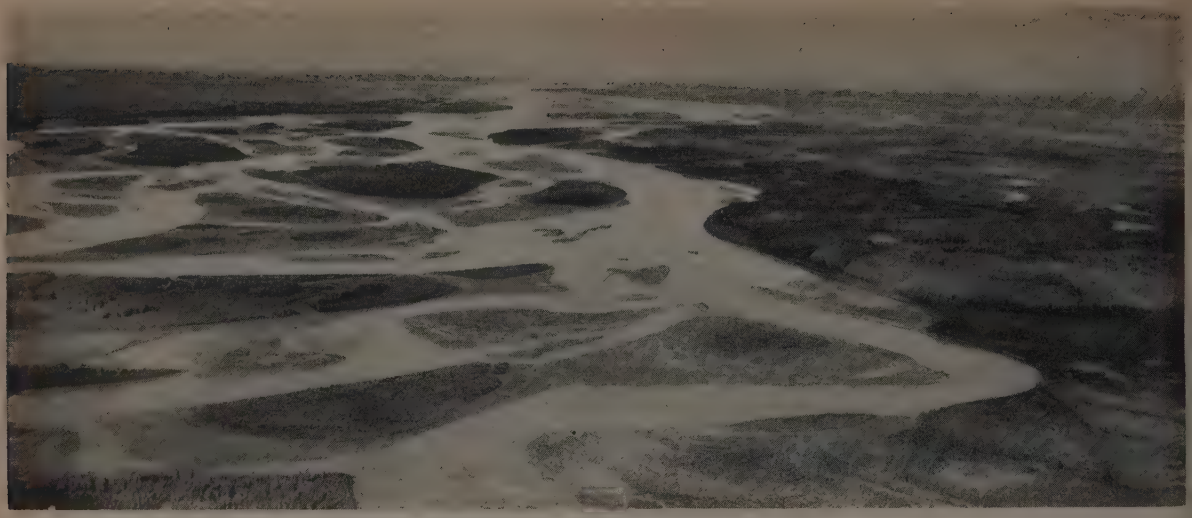

PAUL BUNYON size of reservoir site on the lower Yukon River which could cover an area of 10,000 sq. mi. of the type of territory shown.

This inland delta area lies behind the Rampart Range, where the river cuts through to salt water.

Hydro power from the Yukon River

Corps of Engineers investigations show millions of potential kilowatts of hydroelectric energy awaiting development from the rivers of Alaska. Rampart Canyon project on the Yukon could have a capacity twice that of any existing installation.

IN THE PAST, construction men have said proudly, "I helped build Hoover Dam" and "I worked at Grand Coulee." The "Three K Job," the Kenny-Kemano-Kitimat Project in British Columbia, has become a more recent construction legend. In the future, men may brag that they drew overtime at the biggest in the biggest — The Rampart Canyon Complex on Alaska's Yukon River.

In recent years, the U. S. Army Engineer District, Alaska, at Anchorage has made investigations of undeveloped hydroelectric damsites in the 49th State. The reports state that Alaska has water power resources of approximately 19,000,000 kw. The Yukon River, the main street of Alaska during the Gold Rush Days, has the greatest potential with an estimated 8,000,000 kw. at four sites, Kaltag, Rampart Canyon, Boundary and Woodchopper Creek.

An aerial photograph of the eleven states of the West would show that most of the good economical dam sites are now filled by towering dams to produce electrical power for the ever-demanding needs of modern American civilization. Steam plants are now being called upon to help meet this mounting demand.

Since World War II, a potential giant has been rising in the north background of the power picture. American industry has realized the power potential of western Canada and Alaska and has started to stake claims on the dam sites of the North Country. The pioneer prospector in 1951 was the Aluminum Company of Canada, parented by Aluminum Ltd. searching for cheap power for ingot production. This smelting process has an insatiable appetite, requiring for every pound of aluminum enough power to light up a 25-watt bulb for two weeks.

So the "Three K Job," the Kenny-Kemano-Kitimat Complex, was born in the cold, uninhabited mountain wilderness of Northern British Columbia. It now produces aluminum ingots from the company's mining operations in Jamaica, British West Indies. It is the cheap waterpower that brings the Jamaican alumina, refined from bauxite ore with lime and soda ash, on the long logistic haul through the Panama Canal, up the West Coast, and through the ice-free fjords of the Inside Passage.

This "Three K Job" bred fabulous construction figures in the Canadian wilderness. Surveyors pioneered the locations of the dam, powerhouse, and transmission line to tidewater with 12 amphibious aircraft and seven helicopters. Kenny Dam, with its 317-ft. height, is one of the largest rock-fill dams in the world. Its reservoir pool of 358 sq. mi. of Fraser River headwater lakes is filled from the melting snows and glaciers of its 5,550 sq. mi. of drainage area. The underground Kemano powerhouse is tunneled into the mountain, and water is dropped 2,500 ft. down its penstocks.

With a corresponding potential, the strategic headwaters of the Yukon River in Canada have caused industrialists to dream waterpower dreams. In 1955 the Aluminum Company of America proposed the Taiya development to divert Yu-

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IN A CANYON on the Porcupine River is this potential dam site. The view shows the exposure of a coal seam in the canyon wall. Imagination might vision a combination of steam and hydro power development at this site.

kon headwaters to a power plant near Skagway, Alaska, the port of the Klondike gold stampede of 1898. This reached a stalemate when the Canadian Frobisher interests presented an alternate plan to carry the water southward to the head of Taku Inlet within Canada, not far from the 49th State's capital, Juneau.

The Wood Canyon site on Alaska's Copper River with its power potential of 1,100,000 kw. is under Federal Power Commission permit to the Harvey Aluminum interests of Los Angeles. Contemplated transmission to a tidewater reduction plant at Cordova or Valdez might be supplemented by a branch power line to Anchorage.

Last year, British Columbia's Premier announced that 1960 will see work begin on a gigantic hydroelectric project costing possibly $600,000,000 and including the world's longest man-made lake in the remote Peace River wilderness. It is said that survey for the planning stages has cost more than $8,000,000. The hydroelectric project is only a part of the plan proposed by interests of the Swedish financier, Axel Wenner-gren, to develop the natural resources of forest products and minerals as well as electricity in the Peace River area. The entire vast development is estimated to eventually cost $1,000,000,000. The planned dam in the Peace River Canyon will flood the Finlay and Parsnip rivers, creating a 300-mi. long lake, twice the size of Grand Coulee's reservoir. Its power potential is estimated at 4,000,000 kw. with first power deliveries expected by 1964.

But these great projects are dwarfed by the power potential of the Yukon River within the boundaries of the 49th State. Not including the giant Canadian projects to harness its headwaters, the investigations of the Corps of Engineers in Alaska reveal that this river could become one of the great power rivers of the world with its 8,500,000-kw. capacity.

The magnitude of Alaska's Rampart Canyon project is such that its ultimate installed capacity would probably be twice that of the largest hydroelectric installation on earth today. This site is located at Rampart Rapids near the middle of a narrow 100-mi. S-shaped gorge. Here the rugged Yukon has sliced through a mountain range which blocked its 2,500-mi. journey across Alaska from its Canadian headwater lakes to its Bering Sea mouth. Above the winding, twisting canyon lies an inland delta with myriad lakes and channels, filled with uncountable thousands and thousands of ducks and geese in the summer. This broad basin lowland is some 200 mi. in length with a maximum width of 100 mi. What a reservoir site! The estimated ultimate reservoir pool would cover 10,000 sq. mi. and produce 4,500,000 kw. of electricity. That's Rampart, the future Paul Bunyan power project of the North.

Other Upper Yukon hydroelectric sites are Woodchopper Creek and Boundary. The Woodchopper dam site is about 40 mi. upstream from the Yukon River village of Circle, and its power potential is estimated at about 1,000,000 kw. The Boundary site is 11 mi. up the Yukon from Eagle, and its reservoir would be in Canadian Yukon Territory. It should produce an estimated 785,000 kw. of prime power.

About 8 mi. below the Eskimo village of Kaltag, the Corps of Engineers' investigations have found a 1,775,000-kw. dam site on the lower Yukon, which would control most of the flow of the river and its tributaries.

The most unusual hydroelectric site in Alaska is the potential Knik River project near Anchorage. Studies have indicated a potentiality of 200,000 kw. Knik Glacier, only one of 27 such ice rivers in this drainage area, flows down from the Chugach crags and crosses the valley from the side. Behind this natural ice dam, Lake George accumulates the annual runoff from about 870 sq. mi. of which 40% comprises glaciers and perennial ice-fields. Each year, in July or August, the lake overtops the ice barrier of Knik Glacier at the mountain valley abutment, cutting a channel which widens as it undercuts the glacier front. Icebergs as big as city blocks fall into the chasm with a deafening roar. The torrent, rushing down the ice gorge, empties bathtub Lake George, like pulling the plug, in from 7 to 9 days. The released waters storm down Knik River, ripping and roaring like a hydraulic giant. After the lake empties, the glacier front marches with irresistible force back across the 300-ft. depth of channel chasm and again throws up its ice dam when it meets the immovable object of the valley wall, and is ready to repeat the annual cycle.

The estimated annual runoff is in excess of 3,500,000 ac. ft. Power would be developed by conveying the backed-up lake water through one or two tunnels driven through the valley wall ahead of the glacier dam to a powerhouse. Flood control would be tied in with this hydroelectric project as the short flash flood every year threatens the Alaska Railroad, and Glenn Highway and homes downstream.

Old time construction hands may be retired to a chicken ranch at Tucson, or harvesting avocados from a grove in Southern California on salted-away overtime savings before the 49th State breaks out in a rash of dam building. But the dreams they reserve to satisfy their wanderlust yearnings, uninhibited desires to see new country, and the craving in the blood to help build "the biggest," will be satisfied when construction men begin bragging they worked on THE BIGGEST OF THE BIGGEST, ALASKA'S RAMPART DAM.

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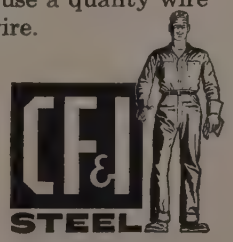

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Little chance for high flows in—

Runoff forecast for Western States

HOMER J. STOCKWELL
Fort Collins, Colorado
and
NORMAN S. HALL
Reno, Nevada
Snow Survey Supervisors
Soil Conservation Service

THE WATER SUPPLY outlook in the Western United States is fair to good in the north, poor in the south and southwest. There are a few areas of very heavy snowpack near the Canadian border in northern Idaho and western Montana. At the other extreme, there is a widespread deficiency of seasonal snow accumulation over southern Colorado, Oregon, Utah and California as well as all of New Mexico, Arizona and Nevada. For intervening areas snowpack is near normal.

Relatively high runoff during the 1957 and 1958 water years provided substantial carryover storage, particularly in larger reservoirs. Water supply outlook in many areas includes the effect of storage. Where snowpack is normal, storage will provide supplemental and late season water supply. Where snowpack is low, stored water will tend to alleviate a disastrous shortage during the 1959 season. Again this year, the need for storage facilities to carry water from good to poor seasons, particularly on tributary streams, is apparent.

With average or less snowpack in the mountains, it follows that very little probability exists for damage from high streamflows resulting from snowmelt. The only reference to this possibility is made for the Blackfoot and Clark Fork rivers in western Montana.

Forecasts of 1959 irrigation water supply and general water supply conditions in the West are based on April 1 measurements by the U. S. Department of Agriculture, Soil Conservation Service and many cooperating organizations* on about 1,300 snow courses and 100 soil moisture stations. The amount of storage in nearly 250 reservoirs also is considered in appraising the water supply outlook. The relative demand for water in an area is recognized as an integral part of the general water supply situation.

The purpose of water supply forecasts is to provide advance information on prospective water supplies in order that plans may be made for the best use of water by individual as well as group users. In this report only general areas and major tributaries are considered.

In the Missouri River basin streamflow will range near normal with 120 percent of normal in some upper Missouri tributaries, and down to 60 percent of normal in the Wind River drainage in Wyoming. Water supplies along both large and small streams should be adequate, but not plentiful. The headwaters of the North and South Platte rivers in Colorado and Wyoming have a normal or better snowpack. Soil moisture in irrigated areas is good. Carryover storage is well in excess of normal in both public and privately-owned reservoirs, for agricultural and municipal use. A similar outlook prevails for the Arkansas River Valley. The irrigated area of eastern Colorado and Wyoming and western Nebraska and Kansas has a reasonably good water supply outlook, almost comparable to the 1957 and 1958 water years.

Water supply outlook for the Rio Grande is poor in both Colo-

*The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Forest Service, Geological Survey, other Federal Bureaus, various departments of the several states, irrigation districts, power companies, and others. The California State Department of Water Resources, which conducts snow surveys in that state, contributed the California figures appearing in this article. The Water Rights Branch, British Columbia Department of Lands and Forests, has charge of the snow surveys in that province and likewise contributed the information here for British Columbia.

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Here's the conveyor-screen plant built to take all the punishment you can throw at a portable plant. The MAN-SIZE Kolman 101 is all muscle — it's ruggedly constructed to handle heavy loads at constant rates, but without excess weight. It's a brute for production — the 36" belt, 50-foot unit shown loads out and screens over 800 tons of wet, sticky gravel per hour!

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rado and New Mexico. April 1 snowpack is near a minimum of record and mountain soils remain dry. Storage in Elephant Butte is near average, but the outlook remains poor because of minimum prospective inflow. In the eastern New Mexico projects at Tucumcari and Carlsbad, the water supply outlook is good with well above normal carryover storage.

Surface runoff prospects are poor in Arizona with no snow remaining as of April 1. Carryover storage is near normal, which will provide an average surface water supply on the Salt River and its tributaries. Storage is not sufficient to meet normal demands for the Gila and Little Colorado rivers.

The general shortage of winter snow extends into the San Juan Basin in Colorado and the southern two-thirds of Utah. Streamflow in this general area of the Colorado River and Great Basin will range from about 30 to 60% of normal. Heavy demand areas without storage will be critically short. Water supply outlook in northern Utah is somewhat better. Streamflow there is forecast from 75% to 100% of normal with above average carryover storage.

Streamflow in Nevada will be extremely low, near 10% of normal on the Humboldt and 50% of normal for streams from the east slope of the Sierras. Central, eastern, and southern Nevada have a short water season in prospect.

In the Columbia Basin water supplies are generally adequate for Washington, northern Idaho and western Montana. Tributaries in western Montana have a near record snowpack. In southern Idaho snowpack is light. Reservoir storage can make up the shortage of natural streamflow, but rivers without storage are faced with a serious shortage of water.

Snowpack on Columbia River tributaries in Oregon has been less than normal. Streamflow forecasts range from a low of 17% on the Owyhee to near 100% on some smaller streams in southwest Oregon. Most streamflow forecasts are in the range of 60 to 90% of normal.

In California, the winter snowpack has been deficient. Water supply outlook varies from fair in the north, where near normal runoff is expected, to poor in the south, as indicated by forecasts of less than one-half of normal. Reservoir storage will provide the difference between poor and fair supplies in many areas.

Western Runoff Forecasts for 1959

	Runoff 1,000 ac. ft.	April-Sept., inc. percent of normal
RIO GRANDE		
South Fork at South Fork, Colo.	70	53
Rio Grande at Del Norte, Colo.	290	51
Conejos at Mogote, Colo.	120	55
Inflow to El Vado Reservoir	100	38
Rio Grande at Otowi Bridge, N. Mex.	280	33
Pecos River at Pecos, N. Mex.	25	40
PLATTE RIVER BASIN		
Poudre at Canon, Colo.	245	111
Clear Creek at Golden, Colo.	160	113
No. Platte at Saratoga, Wyo.	625	95
ARKANSAS RIVER BASIN		
Arkansas at Pueblo, Colo.	325	81
MISSOURI RIVER BASIN		
Yellowstone at Corwin Springs, Mont.	1,792	96
Wind River at Dubois, Wyo.	97	95
Madison nr. West Yellowstone, Mont.	183	93
Jefferson at Sappington, Mont.	881	83
Missouri at Fort Benton, Mont.	3,341	99
Clark Fork at Chance, Mont.	599	103
COLUMBIA BASIN		
Columbia at Birchbank, B. C.	42,000	105
Clark Fork nr. Plains, Mont.	12,977	121
Clark Fork at Cabinet Gorge, Mont.	14,738	121
Pend Oreille blw. Box Canyon, Wash.	17,670	119
Flathead nr. Polson, Mont.	7,222	109
So. Fork Flathead nr. Columbia Falls, Mont.	2,263	110
Snake nr. Heise, Idaho	3,550	93
Columbia at The Dalles, Ore.	96,500	99
Umatilla at Pendleton, Ore.	144	86
Powder nr. Baker, Ore.	43	68
Owyhee Res., net inflow, Ore.	80	17
Deschutes at Benham Falls, Ore.	380	74
McKenzie nr. Vida, Ore.	935	78
Willamette at Salem, Ore.	3,700	85
COLORADO BASIN		
Salt at Intake, Ariz.	25	14*
Gila at Virden, Ariz.	3	14*
Green at Linwood, Utah	1,000	77
Colorado at Glenwood Springs, Colo.	1,475	96
Roaring Fork at Glenwood Springs, Colo.	675	87
San Juan at Rosa, N. Mex.	300	43
Animas at Durango, Colo.	325	62
Dolores at Dolores, Colo.	190	61
Colorado at Grand Canyon, Ariz.	7,300	73
Duchesne nr. Tabiona, Utah	98	80
GREAT BASIN		
E. Walker nr. Bridgeport, Calif.	30	41
W. Walker nr. Coleville, Calif.	100	62
Carson nr. Carson City, Nev.	112	58
Humboldt at Palisade, Nev.	30	12
Bear at Harer, Idaho	210	75
Weber nr. Oakley, Utah	119	93
Provo at Vivian Park, Utah	117	75
OREGON AND CALIFORNIA COASTAL		
Upper Klamath Lake, net inflow, Ore.	475	90
Rogue abv. Prospect, Ore.	220	70
No. Umpqua blw. Lake Creek, Ore.	140	85
Sacramento (Shasta Res. inflow), Calif.	2,000	85
Feather nr. Oroville, Calif.	1,590	71
Yuba nr. Smartville, Calif.	700	58
American at Fair Oaks, Calif.	690	47
Mokelumne nr. Mokelumne Hill, Calif.	250	49
Stanislaus blw. Melones Pwr. House, Calif.	400	50
Tuolumne abv. La Grange Dam, Calif.	675	52
Merced at Exchequer, Calif.	345	51
San Joaquin blw. Friant, Calif.	745	55
Kings River at Piedra, Calif.	695	53
Kaweah River nr. Three Rivers, Calif.	105	36
Tule River nr. Porterville, Calif.	11	22
Kern River nr. Bakersfield, Calif.	150	29

* April-May

Spectacular underwater pipeline

Imagination and boldness characterize construction of Hyperion outfall, world's largest, longest, and deepest. Gigantic mobile platform, ingenious pipe handling, closed circuit underwater TV, electronic surveying are essential keys. Here is detailed look at methods and equipment.

By DAVID R. MILLER
Project Engineer
Hyperion Engineers
Los Angeles, California

and

WILLIAM R. ALBRITON
Principal Inspector-Engineer
Bureau of Contract Administration
City of Los Angeles

IN keeping with the other phases of the $47,000,000 City of Los Angeles Hyperion sewerage expansion program which have set many construction records, the 5-mi. ocean outfall for effluent disposal is featuring spectacular new special equipment and construction methods.

Already noted for breaking records for tunnel driving (*Western Construction,* March 1957) and for installation of submarine pipelines (*Western Construction,* July 1957), even the equipment alone for this feature is setting records. The offshore portion of the Effluent Outfall is being installed by a gigantic mobile work platform which is the largest piece of mobile offshore construction equipment ever built and, in traveling position, its 275-ft. legs make it the tallest vessel afloat. This mobile platform, which is 200 ft. long, 120 ft. wide and displaces 5,500 tons, handles the 12-ft. diameter pipe sections in lengths of 192 ft. weighing 720 tons and lays them rapidly and accurately out to depths of 200 ft.

Contractor for the $20,297,500 contract is Hyperion Constructors, a joint venture of Raymond International (sponsor), New York; De-Long Corporation, New York; Healy Tibbitts Construction Co., San Francisco; Peter Kiewit Sons' Co., Omaha, Neb.; Macco Corporation, Paramount, Calif.; and Tavares Construction Co., La Jolla, Calif. The project is part of the $60,000,000 sewer bond program approved by the voters of the City of Los Angeles in 1955. The project was designed by Hyperion Engineers, a joint venture of the Los Angeles consulting engineering firms of Holmes & Narver, Inc., sponsor; Daniel, Mann, Johnson, & Mendenhall; and Koebig and Koebig; who were retained by the City of Los Angeles Board of Public Works.

Extensive engineering investigations

In order to determine the feasibility of discharging up to 600,000,000 gallons per day of primary effluent into Santa Monica Bay, Hyperion Engineers undertook exhaustive oceanographic and marine geologic investigations, made hydrographic surveys and conducted extensive engineering research studies before completing the final designs. The final result will be a reinforced concrete submarine pipeline, 12 ft. in diameter, conveying the primary effluent from the Hyperion sewage treatment plant to a special wye structure located five miles off shore. At that point, the pipeline splits into two 4,000-ft.

SIMPLIFIED DRAWING shows how floating platform operates. Jacks lower legs to ocean floor and elevate platform above water to free it from influence of waves. Pontoon-strongback with 192-ft. long string of pipe is floated into position underneath platform. Water is admitted into pontoon and cables lower it into trench. In-haul cable pulls pipe into joint. Rock ballast is placed through telescoping tube from bins on platform to split tremie tube (visible in drawing) which rides rails on pontoon. TV monitors operation. Full details are given in text. For photograph of platform see front cover.

ANOTHER 4-LEGGED PLATFORM stands at dock near pipe-casting yard. Photo shows crane placing section on rail-mounted dolly on platform deck. When eight sections have been placed and all joints tested, platform and pipe "string" are submerged by jacks on legs to permit pontoon to be floated into place above pipe. Then platform is jacked up, lifting pipe and pontoon into position shown in next photograph.

long diffuser legs, beginning with 8½ ft. in diameter and ending in 6-ft. diameter, having diffuser holes ranging from 6¾ in. to 8⅛ in. in diameter, spaced alternately on 48-ft. centers along each diffuser leg. Because of the special character of the project and the extremely long required project life (100 years), the project specifications were very rigid and this together with the careful inspection employed by the City of Los Angeles Bureau of Contract Administration insures that the line as installed will fulfill all of the design requirements.

Pipe manufacture

The pipe for the project is manufactured by the United Concrete Pipe Corp. of Baldwin Park, Calif. at two locations. The on-shore and near-shore pipe sections and the off-shore diffuser pipe sections all are manufactured at the central plant in Baldwin Park.

The 12-ft. diameter pipes for the on-shore and near-shore reaches are manufactured in 12-ft., 15-in. wall, 49.2-ton sections and in 14-ft., 12-in. wall, 52.3-ton sections. The 102-in. diameter diffuser pipes have 8½-in. walls and are made in 24-ft. lengths weighing 42.8 tons. The 72-in. diameter diffuser pipes have 7½-in. walls and are made in 24-ft. lengths weighing 24.8 tons.

The 144-in. diameter pipe is transported to the job site on low bed trucks specially designed to meet load limitations of the highways over which they travel. The 72-in. and 102-in. diameter pipe are transported to Pier A in Long Beach, for subsequent assembly and launching in 192-ft. laying units for the diffusers.

The sections of pipe for the off-shore reaches are manufactured at Pier A, Long Beach, where the United Concrete Pipe Corp. has set up a field casting yard for this purpose. These pipes are cast in 24-ft. lengths and in 12-in. wall thicknesses, each weighing 89.5 tons and in 10-in. wall thicknesses weighing 74.0 tons.

The pipe sections are reinforced with inner and outer circular reinforcing steel cages. Transverse reinforcement consisting of hot rolled rods in coils and longitudinal reinforcement are hot rolled bars in cut lengths. The maximum carbon content of the reinforcing is 0.30% and has a minimum yield stress of 36,000 psi. Deformations conform to ASTM Designation A-305. It is interesting to note that the 24-ft. pipe sections each contain approximately 1 mi. of No. 8 reinforcing rod.

Casting pipe

All pipes are cast vertically with the bell end down. Concrete is supplied from a central batching and mixing plant located mid-length of the pouring slab upon which the forms are placed.

The forms are cleaned and then sprayed with a form oil consisting of a mixture of diesel oil and castor oil, the proportions being determined by weather and pouring conditions. All gates and base rings are equipped with rubber gaskets so installed than when the form is assembled the gaskets will prevent leakage of mortar. Three cubic yard batches are pre-weighed into a holding hopper, then discharged into a 3-yd. stationary mixer. The mixing continues for at least two minutes after the water is added before the concrete is discharged into the pouring bucket. Plastiment is added to the concrete with a calibrated dispensing device. The pouring operation is performed by a locomotive crane running parallel to the line of pipe forms. The track crane shuttles two 3-cu. yd. buckets between the batch plant and the pipe forms. Concrete is poured from the 3-yd. bucket onto a sloping pouring cone atop the pipe form and is continuous except for the time required for the crane to return to the batch plant and exchange buckets. Vibration is continuous during the placement of concrete by means of high-frequency JX-708 Viber vibrators attached to the forms. About 45 minutes are required to place the concrete for a 24-ft. pipe.

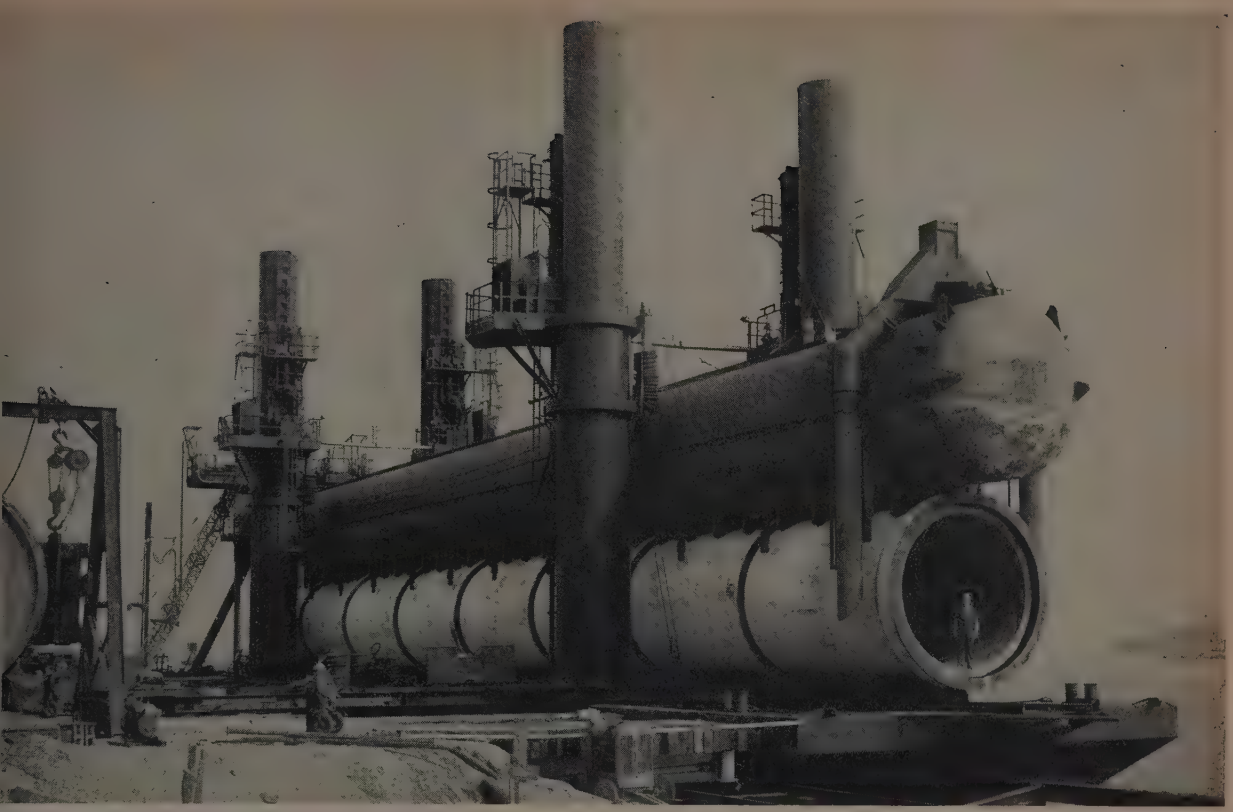
Concrete in the top of each pipe is revibrated briefly with a Viber No. 11 immersion type vibrator as late after the completion of casting as the concrete can again be made plastic.

Immediately following the revibration of a pipe, the cap screw holding the spigot groove forming ring in place is backed off to allow the forming ring to float to minimize shrinkage and stripping problems.

Curing, tipping and storage

After the pipe has been cast and revibrated, it is enclosed in a canvas shroud for initial curing. Commencing not later than 3 hours after completion of concrete placement, steam is introduced through steam hoses at the bottom of the form both inside and outside of the pipe wall to insure full circulation around the pipe. The curing temperature is gradually increased to not more than 130 deg. and so maintained until approximately 3 hours before removal of forms at which time the steam is turned off.

After removal of the jacket, top ring and core, the steam shrouds are replaced over the pipe and the steam again applied to the inside and outside of the pipe. Temperatures within the shroud are main-



LAUNCHING PLATFORM has been jacked upward, lifting pipe and pontoon out of water so that pipe can be securely lashed to pontoon. When platform is lowered again pontoon with cargo of pipe can be towed away. Note double tremie tube at right for placing ballast.

tained between 120 deg. and 150 deg. F. until not less than 36 hours after commencement of the steam curing process.

Not sooner than 36 hours after commencement of steam curing, the 12-ft. and 14-ft. lengths manufactured at Baldwin Park are stulled and tipped to the horizontal position on timber covered skids and rolled to storage position on the skid. For tipping and rolling the stulls consist of two 3-in. pipe columns at right angles to each other at approximately 4 ft. from the bell end and 2 ft. from the spigot end. After the pipe is in the storage position the stulls are relocated so that there will be one vertical stull directly over each skid. If the pipe remains on the storage skids more than 30 days, it is rolled 90 deg. from its original position. The 24-ft. lengths manufactured at Pier A, Long Beach, are transferred from the pouring slab in a vertical position by a movable jumbo to the storage yard where they are placed in a vertical position.

After the pipe has been allowed to cool within + or — 10 deg. of atmospheric temperature, all exposed surfaces of the pipe are sprayed with Hunt Process curing compound. This membrane is maintained undamaged for a period of not less than 14 days. Hunt Process curing compound is of the white-pigmented type for all exterior surfaces of the pipe and is the clear type for the interior surfaces.

Low alkali, Type II cement is used with Plastiment in a special 7-sack mix designed for a 28-day strength of 5,000 psi. in compression and 600 psi. flexural strength. Test cylinders have shown an average strength of 6,000 psi. and the test beams have shown an average strength of 800 psi.

On-shore construction

Since it was impossible to disrupt or detour the heavy traffic on Vista del Mar, the first 200 ft. of the line had to be constructed in a tunnel. The contractor chose to pour a monolithic reinforced concrete tunnel (one of several alternates designed) and sub-contracted the tunnel driving to the Armco Drainage & Metal Products Co., and the pouring of concrete lining to the Kemper Construction Co. The soil encountered in the tunnel was primarily beach sand with lenses of imported fill of various types. This material proved to be highly unstable and the sub-contractor encountered considerable difficulties in maintaining plan grade even though corrugated metal liner plates were used and several retimbering operations were necessary before the concrete lining could be poured. Several unexpected obstructions, such as an old concrete pump base and an abandoned 36-in. steel pipe added to excavation difficulties as did the variable cohesion and porosity of the fill material. An attempt was made to stabilize the material by a chemical injection method but this was only partially successful.

Pipe joints

The intent of the plans and specifications was to permit as much contractor ingenuity as possible consistent with the quality and end result desired. It was for this reason that a variety of construction methods had been anticipated and several alternate types of pipes and joints had been designed. It was up to the contractor to decide upon the selection of a type of pipe and joint most suited to his method.

Of the variety of alternates, the contractor had decided to use an all concrete rubber gasketed joint.

(Continued on next page)

TIGHT SQUEEZE as pipe-placing platform passes Golden Gate Bridge on way to job. Platform was fabricated and assembled in San Francisco Bay area, then towed 450 mi. to Los Angeles.

The original joint design contained the customary single gasket. However, after some experimentation and testing, the contractor elected to provide two gaskets primarily to facilitate testing and in addition to provide some further insurance against leakage. In almost all cases the assembled joints were either completely water-tight or leaked so excessively as to be unable to maintain the test pressure, which usually indicated a gasket had been rolled out of the spigot groove during assembly.

It is required that the bell and spigot faces of the off-shore concrete laying joints be provided with a 1-in. thickness of resilient epoxy resin. This feature protects the pipe from the inherent construction hazards of impacts and contacts occurring during joint make-up. The bumper is cast on the pipe while it is in a vertical position. The spigot or bell is first sand-blasted to remove any laitance or form oil residue after which the mold is fastened to the end of the pipe and gaged to the specified thickness. Resolin Epolite 30-A is then poured into the mold after which it is cured before stripping.

Near-shore construction

Beginning in-shore from the surf line several hundred feet, the contractor constructed an interlocking steel cofferdam with an in-shore bulkhead on the beach at the seaward end of the on-shore portion of the job and extended it approximately 800 ft. into the ocean to a point approximately 500 ft. beyond the surf line. The seaward end of the cofferdam was closed off with a boat-like prow which partially dampened the effects of swell. The cofferdam protected the pipe laying operations at the point of greatest surf turbulence.

All work in this near-shore section was conducted under water, the rough excavation being accomplished by clamshell and fine grade with a siphon operated from a trestle which was approximately 20 ft. above sea level. The pipe laying gantry on the trestle had four separate falls which could be operated independently or in pairs or in unison, at variable speeds.

By conducting pipe laying operations and excavation and backfill on two shifts, and excavation and backfill only on a third shift, the contractor was able to make a production of 6 to 8 pipe sections per day. Maximum trench depth, near the surf line of the beach, was approximately 40 to 45 ft. below the ocean floor which resulted in as much as 25 to 30 ft. of backfill cover over the top of the pipe after placement in this area, with progressively less cover as the line proceeded seaward until only one-half of the pipe diameter was below ocean floor level at the extreme end of this nearshore portion of the job (approximately 2,850 ft. off the beach), 3,700 ft. from the point of beginning.

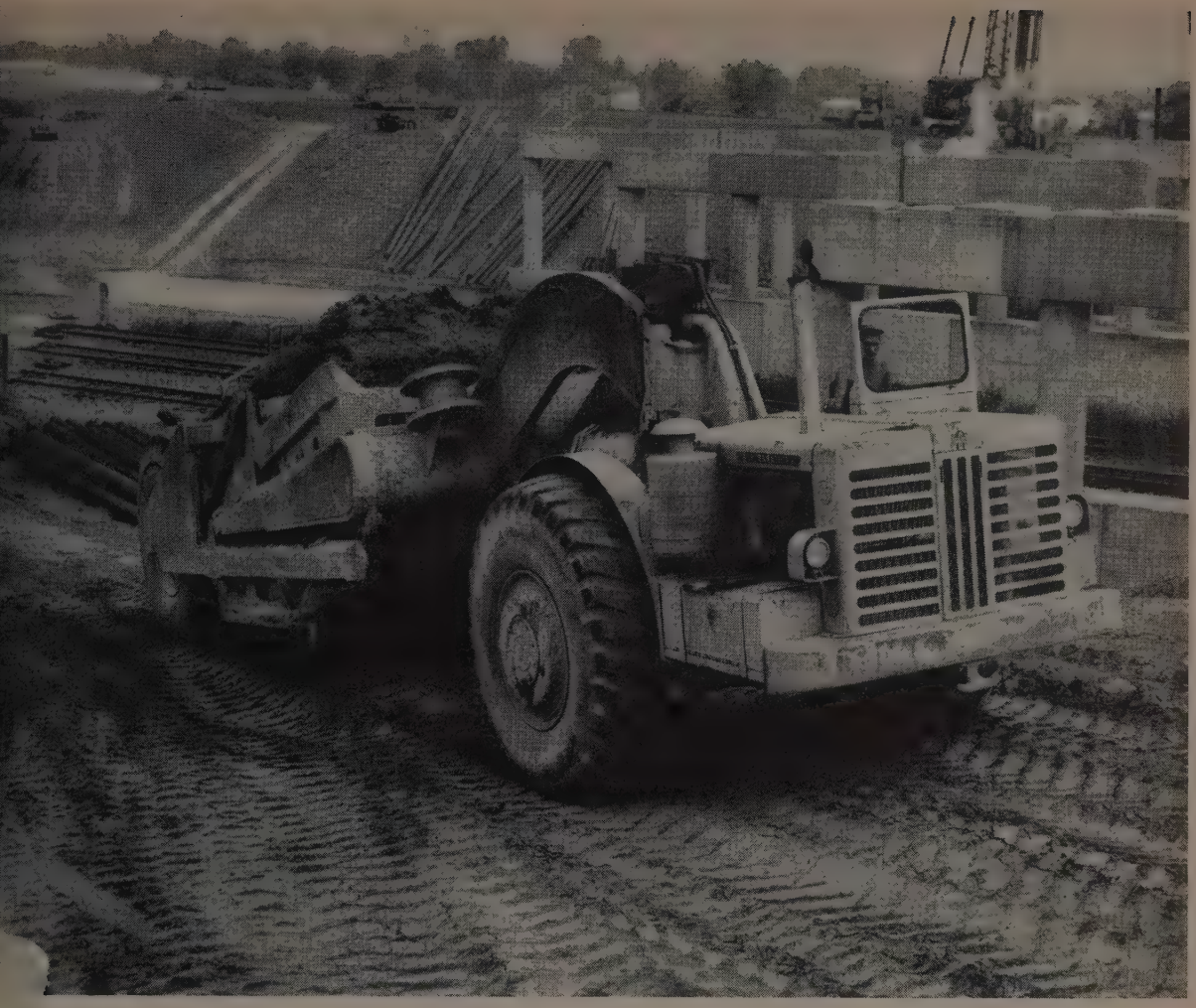
Although the contractor employed divers for various pipe laying functions, the pipe laying foreman actually controlled both grade (by means of weighted sounding tapes on the top of the pipe) and pipe movement during initial partial entry, as the gantry was walked inshore and the offshore haul line was released. Subsequent observations by the diver controlled completion of the joint entry and final make-up of the joint by bolting up interlocking continuous tile bolts with the previously laid joint. These tie bolts consisted of 1½-in. round bolts passing through projecting lugs poured on each side of bell end of pipe approximately 2½ in. above spring line from one pipe section to the next.

The contractor solved the problem of supply for the bulk of his backfill (sand and gravel) on the trestle by designing what he subsequently called an Eductor, which was used in conjunction with a clamshell crane working a considerable distance offshore of his laying operations. This consisted principally of a mobile platform (riding the same trestle rails as his cranes and pipe-laying gantry) containing large hopper into which the excavated material could be dropped by the clamshell performing the rough trench excavation. Grizzly screened large boulders and a chute conveyed them off to one side of the trench. The balance of material (sand and gravel up to 3-in. in diameter) was washed out of the bottom hopper by a high-pressure stream of water into a large capacity centrifugal pump which sluiced all material into a 10-in. pipeline laid along the trestle towards the inshore laying and backfilling operations, and a flexible hose at the end directed the material into the trench area.

Off-shore construction

The point of origin for the off-shore laying operations is located at the extreme end of Pier A, Long Beach, where United Concrete Pipe Corp. manufactures each of the 24-ft. long, 144-in. diameter, 12-in. wall and 10-in. wall pipe sections which comprise this section of the sewer outfall and which extends from a point 2,850 ft. off-shore from the beach at Hyperion to the wye structure approximately 5 mi. off-shore.

At this location, the United Concrete Pipe Corp. delivers each pipe section (weighing from 75 - 90 tons, depending on wall thickness and design reach) to the deck of Hyperion Constructors' launching platform by means of a 4500 Manitowoc crane, for pre-assembly into the "string" or "unit" of eight pipes which are subsequently floated and towed to the Hyperion job site as a laying unit 192 ft. long. From their vertically stored location in the pipe yard, United transports each pipe section to the edge of the pier by a specially designed wheeled jumbo pulled by a D-6 tractor. The lifting cables and pipe bands hold the pipe in a vertical position until adjacent to the loading area where



JOB RECORDS PROVE

Firestones meet schedules on the toughest projects!

Where it's rough going for every yard moved, Firestone tires turn downtime into worktime profit! That's because every Firestone off-the-highway tire is job engineered for the toughest duty. They're built with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires! Firestone S/F (Shock-Fortified) nylon or rayon bodies shrug off bruising shock and impact. Tough Firestone treads and sidewalls work through terrain that often ruins ordinary tires. Call your Firestone Dealer or Store and ask about the full line of Firestone tubeless or tubed off-the-highway tires. He'll recommend the tires that are built for your job! And remember, Firestone off-the-highway tires are backed with on-the-job service!

Rock Grip Excavator® Wide Base

Rock Grip Excavator®

When ordering new equipment always specify Firestone tires—available tubeless or tubed

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PIPE CASTING at United Concrete Pipe yard. Reinforcing steel cage at right contains one mile of bars. Note operator located on concrete bucket. Steam curing under canvas is shown at left.

the pipe is then tipped in the "A" frame to a horizontal position and lowered onto a pipe bed from which the Manitowoc crane can lift it in a horizontal position and swing 180 deg. to lower it to the deck of the launching platform.

The launching platform, designed and constructed by the contractor, "stands" in approximately 40 ft. of water at the edge of Pier A in Long Beach Harbor and is in effect a large platform elevator which is jacked up and down on four circular supporting legs or caissons approximately 7 ft. in diameter which rest on the harbor floor. One hydraulic jack is mounted on each leg sleeve which is rigidly welded to platform deck. All four jacks work in unison, and are operated from a central control station located on a tower platform at one end of the lifting unit. The jacking support caissons are approximately 140 ft. long and extend approximately 95 ft. above the water. The platform itself is structurally designed and constructed very similar to a barge and is 210 ft. long, 36 ft. wide, 8 ft. deep, of all welded steel construction. The platform has holes cut in both the bottom and deck surfaces for intake and exhaust of water passage through the hull as it is raised and lowered through the water from a point approximately 15 ft. above the water (level with end of pier) to the harbor bottom (approximately 40 ft. below the surface).

A pair of railway cars are welded to the deck of the platform in a longitudinal direction and two 4-wheeled, all steel cars or dollies are placed thereon at the loading end of the platform to receive one pipe section. The two cradles of each car are padded with three 12-in. square, 4-in. thick blocks of rubber on each cradle. After being lowered into place on the two cars, the pipe is pulled along the rails to the control end of the platform up against a vertical steel bulkhead braced and welded to the deck. As each succeeding pipe is placed on the platform in the same manner, it is hauled to the far end and the joint is made up and pressure tested. A maximum of 10 gal. per hr. leakage is allowed for each joint. However, the contractor expects to have a perfectly tight joint at this stage of his laying operations, using the 10 gal. per hr. as his control maximum after the pre-assembled pipe unit has been towed to the job site and laid into final line position, not wishing to transport a possibly defective joint that distance and incur the risk of laying a defective joint which might have to be removed and replaced under the water.

When all eight sections of pipe have been thus pre-assembled on the lifting platform, it is then lowered to the harbor floor and a 210-ft. long steel pontoon, 14 ft. in diameter, weighing 340 tons, and displacing 1,040 tons is floated in directly over the string of pipe between the jacking legs, and the platform then raised above the water carrying both the eight sections (720 tons) and the steel pontoon on top of them, supported on the pipe by means of a series of saddles (4 to a pipe section) welded to the underside of the pontoon and padded with five blocks of rubber at point of contact on the pipe.

Three sets of 1½-in. diameter wire cable slings pass under each of the eight pipes in the laying unit, from one side of the pontoon to the other, dead-ending one end of the cable into a cinch-up unit operated by a portable hydraulic jack with the loop of the opposite end of the cable passing over a quick-release pelican hook on the opposite side of the pontoon. Each set of cables is dead-ended alternately on opposite sides of the pontoon, thus making all release hooks also alternate. The quick release pelican hooks are actuated hydraulically in six groups (three sets of hooks on each side of the pontoon), each operated by pulling a slotted drawbar release mechanism with a hydraulic jacking unit so that all release hooks must drop their cables simultaneously, thus effecting release of all 24 supporting cables (holding pipe to the underside of the pontoon) at one time.

After the pipes have been secured to the pontoon with the cable slings, and the intermediate joints given a leakage test, the lifting platform is again lowered to the harbor floor and the laying unit is floated off the platform. It takes a tug six to eight hours to tow the pontoon and pipes to the job site.

In addition to serving as a float to carry the pipe from the Long Beach launching site to the job at Hyperion, the pontoon also acts as a strong back to hold the assembled pipe sections in a rigid position during the tow and subsequent laying operations at the job site. Two identical pontoons have been constructed.

The pontoon shell is 1-in. thick steel plate, of cylindrical shape 14 ft. I. D., with a flanged and dished head on each end. Circular ring stiffeners and ribs and inner compartmentation all increase the rigidity of the pontoon. The seven separate inner compartments being used for ballasting and trimming the pontoon and its load of pipe both during transit by towboat to the job site and to accurately control its buoyancy during the entire laying operation thus effecting release of all 24 supporting cables (holding pipe to the underside of the pontoon) at one time.

The major portion of the offshore section of pipe is specified to be gravel ballasted to spring line with No. 2 gravel. In order to accomplish this part of the work, the contractor has built into the pontoon a split gravel tremie pipe which extends on either side of the pontoon to springline of the pipe

ine. The tremie is supported at op centerline of the pontoon by carriage riding on a single rail. Guide rails are provided on either ide of the pontoon at springline. A system of wire cables and pulleys permits the tremie to be drawn from end to end of the pontoon for ballasting the entire laying unit.

Platform

At the job site the "George F. Ferris", the mobile laying platform, a gigantic 4-legged, 5,500-ton "construction tool" designed and fabricated by the contractors to meet the challenge of the off-shore pipe laying operations, stands ready to accept the 192-ft. pipe unit.

The laying platform consists essentially of two barges rigidly connected by two cross members, with a space 20 ft. between them. The resultant over-all dimensions are 200x120x18 ft. in depth. In this 20-ft. space, seven bins have been provided longitudinally for the storage of the rock ballast material. The capacity of the bins is about 7,400 tons which is more than enough to ballast a 192-ft. laying unit.

The platform has four legs or towers upon which, by means of hydraulic pin jacks (3 per tower), the platform is jacked out of the water and into position for placing the pipe. After the laying cycle has been completed, the platform is lowered until it is buoyant and jacking is continued until the legs are clear of the bottom. By the means of six anchors and winches, the platform will move offshore to the next pipe laying location and will again jack itself up on the towers to a position above any influence of wave or swell, normally about 40 ft.

Each leg is 275 ft. high, 16 ft. square and weighs 700 tons. Main vertical corner members are 14-in. wide flange sections weighing 427 pounds per foot. On the face of each of the corner members of each tower, there is a flat steel plate 1 in. or more thick with 12-in. square holes. The jack pins work in these holes. Provision is made for a fourth jack that may be necessary for future work. Jacks are operated hydraulically and the relief valves are set at 2,900 psi. Each hydraulic cylinder is 18 in. in diameter with a 26 in. stroke and a lifting capacity of 500 tons. The pin casting measures 9x11.5x5 in. and lifts the barge 22 in. each stroke. The jacking can be performed manually or automatically, locally at each tower or remotely at a master control center.

JOINT TESTING apparatus weighs 35 tons and can withstand 1,000,000 lb. of thrust on heads. Two 100-ton jacks can lift end of one pipe section 3 in. for one-degree deflection test.

Two Sundfelt bridge cranes are provided, one at each end mounted on gantries and capable of moving 12 ft. transversely and longitudinally. These cranes each have 300-ton capacity with 1½-in. cable and six sheave blocks to handle the pipe and pontoon. Six air-operated anchor winches with 7-ton anchors control the position of the platform. Two 4-drum winches with 1½-in. cable powered by 85-hp. diesels are provided to handle the tremie tube and position the pipe and pontoon under the platform. Four Chicago Pneumatic compressors, 600 CFM rotary-type powered by 150-hp. GMC diesels, supply air to pontoon and deck winches. One 100-ton Manitowoc 4500 crane with 120-ft. boom powered by two 175-hp. GMC diesels is provided to transfer rock and for general use.

Below decks there are ten 60-hp. 32-GPM hydraulic pumps for hydraulic service to jacks on towers (Denison Engineering Co.), two pumps to each tower and two in reserve; three 50-hp. Caterpillar diesels drive three 350-kw. generators for all platform power requirements; a 1,200-gal. hydraulic oil tank and filtering system; two 40-hp. salt water pumps for fire mains, pump ballast and cooling water for Caterpillar diesels; one 33,000-gal. tank for fresh water supply; one 100,000-gal. tank for diesel fuel supply; one 1,500-gal. tank for diesel oil day tank.

The control shack contains a variety of remote controls to open and close valves to precisely control the flooding of the pontoon for lowering the pipe onto the ocean floor and blowing it to restore buoyancy after pipe-laying operations are completed. The tons of water in each compartment of the pontoon register on separate gages on a control panel. Two indicators record the load on each bridge crane. A recording fathometer and gyroscopic compass are provided for alignment and grade determinations. Pipe joint testing equipment is housed in the shack along with television monitors and control unit. The release mechanism to detach the pontoon from the pipe is remotely operated here.

A telephone communication system connects the control shack with the two bridge crane operators, the winch operator controlling the outhaul and inhaul lines of the pontoon and the diver's shack when a diver is in the water.

Upon arrival at the job site, the laying unit and towing tug are met in the vicinity of the laying platform by a second smaller tug. A tow line is engaged from the smaller tug to the in-shore end of the laying unit. The second tug now acts as the towing medium and passes directly under the platform from the off-shore end while the original towing tug exercises control of the unit off-shore as it passes under the platform. The deck of the platform, in the jacking up position for laying, is about 50 ft. above the water which provides a clearance of 30 ft.

With the two tugs maintaining control at approximate position of the laying unit, falls from the two bridge cranes are connected at the in-shore and off-shore ends of the pontoon. After quarter lines are also connected on the north and south sides of the pontoon on each end, control is now maintained by the platform and the tug towing lines can be released. In-shore and off-shore haul lines are dead-ended to the pontoon from which they lead out to 7-ton anchors and sheaves and then back to the deck winches to the platform. The north and south quarter lines pass through a series of sheaves to lead the cables to deck winches also on the platform. Lateral and horizontal movement is thus controlled with precise accuracy.

(Continued on page 72)

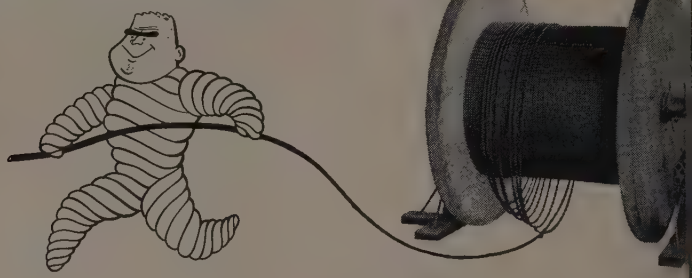
Tuffy® Wire Rope Tips

More Damage is Done by Broken Rules Than by Broken Strands—

Rule 1: RIGHT WAY to Set Up Reel for Unwinding

The stock reel should be set up on jacks, so the rope will come from the under side of the reel.

In the picture below, unwinding has started and the reel is turning faster than the rope is being pulled off. But no damage is done. Why? Because in coming from the under side of the reel, the rope is simply loosening, without forming loops or kinks.



Tuffy Balanced Dozer Rope

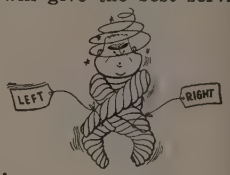
Built to give you longer service with less downtime. Mounted on your dozer, a 150' reel of ½" or 9/16" can give you a big bonus of extra service. Here's how: when rope shows drum wear or is crushed on the drum, you feed through just enough to replace the damaged part. You save the 40 to 50 feet ordinarily thrown away. Also available in 300' and 500' reels.

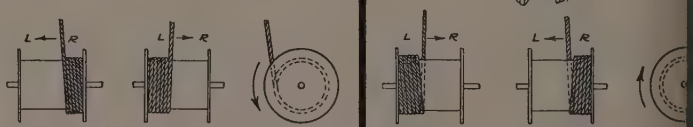
Rule 4: What's The Correct Lay for Each Type of Windi

"Lay" refers to the direction of the strands in wire rope. It's a right lay rope when the strands pass from left to right across the rope. It's left lay when they pass from right to left.

The direction of winding on the drum is determined by standing behind it, looking toward the direction of rope travel.

When winding one layer only o smooth drum, the right and left ropes indicated in the drawings low will give the best service.





Overwind Right to Left **Left Lay Rope**

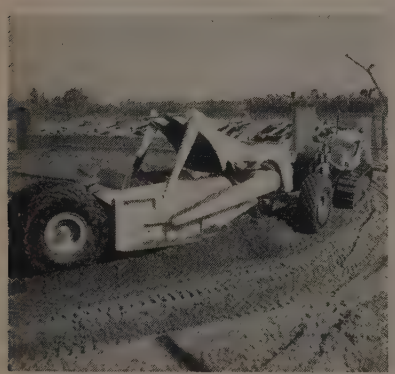
Overwind Left to Right **Right Lay Rope**

Overwind

Underwind Left to Right **Left Lay Rope**

Underwind Right to Left **Right Lay Rope**

Under



Tuffy Balanced Scraper Rope

"Balanced" construction makes it flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Also gives higher resistance to the shock of load impact on slack line. Moves more yardage per foot because it's specially built to take the beating of drum-crushing abuse.

Tuffy Balanced Dragline Rope

Here's highest abrasive resistance with super flexibility. Better spooling. Smoother riding on grooves. And Tuffy Dragline Rope hugs the drum when casting for full load. Gives you longer service life, consistent dependability, in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

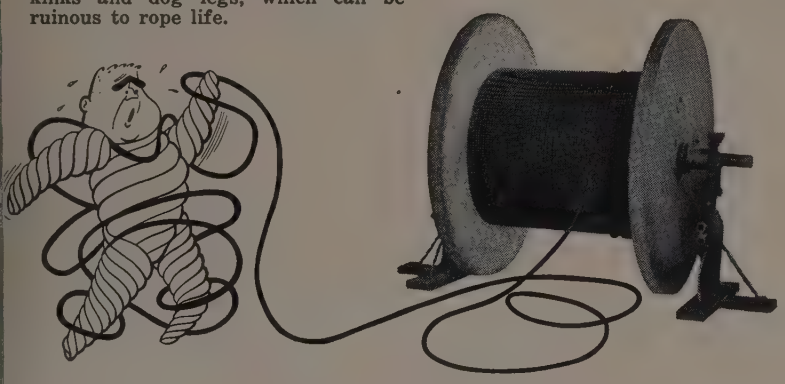
Tuffy Balanced Slings & Hoist Lines

"Balanced" because they combine strength, flexibility and toughness in the proper relationship to do a better job longer.

Tuffy Slings and Hoist Lines are a top-p ing team in every type of materials ha The slings are made of a patented, m braided fabric that's next to impossible or kink. The hoist lines are a special co tion in which strength, flexibility and ness are balanced.

Rule 2: WRONG WAY to Set Up Reel for Unwinding

The rope is coming from the top of the reel and forming loops as it overruns. These loops are likely to form kinks and dog legs, which can be ruinous to rope life.



for multiple layer winding:
n a rope winds in the first layer
ss the face of a drum, it usually
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lange of the drum, the rope rides
the last turn and starts wind-
ack across the face of the drum,
falls into the depression of the
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ncing across the drum on the
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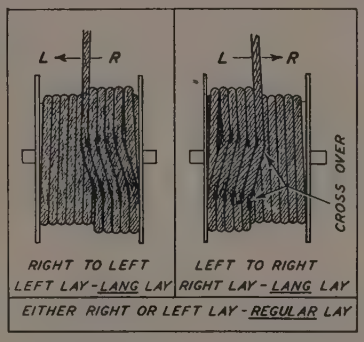
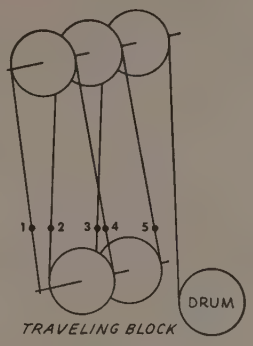
essions of the first layer, ac-
y winds back a turn in each
ution of the drum. It must then
over two depressions of the
layer to have a net advance of
turn per revolution.

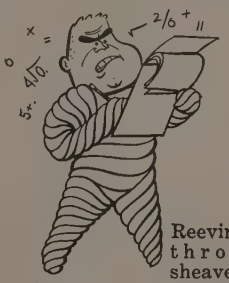
cross over is unavoidable on the
d and succeeding layers. Severe
shment of the rope results, due



to abrasion of the adjacent turns against each other, and the crushing from the next layer above at these points. Parallel-grooved controlled cross-over drums minimize this condition.

Rule 3: How to Figure Reeving Loads





Reeving ropes through the sheaves multiplies the number of parts supporting the load. The lead line to the drum carries the weight of the load lifted, divided by the number of parts, plus the accumulation of friction on all sheaves.

To count the number of parts supporting the load, draw an imaginary line across the parts of the rope supporting the load.

The efficiency of reeving systems ranging from one to eight parts is shown in charts which Union Wire Rope engineers make available to users.

Rule 5: Use the Tuffy Special Purpose Wire Rope "Tailored" to a Specific Application

was a time when just any size and lay of rope was
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Ropes are precisely fitted to each type of use.

are thousands of different wire rope constructions.
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3

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HYPERION

(Continued from page 69)

During the rigging activity, other connecting linkage is also taking place. A bundle of hydraulic lines and a 4-in. diameter flexible air exhaust hose is lowered from the deck of the platform to the in-shore end of the pontoon where a battery of quick release couplings are concentrated. With all the connections made, the flooding and water ballast discharge valves, air exhaust, and the cable release mechanism can all be actuated remotely from the deck of the platform. A telescoping gravel tube is lowered into the socket of the split gravel tremie on the pontoon. A system of wire lines from a deck winch leads from the platform down to the pontoon at each end, pass through sheaves, and dead-end at the gravel tremie to provide movement of the tremie from end to end of the laying unit. Underwater television cameras and light units are dropped into vertical tracks attached to the pontoon tremie and are preset for the proper viewing angle.

As soon as all these operations are completed, the pontoon is flooded to negative buoyancy and lowered to the ocean floor and permitted to rest thereon a few feet seaward of the pipe section that preceded it. Careful control of negative buoyancy is facilitated by observations of load indicators attached to the falls of the two bridge cranes. Gentle grounding of the pipe is done to stabilize any pipe movement due to the surge that has been present near-shore during early operations. While the off-shore end is maintained in a grounded position, the in-shore end is raised to the grade of the preceding joint and make-up is accomplished by the combined efforts of the bridge cranes and the near-shore haul line. After joint entry, the off-shore end of the pipe is raised to grade and stabilized with gravel ballast. The joint is then pressure tested and as soon as it has been determined that a satisfactory joint has been made, preparations are made for ballasting the entire laying unit.

The upper end of the telescoping gravel tube terminates in a hopper centered under the gravel bins at the underside of the platform. The hopper is suspended in a carriage which, by means of a system of wire lines, sheaves and winches, is able to be drawn from gate to gate of the 7 gravel bins as the lower end also travels along the pontoon, the full length of the laying unit. Attached to the upper carriage at the underside of the platform, a cage is provided for the operator who performs the task of opening and closing the gate to start or stop the flow of gravel. Telephone communication permits the gate operator to instruct the winch operator so that the carriage can be located and centered at each of the gravel bins as ballasting continues. The lower end of the tremie tube terminates at the plan elevation of the ballast so that the rock seals off and stops flow automatically at proper grade. With careful control between the gate operator and the winch operator, ballasting is thus progressively completed for the full length of the laying unit.

After the rock ballast is completed, the negative buoyancy of the pontoon is increased and the cable slings holding the pontoon are remotely released by the hydraulic controls on the platform allowing the full weight of the pipe to bear in the gravel. The two bridge cranes then raise the pontoon to the surface and the water ballast is blown free to return to its buoyancy. All the connecting linkages are removed, towing lines are connected, and pontoon is drawn seaward by the tugs from beneath the platform for the return trip to Pier A, Long Beach. The contractor believes that he will maintain a schedule of about one 192-ft. laying unit every 24 hours after laying procedures have been finalized and pipe laying operations have progressed seaward of the shallow water surge conditions.

With the pontoon clear, City survey crews re-check the final elevation of the off-shore end of the pipe with the assistance of the inspector diver. Pressure testing of the laying joint and intermediate joints follows, after which the inspector-diver takes inside and outside gap measurements of all the joints in the laying section. It is believed that as the laying operations progress into the relatively deeper waters off-shore, only outside inspections of the pipe will be necessary either by diver or underwater television, because a definite relationship will have been established between the contractor's laying procedure and its effect on the pipe and the pipe joints.

After all testing, inspection, and survey indicates that a satisfactory laying operation is completed, the laying platform is lowered and moved to the next laying position about 200 ft. off-shore. The elevation and alignment of the laying barge is then checked by the City survey crew who also check the subgrade elevation using sounding lines in the area where the next laying unit is to be laid. The platform is then raised and final subgrade excavation required is performed at this time by siphoning from the platform.

The operation of lowering the platform, moving it off-shore, and jacking at the new position, is currently taking about four hours to accomplish. The major portion of excavation is accomplished by derrick barge ahead of these operations. In order to provide survey control under the adverse weather conditions often encountered in Santa Monica Bay, the survey crew has been provided with an electronic Tellurometer system to measure accurately the distances from shore.

During the laying operations, the contractor has provided two additional pieces of marine equipment to service the platform. To transfer personnel between the platform and the landing at the trestle, the contractor is using a high-speed crew boat, and to move anchors and handle the rock barges, a twin-screw tug and work boat is used. The bedding and ballasting rock is delivered in 500 to 1,000-ton barge loads from the Graham Brothers pits located on Catalina Island. The barges are held alongside the platform and the Manitowoc crane on the platform fills the rock bins of the platform prior to the beginning of each laying operation. In addition, one or more barge loads of rock are anchored near the platform to provide for emergency ballast should this be needed for any purpose.

The mobile laying platform was designed by the De Long Corp. The barge portion of the platform was fabricated by Pacific Coast Engineering Co. at Alameda, Calif. The legs were fabricated at Napa, Calif., by the Kaiser Steel Corp. The legs and jacks were assembled in the barge by Judson Pacific-Murphy Division of Yuba Consolidated Industries at Richmond, Calif. The lifting platform at the Long Beach harbor, the two pontoons, and the jacks for both platforms were fabricated by Yuba.

Underwater inspection

Outside-the-pipe observation accomplishes all the required inspections except the visual inspection of the annular spacing at the joint and damage to the spigot end after mating. However, because of the

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64 Dozer Specifications

Angle: 25 Degrees Right or Left

Tilt: 7-3/4 Inches Right or Left

Lift: 37 Inches Above Ground Level

Depth of Cut: 11 Inches Below Ground Level

Blade: 80 Inches—Box-Welded

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precision manufacture of the bell and spigot clearances, the annular spacing of the joint can be directly determined from outside-the-pipe inspection of the joint. Jointing of the pipe in the dry established criteria for this purpose. Inspection of possible damage to the spigot end from inside the pipe after jointing will not be necessary if continuous observation of the joint make-up is provided from the outside during the joint make-up for possible impacts and contacts that would cause damage and also if careful observation of the pipe is made for differential settlement after the winches suspending the pipe are slacked off.

Continuous inspection by divers is of course impossible, and even limited use of divers is extremely expensive and not always satisfactory. Experience with other projects had indicated that the results were largely dependent upon the intelligence and character of the diver and in many cases it was difficult for the inspection agency and engineer to obtain a complete factual picture upon which to base decisions. However, on the other hand, only a diver can make actual measurements of such things as joint clearances and annular spacing. At a depth of 200 ft., a diver can remain on the ocean floor a total of only 35 minutes in any 24-hr. period, and working at these depths, divers are subject to psychological disturbance which affects the accuracy of their reports.

Regardless of these limitations, however, many of the required inspections can be performed in no other way. The conclusion was that inspector-divers would be necessary, but that every effort should be expended to restrict their use to inspections which could not be handled in any other way. It was therefore decided to investigate underwater closed circuit television as a possible means of improving and expediting underwater inspection methods and techniques. This type of equipment had been used briefly in a minor role during the construction of the companion Hyperion Sludge Outfall installed in June of 1957. Excellent results had been achieved with the equipment at this time under conditions of considerable adversity.

Underwater television

The initial development of closed circuit underwater television came during the nuclear testing operations in the Pacific and much has been done since that time to make

TWO TV CAMERAS observe underwater operation. Cameras are mounted on brackets with four lights each as shown. Brackets are secured to each side of split tremie tube when pontoon is ready to be submerged. Movable tremie tube permits full length of pipe string to be inspected.

it a practical working tool. Manufacturers of the equipment have provided special housings to meet a variety of applications.

The primary disadvantage of the underwater television is the limited mobility of the camera and light source under water, and the limited vision under turbid conditions. However, it was felt that these disadvantages could be overcome. Thorough investigations and tests of camera, light, and mounting systems were carried out and these indicated that underwater television inspection was entirely practical, and that properly mounted the camera unit would permit continuous observation by technical personnel of the pipe positioning, joint assembly, and ballasting operations.

The possibilities of underwater closed circuit television was initially discussed with the contractors at a meeting soon after the contract was awarded. The contractors indicated that they have tentatively planned to use one television unit in a fixed position on the pontoon for observation of the relative position of the previously laid pipe section as the section being laid was lowered to the ocean floor. At this time a scheme was presented that would require that two cameras be employed, mounted on either side of the split gravel tremie and set to cover about 50% of the pipe joint perimeter. Mounting the cameras on the tremie in this manner would provide them with mobility from end to end of the laying section with such movement controlled from the deck of the platform. Much of the desired construction detail and inspection work listed hereinbefore could be accomplished with this method. The mechanics of underwater joint make-up could be observed continuously and precisely controlled from start to finish to eliminate damage due to poor alignment of spigot with bell. From this visual evidence determinations could be made as to whether a diver's physical presence would be necessary at specific locations along the pipeline.

The underwater television finally chosen consists of a camera, water-tight housing camera control unit, monitor together with connecting cabling.

The camera is positioned in a specially designed brass housing 8 in. in diameter and 18 in. long and is capable of submersion to 2,000-ft. depths. The porthole lens is of high quality, water white glass optically ground. The optical system on the camera consists of a Wollensak F 1.5 wide angle lens covering a 60-deg. field. The necessary gearing and motors are incorporated in the lens system to provide remote iris and focus adjustment at the camera control unit. A moisture detector is also incorporated in the housing.

The control unit consists of six sub chassis which plug into each other providing a means of speedy replacement and minimum down time when electronic failure occurs. The remote iris and focus control switches are incorporated on the front panel and the moisture detector incorporated in the camera housing registers by means of an indicator light also on the front panel. Of special interest is the Phantastron Crystal Sync Generator with added crystal control oscillator which provides extreme stability to the entire system.

The monitor includes a 14-in. cathode ray tube and regulated power supply and contains the brightness and contrast controls. A fully interlaced, 525 line system combined with an 8-megacycle bandwidth provides 600 line resolution. Better than broadcast quality.

Between the camera and camera control unit there is 400 ft. of Simplex lead cured neoprene jacketed multi-conductor cable including two coaxial conductors. The closed circuit television system was furnished by Underwater Surveys of San Diego, Calif.

Considerable study and experimentation was made of a number of possible light sources. At this point it is important to note that the television camera has advan-

Architect & Contractor see for themselves . . . . .

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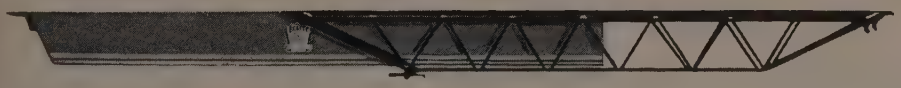
JOB: STATE HQ, CALIF. TEACHERS ASSOC. | **CONTRACTOR: SWINERTON & WALBERG CO.**
ARCHITECT: WELTON BECKET & ASSOC.



Field tested by the contractor *before* actual construction began, Beatty-Pecco Horizontal Shoring proved to be the *economical* choice. Above you see 30″ Pan Construction (equal to 6″ slab) taking place. Beatty-Pecco Spans eliminated practically all the vast jungle of vertical supports necessary for conventional methods.

Wide clear aisle spaces were available throughout the building so that while concrete was being poured above, sub-contractors could work without interference on air conditioning, plumbing, heating, etc. More time economy!

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HYPERION

(Continued from page 74)

tages over the human eyes. The extreme sensitivity of the Vidicon camera tube permits the television to see at lower light levels than the eye. Further benefits are obtained by artificial adjustment of black and white contrast all of which substantially overcomes reduced visibility conditions under water.

A variety of standard light bulbs were pressure tested for the depths of water to be encountered and experimentation was conducted of a number of methods of positioning the lights. The light source selected and in use is provided by 4 PAR 64 500 watt lamps for each camera. Cable connections are made directly to the studs extending out the back of the glass envelope and made water-tight by a special process. Special conditions and circumstances may warrant the use of other lamps as the work progresses.

The four lamps are stacked vertically below the camera housing and spaced to provide equal light value around the contour of the pipe. The camera is set to look down at an angle of about 45 deg. Back scatter from suspended matter is thus minimized by this relationship of camera to light source by preventing a direct reflection of the particles into the face of the camera.

Electronic failure of the equipment during critical construction operations was a source of concern. To assure that the equipment would function without delay short of major electronic component failure, a construction inspector for the City of Los Angeles having a broad electronic background attended a special familiarization course to acquaint him with the circuitry and trouble shooting techniques of this particular equipment. Steady repairs and adjustments of the equipment at the site is thus assured for other than major repairs.

Personnel

The Hyperion Ocean Outfall for Effluent Disposal is a project of the Los Angeles City Board of Public Works under the direction of Rear Admiral Phillips, CEC USN (ret.), President of the Board. Lyall Pardee is City Engineer and W. T. Anderson, Inspector of Public Works, directing the Bureau of Contract Administration.

David L. Narver, Jr. is project manager for Hyperion Engineers, with David R. Miller as project engineer, and D. J. Smith, Jr. as assistant project engineer. For the City of Los Angeles, W. R. Albriton is principal construction inspector-engineer, with Hank Holmes and Ed Littig as resident senior inspectors. Bob Baron is survey party chief.

Arthur Fertell is the project manager for the contractor, with George Bauer as superintendent for offshore work, and Jack Christiansen, superintendent for onshore and near-shore portions of the project.

Letters . . .

Error noted in article on Feather River Bridge

EDITOR: In the current issue (April) is an interesting article on Pacific Bridge Company's Feather River Bridge job. On page 31 center column you state that "timber had been carefully studied and rejected mainly because of the excessive deflections which would occur."

I take exception to this statement since my study of a timber falsework centering system, which I made for Pacific Bridge Company, composed of timber pile bents (prefabricated) at 20-ft. centers with steel girders lined with timber fillers shaped to required curves, and timber joists, indicated no deflections greater than 1/64 inch in any bay. This can hardly be classified as "excessive."

MAC SILVERT
Consulting Engineer
San Francisco, Calif.

Error clarified

EDITOR: In reply to Mr. Silvert's letter and in similar correction of your article on Pacific Bridge Company's Feather River Bridge project . . . we offer the following clarification:

Three methods of supporting the concrete arches were considered: conventional timber and steel shores and beams on pile supports (as investigated by Mr. Silvert), full span three-hinged timber trusses, and full span two-hinged steel trusses.

The steel trusses were selected for use because of their inherent stiffness, less susceptability of fire damage, freedom from possible flood damage, more positive deflection analysis, and finally because of their potential resale value at the end of the job.

It was felt that shrinkage of the green timbers that would be used in the full span timber trusses might lead to indeterminable deflections under load. Also, since the reinforcing steel in the main arch, pylons and spandrel walls was being butt-welded by the Thermit process, we were concerned about potential damage by fire.

We decided not to use the pile-supported falsework because of its like exposure to fire and flood water damage, not because of "excessive deflections" as the article states.

T. B. COULL, JR.
Chief Engineer
Pacific Bridge Company
Alameda, California

New construction films

"The Atlas Copco Cobra", a 16-mm, color-sound motion picture, highlighting many uses of the company's self-contained motor rock drill breaker has been produced by Atlas Copco. The 12-min. film is available for showing through the local Atlas Copco Pacific field offices, or by writing to **Atlas Copco Pacific Inc.**, 930 Brittan Ave., San Carlos, Calif.

"Paving Modern Concrete Highways" is a new 16-mm color film available on loan from Blaw-Knox Co. The 800-ft. long film depicts base laying, form setting, subgrading, cement and aggregate batching, paver, spreader, and finisher operation, form stripping, and shoulder widening. The film is available to engineers, contractors and other interested groups, and may be obtained by writing to **Sales Promotion Department, Construction Equipment, Blaw-Knox Co.**, Pittsburgh, Pa.

"And a Great Deal More", a 19-min. color and sound movie depicting the uses of TractoLoaders, has been announced by Tractomotive Corporation, Deerfield, Ill. The movie features on-the-spot scenes showing the TL-20D TractoLoader and the TL-16 TractoLoader in action. It can be seen at your local **Allis-Chalmers Construction Machinery** dealers.

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Length, incl. draw bar	10'1"	10'1"
Width	5'8¾"	5'8¾"
Height	5'1½"	5'1½"
Track	60"	60"
LESS RUNNING GEAR (INCL. SHIPPING SKID)		
Weight (dry)	2165	2226
Weight (wet)	2370	2450
Length	5'9¾"	5'9¾"
Width	2'8¼"	2'8¼"
Height	3'8¾"	3'9½"

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Wanapum Dam bid opening May 8

AN INVITATION for bids on the construction of Wanapum Dam was issued March 19 and the bid opening is set for May 8 at Ephrata, Wash., in accordance with a resolution passed by the Commissioners of the Public Utility District of Grant County.

Bidders will be allowed to submit bids on either foreign or domestic turbines and generators. However, any bidder who submits a bid to supply foreign turbines or generators must also submit a bid for the same type of equipment manufactured on the North American continent.

The contract documents say, "Because of unsettled world conditions and the continual recurrence of international crises with attendant possibility of hostilities which might give rise to difficulties in delivery of equipment, the bidder, if his proposal specifies turbines and/or generators to be manufactured outside of the North American continent, shall submit as an alternate supplier the specifications and unit prices of turbines and generators which will be manufactured on the North American continent."

The document goes on to say that if, at the time of the execution of the contract, it appears to the best interest of the District, the District may elect to require the equipment to be manufactured on the North American continent, and the bidder will be required to furnish the alternate equipment with appropriate adjustment of prices.

Commissioner Paul Neihart said, "I am reluctant to see the bid call and accompanying information documents issued in their present form, but it is the best the Board could do under the circumstances. We felt we were subjected to certain pressures, so we did the best we could."

After the meeting, Neihart amplified his statement by saying the District had a letter on file indicating that legal action would be taken if foreign manufacturers of major equipment were excluded. He said the possibility of delay in starting Wanapum because of a possible lawsuit was a factor that had to be considered. Neihart also admitted there had been pressure on the Commissioners to limit the bidding to domestic equipment.

Wanapum dam will be the second major hydroelectric project to be undertaken by the Grant County PUD within the last three years. Priest Rapids Dam, now under construction for the PUD, is located 24 mi. below Vantage, and is 70% complete.

Wanapum Dam will be financed by the sale of 50-year power revenue bonds in an amount of approximately $200,000,000. It will be a modified "Z" shaped structure located 3 miles above Beverly. Its 10 generators will have a total capacity of 831,250 kw., compared to 788,500 kw. for Priest Rapids Dam.

Construction of the dam is scheduled to start by September 1, 1959.

3 dams proposed for Washington

PACIFIC Power & Light Co., of Portland, has filed an application with the Federal Power Commission seeking a license for a proposed hydroelectric project on Rush, Curly, Meadow and Big creeks, tributaries of the Lewis River, in Skamania County, Wash.

Pacific P&L proposes to construct three diversion dams, a forebay, penstock and a powerhouse containing a single 35,000-hp. turbine connected to a 25,000-kilowatt generator. The project, designated as the Meadows project, would be operated by remote control from the existing Merwin plant approximately 30 mi. downstream.

The cost of the project is estimated at about $7,696,000.

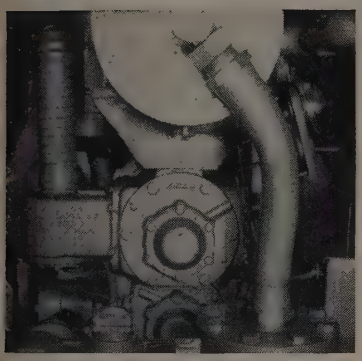
LIFT JACKS HANDLE 115-TON FLOOR SLABS IN DENVER BUILDING

Six hydraulic lifting jacks raised the three prestressed concrete floors of the new Metropolitan Industrial Bank building in Denver, hoisting the 115-ton slabs as high as 34 ft. above the ground.

The prestressed concrete slabs were constructed on the ground, some weeks apart, and lifted by the Skyhook Lift Slab Corp., in about six hours of lifting for each floor. Each slab was nine inches thick, 75 ft. long and 50 ft. wide. The slabs are of lightweight Idealite concrete.

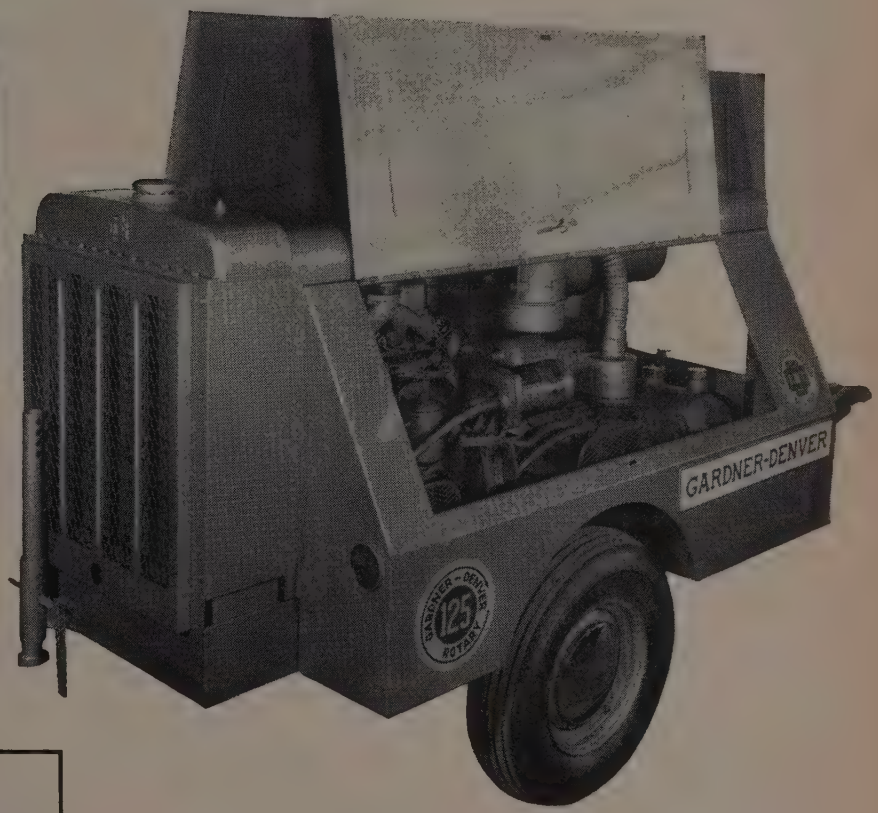
The $175,000 building, on the site of the old First Universalist Church, represents the first lift-slab construction in Denver in some four years. The slabs are the longest flat plate lift-slabs in Colorado. Marvin Lederman is the contractor.

Can your present portable pass this vital double-value check?

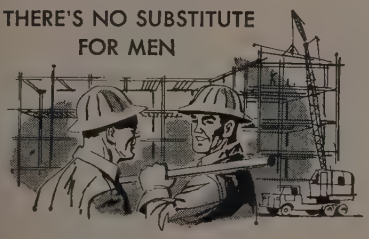


Gardner-Denver rotaries require no major dismantling job for inspection of working parts. Only a few minutes are required to remove the 12 cap screws to expose all the rotor blades for routine inspection or replacement that assures trouble-free operation.

The Gardner-Denver RP125 is built with extra tool storage space. Big, weather-tight toolbox provides safe storage for tools, steel and hose.



THERE'S NO SUBSTITUTE FOR MEN



In construction—on jobs large or small—the Gardner-Denver specialist is trained to assist in solving your air equipment problems. He can help you minimize down time and lost production. At Gardner-Denver *there's no substitute for men*—our 100-year philosophy of growth.

✓ Does your present portable air compressor have parts within easy reach for quick inspection and maintenance on the job? *Gardner-Denver portables do.* (See photo above.)

✓ Does your present portable offer top fuel economy? *Gardner-Denver portables do.* Exclusive "THRIFTMETER"® control matches air output to demand—saves fuel, saves wear and tear on engine and compressor.

These values are important on any job where air power helps keep work moving. That's why Gardner-Denver builds these features into *all* rotary portables—large and small alike.

Furthermore, Gardner-Denver RP125 and larger compressors have a clutch and water-oil cooling system for easy, all-weather starting. Engine water warms up compressor oil before clutch is engaged.

If your present portable doesn't measure up to all these cost-cutting values, take a look at Gardner-Denver. Get all the details from your Gardner-Denver distributor.

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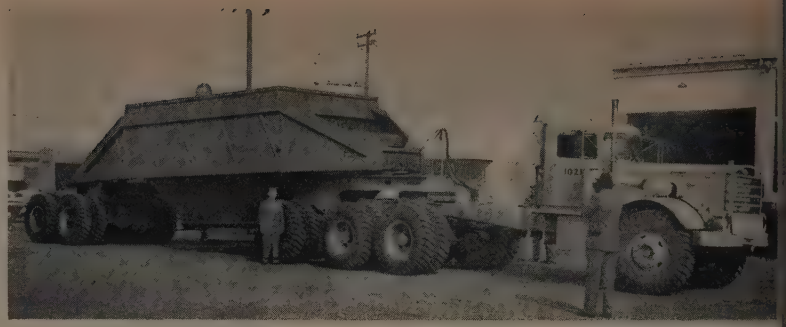

DOUBLE-JOINTED GIANT HAULS 92-TON PAYLOAD

A FLEET of enormous earth-hauling rigs like the one shown above was built for Miles International Inc., sister corporation of Miles & Sons Trucking Service, Merced, Calif., to move ore in Peru, where Miles has a hauling contract with Marcona Mining Co., Utah Construction Co. subsidiary. The 22-wheel units were built to Miles specifications, and include Kenworth trucks with Cummins diesel engines; Freuhauf trailer running gear; and trailer bodies built by Western Iron & Bridge Co., Oakland.

Giant trailer is mounted on a dolly which in turn connects to tractor, giving the rig a double pivot. Refrigeration unit mounted at extreme rear of trailer is part of hydro-retarder system, necessary to prevent trailer with its 92-ton load from swapping ends with tractor on the 17-mi. downhill haul. Company employs Peruvian drivers who proved adept learners despite lack of experience and small stature (truck has power steering). At outset, posts were placed at roadside to show novice drivers where to shift gears.

Hoh River hydro permit asked

WASHINGTON Public Power Supply System, of Kennewick, Wash., has filed an application with the Federal Power Commission requesting a preliminary permit for a proposed hydroelectric project on the Hoh River in Jefferson County, Wash.

The Washington Public Power Supply System is a municipal corporation in Washington, composed of 13 member public utility districts.

The proposed project, to be located near Forks, Wash., would include a 210-ft. high dam, with a powerhouse located immediately downstream containing two 33,500-hp. turbines having 26,800-kw. generators. The application says that the reservoir created by the dam would extend about 12½ mi. upstream and would inundate an estimated 5,070 ac. of timberland. Since the project would create this "sizable" man-made lake, the application says, all possible recreational aspects will be developed to their fullest extent.

A preliminary permit, if issued, does not authorize any construction. It gives the holder the right to priority of application for an FPC license while the necessary studies and examinations are carried out to determine the economic feasibility of the proposed project, methods of financing, potential markets, and all other information necessary for inclusion in a license application, if one is filed.

Hoover Dam turbine contracts awarded

TWO BUREAU of Reclamation contracts, totaling $1,840,806, have been approved for award for the manufacture of a 115,000-hp. turbine and one 168-in. butterfly control valve for the final generating unit of the Nevada wing of the Hoover Dam powerplant.

The Baldwin-Lima-Hamilton Corporation submitted the low bid of $1,422,800 for the hydraulic turbine. Todd Shipyards Corporation of Seattle, Wash., was low bidder for the butterfly valve, with an offer of $418,006. No foreign bids were received.

Invitations to bid on the 95,000-kw. generator, which will complete the power installation at Hoover, are expected to be issued soon. The unit, scheduled for operation in the summer of 1961, will bring the hydroelectric plant at the dam to its full capacity of 1,344,800 kw.—second only to Grand Coulee among hydroelectric installations in the United States.

Hoover Dam was authorized in December 1929, and constructed between 1931 and 1936. Seven 82,500-kw. generators, one 40,000-kw. and one 50,000-kw. unit have been constructed on the Arizona side of the U-shaped powerplant on the downstream side of Hoover Dam. Seven 82,500-kw. generators previously have been installed on the Nevada wing. Technological advances in design permit the installation of a 95,000-kw. unit in the remaining generator installation.

SUPERIOR

Heavy-Duty SCREED SUPPORTS

Pat. Applied For

For Use with 1¼" and 1½" I.D. Pipe Screeds and Vibratory Screeding Equipment

ADJUSTABLE SCREED HOLDER

Consists of a 1" threaded rod to which is welded a cradle to hold the pipe screed. This cradle is slotted as shown so that the arms may be bent over to secure the 1¼" or 1½" I.D. pipe screed. Threaded onto the rods is a half nut which provides the adjustment.

Especially Designed for Use on Bridges, Underpasses and Overpasses

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

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

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

PERFORMANCE

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

Adjustable Standard SUPERIOR SCREED CHAIRS

FOR FORMED SLABS 4½" AND GREATER

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

FOR SLABS ON FILL

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

HOLDER INSERTED IN CHAIR BASE

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

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HAWAII Report

By ALAN GOODFADER, Honolulu

THE STATE OF HAWAII—The announcement of passage by the House of Representatives of the Hawaiian statehood bill stilled the noise of Hawaii's busy construction industry. Construction workers along with virtually everyone else in Hawaii—downed tools for two days to celebrate and congratulate each other on the achievement of full participation in the American union. But the silence in Hawaii's booming construction industry was only temporary. It started again in a drive that experts predict will send the trade to even greater heights of activity.

GREAT DAY COMING—Clarence L. Hodge, executive secretary of the General Contractors' Assn. of Hawaii, sees it this way: "The major effect will be an influx of tourists. This means more hotel and apartment construction to accommodate them. The second effect will be the impact on industrial expansion potential. We are already getting numerous inquiries based on news and editorial comment (on statehood) from contracting, sub-contracting and material houses on the Mainland interested in expanding their activities. How far or how much (this expansion will amount to) no one knows. The shift from Territorial status to statehood has always led to industrial expansion. This has led to expansion of the construction industry which has to provide the plants for industrial expansion. I think the local industry can expect to see more competition from Mainland people interested in entering the industry. It is an interesting fact that under the contractors' licensing law (a Territorial statute) there is no residential requirement for entering the construction industry. This past year was the healthiest year construction-wise in the history of the Territory, with a total of some $185,000,000 worth of construction compared to the previous year's record total of $154,000,000.

ADDED SUPPORT—The prediction is echoed by the Bank of Hawaii's review of business and economic conditions for March. "New highs (of business activity) are in prospect," the review says. "All of the basic business indicators currently show substantial increases over previous year levels." The review notes that Waikiki hotels were turning away guests in February, and points out that 51 per cent more persons arrived here in June, July and August last year than in February, 1958. Presumably, this will give a lift to plans for hotel expansion here. Even before statehood, construction hiring in January helped offset a seasonal retailing and wholesaling employment decline. The Bank's review points out that 3,670 Capehart units costing $60 million will be completed here this year.

BEHIND THE BOOM—What's behind the continuing spiral of construction activity here? In a special statehood business information fact sheet, the Bank of Hawaii points out that Hawaii has a population of 635,000 (including the military) and a gross Territorial product of $1,400,000,000, which included $175,000,000 worth of construction put in place in 1958. Employment in the construction industry totaled 13,470 during January, 1959. Since 1950, organized programs for economic development have been "followed by a dynamic growth in production, services, trade and tourism," the bank says. It points out that the population has grown 27.3 per cent since 1950, personal income has gone up 66.2 per cent, manufacturing 60.5 per cent, the tourist trade 238.8 per cent, armed forces expenditures 122.7 per cent and construction 157.6 per cent. "The whole of Hawaii is gradually becoming a metropolitan area based on Honolulu as the operating center and point of contact with the rest of the world," the bank says. "Hawaii is trending toward a broader, stronger and more stable economy." During the next decade, the bank foresees "a substantial expansion" of the construction industry as part of "a dynamic advance . . . exceeding the record growth of the fifties."

NEW PRODUCT—As a sidelight, the bank notes that research indicates the pith of sugar cane may be used to manufacture a construction hardboard. Bagasse (sugar cane residue after juice is squeezed out) already is used to make a wallboard here.

NEW PROGRAM—The Honolulu Dredging and Construction Co. has been the big name in construction contract news here recently. It was announced the firm has a contract to furnish technical assistance to a Japanese firm in a multi-million dollar dredging job in Tokyo Bay. The project includes 1,800,000 cubic meters of dredging work to construct industrial sites. HD&C also teamed up with Pomeroy-Foster to submit a $4,176,000 low bid on a contract to build 220 units of Capehart housing for the Navy on Guam. The Navy has until July 1 to accept the bid. Other bidders were H. B. Nicholson Co. of Pasadena, Calif.; Empire Gas Engineering of Atlanta, Ga.; Black, Raber, Kief and Associates and Vinnell Construction Co. of Alhambra, Calif.

HARBOR WORK—On a smaller scale, HD&C was apparent low bidder with a $184,860 offer to do the Maalaea, Maui, small boat harbor project of the Territorial Board of Harbor Commissioners. The job is one of 11 small boat harbor projects authorized by the 1957 Territorial Legislature.

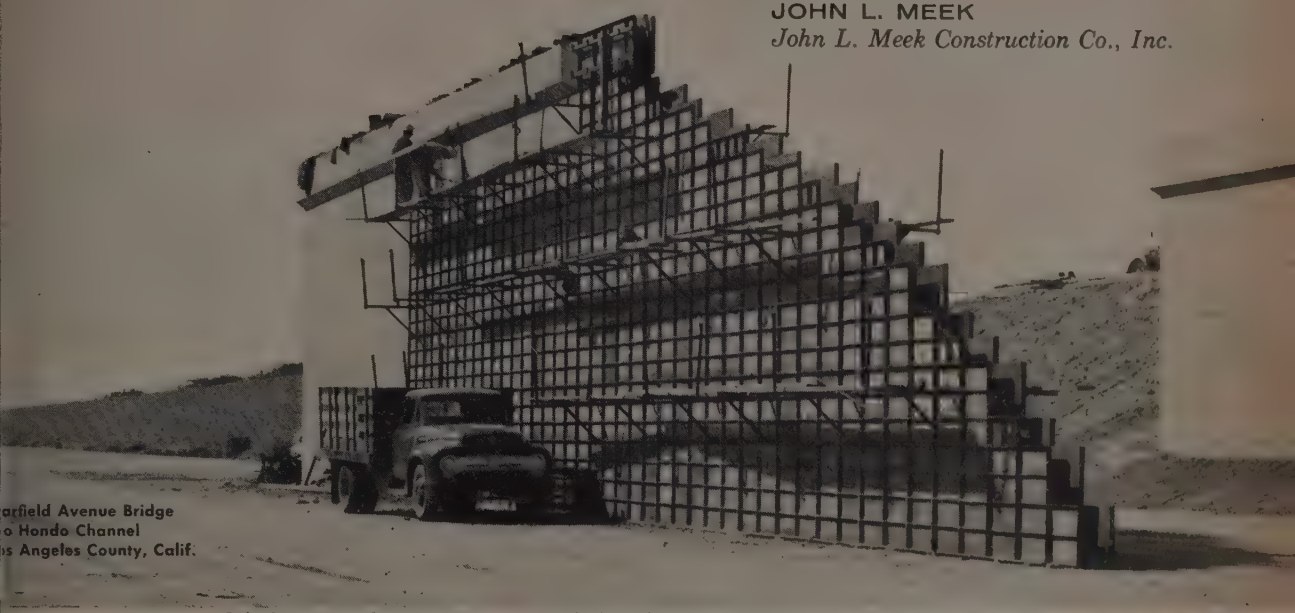
NEW WAREHOUSE—South Pacific Contracting Co. is building a $344,320 warehouse for the Hawaiian Pineapple Co. in Honolulu. Construction time is 110 days. The firm wants the space in time for this summer's pack.

BEACH FACELIFTING PROPOSED—The Honolulu Chamber of Commerce has proposed a $3,000,000 facelifting project for Waikiki beach. A bill containing the proposals is being debated by the Legislature. Under the proposal there would be constructed: (1) a 100-foot-wide park strip along the beach, (2) a 75-foot-wide addition to the beach, (3) rest rooms and other beach facilities, (4) filling of holes and cropping of coral at the ends of the present beach to enlarge it.

GETS CONTRACT—W. T. Chang of Honolulu was awarded a $68,400 contract to construct two breakwaters at Kikiaola, Kauai, by the Territorial Board of Harbor Commissioners.

my men were UNI-FORM EXPERTS *an hour after they began using them"*

JOHN L. MEEK
John L. Meek Construction Co., Inc.



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Stripping center of 3 piers. Piers were 26' high, with 40" cap. UNI-FORM Scaffold Brackets attach to steel frame of UNI-FORMS.

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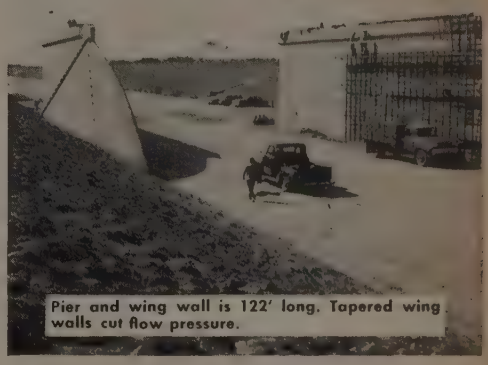
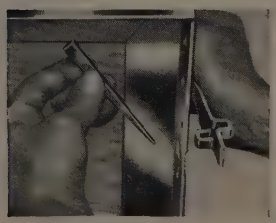
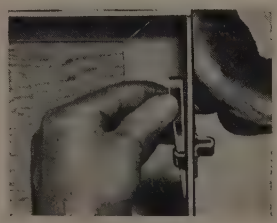


Pier and wing wall is 122' long. Tapered wing walls cut flow pressure.

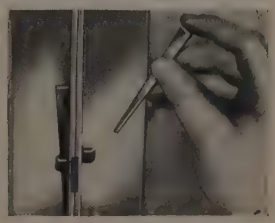
UNI-FORM ASSEMBLY IS SIMPLE AS THIS:



1. UNI-FORM Tie Loop is placed into the square tie hole of Panel.



2. Tie Key is set into the Tie loop. This locks tie and Panel into 1 unit.



3. Bring next UNI-FORM Panel into position. Insert Tie Key in other Tie loop. Assembly is completed.

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Colorado faces 38% highway cut

COLORADO faces the loss of $19,278,000 in Interstate highway funds for the fiscal year beginning July 1, 1960, if Congress does not find a way to provide nearly two and one-half billion dollars in federal-aid highway funds for this portion of the national highway program.

This statement was made by Chief Engineer Mark U. Watrous of the Colorado Department of Highways in summing up the effect on Colorado if Congress fails to act.

The national federal aid program called for an allocation of approximately two and one-half billion dollars for the Interstate System in 1961. The money will not be available because the Byrd amendment to the federal highway act limits the apportionment of federal funds to the amounts that will be in the highway trust fund when the obligations fall due.

The construction budget for the fiscal year beginning July 1, 1960, and ending June 30, 1961, would be reduced by $19,278,125. This is Colorado's share of federal-aid Interstate funds for that period and is 90% money, requiring only 10% matching funds by the state.

This reduction would mean a 38% in cut in the construction budget for that year, which has been estimated at approximately $50,000,000.

The Department would have to start cutting back on contract awards in the spring of 1960. This probably would require a cutback of about 20% in staff work and a much greater reduction in work by consulting engineers.

Work on the state's entire Interstate system of 964 mi. would be drastically curtailed. Major projects which would be dead-ended would include the 17-mi. by-pass from Fort Morgan to Brush, on US 6, and the 16-mi. by-pass of Aguilar on US 87.

There would be a halt to improvement on the 290-mi. western link of the Interstate between Denver and the Utah line.

The purchase of right-of-way for future projects on the Interstate probably would be discontinued and it is likely that no construction would be attempted on about $1-million worth of right-of-way already acquired.

The Department probably would have to forego construction on the $30-million freeway east and west through Denver, and on the Interstate circumferencial route around the capital city.

The highway construction industry and the materials suppliers would be hard hit by the 38 per cent reduction in highway building, as both now are geared for a large volume of construction. Bids on highway projects run from six to 18 with an average of more than nine bidders per project.

Colorado would be particularly hard hit for two reasons. First, in the fiscal year ending June 30, 1960, the state will have $16-million less in federal aid funds than in the current fiscal period. This decrease is a result of the action of Congress in allocating funds to the states on the basis of need, rather than on the old population-mileage formula. And second, in the fiscal year ending in 1960, the state will be using the last $6-million from the $35-million anticipation warrant bond issue.

The overall construction program for this fiscal year is approximately $70-million. Next year it will drop to about $55-million. In 1961 it will be about $50-million even if the anticipated Interstate funds are provided.

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You've got a tiger for heavy work on the job when you rig with USS Tiger Brand Wire Rope! Every rope is precision-engineered to stay on the job longer and cut down-time to the minimum. Whether it's for your clamshells, scrapers, 'dozers or other equipment, your Tiger Brand supplier has the right rope for the job. Shouldn't it be on your jobs? It's the world's largest-selling wire rope! Call your Tiger Brand supplier now... and save money job after job!

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"Back-dragging" bank material by the truck-load, this TD-15 4-in-1 shows one (of dozens!) of its exclusive clamshell applications! This long-reaching action can also grade slopes; clean ditches; give space-saving, one-gulp bucket-full bites of loose materials; load stumps or other "impossibles"; give positive bottom-dumping that eliminates the sticky materials problem!

As an inch-close-accurate "carry-type scraper" the 4-in-1 can often double for blade grader or tractor-towed scraper. And the 4-in-1 can do closely-controlled *grading, stripping,* or *spreading* in quarters too cramped for long-hitched equipment. This TD-20 4-in-1 is the "one-man equipment fleet" on a big housing project.

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Prove to yourself an International Drott TD-15 or TD-20 4-in-1 gives you mass-production efficiency, along with versatility unlimited! Match exclusive 4-in-1 pry-action break-out and loading capacity against any obsolete single-action loader! Measure shock-swallowing Hydro-Spring advantages. Count the machines a 4-in-1 can replace, to save you up to $100,000 on equipment. See your International Drott Distributor for a demonstration!

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

ROLLER-COASTER YEAR—The annual construction cycle in Alaska when plotted out on a graph has that "roller-coaster look." During the winter, construction employment and contractors' expenditures reach the low-point of the curve. In July and August, the giddy heights are reached, followed by the annual plunge into the depths of winter inactivity. There's little change in that pattern so far in 1959. Construction and employment are moving upward toward those mid-summer heights. There's optimism in the air. It's been a tough, long winter but those incomparable Alaskan days are here again. For sourdoughs, out-of-work construction men and hotel-lobby hangers-on, it's time to put the decks of cards away, toss the empty fifth into the ashcan, roll up sleeves and go to work. Construction men in Alaska don't like to waste the precious daylight hours of spring and summer when there's so much to be done and so little time in which to do it.

HOTELS JAMMED—Job-seekers, tourists, contractors, promoters and traveling salesmen are beginning to converge on Alaska in such numbers that hotels and motels are already showing the "no vacancy" sign. There's a special fascination being felt by residents of the smaller states, apparently, because travel north has never been more brisk. The Bureau of Land Management reports applications for homesteads are heaviest in history. Hans Beckerwerth, manager of the Travelers Inn at Anchorage, says he's "booked solid" through September. Forrest Rohan, manager of the Anchorage hotel, says his reservations show indications of a tremendous influx of people. An airline official estimates incoming traffic is already up 15 per cent this year. Brad Phillips, a travel agency owner, says "a conservative estimate of new tourist business is at least 50 per cent over last year. It wouldn't surprise me if it went to 60 or 70%. Already, my bookings for 1959 are more than for all of 1958." One flustered Fairbanks motel owner, confronted with a flood of reservations and requests for rooms, declared: "At first I was delighted, then I began to feel sorry for those I had to turn away. If you ask me, when the tourist season hits the peak in Alaska, we're going to be faced with a hess of a mell!" With snow still on the ground in Alaska, the annual rush is on. From where I sit, it looks like a mighty good year for the guy who happens to own a hotel.

INSIDE TIPS—To "outsiders" planning to come to Alaska, here's a few tips from one who has been "inside" Alaska more than 10 years. You'll study these tips carefully unless you want to be a damn fool about your trip north. If you're a contractor, wire or write for reservations at Alaska hotels at least a month or two in advance. If this fails, prevail upon those you know in the construction industry to hunt up accommodations. It will do you no good to "hope" you can find a room all by yourself once you get here. And Alaskan hotel clerks are becoming accustomed to having "rejectees" cuss up a storm after they are turned down. If you're a construction worker and have a job lined up, be sure to find out whether or not the job includes camp accommodations. Your best bet, in any case, is to bring a tent and a sleeping bag along. If you have a trailer, so much the better. If your job is located a considerable distance away from either Anchorage or Fairbanks, you're lucky. In the smaller communities, you'll find it easier to obtain lodgings and you'll be away from a number of temptations. (Assuming, of course, that you want to retain some of your construction earnings.) Above all, don't come rushing up to Alaska in hopes of finding a job. Try to line up a job through some contractor—or through your trade union—before you head north. This summer, even the Salvation Army may have to turn you away. The Alaska State Employment office, which maintains branches in Anchorage, Fairbanks, Juneau and other cities, is a source of information on the overall employment and construction picture.

NO SETTLEMENT—There still has been no settlement of issues being discussed at Anchorage by Alaskan union officials and representatives of the Associated General Contractors. At this writing, it's reported that the discussions have been "recessed." The unions are holding out for a clause in new contracts giving hiring preference to Alaskans based on experience in a given area. Contractors apparently are holding firm on a stand based on the belief that they should retain full right to select their personnel as they have in the past. This is a thorny problem—and one that could deal a serious blow to this year's construction effort unless it is settled—and soon.

STATE CONSTRUCTION—Alaska's legislators are giving careful attention to legislation which concerns planning for long-range construction requirements in the new state. One bill introduced in the House of Representatives would ask the voters in a special election next October to approve a $50,000,000, 30-year bonding program to finance needed public construction. The money would go to finance schools, university and state office buildings, airport facilities, highways, ferries and state capital improvements. Whether or not this bill is favorably acted upon in the final days of the legislature, its introduction indicates that Alaskans foresee a very sizable construction program ahead for the state.

VICTORY AT CLEAR—The Bellingham, Wash. contracting firm of Baker & Ford has been unusually successful in obtaining construction contracts for early phases of the work at the mammoth Clear missile detection base. Bidding for these contracts was unusually spirited, and in the first-round skirmish, Baker & Ford came out victorious with three of the initial contracts. The U. S. Army Engineer District awarded the firm a $3,666,499 contract for construction of the composite building at Clear, which includes dormitory space for 600 servicemen. Within the past 60 days, the firm has also received a $836,475 contract for construction of antenna foundations, and a $342,678 contract for a warehouse at the missile detection site. Construction of the composite building should be a challenging project for Baker & Ford. For $3,666,499 they must construct a

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building on which the government estimate was $4,828,721.

URBAN RENEWAL PROGRESS — The Alaska Housing Authority and the City of Fairbanks are now offering for sale four blocks of improved commercial land in the central downtown area of Fairbanks. The valuable business property is the site of Alaska's first commercial urban renewal project. The AHA and City hope to see the land used for modern shopping centers, offices, hotels and shops. A provision of Alaska law gives preference in purchasing to those who occupied land in the urban renewal area prior to its acquisition by the AHA. General criteria have been set up by AHA and the City to insure the redevelopment will meet necessary standards. The area formerly was the Fairbanks red light district.

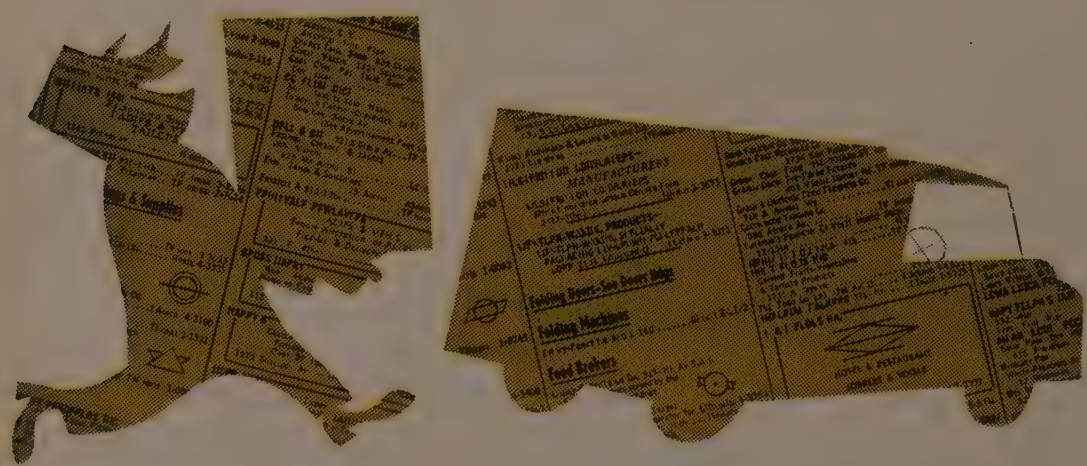
CONSTRUCTION NEWS NUGGETS—The Alaska House of Representatives has approved a $1,600,000 gymnasium for the University of Alaska and has appropriated $60,000 to pay for the plans. . . . Union officials have reported that about 538 members of the Alaska Plumbers Union locals are without jobs. . . . William A. Niemi has been named regional engineer for the Bureau of Public Roads in Alaska succeeding Edgar H. Swick, whose new job will be management of the federal highway program in North Dakota, South Dakota, Minnesota, Iowa, Kansas, Missouri and Nebraska. . . . A proposed study to determine a so-called "best location" for Alaska's state capital has been defeated in the State Senate. . . . A new Alaska bill calls for a jobless insurance tax on total wages instead of the present ceiling on contributions of the first $4,200 earned each year by a worker. . . . The Defense Department's request for legislation authorizing military public works construction throughout the country includes projects in Alaska totaling $25,912,000 for the 1960 fiscal year. . . . Anchorage, Fairbanks and Ketchikan have been classified as labor surplus areas by the Bureau of Employment Security of the U. S. Department of Labor. The designations were made because of the high rate of unemployment in the areas.

FPC asks decision on Pend Oreille power

THE FEDERAL Power Commission has sent back to a hearing examiner for a ruling motions by two competing applicants, each of which is seeking dismissal of the other's application for a license for a hydroelectric project on the Pend Oreille River in Washington

The FPC order directs Presiding Examiner Edward B. Marsh to rule on the motions as a part of his initial decision, to be filed after the hearing on the applications is concluded. The Commission at the same time ordered the hearing, which has been in recess since March 2, to resume on June 9 in Washington, D. C. The hearing was recessed subject to further Commission order after Presiding Examiner Marsh referred the two motions to the FPC. The first phase of the hearings commenced January 19.

The proceedings involve conflicting applications by the City of Seattle, Wash., seeking a license for its proposed Boundary Project and Public Utility District No. 1 of Pend Oreille County, of Newport, Wash., requesting a license for its proposed Z Canyon Project.



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$350,000,000 town planned for Hawaii

PLANS have been revealed for the building of a resort and residential community of 50,000 people and the investment of $350,000,000 in the Koko Head and Maunalua Lands in Honolulu. The new community will be known as Hawaii-Kai.

Industrialist Henry J. Kaiser, community builder Fritz P. Burns, architect Welton Becket and the trustees of the Bernice P. Bishop estate announced they have entered upon an arrangement for a completely integrated series of projects, culminating two years of informal discussions.

These major decisions in principle:

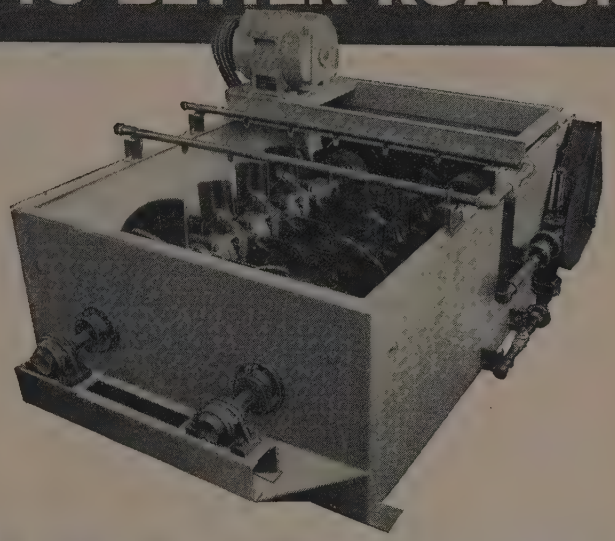
1. The Kaiser-Burns-Becket Organization will go to work immeddiately on a master plan contemplating the building of one of the world's most beautiful model cities on more than 6,000 ac.

The resort residential community will reach from the undeveloped lands of Koko Head, will encircle Maunalua Bay and a salt water lake at the Kuapa Fish Pond, will extend up the many valleys and hillsides of the Maunalua area, and sweep around Koko Crater with choice building sites all the way to Makapuu Point.

2. Immediate, concentrated action will be put into getting the community building under way, on a step by step basis, with all possible speed. Conferences forthwith are planned with legislative and other governmental agencies to clear the way concerning highway routes, water and sewage systems, beach developments and other essential planning. The aim is to undertake the first building within a matter of months, followed up rapidly with other units in an orderly master-planned program.

3. To be fitted into the master plan for highest and best land uses of the large area will be plans for future resort hotels, high quality private homes in various price brackets, luxurious modern apartments, a marina with boating and water sports, and all the facilities and services that make up a completely rounded-out community.

HERE'S A SHORT CUT TO BETTER ROADS!



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The EAGLE MIXER consists of a tub mounting two opposing rows of paddles which thoroughly mix and blend materials, while conveying them toward discharge opening. Mixer can be erected over bin or hopper with clamshell gates or elevated for discharging directly into trucks. Can be equipped with spray bars and water metering system, as optional equipment.

The EAGLE MIXER blends water and required additives with fine and/or coarse aggregate, aggregate with clay, crushed stone with crusher dust and other stabilized road base materials for supporting asphaltic or concrete pavement. These rugged units are available in four sizes with capacities of 125 to 500 t.p.h. You can build better roads at lower cost with the EAGLE MIXER—Send for Bulletin 1258 today!

Contractor blends stabilized air strip base materials at Columbus, Miss., air base, with an Eagle Mixer.

Western Contracting Co., Sioux City, Ia., mixes sand, clay and water producing an amalgam to form the base for concrete slabs and blacktop shoulders on a highway from Omaha to Lincoln, Neb.

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Arizona Cedar Rapids Co., Phoenix; Cook Bros. Equipment Co., Oakland, Calif.; Brown-Bevis Industrial Equip. Co., Los Angeles, Bakersfield, Ventura, Calif.; Balzer Machinery Co., Portland, Oregon; Intermountain Equip. Co., Boise, Pocatello, Ida.; Spokane, Wash.; Keremi Tractor & Equip. Co., Cheyenne, Casper, Wyo.; The Lang Co., Salt Lake City, Utah; H. W. Moore Equip. Co., Denver, Grand Junction, Durango, Colo.; Jack Sahlberg Equip. Co., Seattle, Wash.; Sierra Machinery Co., Reno, Nev.; N. C. Ribble Co., Albuquerque, N. Mex.; Western Construction Equip. Co., Billings, Missoula, Great Falls, Bozeman, Mont.

. . . for more details, circle No. 41 on Reader Service Postcard

Low bids and contract awards

ALASKA

Baker & Ford Co. of Bellingham, Washington, received three contracts for work at Clear: $3,666,499 contract for construction of a composite building for the U. S. Air Force; $342,678 for construction of warehouse, and $836,475 for construction of radar antenna foundations. **William A. Smith Co., Inc.** of Kansas City, Kan., submitted a low bid of $1,676,554 for relocation of the Alaska Railroad line for the U. S. Air Force Base at Clear. A $481,439 contract was received by **Puget Sound Dredging Co.** of Seattle, Wash. for dredging a navigation channel in the Gastineau Channel area near Juneau.

ARIZONA

Arrow Construction Co. of Yuma submitted a low bid of $347,970 for grading, surfacing and related work on 2.5 mi. of highway west of Kingman in Mohave County. A low bid of $323,900 was submitted by **Mohamed Earthmoving Co.** of Phoenix for grading, surfacing and related work west of Douglas in Cochise County. **Givens Construction Co.**, Phoenix, submitted a low bid of $228,657 for grading and surfacing north of Randolph in Pinal County. **Vega Engineering & Grading Co.**, Berkeley, Calif., submitted a low bid of $188,110 for earthwork, pipeline and structures, South Gila Drain No. 2, Colorado River front work and levee system. **Reeder Construction Co. and Charles L. Jenkins**, Page, submitted a low bid of $176,371 for construction of bridge on the Duncan-Alpine highway, Route 666 crossing of the San Francisco River in the city of Clifton, Greenlee County.

CALIFORNIA

Rothschild, Raffin & Weirick and Continental Construction Co., Inc. of San Francisco received a $2,348,000 contract for the general work to construct six 3-story residence halls at San Jose State College, Santa Clara County. **John Delphia, Fred J. Early, Jr., Co., Inc.** and **L. A. & R. S. Crow** of Patterson received a $2,288,888 contract for grading and surfacing to construct 3.7 mi. of 4-lane freeway, north of Trinidad in Humboldt County. **Massey Sand & Rock Co.** and **Silva & Hill Construction Co.**, Indio, received a $1,757,460 contract for grading and surfacing to construct 9 mi. of 4-lane freeway between Indio and Thousand Palms in Riverside County. **Fredrickson & Watson Construction Co.** and **Ransome Co.** of Oakland received a $975,624 contract for grading and surfacing to construct 3.7 mi. of 4-lane freeway in city of Oakland, Alameda County. **Fredrickson & Watson Construction Co.**, Oakland, submitted a low bid of $1,532,222 for grading, surfacing and constructing two bridges on 3.3 mi. of 4-lane freeway north of Santa Cruz in Santa Cruz County. **R. R. Hensler, Inc.** of Sun Valley received a $677,448 contract for grading, surfacing, construction of one bridge and related work to relocate 3.7 mi. of highway north of Ittners in Kern County. A $517,741 contract was received by **Rice Brothers, Inc.** of Fresno for 4.3 mi. of grading, surfacing and constructing one bridge over the Alamo River, south of Sandia in Imperial County. **Twaits-Wittenberg Co.** and **Morrison-Knudsen Co., Inc.**, of Los Angeles, joint venture, have started construction of the $11,464,000 new Hall of Records building for County of Los Angeles. **Peter Kiewit Sons' Co.**, Arcadia, submitted a low bid of $9,725,920 for road construction, bridge widening, construction of 28 bridges, portions of 2 bridges, undercrossing and related work in city and county of Los Angeles.

COLORADO

Pioneer Construction Co. of Pueblo submitted three low bids for roadwork in El Paso, Montrose, Conejos and Alamosa counties: $496,826 for grading, surfacing and structures on State Highway 4, between Payton and Calhoun in El Paso County; $432,361 for 8.4 mi. of grading, surfacing and structures on Highway 6, east of Montrose in Montrose County, and $237,284 for 2.9 mi. of grading, structures, surfacing, and related work on State Highway 17 between Alamosa and La Jara in Conejos and Alamosa counties. **Colorado Constructors, Inc.** of Denver submitted a low bid of $372,829 for grading, structures and surfacing near Lyons on State Highway 66 in Boulder County. **Smith & Lucas** of Colorado Springs submitted a low bid of $324,738 for 4.5 mi. of grading, surfacing and structures on State Highway 9, beginning at the Grand - Summit county line and extending southeast in Summit County. A low bid of $242,773 was submitted by **Corn Construction Co.** of Grand Junction for 1.4 mi. of grading, structures and surfacing on State Highway 4 in city of Grand Junction, Mesa County. **Graham Construction Co.** of Pueblo submitted two low bids for work in Montrose and Bent counties: $195,018 for 1.9 mi. of grading, structures and surfacing between Naturita and Nucla in Montrose County, and $117,562 for 6.1 mi. of stabilization and surfacing south of Las Animas in Bent County. **Western Paving & Construction Co.** of Denver submitted a low bid of $159,970 for street improvement, in city and county of Denver. **Leon K. Suhm** of Denver submitted a low bid of $124,235 for 1 mi. of grading, surfacing, structures and related work on State Highway 88 in Arapahoe County.

IDAHO

Pickett & Nelson Construction Co. of Idaho Falls submitted a low bid of $561,762 for drainage structures, roadway construction and underpass in Bannock County. A low bid of $671,555 was submitted by **Eagle Construction Co., Inc.**, of Boise for grading and surfacing on the Elk City highway, Nez Perce National Forest. **Cherf Brothers & Sandkay Contractors**, Ephrata, Wash. submitted a low bid of $3,094,467 for grading, surfacing and structures in and near city of Kootenai in Bonner County. **Teller Construction Co.**, Idaho Falls, submitted a low bid of $666,500 to construct a hot cell shop and maintenance building at the Atomic Energy

(Continued on page 94)

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The M-F Work Bull 1001 has instant reversing with torque converter. Requires no clutching, shifting, or levers to pull to change direction of travel. Directional pedal also serves as foot feed—the farther you push the faster you go. It gives unequalled maneuverability and convenience!

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Missoula
Prestrude Implement
1900 Sherwood

Butte
Farmers Union Trading Company
624 East Front Street

NEW MEXICO:

Albuquerque
Durand Tractor & Equipment Company
929 Fourth, Street, S.W.

IN OREGON:

Eugene
Frank Lane Machinery Company
603 McKinley Street

Medford
Valley Equipment Company
2840 South Pacific Highway

Island City
Union County Grange Supply

Rickreall
Rickreall Farm Supply, Inc.

Silverton
Cascade Farm Machinery Co.
707 McClaine Street

IN TEXAS:

El Paso
The Myers Company
140 North Cotton

IN UTAH:

Salt Lake City
Lund Machinery Company
2350 South West Temple

IN WASHINGTON:

Battle Ground
Clark County Dairymens Co-Op

Burlington
Van's Equipment Company

Pasco
Guenther Tractor Company, Inc.
303 South 4th

Tacoma
Evergreen Equipment Company
505 Puyallup Avenue

Yakima
Turner Implement Company
2006 South 1st Street

IN WYOMING:

Douglas
Ranch Supply
242 North Second

Low bids and contract awards

(Continued from page 90)

Commission National Reactor Testing Station. **Osberg Construction Co.**, Seattle, Wash. submitted a low bid of $283,501 for road construction and stockpiling in Bonner County.

MONTANA

Baltrusch Construction Co. of Havre received a $668,851 contract for grading, surfacing, and draining on 14.6 mi. of Whitefish-Columbia Falls and Kalispell-Whitefish roads in Flathead County. A $499,697 contract was received by **Zook Brothers Construction Co.** of Cut Bank for 7.4 mi. of grading, surfacing, and draining on the Birch Creek - Browning road in Glacier County. **Inland Asphalt Co.** of Spokane, Wash. received a $257,323 contract for surfacing and sealcoating portions of highway on the Santa Rita - Dol Bonito road in Glacier County. **Fred H. Slate Co., Ore. Ltd.**, Portland, Ore., received a $297,245 contract for grading, surfacing and related work on 3.3 mi. of the St. Regis - Paradise road in Mineral County. **McLaughlin, Inc.** of Great Falls, received a $203,307 contract for 13 mi. of surfacing and seal coating on the Arrow Creek-Brooke road in Fergus County. A $153,459 contract was received by **Wyoming Paving** of Riverton, Wyo., for 9 mi. of surfacing, seal coating and related work on the Lame Deer-Colstrip road in Rosebud County.

NEVADA

Wells-Stewart Construction Co., Inc. of Las Vegas received a $240,473 contract for grading and surfacing on 8 mi. of highway on State Route 3 in Esmeralda County.

OREGON

J. N. Conley and **G. D. Dennis & Sons**, Portland, in a joint venture submitted a low bid of $2,890,100 for construction of two rubble-mound jetties at the entrance to the Rogue River on the Oregon Coast near Gold Beach. **Schrader Construction Co., Inc.** of Portland submitted a low bid of $672,373 for construction of two bridges, Perry-Oro section on the Old Oregon Trail in Union County. **Erland & Blickle Co.** of Portland submitted a low bid of $301,154 for grading, paving and structures, Goble section on the Columbia River Highway in Columbia County. A low bid of $278,741 was submitted by **Fred H. Slate Co., Ore. Ltd.** and **E. C. Hall Co.** of Portland for grading, oiling and structure on The Dalles-California highway in Jefferson County. A low bid of $270,762 was submitted by **Birkemeier Construction Co.** of Milwaukie for construction of the North Yamhill River Bridge on Pacific-West Highway in Yamhill County. **Bechtel Bros.** of La Grande submitted a low bid of $244,633 for construction of three bridges and related work, Glover-Perry section on the Old Oregon Trail in Union County. **J. N. Conley**, Portland, submitted a low bid of $241,568 for stone base and oiling the Richardson-Siuslaw River section on the Richardson-Eugene highway in Lane County. **Peter Kiewit Sons' Co.**, Vancouver, Wash., submitted a low bid of $239,774 for construction of North Grants Pass Interchange structures on the Pacific Highway in Josephine County. **E. C. Hall Co.** of Portland submitted a low bid of $179,707 for stone base and oiling a portion of the Richardson-Siuslaw River section on the Richardson-Eugene highway in Lane County. **Pacific Concrete** and **Otis P. Jordan, Jr.** of Portland submitted a low bid of $533,333 for construction of five grade separation structures on the Ontario-Idaho line section of the Old Oregon Trail highway in Malheur County. **Earl L. McNutt Co.**, Eugene, submitted a low bid of $477,817 for grading, surfacing and related work on the West Unit, Siuslaw River-Walton section of the Richardson-Eugene highway, west of Eugene in Lane County.

UTAH

Alfred Brown Co., Salt Lake City, received a $2,341,696 contract for construction of a new State Office Building in Salt Lake City. A $332,607 contract was received by **Whiting & Haymond Construction Co.**, Springville, for 8.7 mi. of grading and surfacing west of Henrieville in Garfield County. **D. W. Brimhall Construction Corp.**, **Maurice Rasmussen Construction Co.** and the **Johnson Co.** of Salina submitted a low bid of $211,826 for grading and surfacing on 5.8 mi. of highway west of Hanksville, near Giles in Wayne County.

WASHINGTON

S. S. Mullen, Inc. of Seattle received two contracts for roadwork in King County: $2,479,211 for constructing reinforced concrete box girder approach structure on the south end of the Lake Washington Ship Canal bridge on the Seattle Freeway, and $365,351 for bridge construction, Pierce County line to Jct. PSH 5. **Pakar Construction Co.** of Chehalis received a $150,932 contract for constructing the Mellon Street Bridge in Lewis County. **Lewis Hopkins Co.** of Pasco submitted a low bid of $216,361 for construction of Sand Hollow pumping plant and discharge line, Block 83, Columbia Basin Project. **Northwest Construction Co.**, Seattle, received a $202,635 contract for grading, clearing 3.4 mi. of the Cassidy and Callow roads in Snohomish County.

WYOMING

Knisely-Moore Co., Douglas, received a $470,297 contract for construction of one interchange structure, one bridge over Cottonwood Creek and one bridge over Spring Creek, one machinery pass structure and miscellaneous work on 5.1 mi. of 4-lane divided highway on the Wheatland - Glendo road in Platte County. **Husman Bros., Inc.** of Sheridan received a $314,660 contract for constructing two interchange structures, one bridge, one separation structure and related work on 4.7 mi. of 4-lane divided interstate highway on the Buffalo Gillette road in Johnson County. **W. E. Barling, Inc.** of Meeteetse received a $218,568 contract for grading, special embankment and surfacing on 4.9 mi. of the Manderson-South road near Manderson in Big Horn County. **L. H. Weber Contractor** of Rawlins received a $132,790 contract for grading, surfacing and miscellaneous work on the Seminole Dam road in Carbon County. **Ellingford Bros., Inc.** of Evanston received a $127,873 contract for grading, structures, surfacing and related work on 6.2 mi. of 4-lane divided highway on the Rock Springs-Rawlins road in Carbon County.

for more details, adv. pgs. 95, 96, 97 and 98, circle No. 44 on Reader Service Postcard

ENGINEERS and CONTRACTORS

OHN R. WINBLAD (second from right), owner of Midstate Construction Co., San Francisco, accepts his third national Safety Award from The Associated General Contractors of America, Inc. Winblad receives the award from *W. F. Ames, Jr.* of Miller & Ames, chairman of the Northern and Central California Chapter's accident prevention and safety committee. *Robert Evenden* (left) of Guy F. Atkinson Co., a member of the committee, and *Frank W. Callahan* (right) of AGC look on.

With more than 45 years of engineering and construction work behind him, **Oliver A. Lewis,** Chief of the Construction Division, U. S. Army Engineer District, Walla Walla, Wash., retired at the end of March. Following a degree in civil engineering in 1913 he started his career with the Washington State Highway Department. He saw overseas duty in World War I and later spent 17 years in railroad engineering work before joining the Corps in 1936 at Portland. As a commissioned officer in the Second World War he was assigned to military construction work, serving as area engineer at Boise, Idaho. On termination of the war he resumed his former duties on flood control, and transferred to the Walla Walla District when it was established in 1948.

* * *

Col. Herbert N. Turner recently arrived in Portland and will be assistant to the division engineer of the North Pacific Division, Corps of Engineers. **Col. H. R. Davis,** deputy division engineer, requested retirement after 29 years of Army service, and following his departure in June his post will be assumed by Colonel Turner.

* * *

Jacobs Associates, San Francisco firm of construction engineers, has purchased the assets and practice of John C. Oglesby Engineering Co., Inc., San Rafael, Calif. The acquisition enables the Jacobs organization to add surveying to the other technical services which it now provides to the construction industry. The new venture is incorporated under the name of Oglesby, Jacobs & Wickham, with offices in San Rafael. **George E. Wickham** will be resident manager.

* * *

Utah State Road officials have named resident engineers to the following road contracts: **Edwin E. Lovelace** to Wardle & Jensen Construction Co.'s work on Highways No. 261 and 95 in central San Juan County; **Edward Kenelly** to Weyber Construction Co.'s job on Interstate Defense Highway 15 in Salt Lake City, and to Holman & Tuft's job in the same vicinity; **Sherman Burton** to J. L. Christenson Co.'s contract on No. 106 near Kaysville; **Robert Wheadon** to Whiting-Haymond Construction Co.'s work near Henrieville; **William Marsden** to G. W. Harris' contract for building demolition in Ogden; **William J. Merkley** for work being done by Maurice Rasmussen, Roger Johnson & D. W. Brimhall on Road No. 24 near Hanksville.

* * *

Lowell E. McLean has joined the staff of the Northern and Central California Chapter, Associated General Contractors, as a field representative. McLean brings to his new position 18 years of experience in the construction field. Two other changes in the Chapter staff are also announced. **E. James Bailey** has become new director of press and public relations. **Robert E. McCann,** former administrative assistant, has left to join the news and publications department of Stanford University

* * *

Lewis M. Tuthill has been elected vice president of the American Concrete Institute for a 2-year term. He is concrete engineer with the Division of Design and Construction of the California Department of Water Resources.

* * *

Donald L. Perry, Lt. Colonel, USAF (Ret.) has left the Air Force at Los Angeles to join the plan-

CALENDAR

May 4-7—American Society of Civil Engineers, annual convention, Cleveland, Ohio.

June 22-26—Western Association of State Highway Officials, annual meeting, Billings, Mont.

Sept. 14-17—American Mining Congress, Denver, Colo.

Oct. 26-28—American Road Builders' Association, National Highway Conference for County Engineers and Officials, Hotel Leamington, Minneapolis, Minn.

Dec. 2-3 — The Asphalt Institute, annual meeting, Shoreham Hotel, Washington, D.C.

ning-architectural-engineering firm of Charles Luckman Associates as director of aero-space development.

* * *

Fred E. Ressegieu, who joined the Bechtel Corporation last year as an executive engineer, has been appointed manager of defense projects, while **Thomas A. Lang,** an authority on hydroelectric development, has joined Bechtel as an executive in the power and industrial division.

* * *

Edgar F. Kaiser, president of Kaiser Industries, Oakland, has been re-elected president of the San Francisco Bay Area Council. He has headed the council for the past year during which it was active in developing the Golden Gate Authority plan.

* * *

Richard C. Gerke has been appointed assistant director of sales by Herrick Iron Works in Hayward, Calif. A graduate civil engineer, Gerke was for ten years a contracting engineer with one of the larger mill fabricators of structural steel in the Los Angeles area.

* * *

J. H. Ryan of the contracting firm of J. H. Ryan & Son of Albuquerque, was elected president of the Associated Contractors of New Mexico at the organization's annual meeting. Elected to serve with him were **J. W. Jones** of the J. W. Jones Construction Co., vice president; **E. R. Hise** of Skousen-Hise Construction Co., secretary-treasurer. **A. J. Haney** of Allison & Haney is a new director. Continuing as manager of the association is **Robert E. Miller.**

* * *

James W. Cawdrey of Cawdrey & Vemo, Inc., Seattle building contracting firm, is the new president of the Associated General Contractors of America. He served as vice president last year and succeeds **Fred W. Heldenfels, Jr.** to the top AGC post in 1959.

* * *

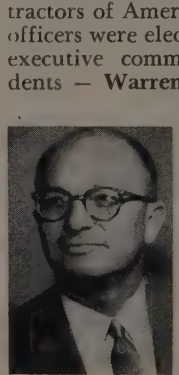
John W. Brown Construction Co., Inc., general contractors, have opened an office at 3121 East Colfax Ave., Denver, Colo.

* * *

Robert E. Harvey, senior executive vice president of Merritt-Chapman & Scott Corp., has been elected president of the world-wide construction organization, with headquarters in New York City. Harvey's advancement is in accordance with the decision to separate the dual posts of president and board chairman held by **Louis E. Wolfson,** who continues as chairman. Prime contract for the Glen Canyon Dam on the Colorado River is currently being executed by M-C&S.

* * *

J. W. Bernard, executive vice president of William J. Moran Co., was recently installed as 1959 president of Southern California Chapter of the Associated General Contractors of America. The following officers were elected to serve on the executive committee: vice presidents — **Warren Driver** of C. W.



J. W. Bernard

Driver, Inc.; **M. A. Matich** of Matich Constructors; **S. A. Wattson** of R. A. Wattson Co. **D. E. Kelbey** of Alex Robertson Co., retiring president, was elected to serve as a member of the executive committee in the capacity of treasurer. **W. D. Shaw** is Chapter manager.

* * *

Charles A. McMahon, one of the best known construction project superintendents in the West and a registered civil engineer, has been promoted to chief of the Planning and Engineering Department for the Community Redevelopment Agency of Los Angeles, of which the Bunker Hill Project is a part. More than $10,000,000 in heavy construction work and $250,000,000 in buildings are involved in the development of this project.

* * *

Robert A. Skinner is the 1959 president of the Los Angeles Section of the American Society of Civil Engineers. He is assistant chief engineer of the Metropolitan Water District of Southern California.

* * *

Harold E. Hedger, Chief Engineer of the Los Angeles County Flood Control District, retired in January. He had served the District as its chief engineer for twenty years, but had been employed there continuously since 1924. **M. E. Salsbury,** who has served in various engineering posts with the District since 1927, has assumed the title of chief engineer. He served as acting chief engineer while Colonel Heger was on military leave for three years during World War II.

* * *

Announcement is made by Fisher Contracting Co., Phoenix, Ariz. of the promotions of **Bob Moran** and **Roy Stegall.** Moran, who has been with the Fisher organization since 1945, was promoted from plant superintendent to production manager, supervising purchase of parts as well as the repair of all division equipment. Stegall, who has been with the construction firm since 1949, has been named material manager. He will also have charge of design and control of all sand and gravel and ready-mix products put out by the Superior Division of the company. His previous job was that of chief materials inspector.

* * *

J. Al Head, assistant traffic engineer in the Oregon State Highway Department, was elected a director of the Institute of Traffic Engineers at the I. T. E. annual conference recently. He replaces **H. J. Higgins** as representative in the twelve Western states and Hawaii. A member of the American Society of Civil Engineers, and also a member of the Professional Engineers of Oregon, Head was 1955 winner of the Dr. L. I. Hewes Award sponsored by *Western Construction.*

* * *

Andrew P. Wick of Wick Construction Co. has been elected 1959 president of Seattle Chapter of Associated General Contractors. At AGC's recent convention at Miami Beach, Wick was also elected to the Advisory Board of the National AGC.

* * *

William C. Hill was recently chosen president of the Professional Engineers of Oregon, succeeding **Ellsworth R. Fletcher.** Hill is assistant research engineer in the Oregon State Highway Department.

* * *

Herbert B. Glaisyer, secretary of the State Highway Commission of Oregon, recently retired following forty years of service. He joined the Department in 1919 as a survey engineer, and has been Commission secretary since 1930.

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Contractor: Charles L. Harney, Inc. Concrete reinforcing: Richards Reinforcing Steel Corp.

New Playground for Giants. This summer, 40,000 eager fans will echo the cry "play ball" when the first pitch steams across the plate in Candlestick Park, the San Francisco Giants' handsome new stadium. More than 2000 tons of steel bars will be used for concrete reinforcement in this project. Here and in other stadiums, arenas and coliseums throughout the sports-minded West, USS Rebar is on the job. And now available from USS is a new high strength rebar, that makes possible a lighter, and more graceful structural design.

New Power from Hell's Canyon. To supply the power-hungry Pacific Northwest, 95 miles of USS Electrical Wire and Cable went into the heart of Brownlee Dam, built by Morrison-Knudsen Co., for Idaho Power Company. USS control cable resists heat and moisture under the toughest operating conditions.

Cont: Neukirch Bros. Steelwork: United Concrete Pipe Corp.

New Grace for Girders. Skagit County's La Conner Bridge, across busy Swinomish Channel at La Conner, Washington, was designed by Harry R. Powell and Associates. The use of light-weight USS Hi-Strength Steels saved 250,000 lbs. in weight and $65,000 to make this bridge as economical as it is graceful.

New Span for High-Wire Work. In northern Arizona, this king-size cable, fabricated by United States Steel, is being used in the construction of Glen Canyon Dam for the U. S. Bureau of Reclamation's Colorado River Storage Project. Prime contractor for the $108 million job is Merritt-Chapman & Scott Corporation.

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SUPERVISING the jobs

Jack Edwards is superintending a $126,236 job for Colorado Constructors, Inc., covering stabilization, structures and surfacing on 6 mi. of State Highway 96 in Pueblo County, Colo. Among the key personnel are **S. R. Samuelson**, grading foreman; **R. G. Droel**, surfacing foreman, and **R. J. McMullen**, timekeeper. Crusher operator is **H. H. Hoffman, Jr.**; operator on the Northwest 6 is **Cliff McAdams**, and on the Northwest 41, **John Biersdorfer. Van Williams** represents the Department of Highways as resident engineer.

* * *

Vern Mulherron, superintendent for Mardian Construction Co., is in charge of two recent awards going to this firm: $403,296 for construction of six 2-span overpass structures, and $337,238 for three 2-span underpasses in Phoenix, Ariz. The first mentioned job has **Ed Spear** as foreman, while **Fred Day** is foreman on the latter.

* * *

William DeJager, supervisor, and **W. R. Forhan**, superintendent, key men employed by the contracting firm of C. M. Corkum Co., Inc., are in charge of overcrossing construction on Highway 30 at Dodson, Ore. The $218,709 job started in February and will be finished in August.

* * *

O. C. VanSickel, superintendent for McMillon Construction Co., is supervising 4.5 mi. of grading, structures and asphalt paving on State Highway 6 in Bent County, Colo. This $478,888 job has been under way since Jan. 12, slated for August finish.

* * *

Brandford Smith and **Wally Smith** are supervising a recent award to Enoch Smith Sons Co. for a widening job in Salt Lake County, Utah. **A. G. Jenson** is foreman for the $343,608 contract, which consists of 1.3 mi. of grading and surfacing on FAS Highway 140. Scheduled for termination in July, the work has been going since February.

* * *

James W. Lawrence is acting as superintendent on a grading and surfacing job, with structures, on State Highway 1 in Adams County, Colo., for the Lawrence Construction Co., successful bidder at $307,739. On another job recently awarded this contractor, **Earl R. Lawrence** is superintending. This work is located on State Highway 185 and consists of grading, structures and surfacing in the amount of $262,906. Both jobs started in February and will be finished in July.

* * *

Harold Percival is supervising a $289,493 award to Lord Bros. for construction of an overpass on Baldock Freeway on the west side of Portland. Under construction since mid-February, the work will be finished the end of September.

* * *

Ted Kinsman is superintending a $442,581 project which Wayne A. Lowdermilk, Inc., has in Otero County, N. Mex. Described as a rough job, work consists of grading, surfacing and structures on 6.1 mi. near Mescalero. **F. W. Schooley** is foreman and master mechanic here, while **E. P. Archuletta** is grade foreman, and **Roy Perry**, labor foreman. Field office manager is **James A. Borden.** Job will be finished in July.

* * *

Frank K. English is supervising a job recently awarded to H. E. Lowdermilk Co. on a low bid of $615,529 for grading, surfacing and structures on 5.8 mi. of State Highway 10 from Dove Creek to Cahone, Colo. Other key men for the contractor are **Donald F. Barber**, timekeeper; **Stanley D. Coffey**, structure superintendent, and **A. Keith Warner**, grade foreman. Scheduled for September completion, work started in March.

* * *

Charles Stierwalt and **Russell Hopkins**, supervisor and project engineer respectively, are key men on a $648,278 job recently awarded to Cherf Brothers, Inc. and Sandkay Contractors, Inc. Contract covers grading and surfacing 2.6 mi. of 4-lane highway and two concrete bridges in Grant County, Wash. Under way since March, the job will be finished in September.

* * *

Ralph Brady, general superintendent, **Victor Franks**, steel superintendent, **H. B. Raun**, engineer, and **Ed Lehr**, purchasing agent, comprise W. F. Maxwell Co.'s chief men on the construction of interchanges on the San Bernardino Freeway east of Ontario, Calif. Work on the $596,166 project started last November, with completion set for this September.

* * *

Dave Barker, superintendent for Big Horn Construction Co., has charge of a $490,116 road job in Converse County, Wyo., consisting of select embankment, soil cement base, hot-mix surface on 21 mi. Foremen selected for this grading and surfacing job are **Stanley Mitchell, Fred Noack** and **Bill Daley. John Squier** is office manager. Work is scheduled for completion about Aug. 1.

* * *

"Chuck" Loser, grading superintendent, and **George Williams**, structures superintendent, head the job personnel working for C. L. Hubner Co. on this contractor's $1,056,885 contract under way near Longmont, Colo. To end in July, work consists of grading and structures on 6.2 mi. on State Highway 185.

* * *

G. Henry Eberhardt is superintending a $741,000 project recently awarded to Northwestern Engineering Co. covering 13.3 mi. of grading and surfacing the Alamogordo-Cloudcroft route in Lincoln National Forest, N. Mex. Other key personnel are **Marvin Jenson**, field accountant, **L. F. Pont**, crusher foreman, and **James "Red" Bostock**

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grade foreman. Northwestern started work in January and will be finished in August.

* * *

J. E. Howsman, superintendent for Daniels Construction Co., is in charge of a grading, surfacing and structures job on U. S. 60 near Vaughn, N. Mex. The $180,148 contract got under way in March; will finish in July.

* * *

R. W. Finke, project manager for MacRae Bros., is in over-all charge of MacRae's contract in the amount of $1,838,402 for bridge, north approach on Seattle Freeway, Lake Washington Ship Canal, King County, Wash. Work commenced in March and will probably run until September next year.

* * *

Claude Royer, Harold Stinson, and **Gene Heinbaugh,** foremen, head the crew on a road grading and surfacing contract which went to Rissler & McMurry Co. on a low bid of $1,103,753. The work, which started in April and will end some time next year, consists of 5.1 mi. of grading, surfacing and related work on the Wheatland - Glendo road in Platte County, Wyo.

* * *

Joe Huston and **H. M. Kaiser,** grading and surfacing superintendent respectively, will supervise Summit Construction Co.'s contract covering grading, surfacing and related work on 5.5 mi. of the Newcastle - Clareton road in Weston County, Wyo. The $210,385 job starts in June and will finish in September.

* * *

Bill Paukovich is superintendent on another of Brannan Sand & Gravel Co.'s jobs in Colorado. This $226,954 award covers 1 mi. of grading, drainage and surfacing on Colorado Boulevard in Denver. Other important men on the 90-day job which has been going since March, are **Karl Bromstrup,** field engineer, and **Bill Thomas,** foreman.

* * *

Robert J. Schurger, with the aid of **Jim Dugan, John Jackson** and **Fred Lahn,** foremen, is to supervise construction on 3.6 mi. of grading and related work on the Buffalo-Gillette road in Campbell County, Wyo. Maintenance foreman will be **LeRoy Heller.** The successful bid was $320,000 submitted by Roth Construction Co., which expects to have the job in progress about mid-June, and finished by Sept. 1.

* * *

George Verschingel, superintendent, and **Wayne Lowell,** engineer, are Pacific Concrete Co.'s key men on construction of undercrossing on the Pacific Highway west, in Washington County, Ore. The $143,333 job starts in June and will finish in September.

* * *

H. M. "Slim" Thomas is supervising regrading, widening and resurfacing streets in Raton, N. Mex., for Allison & Haney, Inc., contractor doing the job at a cost of $574,051. Other key supervisors working on this project are **Robert Joiner,** grade foreman; **Kenneth Laughlin,** crusher foreman; **John McConnell,** paving foreman; and **John Barraclough,** timekeeper. Work has been going since March and is expected to be finished in August.

* * *

H. T. Langworthy, general superintendent, **Sam Ellerman,** superintendent, and **Truman Hart,** bridge superintendent, are the chief personnel on a $1,213,980 award to R. E. Hazard Contracting Co. and W. F. Maxwell Co. for 1.3 mi. of grading, structures and surfacing in San Diego, Calif. A year-long job, it is expected to be finished in October.

* * *

Charles Purser and **Joe Sipes** are the top men supervising M-B Contracting Co.'s $965,808 award for grading, paving and drainage, 15.3 mi. on Sterling Highway and one bridge over Anchor River, near Homer, Alaska. Started last November, the work is slated for completion Oct. 1.

* * *

J. C. Hubbard, general superintendent, with **Clayton Peterson** job superintendent, and **J. R. Ellis** foreman, has charge of Etlin E. Peterson's $679,981 bridge job in Teton County, Wyo. Span is over the Snake River on the Jackson-Wilson road and has been under construction since the middle of October. Finish date, November 1959.

* * *

Arthur W. Ingwersen is project superintendent, and **Richard A. Downing** is supervising engineer on a job just starting by Morrison-

WITH the signing of a contract awarded Cherf Brothers, Inc. and Sandkay Contractors, Inc. for the Coeur d'Alene Belt Line road a milestone in Idaho's highway construction program was reached. The $3,094,467 contract, a part of the interstate highway program, was the largest ever awarded by the Idaho State Highway Department. Present at the signing were *G. Bryce Bennett,* State Highway Engineer (seated), with *James W. Cherf* of the construction firm, *Roscoe Rich,* chairman of the Idaho Highway Board and *Roy F. Johnson* of the contractor's organization.

Knudsen Co., Inc. at Eielson AFB, Alaska. Costing $596,298, the job consists of widening hardstand shoulder stabilization and taxiway, and runway access stabilization. According to **George W. Nourse,** assistant District Manager for M-K, the job should be finished the end of September.

* * *

Foster B. Cain, general superintendent, with **Harold Wolf,** assistant superintendent, is in charge of housing rehabilitation and improvement at Larson AFB in Washington. Other key men for Lewis Hopkins Construction Co., which won the award on a low bid of $1,628,232, are **Roy Dunham,** field engineer, **Dave Hindeman,** office engineer, and **Emil Trautman,** general foreman. Started last December, the job will be finished by the end of this year.

* * *

W. B. McMakin, project manager, **Anthony Bruno,** project superintendent, **George Marsh,** underground foreman, and **Pete Karagas,** office engineer, comprise the chief personnel on 4.4 mi. of 6-lane freeway on U. S. 101 Bypass and 5 bridges and related work in San Mateo and Santa Clara counties, Calif. L. C. Smith and Concar Ranch & Enterprises is doing the work at a cost of $3,226,722. Scheduled for December completion, work started in February.

* * *

J. B. Goodfellow, Jr., project manager, **T. M. Reilly,** general superintendent, and **Doyle L. Condrey,** superintendent, head the list of personnel on a recent award to Goodfellow Bros. Inc. for Section III of relocation of highway and railroad on Chelan County shore of reservoir to be created by Rocky Reach Dam in Washington. Key foremen on the $2,024,332 project are **Richard N. Selland,** equipment; **Chalmers D. Corle,** labor; **Frank Gardner,** drill; and **Don Obert,** master mechanic. Scheduled for completion next March, work has been under way since February.

* * *

S. J. Peltzer, superintendent, and **Robert A. Crook,** project engineer, are head men working for General Construction Co., contractor on construction of the Hood Canal Bridge Unit 2 approach structure, in Jefferson and Kitsap counties, Wash. A $508,855 job, work started in January.

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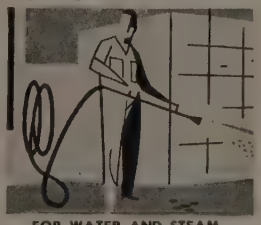

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CONSTRUCTION BRIEFS

Hanging a tunnel catwalk

A 2,000-FT. LONG catwalk of steel will serve as an emergency exit for the Haas underground powerhouse in the Kings River Project. This unusual walkway will be located above water level in the tailrace tunnel of the first large underground powerhouse in the United States. Pacific Gas & Electric Company is putting the finishing touches on the imaginative plan envisioned decades ago to harness the plunging water. Construction of the Kings River Project was described in the Nov. 1957 issue of *Western Construction.*

Location of the Haas powerhouse in a cathedral-like room, 400 ft. from the surface, was dictated by certain economies. The location underground results in 28 ft. of additional head developed with a less expensive penstock, some 2,000 ft. shorter than would be required by a surface plant.

The powerhouse is 173 ft. long by 85 ft. high by 56 ft. wide. In addition, it is served by a 400-ft. long, 18-ft. diameter vertical shaft, containing a 5-ton capacity elevator and an emergency stair. A 750-ft. long penstock tunnel slants up from the powerhouse at a 65-deg. angle.

The "back door" to the powerhouse is a 2,000-ft. long access tunnel which was first driven to reach into the powerhouse proper. More than 29,000 cu. yd. of granite was removed via the access tunnel during the powerhouse excavation. The floor of the access tunnel was then concreted and it will remain as the tailrace tunnel for the powerhouse, bringing the water into Balch Diversion Dam.

When Pacific Gas & Electric Company designed the access—tailrace tunnel, a third role was chosen for it—an emergency entrance or exit for the powerhouse. Should the elevator become inoperative, the easiest exit would be through this tunnel. For that reason, a catwalk was devised to hang from the solid granite roof.

Rothschild, Raffin & Weirick, general structural contractors for the Haas and Balch powerhouse construction, installed the catwalk, using a special eye bolt hanger, manufactured by Bethlehem Pacific Coast Steel Corporation. The eye bolt is ⅞ in. in diameter, 24 in. long with a ¾-in. threaded end. The eye bolt is threaded into a C type expansion shell, normally used in Bethlehem Pacific rock anchor bolts. These fasteners operate on the same principle as rock anchor bolts. The contractor drilled pairs of 30-in. deep holes on 12-ft. centers with an air leg jack hammer. Each location for the 332 hangers was individually surveyed. To facilitate installation, all computed levels were used to measure off lengths of ⅜-in. wire strand used to hang the catwalk from the eyes. There were cut to the proper length and taped and numbered according to their location.

The catwalk is composed of 12-ft. sections of opposing 6-in. channels tied together at their bottom web with 1½-in. angles to form a simple truss. Connections between each 12-ft. section are made with hinged plates composed of 3-in. angles which are punched to receive the cables. A flat bar grid is laid between the webs of the opposing channels. The catwalk was fabricated by Endurance Metal Products of South San Francisco, using galvanized steel sections. All connections were made with Bethlehem Pacific galvanized ½-in. machine bolts.

Kelly Bros., subcontractors for Rothschild, Raffin and Weirick, installed the catwalk using a fork lift to raise each section. The cables were installed through the hanger eyes in the roof and clipped at the indicated tape marks. "By premeasuring each cable length from the survey data, there was no guesswork in leveling the catwalk," according to Tony Moroni, project superintendent for Rothschild, Raffin and Weirick.

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Tractor shovel operating hints

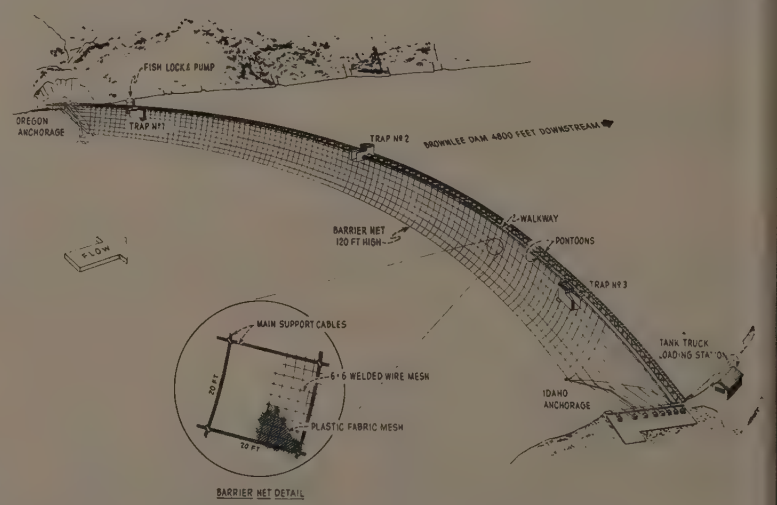
VERNE FAWBUSH knows how to operate a tractor-shovel. His output, using a 4-cu. yd. Michigan, runs as high as 400 tons per hr. from widely scattered locations. He loads out 15 different grades of material from powdery agricultural lime to 6-in. stone at the stone company where he works. And he loads about 90 different kinds of haul units in all shapes and sizes from pick-ups to 22-ton trailers. Look at his suggestions for better tractor shovel operation.

For best production, develop a smooth work cycle. Remember, you're not parking cars. Tire screeching, jerky movements, engine revving and "wild west" tactics are really time-wasters.

Don't sit on your hands between loadings. Keep busy while waiting for trucks. Work the stockpile, clean up corners, loosen the bank, level the grade. Then when the times comes to load, you can load. You won't be *preparing to load.*

Don't overload the first haul truck and then let the next one go away half empty. And spread the load evenly in each truck. Don't overload the rear axle by dumping everything at the back. This is especially true with tandems. Highway weigh stations watch them closely. We've heard of overload fines all the way up to $1,200.

Some tractor shovel operators say that they *have* to place the load toward the rear end because they don't want to spill material on the truck cab. Especially when they're loading heavy stone. Well, we solved that very simply. We built a spill guard on the bucket—just on the side that is nearer the truck cab. (We always load the trucks from the left side—the driver's side. This makes it easier for the driver to back up and position his truck.) The spill guard does not interfere with stockpile work and permits us to dump the bucketload within inches of the truck cab.



UNIQUE FISH FACILITIES AT BROWNLEE DAM

Artist's sketch shows how unique downstream-migrant fish facilities—first of their kind ever built—will appear when completed in the reservoir of Idaho Power Co.'s Brownlee Dam. Extending 2,800 ft. across reservoir, net of plastic mesh, wire mesh and cables will prevent salmon and steelhead fingerlings from continuing downstream and going through project's turbines or over its spillway. It is expected that fish will be attracted into these traps, or "skimmers," and delivered through pipeline to truck-loading station on Idaho shore. Specially built tank trucks will return them to river below Oxbow Dam, 12 mi. downstream from Brownlee. Brownlee's facilities will be the only ones for downstream migrants on the Snake or Columbia rivers.

If you're not worried about axle loadings because the haul fleet is running only over the work site or private roads, you might like to put in "one for good measure." Well, don't. The material will spill out all over the haul roads and then you've got extra policing-up to do. Heap your loads, all right, but don't overheap.

Don't bounce material into the truck bed. Don't lift the load as high as you can, and then dump. The material—especially if it's rock—will shake and jar the truck. Just ease the first few loads over the sideboards or tailgate.

Vary your loading technique to suit the material and the haul unit. For example, loading ag lime into spreader truck bodies calls for extra care. If you simply throw in the ag lime, it'll pack down and cake in the bed. Then when the driver wants to spread the material, the auger or chain will tunnel out the material from the bottom—leaving a big cake of lime still high up in the truck bed. Or, suppose you're loading a small truck with a bed shorter than the tractor shovel bucket. Then, have the driver back the truck right up to the stockpile. Load normally, letting the bucket extend beyond the rear of the truck bed. Most of the excess will fall back onto the stockpile. You'll have less to clean up.

Take one bite at a time. Don't try to lift the whole stockpile at once. Crowd the bucket partway into the pile, and then slowly raise the bucket as you back off. Don't bury the bucket and then try to lift it out. By "slicing" off a bucketful each pass, you'll be getting heaped loads quicker and there'll be less strain on the machine.

Keep the load low for stability. Don't scoop up a full load, lift it high and then roll to the haul truck. Instead, scoop the load, keep it low and then, as you approach the haul unit, raise it to the necessary height—and then dump.

Look out for the truck driver. When loading into the truck, make sure the driver is not hanging out of the cab—even if it is fortified with a sturdy headache rack. When backing up, make sure the driver isn't walking around aimlessly between truck and stockpile. And watch the load at all times. Stop the machine if you have to look in another direction.

Police the load area. Scoop up rock and any other jagged material around the work area. Don't punish tires needlessly by driving over sharp material.

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100

. . . for more details, circle No. 51 on Reader Service Postcard

New rig cleans culverts fast

FOR 16 YEARS E. J. (Jack) Kinney, Arizona Highway Department maintenance foreman at Prescott, fought the recurring battle of cleaning culverts of sand and other debris by hand labor.

To get this back-breaking job done, his men were required to grab shovels and work on their hands and knees to remove the tons of sand washed into culverts by desert rains. The same was true of all other maintenance crews throughout the state.

Then Kinney, a rough-hewn veteran of the department, hatched an idea.

He discussed the problem with Lloyd Edwards, his shop foreman, also an old-timer with the Highway Department. Together they went to work and last month came up with the result—a machine which drastically cuts the time and effort required for this difficult but highly essential maintenance function.

Utilizing scrap materials in the Prescott shop, the veteran team put together a radically-new piece of equipment that gets the cleaning job done in one-sixteenth the time formerly needed—and does it mechanically instead of by hand.

To the end of a 21-ft. long boom, the inventors attached part of a grader blade. This boom in turn was attached to the tractor of a four-wheel-drive end loader.

Presto—a highly maneuverable cleaner!

The boom is inserted in the culvert box and the steel blade then bites into the tightly packed sand and drags it into the open.

The blade attachment is used to clean box culverts and the inventors also have perfected a device for use in pipe culverts. This attachment is a collapsible disc which is inserted horizontally, into the pipe. The disc then drops into a vertical attitude, bites into the sand or debris and cleans the pipe in jig time.

Concrete mixing film produced

THE BUREAU of Public Roads, U. S. Department of Commerce, recently produced a new motion picture, "Lost Mixing Time of Dual Drum Pavers." The film, based on extensive studies of portland cement concrete paving, conducted by Public Roads, highlights the importance of the simultaneous mixing interval in dual drum pavers, in meeting mixing time specifications. It shows some trouble spots and the significance of proper adjustments to the batchmeter.

"Lost Mixing Time of Dual Drum Pavers" is a 16-mm. sound and color film with a running time of 30 min. Prints may be borrowed for showings by any responsible organization by request. There is no charge except for the express or postage fees. Requests should be sent well in advance of the desired showing and alternate dates should be given if possible. Prompt return after each showing is necessary, so that all requested bookings may be fulfilled.

"Lost Mixing Time of Dual Drum Pavers" may be purchased at $127.45 per copy, the price including film, reel, can, and shipping container, and postage within the United States. Inquiries should be addressed to Ray B. Dame, Chief, Photographic Services, Bureau of Public Roads, Washington 25, D. C. Payment should *not* be sent with the inquiry.

KEEP PROFITS HIGH! CONTACT THE MARION DISTRIBUTOR IN YOUR AREA

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PHOENIX—Superior Equipment Co., 2402 South 19th Ave., P.O. Box 6325
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EUGENE—Western Equipment Co. of Eugene, 1360 W. First Ave., P. O. Box 3218
PORTLAND—Western Equipment Co. of Portland, 2244 N. W. Savier St.

UTAH

SALT LAKE CITY—Heiner Equipment & Supply Co., Inc., 501 West 7th South, Phone EM 3-3979

WASHINGTON

SEATTLE—Star Machinery Co., 241 Lander St.

You get

MORE with MARION

. . . for more details, circle No. 52

OOMS--AND PROFITS -BEGIN HERE!

rion 93-M gulps up 2½ yd. bites of limestone in a California quarry.

here's good reason why more and more ions are being put to work on those "tight fit" excavating and crane jobs throughout the ming West. Contractors have found that ions "deliver" . . . whether ripping copper ore n the ground in Colorado, or gently pin-point-steel girders for a new building in California.

eep in the black-soiled timberlands of the ific Northwest they know about dependable ions too, for here you'll find these versatile hines daily moving millions of boardfeet of ber closer to the ultimate consumer. And, ions can be found on the more menial tasks well . . . digging sewerage ditches, powering ull crackers" in rebuilding programs, rehan-g coal from barges or performing hundreds ther, similar jobs.

arions are in business throughout the bur-ning West because they are "profit oriented" hines . . . with the power, speed, versatility capacity to make the toughest jobs look ple.

You get

MORE with MARION

A Marion 43-M with a 1-yd. backhoe completes sewerage project in Seattle area.

This versatile 35-M is excavating foundations for a $1,600,000 building project on the coast. It carries a 60-ft. boom and 20-ft. jib.

DISTRIBUTOR MACHINE CHART

MACHINE	Shovel Capacity	AVAILABLE AS .			
		Hoe	Crawler Crane	Truck Crane	Special Crane
35-M	¾	Yes	Yes	Yes	—
43-M	1	Yes	Yes	Yes	—
362	1½	Yes	Yes	—	Yes
93-M	2½	Yes	Yes	—	Yes
101-M	3	—	Yes	—	—

MASTER MECHANIC

Diesel engines—Tips on valves

(From General Petroleum Corp.)

WEAK SPRINGS cause much trouble. Shims usually are required after the first 25,000 miles of service to bring the springs up to minimum tension.

If pie section comes out of the valve, look for wrong spray tip protrusion as the cause.

There are some valves in the field with a thick head and fuel impinged on the rim causing valve failure. New valves are chamfered on the top edge. Present production valves are thicker than previous valves.

Short valve life may be due to:

1. Worn guides
2. Bent stems
3. Inadequate clearance
4. Ground out of round—valve or seat
5. Injectors—improperly torqued
6. Scale in water jacket or air in water
7. Impingement of fuel spray on valve, plugged orifices or wrong injector protrusion due to improper machining of copper sleeve seat
8. Over injection of fuel or overload

Advocate the use of a vacuum tester over the newly ground valve to determine seating efficiency. If a vacuum tester is not available, wrap an air hose nozzle with a rag and stuff in intake or exhaust manifold. Squirt light oil over head of valve. Bleed air into manifold to build up slight pressure. If bubbles are emitted around valve rim, proper valve seating is not provided.

Carbon build-up under valve may be due to:

1. Worn guides
2. Too light oil in air cleaner
3. Too much oil in air cleaner or an old air cleaner that has channeled
4. Too much oil to rocker assembly
5. Worn rocker arm bushings
6. High exhaust back pressure
7. Too high valve temperature
   a. Poor seating — too wide a face or seat
   b. Reversed interference angle
   c. Water cooling poor due to scale or mud, air in water, or obstructions
   d. Weak valve springs
   e. Improper valve clearance

Present production NH Cummins engines are being rated at 210 hp. instead of 200 hp. The new 210 hp.-engine has a new BM4943 camshaft (113642) assembly that provides greater valve overlap and a new BM43137 PT pressure regulator, new 111446 valve springs, new 111681 valve crosshead and 111688 crosshead valve guide. Besides the extra horsepower, better economy is also claimed.

Some advantages claimed for exhaust turbo chargers are:

1. No loss of hp. for increase of elevation
2. More hp. for small extra weight (50 extra hp. for 125 lb. additional weight or only 2½ lb./hp. vs: 12 lb./hp.)
3. More hp. for less dollars per hp.
4. Excellent exhaust silencing
5. Almost complete elimination of smoke except for puff when throttle suddenly depressed

Idle machines

TODAY'S heavy earthmoving machinery and industrial engines are built to work hard over a period of many thousand hours. Unlike human beings and animals, they require no rest. However, due to seasonal lulls or waits between jobs, all machines periodically may be idle for indefinite periods of time. These idle hours need not be lost: they *can* mean future savings in both time and money, according to the Service Department of Caterpillar Tractor Co.

The time the machine remains idle can be made to work for the owner if it is properly prepared for storage. Here are some suggestions on how this can be accomplished for two to six month storage periods.

DIESEL ENGINES AND STARTING ENGINES — Internal surfaces of the engines should be kept coated with oil either by periodically operating the engines, or by spraying with a preservative oil. Regular attention to this matter is particularly important when the parts involved have machined sur-

G. J. Smith (left) and J. A. Moren review the maintenance records for tires in use on the gigantic Glen Canyon Dam project. A case history is kept on every tire. Moren is master mechanic in charge of all mechanical equipment for Merritt-Chapman & Scott Corp. Smith is truck tire representative for the Los Angeles zone of B. F. Goodrich Tire Co.

faces. Oil tends to drain from these smooth surfaces more readily than from rougher surfaces.

Fuel tanks of both the gasoline starting engine and the diesel engine should be protected. The starting engine tank should be filled completely with gasoline containing a gum stabilizing additive. The diesel tank should be filled with fuel to which enough preservative lubricating oil has been added to achieve a three per cent mixture.

TRACK-TYPE TRACTORS, PIPELAYERS, FRONT-END LOADERS—The cork-rubber sealing surfaces on the final drive seal assemblies may stick to the wear washers on track-type tractors, pipelayers or front-end loaders which are allowed to stand for lengthy periods. Should this occur, the seals will, in all probability, be damaged and cause leakage when the machine is again operated. To prevent this, the machine should be driven forward and backward occasionally during the storage period.

Usually the most convenient time to accomplish this is when the engine has been started to renew the oil film on the cylinder walls and piston rings, which should be done at least once every 30 days.

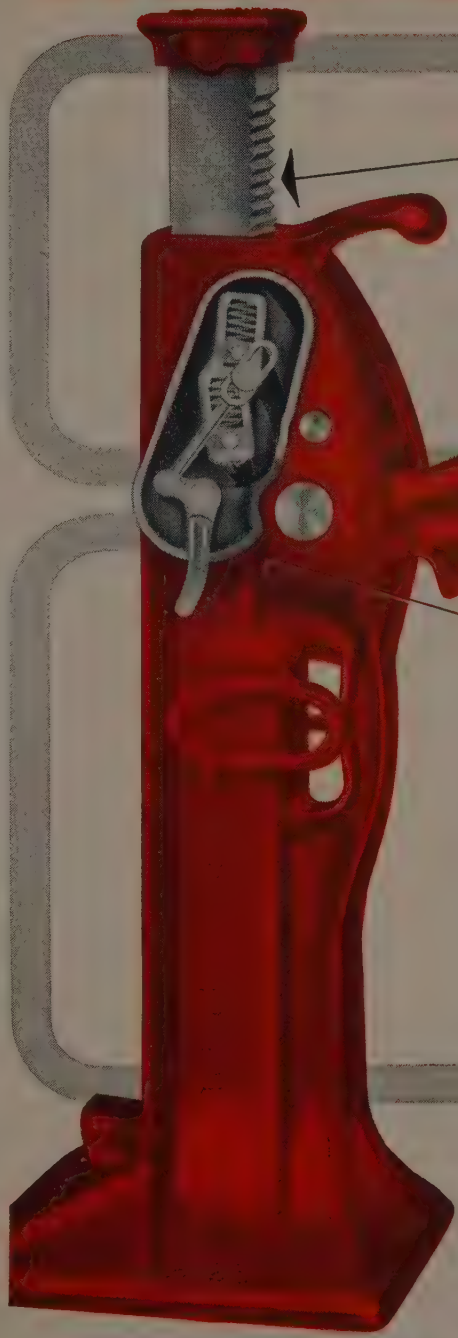
At the same time the oil film should be renewed on all the moving parts of the machine. This can be accomplished best by driving the machine for a sufficient time in all gears to thoroughly circulate the oil in the transmission and final drive compartments.

WHEEL TRACTORS AND MOTOR GRADERS—The oil film can be renewed on the moving parts of a wheel tractor or motor grader by driving the machine a short distance at the time the engine is operated to renew the oil film on the cylinder walls and piston rings. When a machine has been placed on blocks for storage purposes, the same results can be accomplished by shifting the transmission into all gears while the engine is running.

In neither of these cases is it necessary to operate the machine until the transmission oil becomes warm. However, ample running time should be allowed so the oil will be circulated thoroughly over all moving parts.

If you make sure the hours your machine is idle are "banked," you will receive "interest" in the form of availability and longer service life.

DUFF-NORTON Ratchet Jacks
are safer...last longer



safer...

because the forged steel rack bar on Duff-Norton ratchet jacks is larger and stronger than the rack bar on any other make. Also, these jacks can not trip under load which guards men and equipment.

last longer...

because the exclusive spring mechanism makes maintenance easy. It is a patented self-contained, one-piece unit. It can be adjusted, repaired or replaced without taking the jack apart. Tension can be tightened by the turn of a screw. It can be cleaned by removing cover plate and four cotter pins. After years of service a worn mechanism can be quickly replaced.

Years of hard use are built into every one of the nine models—capacities range from 5 to 20 tons. For rugged, dependable, fast lifting power at minimum cost ask your distributor for Duff-Norton Ratchet Jacks.

Branch Office: 1016 Howard Street, San Francisco, California

DUFF-NORTON COMPANY

P. O. Box 1889 • Pittsburgh 30, Pennsylvania

COFFING HOIST DIVISION • Danville, Illinois

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

COFFING HOISTS
Ratchet Lever
Hand Chain • Electric

. . . for more details, circle No. 54 on Reader Service Postcard

NEW LITERATURE

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

Tomorrow's bituminous paver

A well-illustrated 20-page folder describing the Cedarapids bituminous paver has been made available by the **Iowa Manufacturing Co.** Thirty-three features of the machine are described by means of keyed cutaway line drawings. Complete specifications are given on a tractor unit, the paver unit and optional equipment. The booklet points out that the most important feature of the paver is the principle of paving by the use of an electric vibrating screed which irons the bituminous material to a uniform high density mat. This method permits paving at higher speeds since the vibrating action greatly reduces the possibility of tearing the mat or of causing voids. ... *Circle No. 156*

Submersible pump booklet

Detailed illustrations of several different pump installations are featured in a new eight-page catalog issued by **Kenco Pump Division, American Crucible Products Co.,** listing the firm's entire line of domestic and industrial submersible pumps. Catalog lists physical dimensions, pumping capacities, electrical data and specific features for each Kenco pump. Also included are engineers' specification forms, a directory of all Kenco service centers, and a concise explanation of the company's exchange pump plan and service policy. ... *Circle No. 157*

Air cleaner change-over

Dry-type air cleaner change-over kits for a number of Cat tractors are listed in a 2-page circular published by **Caterpillar Tractor Co.** Factory packed kits include cleaner, manifolds, gaskets and all necessary hardware. Change-over groups are listed for D8, D9, DW20, DW21, and 583 Pipelayer. ... *Circle No. 158*

Pneumatic roller described

A colorful 4-page brochure listing specifications and accessories of the Roscoe Self-Propelled Roller has been published by **Roscoe Manufacturing Co.** Features include overhead-valve engine, torque converter, power brakes and steering, and a unique single pedal control for forward and reverse speeds up to 30 miles per hour. Throttle setting device allows the operator to maintain constant speed without holding his foot on the accelerator. Slight pressure on the foot pedal returns control to the accelerator. ... *Circle No. 159*

Grinding wheel safety

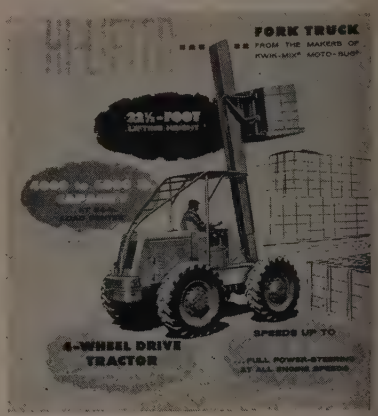
A colorful wall placard listing 10 do's and don'ts for safe operation of grinding wheels has been published by the **Carborundum Co.** The 12 x 12-in. chart, printed in red and black gives terse, easy to read and easy to remember safety instructions. ... *Circle No. 160*

Shoring Handbook

A large 50-page manual containing all types of factual information about shoring with steel scaffolding has been published by **Universal Mfg. Corp.** The manual is divided into four sections. One section devotes itself to engineering data and includes valuable tables on loading and spacing of scaffolding used for shoring, weights of various types of concrete construction, allowable timber loads, etc. One section is devoted to pointing out the advantages of steel panel scaffolding with particular emphasis on the features of the product manufactured by Universal. A third section gives six case histories of construction projects, complete with photographs and drawings showing the forming and shoring system. The fourth section shows how various forming and shoring problems can be solved with the company's shores and accessories. The manual includes several full sized request sheets containing fourteen questions which can be used in requesting a proposal from the company on a shoring project. ... *Circle No. 161*

Fork truck bulletin

Complete fork and tractor capacities and specifications for the "Hi-Lifter" 6,000-lb. fork truck are contained in a 4-page folder issued by



Kwik Mix Co. Features discussed include 4-wheel-drive traction, and 4-wheel power brakes, power steering and telescoping hydraulic mast that offers high-speed hoisting. ... *Circle No. 162*

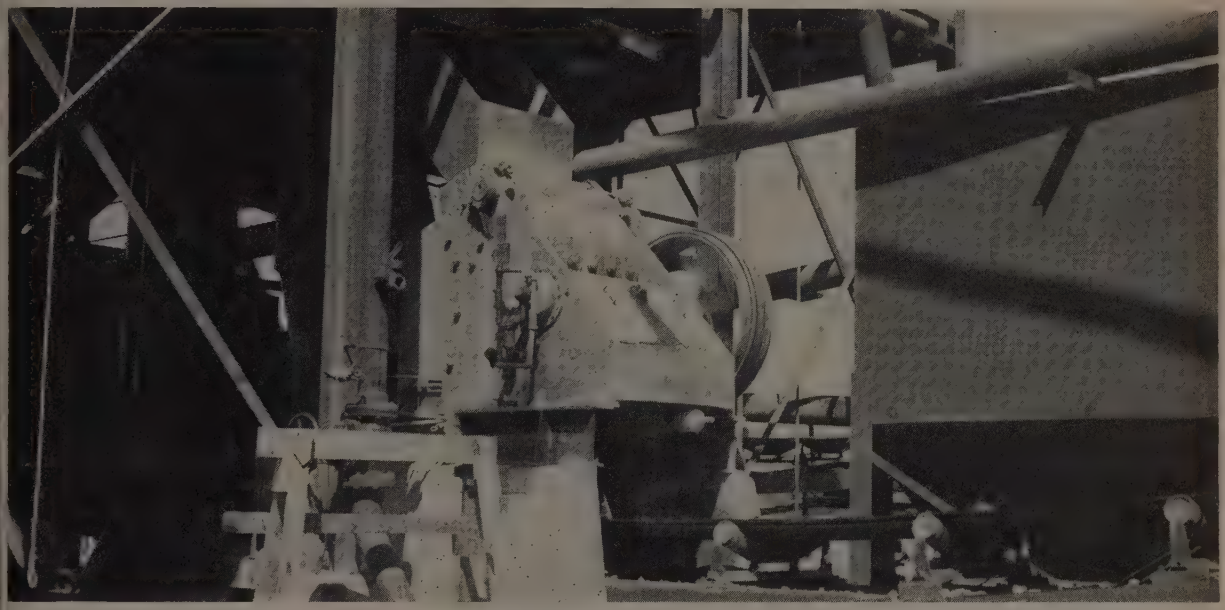
Abrasive wheel catalog

Grinding wheels in a multitude of shapes and sizes are listed in the new 12-page catalog issued by **Chicago Wheel & Mfg. Co.** In addition to straight and tapered wheels, the booklet lists dish, saucer, offset and flared shapes, and plate mounted wheels. Tables list prices, thicknesses, dimensions and hole sizes. Vitrified, resinoid and rubber bonds are included. Important in the line are Chicago Flex and BR (break resistant) wheels for portable grinding, weld and metal fabrication, finishing, portable cement grinding, notching and plastic grooving. ... *Circle No. 163*

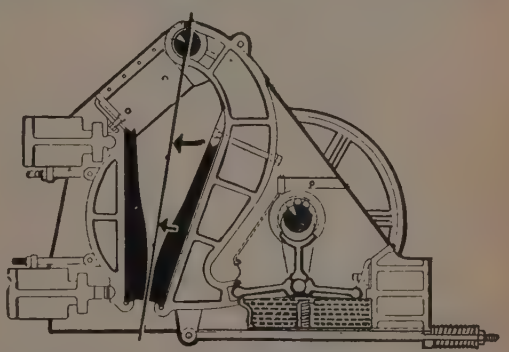
Safety barricades

A line of steel barricades, lights, flags, tripod stands and other warning equipment is discussed in a new 12-page brochure issued by **Traffic Equipment Co.** The "Sentry" line includes barricade panels, stands, sign brackets, flashing lights and brackets, extensions and flags, and a series of panel signs with built-in safety flashes. ... *Circle No. 164*

KUE-KEN® crushes gravel for over 3 years on original jaw plates . . . "crushing without rubbing" lengthens jaw plate life at least 5 times!



Rhodes & Jamieson, Pleasanton, California, like scores of other aggregate producers has eliminated the recurring cost of premature jaw plate replacement and expensive downtime by using Kue-Ken crushers. Kue-Ken alone operates on the advanced principles of crushing without rubbing. Even on hardest gravel, Kue-Ken jaw plates will outlast all others at least 5 times. And for crushing economy, Kue-Ken uses far less power than conventional crushers that waste power wearing out jaw plates. With its mechanism operating in a sealed, dust-tight crankcase lubricated by filtered oil, Kue-Ken crushes at higher speed for greater capacity and a more uniform product. Wear is negligible and shut-downs common to conventional crushers are practically eliminated. Automatic flywheel release prevents breakage from tramp iron. Kue-Ken crushes at the lowest cost per ton. There is a size to meet every need.



See how the hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.

Write for Catalog

KUE-KEN® CRUSHERS

"CRUSHING WITHOUT RUBBING"

Straub Mfg. Co., Inc., 8382 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

DEALERS:

SEATTLE, WASH.	Washington Machinery Co
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SALT LAKE CITY, UTAH	Lund Machinery Co
SAN ANTONIO, TEX.	Closner Equipment Co
LOS ANGELES, CALIF.	Garlinghouse, Fremon Co
SAN FRANCISCO, CALIF.	Aggregate Engineers, Inc.
BISMARK, NORTH DAKOTA	Midwest Equipment Co.
PHOENIX, ARIZ.	Road Machinery Co.

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

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

Portable crushing plant

Flow of material through closed system linking jaw crusher and vibrating screen is diagramed in a new four-page folder on the Model 8C in-line portable crushing and screening plant issued by **Pioneer Engineering, Division of Poor & Co.** Features covering set-up, operation, maintenance and mobility are adequately described. Booklet lists complete specifications, dimensions, heights and power requirements of the equipment, and includes several "on the job" photos.

. . . Circle No. 165

Diamond wheel booklet

Diamond grinding wheels in a variety of shapes, sizes and bonds are described in a 4-page folder issued by **Carborundum Co.** Material includes both man-made and natural diamonds. Booklet lists data on various types of wheels and their application as well as operating recommendations.

. . . Circle No. 166

Batch plant brochure

Details of a new line of asphalt batch plants and components has been released by **Bollard Asphalt Plant, division of Colonial Iron Works Co.** Constructed from basic components, plants may be assembled in any combination to meet particular requirements. They are available in stationary and mobile units of 75 to 200 tons per hour capacities. Brochure shows construction details of dryer, pug mill-type mixer, control panel, dust collecting units, elevator and storage bins, as well as bases and other features.

. . . Circle No. 167

4 in 1

3 in 1

2 in 1

GASOLINE ENGINE DRIVEN WELDER/POWER PLANTS

FIREBALL AMPERAGE RANGES	
METALLIC	INERT GAS
35-100 AC	35-75 AC
65-160 AC	65-160 AC
110-400 AC	150-375 AC
35-80 DC	35-100 DC
75-175 DC	85-225 DC
125-350 DC	170-375 DC

DAH-350 FIREBALL four-in-one model is the only complete unit made to incorporate an ac-dc welder for (1) metallic arc, or (2) tungsten inert gas welding, plus (3) ac power plant, and (4) 1 KW dc power while welding. Twelve separate amperage ranges as shown above. Additional standard equipment features include a polarity switch, either continuous or "start only" high frequency and an automatic inert gas control panel with solenoid valve and postflow timer. Rated output at 100% duty cycle: 250 amps dc tungsten arc; 300 amps ac tungsten arc. Generator: 10 KW of 115/230v, single phase, 60 cycle ac.

DA-300 BIG RIG. Combination ac-dc welder, plus an ac power plant, plus 1 KW of dc power while welding, give this model three-in-one versatility. Generator rated at 10 KW of 115/230v, single phase, 60 cycle ac. Welding ranges in amperes are: (dc) 75-175 or 125-350; (ac) 65-160 or 110-400. Rated output at 100% duty cycle: 250 amps dc at 40 volts and 300 amps ac at 40 volts.

D-250 ROUSTABOUT provides a two-in-one arrangement whereby either of two dc welding current ranges — 75-175 amps or 125-350 amps — and 1 KW of 115v dc auxiliary power are available simultaneously. Rated output is 250 amps at 40 volts, 100% duty cycle. Generator produces 10 KW of 115/230v, single phase, 60 cycle ac.

All models offered with skids or trailers. Complete specifications and prices sent promptly.

miller ELECTRIC MANUFACTURING COMPANY, INC.

Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal • APPLETON, WISCONSIN

miller WELDERS

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

Report on steel strapping

A 6-page Ideas-In-Action report on hanging beam bottoms with steel strapping is available from **Acme Steel Co.** The folder shows how steel strapping can tie forms to girders faster than snap-tie hangers or U-bolts. Charts and diagrams explain how to calculate size and spacing of steel strapping for handling beam form work. Photographs of several installations and of the steel strapping equipment used in hanging beam bottoms are included. Typical problems of form design are carried through, step by step, and are illustrated by fully dimensioned drawings.

. . . Circle No. 168

High capacity pumps

Pumps capable of handling up to 70,000 gpm. are listed in a new bulletin issued by **Peerless Pump Division, Food Machinery & Chemical Corp.** Bulletin is devoted to Type A pumps which have a wide capacity and application range. It has cutaway sectional views and cross section drawings that describe the pumps in detail. Included are complete dimensional and performance data plus a detailed page of sample specifications.

. . . Circle No. 169

Diesel power units

The full series of industrial diesel engines which ranges from 20 to 1,650 hp. in only three cylinder sizes is discussed in a well-illustrated 12-page booklet issued by **General Motors Detroit Diesel Engine Division.** Covered in the 3-color brochure are fan to flywheel engines, complete industrial power units, and special multi-engine rig

including Turbopower and Torqmatic Converter models. Charts list dimensions, weight, and brake horsepower ratings for each model.

. . . Circle No. 170

Backhoe-loader bulletin

Complete description, specifications and accessories of the Case Utility Backhoe-Loader are contained in a colorful new 8-page booklet produced by **J. I. Case Co.** All components of the machine, backhoe, tractor, engine, and loader are produced by Case, and are covered in detail by the booklet. The publication lists 36 special features of the backhoe-loader combination, as well as a number of buckets available for specific jobs.

. . . Circle No. 171

Scraper blade booklet

An 8-page booklet on hard-surface replacement cutting edges for scrapers and bulldozers has been issued by **International Harvester Co.,** Construction Equipment Division. The publication describes a number of features of the reversible blades which have heat-treated cores as well as surfaces hardened to a depth of 3/16 in. Included is a chart listing data on cutting edges for IH bullgraders, bulldozers and Payscrapers.

. . . Circle No. 172

Hollow-core concrete panels

Versatile hollow-core reinforced concrete panels for use on floor and roof construction are described in a 1959 catalog issued by the **Flexicore Co., Inc.** Included are design data and detail drawings on the use of Flexicore panels with reinforced concrete and steel frames, plumbing, heating and cooling systems, and electrical wiring. Recommended specifications and construction information on the prestressed modular slabs also are included.

. . . Circle No. 173

Conveyor components

Standard conveyor components and equipment are described in a folder issued by **Barber-Greene Co.** Items covered include rolls, idlers, pulleys, channel frames, supports, loaders, feeders and specialized equipment. Use of these components in various combinations eliminates need for costly special engineering, and enables construction of custom conveyors from standard parts.

. . . Circle No. 174

Only forty-two years ago, this two mule-power dozer was in operation for the Frazier-Davis Construction Company of St. Louis handling final clean-up and grading for the intake chamber on the Missouri River development of the St. Louis Water Works at Hine, Mo. The blade up ahead, was rotated over the axle, so to get more weight on the blade, the operator simply walked forward. To raise the blade, he stepped to the rear.

What a difference today . . . **If** the dozer you are comparing is the modern Eimco 105! Because even today, most other tractors **still** have the operator at the wrong end of his horsepower . . . nearly as far away from the blade and his work as he was in 1917!

Only the Eimco 105 puts the operator up front, where he belongs . . . where he can see what he's doing. See his work. See stumps and obstacles. Guide and work his tractor efficiently and with less fatigue, for more work output, greater safety and control. All this, plus famous Eimco rugged construction, easy maneuverability, greater stamina and more efficient and effective utilization of power through Eimco's unique power-team of modern engine - torque converter - Unidrive - Dual Final Drives.

You can't know what a **really modern** tractor can do for you unless you have job-tested the Eimco 105. Call any Eimco branch for a demonstration on your own job-site . . . or write The Eimco Corporation, P.O. Box 300, Salt Lake City 10, Utah for specifications and all the facts of modern tractor design and engineering.

"Advanced Engineering and Quality Craftsmanship Since 1884"

THE EIMCO CORPORATION
SALT LAKE CITY, UTAH

B - 420

EXPORT OFFICE, 51-52 SOUTH STREET, NEW YORK, N. Y.

BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

. . . for more details, circle No. 57 on Reader Service Postcard

Masonry anchor brochure

Uses of "Slugin" masonry anchors in heavy construction are illustrated in a new comprehensive brochure published by **Star Expansion Industries Corp.** Step-by-step photos and drawings show how different fastening problems can be

overcome with compounded anchors. Included are technical data on tensile, shear and compression strengths as well as full specifications in all sizes of plain and threaded types. ... *Circle No. 175*

Road equipment catalog

The entire line of **Seaman-Gunnison Corp.** road construction and maintenance equipment is described in a new 8-page catalog issued by the company. The booklet lists specifications, equipment features, and performance characteristics of the firm's scrapers, rollers, compaction equipment, and liquid hauling and spreading units.
... *Circle No. 176*

Screen area estimator

An eight-page folder featuring a new method of estimating screen area requirements has been published by **Overstrom & Sons, Inc.,** makers of vibrating screens. Method is described in seven steps, using deck location, material shape and weight factors, and screen dimensions. Folder also describes various types of Overstrom equipment, construction and operating features and application. ... *Circle No. 177*

Catalog on explosives

An 82-page indexed catalog of blasting agents, explosives, and blasting supplies is available from **Hercules Powder Co.** New blasting agents included are "Dynatex", a nitro carbo nitrate for construction blast work; "Kanite", blasting agents packed in cylindrical metal containers to provide protection from water; and desensitized explosives which require a strong primer or booster for detonation.
... *Circle No. 178*

Bridge railing catalog

Engineering information and installation data on the complete line of **Kaiser Aluminum** bridge railings are provided in a 24-pg. illustrated brochure recently issued. Engineering and perspective drawings of a variety of posts for round and square cross-section rails as well as a number of other designs are included, along with information on various alloys and dimensions.
... *Circle No. 179*

Wire rope inspection

Methods of increasing service life of wire rope are outlined in a new booklet issued by **Leschen Wire Rope Division of H. K. Porter Co., Inc.** Bulletin concentrates on regular, thorough inspections of wire rope, explaining when inspections should start, how often they should be made and how reported. A check list of inspection items to be covered is included. ... *Circle No. 180*

Parts exchange program

Parts exchange program which enables mechanics to switch entire assemblies rather than individual parts is described in a colorful 8-page booklet issued by **Caterpillar Tractor Co.** Exchange program is designed to allow operators to reduce down-time by installing complete rebuilt assemblies and turning in exchange parts for factory rebuilding. ... *Circle No. 181*

Hydraulic steering unit

A new hydraulic power steering attachment for track-type tractors is described in a 4-page folder issued by the **Skookum Co., Inc.** The servo mechanism which reduces steering pressure from 38-50 lb. range to 3 lb. is diagramed and accompanied by installation photos. Unit fits all small track-type tractors and has been field tested for two years. ... *Circle No. 182*

See your local OLIVER Distributor for complete information

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Southern Arizona Machinery Co., Tucson
Sturges Implement Co., Yuma

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Bechthold Tractor Service, Lodi
Brown-Bevis Industrial Equip., Los Angeles
Caron & Oliver Equip. Center, Tracy
Coachella Valley Tractor Co., Coachella
Condosta Tractor Co., Colton
Equipment, Inc., Modesto
Farmers Tractor & Equip. Co., Portersville
Flood Equipment Co., Sacramento
Flynn's Tree Service, Calistoga
Fowler Farm Supplies, Fowler
Frank Russell Mfg. Co., Shafter
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H-C Equipment Co., Cotati
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Tri-County Implement Co., Los Banos
Yolo Tractor Co., Woodland

COLORADO
Colorado Road Machine Co., Pueblo & Colorado Springs
Liberty Truck & Parts Co., Denver

IDAHO
Engineering Sales Service Inc., Boise

MONTANA
Caird Engineering Works, Helena & Billings
Farm Supply Co., Kalispell

NEW MEXICO
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OREGON
A. C. Haag & Co., Salem
Herrold & Jensen Implement Co., Albany
Kenneth Snodgrass, Maupin
Oregon Tractor & Equip. Co., Portland
Paul Casey Equipment Co., Roseburg
Valley Implement Co., Island City

UTAH
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WASHINGTON
Buck & Son Farm Equip. Co., Chehalis
Fray Equipment Co., Inc., Seattle
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THE **OLIVER** CORPORATION
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be the taskmaster—tough, demand-
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lo—*all they can do* to get your dig-
loading cycles up, job costs down,
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Y THIS "FREE SAMPLE" OF OLIVER WORK-POWER

rubber! Choose from the Oliver 12-
. Model 558... ¾-cu.-yd. Model 778
d. Model 888. The last two are
able with Oliver's famed "Reverse-
rc" transmission, which gives you
nt, finger-tip reversing without shift-
r clutching. All are today's newest
l loaders—fast, agile and full-
red, with engine and hydraulics
ed to perfection to lift, dig and
materials faster, easier.

crawlers! If a crawler loader is your
select from this 3-loader line-up by
r—all with "Spot-Turn," wet clutch
ng. Try the Oliver OC-46, most
-performing loader in the ⅝-yd. size.
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out. In the big 2¼-yd. loader class,
w Oliver OC-156 is the most modern
size. And you get extra value by
ng *any* Oliver tractor-loader with a
y of attachments.

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ng all that's new with Oliver. Arrange
onstration now!**

OLIVER CORPORATION

al Div., 19300 Euclid Ave., Cleveland 17, Ohio
mplete line of industrial wheel and crawler tractors and matched allied equipment

for more details, circle No. 59

Blasting handbook

Atlas Powder Co. has published a pocket-size "Handbook of Electric Blasting" by David M. McFarland and Guy F. Rolland. The 60-page book covers advantages of electric blasting, nature and construction of an electric blasting cap, sources of power for electric blasting and explains various technical terms. Tables and graphs are given for current delivered by standard blasting machines, resistance of copper wire and caps, and electric blasting circuits. The book also describes and illustrates methods of splicing wires, testing circuits, checking current leakage and the use of rheostats.

. . . Circle No. 183

Steel Building Code

Publication of the revised "Code of Standard Practice for Buildings and Bridges" is announced by the **American Institute of Steel Construction, Inc.** An important change in the new code refers to tolerances permitted in erection. The revision establishes the limits of variation in finished overall dimensions of structural steel frames applicable to the erection of single and multi-story steel frame buildings. Other revisions clarify responsibilities of the steel fabricator, erector and owner with respect to the erection, setting of loose lintels and adequate storage space during erection. *. . . Circle No. 184*

Tunnel liner plate

A 24-page manual describing tunneling practices with steel liner plates has been issued by **Armco Drainage & Metal Products, Inc.** The booklet covers various applications and provides engineering data as well as tables, graphs and typical installations. Additional uses of Armco plate in construction of storage bins also are described.

. . . Circle No. 185

Excavating folder

A complete description of the new Gradall excavating machine is contained in a 6-page folder issued by Warner & Swasey Co. Booklet covers the three types of carriers available for the telescoping boom machine as well as construction details, attachments and complete specifications.

. . . Circle No. 186

Calcium chloride manual

A 34-page manual on uses of calcium chloride for stabilization of bases and wearing courses has been issued by the **Calcium Chloride Institute.** With data directed to assist highway engineers, contractors and material suppliers, using calcium chloride in the construction of dense graded bases and wearing courses, the booklet deals with properties and design, types and methods of construction and specifications. The book is well illustrated with photographs, charts and drawings. *. . . Circle No. 187*

Sprocket design features

An eight-page booklet describing design features of sprockets and idlers has been published by **Caterpillar Tractor Co.** Listed are various characteristics and manufacturing processes which contribute to long distortion-free life for these components. Booklet stresses sturdy construction and precise machining to exact dimensions to minimize wear of teeth and bushings.

. . . Circle No. 188

. . . for more details, circle No. 60 on Reader Service Postcard

Looking for a new employment opportunity, or for a man with specialized experience?

Have you used equipment to sell, or do you need used equipment?

Your ad in the classified section of WESTERN CONSTRUCTION will reach 18,000 construction men in the West, and at a cost of only $15.50 per column inch.

Send your copy today, enclosing check, to WESTERN CONSTRUCTION, 609 Mission Street, San Francisco 5, California. (If proofs are required, the closing date is the 5th of the preceding month of publication, or the 10th without proofs).

D-443

A Diamond 77 Plant

built to keep you in aggregate . . . at a profit

DIAMOND PORTABLE *Rotor-Lift* CRUSHING PLANTS

When you can turn out 300 to 400 tons of road gravel per hour in 25% to 35% crush, you're in a good profit position. That's what Diamond Portable Plants are doing in locations all over the country. Here's how and why—

- **line-flo system moves material through plant without delay—no extra scalpers, no by-passes, no bottlenecks.**
- **rotor-lift recirculates material fast, distributes it without batching or bunching on feed conveyor.**
- **long jaw design of jaw crusher handles the hardest of rock, gives maximum size uniformity.**
- **high speed roll crusher steps up output by eliminating reruns through jaw crusher, has high capacity for its weight, requires low h.p. per ton produced.**
- **balanced vibrating screen does thorough job of separating materials without clogging, can be depended upon for long, trouble-free service.**
- **belt conveyors run on antifriction bearings, move material quickly and smoothly.**

Add to these advantages complete portability in the pit or on the road without costly delay, and a choice of drives to best suit your conditions. It's easy then to see why companies that base their profit on aggregate production ability turn to Diamond when starting a new operation or expanding an existing one. Check with your Diamond distributor.

DIAMOND IRON WORKS

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GOODMAN MANUFACTURING COMPANY

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ttle, Washington

NEW EQUIPMENT

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

Electric wheel earthmover hauls 50 tons

A giant earth-hauling unit powered by electric motors at each of its eight wheels has passed pilot tests and will be built on assembly line basis by **R. G. LeTourneau, Inc.**

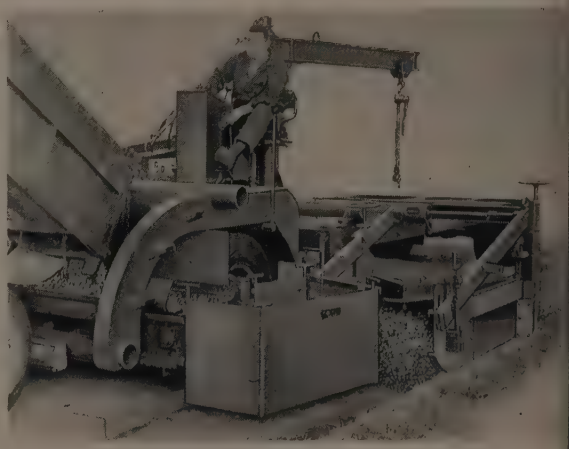
Called the "Electric Road Builder," the big hauler consists of a tractor and two self-loading scrapers. Tires of the machine are more than 6 ft. in diameter and 2 ft. wide. Each fits over an outsize hub holding an individual electric drive motor. All other power functions, such as opening and closing of bottom gates are handled with individual electric motors. Power is supplied by a 600-hp. diesel engine and generator. Electric system eliminates all mechanical power trains, clutches and transmissions.

Two-bucket arrangement is designed for speedy digging. Power at all wheels enables rear bucket to serve as a pusher to help load front bucket. Then weight of loaded front bucket increases tire traction to help pull-load the rear bucket. Loading is accomplished in 1¼ minutes.

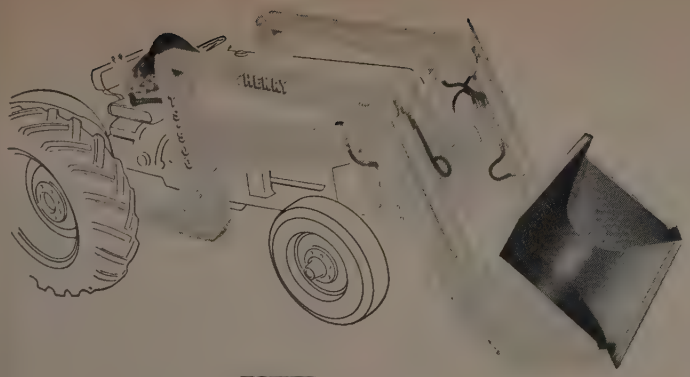
Road machine is an outgrowth of the giant "dam builder" announced by the company several months ago. Its electric wheel system was perfected some five years ago for use on other types of equipment. Two road machines built as pilot models have been extensively job-tested. They are 74 ft. long and 12 ft. wide. Simple electric controls in the "second story" cab govern all functions. *. . . Circle No. 190*

Versatile road widener cuts side drag

An articulated road widener with long wheel-base to reduce side drag is announced by **Barber-Greene Co.** New model SJ-50 road widener consists of a tractor and trailer connected by conventional fifth-wheel. Tractor includes operator's deck, power unit, drive wheels, receiving hopper and discharge conveyor. The trailer which is equipped with its own jib-hoist

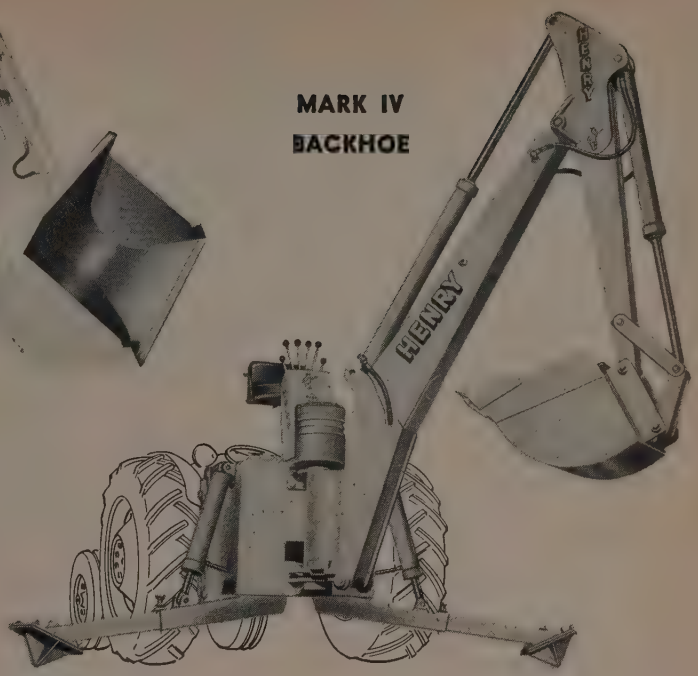


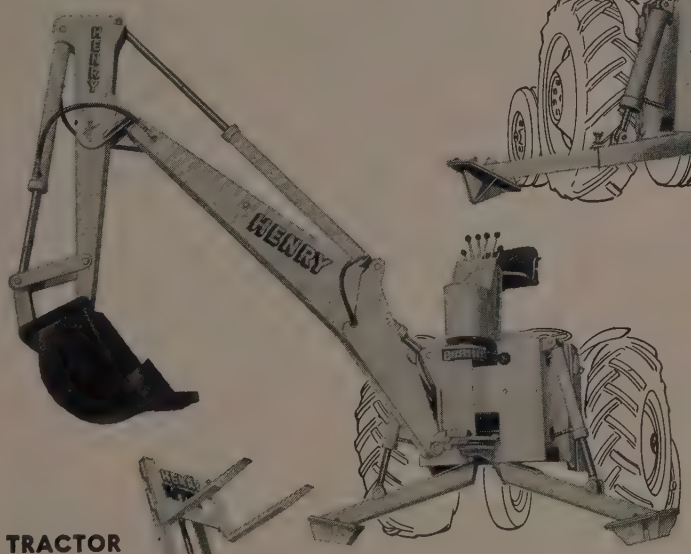
supports the widening attachments and serves to transport the tractor unit and attachments when moving from job to job. Attachments include concrete slip form with electric vibrators and oscillating screed; asphalt paver with automatic leveling and tamper compaction. *. . . Circle No. 19*



TS-500
TRACTOR SHOVEL

MARK IV
BACKHOE





THE LINE
DESIGNED WITH
YOUR JOB
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TRACTOR
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MARK I
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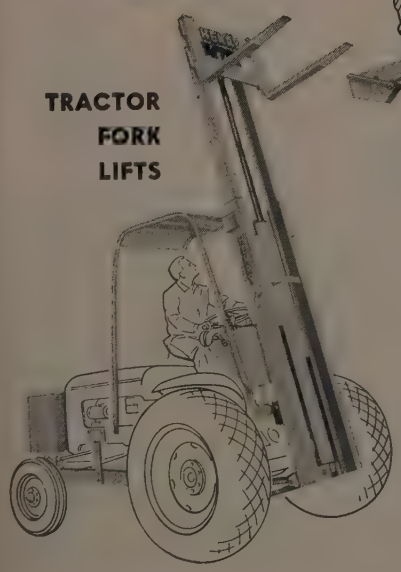

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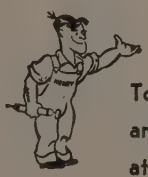

Today all construction jobs . . . large or small . . . are based on contractors doing more work faster at lower cost. All contractors . . . large or small . . . find that the versatility and economy of HENRY Industrial Equipment pays off on any job, large or small.

YOU CAN DO IT BETTER WITH A HENRY . . .

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Branches: Santa Ana, California
Fresno, California
Phoenix, Arizona

. . . for more details, circle No. 62 on Reader Service Postcard

NATIONAL GENERAL CONTRACTORS JOINT-VENTURE USE FLYGT PUMPS ON TOUGH DE-WATERING JOB.

When ground water intrusion — at the rate of about 2,000,000 gallons per day — threatened a $13,000,000 pipeline job for Southern California's famous Metropolitan Water District, joint-venture contractors *Morrison-Knudsen Company, Inc. and Macco Corp.* brought in eight Flygt Submersible Electric Pumps to help keep the giant project on schedule.

More than fourteen miles of mammoth 96-inch-diameter pipeline on this particular job carries additional water to the rapidly growing California Orange County and southeastern Los Angeles County industrial and residential areas. When the 200 man M-K-Macco work force began excavations along the 4000-foot section of pipeline paralleling Coyote Creek, ground water seepage was immediate. As huge clamshells and draglines carved a ten-foot-wide ditch close to its 18 to 20 foot depth, water intrusion turned the bottom of the ditch into a soupy quagmire of water and mud. Needed! — a de-watering pump which would take a high proportion of solids and run 24 hours a day with little or no supervision.

The answer! — eight Flygt Submersible Electric Pumps were installed by the joint-venture contractors to supplement a regular battery of gasoline-powered centrifugals and diaphragm pumps. Working around the clock, 24 hours a day, the Flygt Pumps cleared the ditch — and kept it cleared. Three 3" and five 1½" Flygt Pumps were used. The larger models were assigned to keeping the ditch dry before the pipe was placed, and the 1½" Flygts were utilized to keep bell holes water-free, so as to facilitate welding operations, which were carried on both inside and outside the big pipe. The eight Flygts solved the problem — moved water containing a high proportion of solids, 24 hours a day, with little or no supervision!

FLYGT SUBMERSIBLE ELECTRIC PUMPS range in size from 1½"-85 GPM capacity to 8"-3000 GPM capacity. Head capacities range up to 210 feet. Higher heads obtainable with FLYGT pumps in tandem. Weights range from 70 to 1200 pounds. Write for complete specifications.

CHECK THESE FLYGT FEATURES

- Electric, fully submersible, fully portable.
- Instant pumping—no priming, no installation.
- Runs dry without damage, resistant to salt water.
- Takes a high proportion of solids, frost and fire-proof.
- Practically no maintenance or supervision.
- Operates unattended, quick, easy to service.

ASK FOR NAME OF YOUR NEAREST FLYGT DEALER

Stanco MFGS. & SALES INC.

1666 Ninth St. (Corner of Olympic & Ninth)
Santa Monica, California

. . . for more details, circle No. 63 on Reader Service Postcard

Self-unloading bulk cement truck

A tank-type trailer with pneumatic unloading attachment has been marketed by **Fruehauf Trailer Co.** The trailer has a capacity of 105 to 120 bbls., and is equipped with blower mounted at rear driven by gasoline engine (shown), or mounted on tractor and driven by power takeoff. Unloading is accomplished on the "Airslide" principle, a trademarked

development of the Fuller Co. first applied to rail cars for unloading finely divided dry commodities. Air under relatively high pressure and low velocity is introduced in the commodity, separating the particles and causing the material to flow like a fluid. Discharge rate of the Fruehauf pressure tank is 3.33 bbls. per min. through a 4-in. hose. At 11-lb. pressure, cement can be raised 85 ft. to discharge into the top of storage elevator.

. . . Circle No. 19

Heavy duty motor grader

A 29,280 lb. motor grader with a 12-ft. moldboard 27 in. high and rated at 150 hp. has been added to the Caterpillar line. It is the largest motor grader manufactured by **Caterpillar Tractor Co.** Features include transistorized circuits in blade control unit, high

clearance between blade and circle drawbar, power assisted brakes and power steering. Wheels have 1 in. rims for 14 x 24 tires giving straighter sidewall and reducing side-roll tendency. Added traction provided in design which puts 22,000 lb. of machine weight on drive wheels. Turbocharged engine is the first to be used on a motor grader.

. . . Circle No. 1

How to be comfortable . . . and still do a "Finishing Man's" Job

Whether you're shining a slope or skimming the high spots off a haul road, you can do a better job . . . easier with the Allis-Chalmers FORTY FIVE motor grader. If comfort means topnotch visibility in any grading position—a big, clean deck without a clutter of shin-busters and toe-tanglers—and friendly controls that don't fight back . . . if all this is grader comfort, then the Allis-Chalmers FORTY FIVE is the lap of luxury.

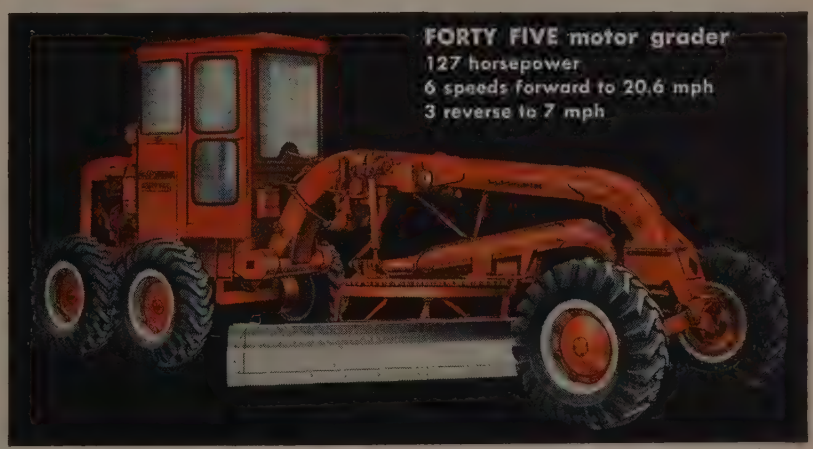
Come on and take a look at the FORTY FIVE . . . Judge for yourself!

No matter what size or shape you are when you climb into the cab of a FORTY FIVE, you can't help but feel the *extra* roominess. And leave your hat on, too—if you're under 6 foot 6 . . . because there's plenty of head room. Now look all around . . . there's over 35 square feet of safety glass to look through. The FORTY FIVE'S big, one-piece windshield gives you more visibility than any other grader . . . extends below the steering column on both sides, too, so you can see the heel of the blade easily when you're sitting down.

With or without a cab, the FORTY FIVE'S clean, flat deck gives you more unobstructed foot room than any other grader. No "tangle-foot" when you need to hit that clutch quickly on a steep slope. The FORTY FIVE's new suspended brake and clutch pedals give you even more foot room than before . . . and they're feather-light to operate. Foot-controlled accelerator/decelerator makes it real handy to creep along in tight quarters . . . around culverts . . . on slippery slopes—leaves both hands free to control the blade and steer.

Try the "toggle test," too. Take hold of the FORTY FIVE's "kick-free" toggles. You can give the blade control all she's got without any wrist-snapping backlash. The FORTY FIVE will save you many a painful hand and wrist strain when you're splitting hairs on a blue-topping job, or cutting a fine shoulder swath. You'll appreciate that smooth, precision blade control that lets you skim a 10th of an inch *when* and *where* you want to. And, the FORTY FIVE's extra-high blade lift—*higher than any other grader*—lets you climb out of a ditch without gouging up finished foreslopes.

These are typical of all the FORTY FIVE's "operator extras" that help you work easier . . . look better than on any other machine. Don't take anybody's word for it! You'll never really know all the "big-time" features of the Allis-Chalmers FORTY FIVE until you've had the feel of it in the dirt. The Allis-Chalmers dealer nearest you will be glad to let you try a FORTY FIVE. Go see him next time you have a day off.



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Berkeley Branch: San Jose and Ukiah
Trinity Tractor Company—Eureka

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

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

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

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

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

UTAH
Cate Equipment Company—Salt Lake City

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

WYOMING
Studer Tractor & Equipment Company—Casper

. . . for more details, circle No. 64 on Reader Service Postcard

Hydraulic utility crane

A hydraulic crane-excavator on 6-wheel frame has been marketed by **Davis Engineering Inc.** All functions, including travel, steering, wheel brakes and attachments are hydraulically controlled from the cab.

Attachments for the self-propelled unit, quickly interchangeable on basic boom and dipper stick include backhoe, clamshell, and shovel-loader buckets and backfill blade. Bucket capacity is ⅜ cu. yd., and digging depth is 11 ft. With extended dipper stick depth can be increased to 13 ft. Crane boom will lift 4 tons with outriggers. Gooseneck extends lifting height to 25 ft. *. . . Circle No. 194*

"Crab" tractor goes sideways

The Napco Crab, versatile utility tractor which has 4-wheel steering as well as 4-wheel drive, has been introduced by **Napco Industries Inc., Construction Equipment Division.** Tractor has 3 steering positions, front wheel, four wheel, and oblique. *. . . Circle No. 195*

Two big earthmovers added

"Payscraper" models 495 and 295, each with 31-cu.

yd. heaped capacity, and powered by 375-hp. diese engines, are announced by **International Harveste Co. Construction Equipment Division.** Model 49 features tapered bowl, 131-in. cutting width, quic dumping with positive ejection, speeds up to 21 mph and short turning radius. It has an overall length o 50 ft., 6 in. Model 295 is somewhat shorter, 44 ft., in., has a top speed of 26 mph. It features powe steering for full 90-deg. turns, and has a 4-spee torque converter remote mounted behind the engin for quick shifting. *. . . Circle No. 19*

Digger-loader combines bucket and belt

An unusual machine combining a hydraulic bucke and mobile belt conveyor for continuous digging an loading has been developed by **Peters Co.** Calle "Gatescavator," the unit consists of a long diggin boom hinged at the rear of the machine and sus pended from a steel frame in front. A hydrauli bucket is attached at the end, and a conveyor bel

runs along its length. Telescoping boom extends t drive bucket forward. Load is then dumped directl on conveyor. Trucks are loaded from second pivote belt in the rear. Individually powered wheels pivo 180 deg. to maneuver machine. *. . . Circle No. 19*

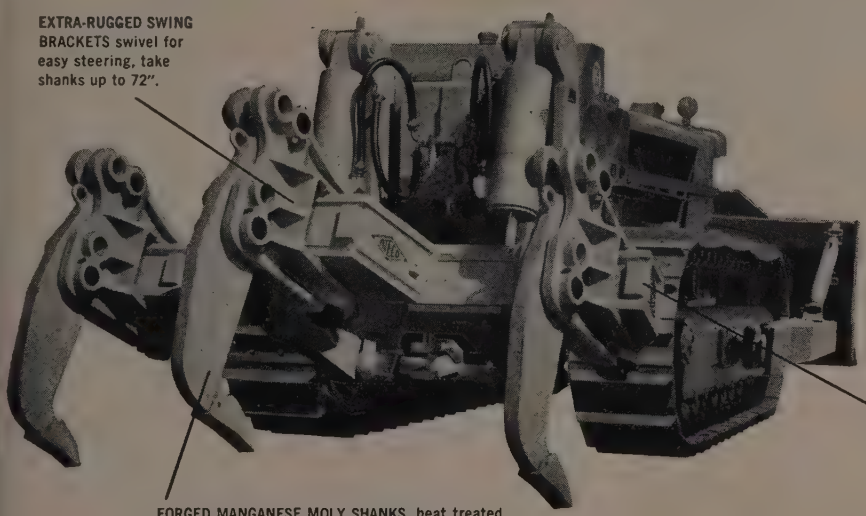
Hydraulic crane outriggers

Hydraulic-power outriggers which can be move from travel to work position in 76 seconds are now available on Lorain Moto-Cranes, made by **Thew**

Shovel Co. "Power-Set" outriggers consist of curved beams, each actuated by a double-acting hydrauli cylinder. Float at end of beam moves out and dow simultaneously with beam travel. *. . . Circle No. 19*

Tougher Than Ever!

SUPER-RIPPER



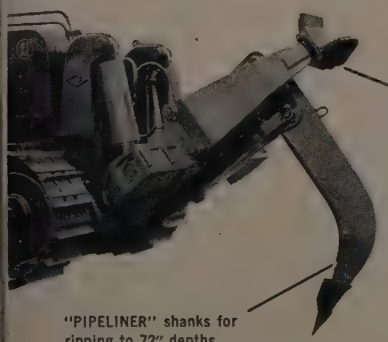
EXTRA-RUGGED SWING BRACKETS swivel for easy steering, take shanks up to 72".

FORGED MANGANESE MOLY SHANKS, heat treated four times, carry replaceable points. Curved gooseneck shanks also available for ripping depths to 24".

SUPER-STRENGTH TOOL BEAM is 11" x 16" in section, fabricated of 1½" steel, internally reinforced. Solid steel, not welds, takes all compression strains.

Built by the pioneer in the tractor-mounted ripper field, new ATECO Super Heavy Duty models have the extra strength, extra ruggedness and weight to harness the full power of the biggest crawlers built—in tandem, if necessary. (See pusher attachment below.) Take a look at the facts:

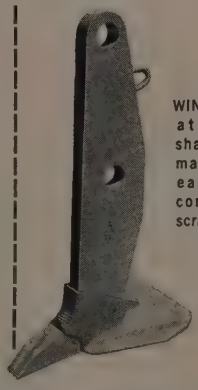
EXTRA VERSATILE, TOO!



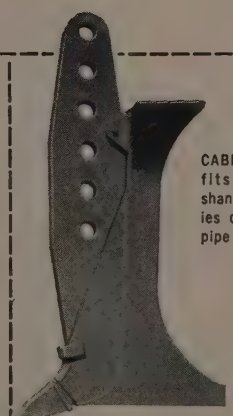
STRADDLE-MOUNT BOOSTER applies booster thrust directly to tool beam, leaves swing bracket free to swivel.

Bowl-carrying booster plate applies dozer weight directly over shank.

"PIPELINER" shanks for ripping to 72" depths.



WINGFOOT shank attachment shatters most material into easy-loading condition for scrapers.



CABLE-LAYER boot fits on standard shank, lays and buries cable or plastic pipe to 3" diameter.

Only ATECO "Supers" offer the profit-making advantages of really big equipment—better performance from the start, superior output with less downtime through the years. Why settle for less? They're available for Caterpillar D8 and D9, and International TD24 tractors. Standard ATECO rippers available for all popular crawler makes and models. Write for literature, prices.

56

American

TRACTOR EQUIPMENT

Corporation

Designers and Manufacturers Since 1920

Dept. W5

9131 SAN LEANDRO BOULEVARD • OAKLAND 3, CALIFORNIA

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

Portable gravel loaders developed

A combination receiving hopper and belt conveyor for loading trucks with aggregate material has been developed by **Koehring California Co.** Named "Pit-

loader," the machine is available in 36, 42 and 60-in. sizes, Largest model has a capacity of 1 cu. yd. per second. Loaders can be skidded from one location to another without dismantling.

. . . Circle No. 199

Self sealing joints for large pipe

"Speed Seal" joints for vitrified clay pipe in 15-in. through 42-in. sizes has been introduced by **Gladding, McBean & Co.** Joints, similar to wedge-lock design in smaller pipes, consist of rubber gasket and polyester casting on the interior surface of the bell and a polyester casting on the spigot end. Both castings are factory applied. Pipe sections are simply pushed together to form a quick permanent seal.

. . . Circle No. 200

Clearing blade fells trees

A new clearing blade designed to windrow small trees, split and fell large trees, and remove stumps

and root systems below ground level is announced by **Rome Plow Co.** Designated Rome K/G clearing Blade, it has a sharp "stinger" for splitting large trees. Made to fit Caterpillar D4, D6, D7, D8 and D9 tractors.

. . . Circle No. 201

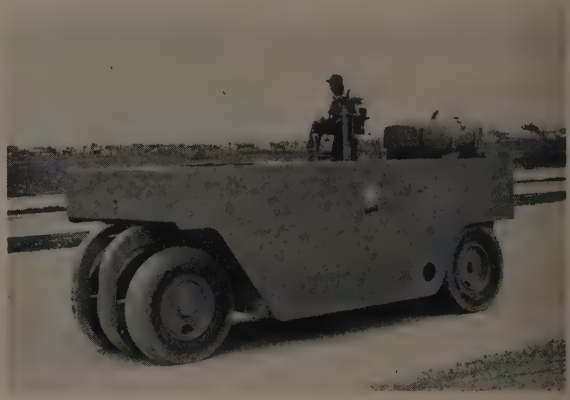
Bridge column forms

Easily assembled metal forms for pouring cylindrical bridge columns are manufactured by **Economy Forms Co.** Forms are made in 180-deg. sections 4 ft. high for diameters up to 4 ft., and in 90-deg. sections or less for larger diameters. Precision fit enables forms to be pulled off column like a sleeve.

. . . Circle No. 202

Heavyweight rubber tire roller

A 33-ton self-propelled, 7-wheel roller believed to be largest in the industry is being manufactured by **Browning Mfg. Co.** Machine has water tanks with capacity of 520 gal. and weight range of 11 to 33 tons.



Wheels oscillate independently for uniform coverage. Powered by diesel engine, it has torque converter and reversing transmission. Literature available.

. . . Circle No. 203

New motor grader features

Several new features have been added to **LeTourneau-Westinghouse** "Adams" motor graders. Design

changes have added 9 inches to circle diameter, now 63 in., and relocated lift housing box-beam support for more visibility. Moldboard tilt adjustments can be made by loosening one nut on each circle leg. New 6-cylinder Cummins engines of 115 to 145 hp are now available.

. . . Circle No. 204

All-wheel drive graders introduced

Two 20,000-lb. graders with all-wheel drive, front and rear power steering and full hydraulic control

have been introduced by **Austin-Western, Division of Baldwin-Lima-Hamilton Corp.** Models are designated Pacer-200, a 4-wheel machine; and Pacer-600, with 6 wheels. Both are powered by GMC 106-hp. diesels. Austin-Western will introduce eight other machines during 1959, its 100th anniversary year. Literature available.

. . . Circle No. 207

High speed tractor-scraper

A combination 2-wheel haul unit, No. 619, and low-bowl scraper, No. 442, featuring high speeds, improved roadability, and increased turning power is announced by **Caterpillar Tractor Co.** Performance features include a top speed of 30 mph.; dampening of vibration for good roadability; and 90-deg. hydraulic steering which provides extra turning power coming out of a turn, with improved two-jack steering mechanism. Scraper has 18-cu. yd. heaped capacity. It is cable-operated with "dozer" type ejection, apron opening of 5 ft, 4 in., and adjustable scraper axles.

. . . Circle No. 208

Asphalt paving cutter

An asphalt paving cutter, called "Cutaline," is marketed by **Cutaline Co.** Designed as an attachment to

a motor grader, it can be mounted or removed in a few minutes and requires no alterations to the grader. Successfully tested during past five years, it now is available nationally.

. . . Circle No. 209

Air cleaner for heavy equipment

A new dry air cleaner for heavy construction equipment and trucks has been announced by **Donaldson Co.** The cleaner operates in two stages. Primary stage which removes 98% of the dirt is made up of a cluster of Donaclone tube centrifugal cleaners. Second stage is a chemically-treated paper filter of improved design.

. . . Circle No. 210

Traveling bridge holds mesh

A labor-saving mesh bridge holding 10 tons of reinforcing mesh and dowels is made by **Cleveland**

Formgrader Co. Bridge is attached to paving train and makes it possible for two men to unload and lay reinforcing steel and dowels. Bridge deck is 12 ft. deep and is available in widths of 16 to 30 ft.

. . . Circle No. 211

Roller has retractable wheels

A tandem roller of 4-6 ton size with retractable rubber-tired wheels for highway travel has been marketed by **Galion Iron Works & Mfg. Co.** Machine is

equipped with "Roll-O-Matic" drive, a combination of torque converter, automatic fluid transmission and tail-shaft governor, by means of which rolling power is automatically increased or reduced as needed. Highway wheels are retracted hydraulically.

. . . Circle No. 212

New pile hammer

Vulcan Iron Works, Inc., is marketing a new Model DGH-900 pile hammer with rated striking capacity of 4,000 ft. lb., short stroke and high frequency of blows. Differential-acting hammer has only 4 moving parts, operates with or without leaders, and can be used with steam or compressed air. Fully automatic hammer is said to be ideal for close quarter work.

. . . Circle No. 213

1 1/2 yd. TROJAN

...Packed with Operating "Extras"

There's no mistaking this new Trojan 124 — a standout performer in any task force, on any job . . . This is the 1½ cu. yd. tractor shovel that you have been asking for . . . The new job-rated Trojan proudly presents an imposing combination of extra operating benefits that can only spell P-R-O-F-I-T to the user.

At no extra cost Trojan offers the safety and greater visibility made possible by Trojan's *patented safety curve arms,* a favorite with tractor shovel operators . . . the maximum stability provided by wide-tread tires . . . 10,000 lbs. rated lifting capacity, highest for any machine of this size . . . greater carrying capacity . . . 40° bucket tip back at carry position . . . full power shift transmission . . . a variety of bucket sizes from 1½ to 2 cubic yards . . . choice of gas or diesel power . . . plus the widely preferred Trojan features that insure low-cost, efficient production on so many jobs today!

Give your Trojan distributor a few minutes of your time. That's all he needs to prove to you that the new Trojan Model 124 can be your most valuable piece of working equipment . . . Ask for a demonstration — see it in action!

Take full advantage of the variety of applic tions your Trojan 124 can offer, and all oth Trojan models as well, with such quick-chan attachments as pallet forks, backhoe, sno plow, dozer blade, crane hook and spec buckets.

TROJAN
TRACTOR SHOVELS
YALE & TOWNE

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

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

TROJAN
YALE & TOWNE

YOUR TROJAN DISTRIBUTORS FOR SALES, PARTS AND SERVICE

INLAND DIESEL & MACHINERY CO.
Spokane, Washington

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COOK BROS. TRUCK & EQUIPMENT CO.
Oakland, California

•

GARLINGHOUSE, FREMON & COMPANY
Los Angeles, California

•

INTERMOUNTAIN EQUIPMENT CO.
Pocatello, Idaho

•

INLAND SERVICE & SUPPLY CORP.
Las Vegas, Nevada

•

SIERRA MACHINERY COMPANY, INC.
Reno, Nevada

•

WESTERN MACHINERY COMPANY
Salt Lake City, Utah

•

ROAD MACHINERY COMPANY, INC.
Phoenix, Arizona

•

NORMONT EQUIPMENT COMPANY
Great Falls, Montana

•

TRACTOR SUPPLY COMPANY
San Diego, California

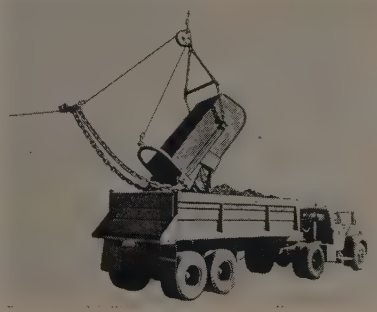
•

CONTRACTORS' EQUIPMENT & SUPPLY COMPANY
Albuquerque, New Mexico

. . . for more details, circle No. 67

Lightweight dragline bucket

A series of dragline buckets weighing as much as 1 ton less than other buckets of comparable capacity is announced by **M. P. Mc-**



Caffrey, Inc. Product is designated Type A and is designed for easy and medium digging. Buckets are of all-welded construction. Sizes range from ⅜ yd. to 3½ yd. The line uses a new alloy steel chain of 100,000 psi. tensile strength.

. . . Circle No. 214

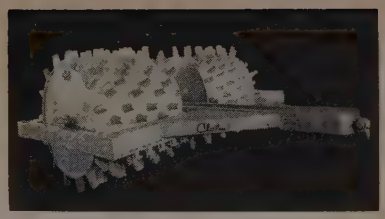
Mobile rock feeder

A 30-ft. drag feeder mounted on wheels for highway transport has

been introduced by **Pioneer Engineering, Division of Poor & Co., Inc.** Designed for moving quarry rock and boulders to the primary crusher, the unit weighs 45,000 lb. Hopper is made of 1-in. steel plate and feeder pans are of ½-in. forged steel on heavy duty chains. The feeder is transported on dual tandem rear wheels. Hopper unit may be ordered without wheels and hitch. *. . . Circle No. 215*

Tamping roller redesigned

Cone-type feet of forged steel are now featured on the redesigned Chester Model 6060 tamping rollers made by **Chester Products, Inc.** The Model 6060 has a drum diameter of 60 in. and a width of 60 in. It carries 120 ft. per drum. Ends of the cone feet are flat with a 7½-sq. in. surface. They are designed to prevent scuffing or dragging compacted lifts. Optional



wedge, round or sheep type feet are available. New design also includes wedge-spade type cleaner bars. *. . . Circle No. 216*

12 tons of vertical impact

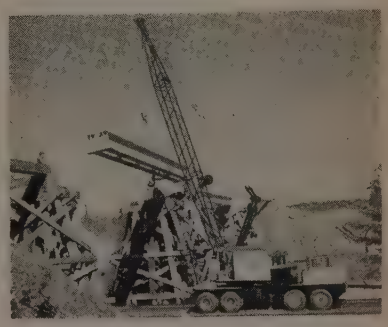
A pull-type vibratory compactor, which delivers vertical impact only, has been introduced by **Seaman-Gunnison Corp.** The steel roll unit is powered by 35-hp. Hercules air-cooled engine and produces a 12-

ton dynamic impact. Compactor is offered in two models: VE-72, 6 ft. wide, weighing 5,000 lb.; and VE-84, 7 ft. wide, weighing 6,000 lb. Either model can be pulled by a light rubber-tired tractor.

. . . Circle No. 217

30-ton shovel crane

A new 30-ton 8 x 4 shovel crane has been added to the Lorain Moto-Crane line by **The Thew Shovel Co.** Designated MC-430, the new crane is mounted on a 12-wheel carrier which features im-



proved steering, better axle loadings, 8-wheel brakes and 15 forward speeds to 47 mph. Turntable has "Shear Ball" mounting and can be located at three different positions on the carrier. The machine can operate as crane, clamshovel, dragline, shovel or hoe.

. . . Circle No. 218

Huge concrete vibrator

The "Texan", a 43½-lb., high-cycle concrete vibrator, said to be the largest ever built, using a rotary centrifugal eccentric, is now being produced by **Dart Mfg. & Sales Co.** The Model DHC-300 Texan has a head length of 21 in.

and a diameter of 4 in. It was developed especially for service on big jobs. It operates on 180-cycle current and is available in either 115 or 230 volts. Under full load it develops 10,800 rpm. A key feature is the easily removable motor section which may be replaced quickly in the field.

. . . Circle No. 219

Self-propelled power broom

A self-propelled power broom operated by one man and featuring a built-in blower has been marketed by **Flaherty Mfg. Inc.** Blower extends full width of the broom and can be adjusted separately. Broom

may be operated with or without blower and is interchangeable with an 8-ft. moldboard blade attachment. Machine has five forward speeds as well as reverse and contains a 240-gal. water tank as an integral part of the frame.

. . . Circle No. 220

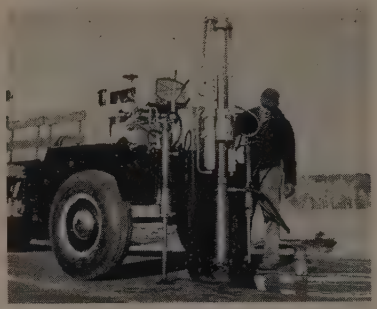
Front end loader

A new model TractoLoader with a 5,300-lb. carrying capacity is announced by **Tractomotive Corp.** The model TL-14 has a lifting capacity of 11,000 lb. and a breakout force of up to 17,800 lb. Dumping clearance is 8 ft., 3 in. Six buckets ranging from 1 to 3 cu. yd. are

available. The unit weighs 14,480 lb. and is powered by either an 86-hp. gasoline engine or an 81.5-hp. diesel, both made by **Allis-Chalmers.** *. . . Circle No. 221*

Portable pavement drill

A new trailer-mounted drill for pavement core test drilling has been introduced, by **Acker Drill**



Co. Drill features a new adjustable core drill guide which simplifies the drilling operation. The rig can be towed by car or truck, and field tests indicate a production capacity of up to 65 test core samples per 8-hr. shift. *. . . Circle No. 222*

Durable vibratory tamper

A vibratory tamper with the gas tank located beneath the engine where it can't shake loose has been marketed by **Stow Mfg. Co.** Powered by a 3.8-hp. gasoline engine,

the Stow tamper has a frequency of 2,400 vibrations per minute and delivers a 2,200-lb. blow. It is self propeled with a speed of up to 50 ft. per minute. Unit is available with shoe sizes of 12 in., 18 in., or 24 in. *. . . Circle No. 223*

See These BLAW-KNOX Dealers

BLAW-KNOX

ARIZONA

O. S. STAPLEY'S COMPANY
Phoenix, Arizona

CALIFORNIA

CONSTRUCTION MACHINERY COMPANY
San Diego, California

SHAW SALES & SERVICE COMPANY
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SUN EQUIPMENT COMPANY
Oakland, California

COLORADO

COLORADO BUILDERS SUPPLY COMPANY
Denver, Colorado

MONTANA

NORMONT EQUIPMENT COMPANY
S. Great Falls, Montana

OREGON

AIR MAC INC. OF OREGON
Portland, Oregon

TEXAS

LIVELY EQUIPMENT COMPANY
Albuquerque, New Mexico

UTAH

FOULGER EQUIPMENT COMPANY
Salt Lake City, Utah

WASHINGTON

HATTEN MACHINERY COMPANY
Seattle, Washington

INLAND DIESEL & MACHINERY COMPANY
Spokane, Washington

YUKON EQUIPMENT, INC.
Seattle, Washington

. . . for more details, circle No.

Blaw-Knox Concrete Paving spread used by McGeorge Contracting Company lays the first 5-inch for steel mesh on Interstate Route 91 near Little Rock, Arkansas. A second 5-inch completes the 10" slab.

from forms to finisher...

McGeorge Contracting uses Blaw-Knox Concrete Paving Spread on Interstate Paving Project

By use of coordinated Blaw-Knox Concrete Batching and Paving Equipment, McGeorge Contracting Company completed a three-mile section of Interstate Route 91 near Little Rock, Arkansas, within the allotted contract time. The company, long a leading highway and heavy construction contractor in Arkansas, chose the Blaw-Knox spread for this major concrete paving job.

A Blaw-Knox 200-bbl. Hi-cement bin served as a railhead transfer unit. The two-stop batch operation included a 400-bbl. Hi-cement bin and a P-3100 G aggregate bin set with a twin aggregate weigh batcher. Batch trucks moved dry material to the Blaw-Knox 34-E Dual Drum Paver. Running on 5,000 feet of Blaw-Knox 10-inch road forms was a Blaw-Knox concrete spreader, followed by a Model XE finisher equipped with the new Blaw-Knox quick adjustable screed.

Specially engineered Blaw-Knox concrete paving equipment has what it takes to turn out high production to the tightest specifications, at a profit. Your Blaw-Knox distributor has the details. Why not contact him?

BK-4908

BLAW-KNOX COMPANY

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

BLAW-KNOX

NEW DYNALARM

by ADCO

THE ELECTRONIC BACKUP HORN ENGINEERED FOR HUMAN SAFETY AND RELIABILITY

The DYNALARM is specifically designed to meet industry and Government specifications for a positive and permanent back-up alarm system on rolling or track type equipment.

DYNALARM is more than just a horn. It is a fully automatic safety system, scientifically engineered and thoroughly field tested, assuring years of reliable service.

- Extensive engineering field tests were conducted to determine the horn sound level best suited to penetrate actual "on the job" noise.
- The horn signal is directed for maximum clear warning to the rear of the equipment with minimum sound spillover to the operator.
- The actuating switch is made of nylon and stainless steel, permanently lubricated, and with a tested life expectancy of more than 100 million operating cycles.
- Heavy duty transistors are used to insure a high degree reliability with extremely low power drain, and permanently sealed circuitry in epoxy plastic is used for full protection against moisture, vibration and physical damage.
- Under field conditions of mud, rain, snow, heat and rough handling, DYNALARM was proven jobworthy **before** regular production started.

SPECIFICATIONS

General:			
Operating temp. limits	−20° F to +130° F.		
Cable Connector	Quick-disconnect military type		
Shipping Weight	15 pounds		
Electrical:			
Nominal Voltage DC	6V	12V	24V
Operating Current	1.5 Amps	0.75 Amps	0.4 Amps
Standby Current	.004 Amps	.004 Amps	.008 Amps

For further information write:

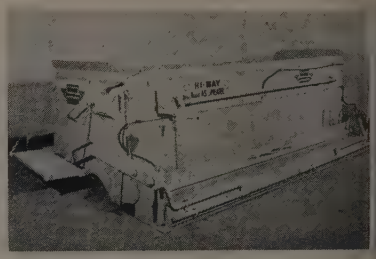
ATKINSON DYNAMICS
10 West Orange Avenue
South San Francisco, California

—or fill in reader service card

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

Versatile bituminous paver

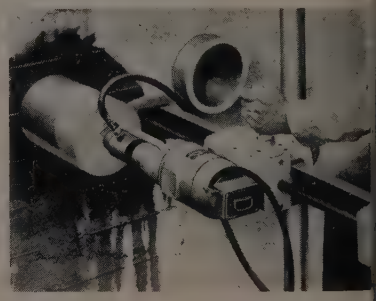
A new bituminous paver adaptable to most kinds of self propelled equipment is announced by **Highway Equipment Co.** The Model AS is available in widths of 8, 9



and 10 ft. with capacities up to 1 1/3 cu. yd. Features include a full-floated screed that permits concave or convex surfaces and a hydraulic shut-off gate that prevents dribbling of material.

. . . Circle No. 224

Diamond core drills



A line of core drills utilizing whole surface-set industrial diamonds for wet drilling of concrete and stone is announced by **Felker Mfg. Co.** The core lock drill line is available in sizes ranging from ¼ to 14-in. outside diameter and in two qualities, "Resettable" in which diamonds are replaced, and "Throwaway" economy version. Normal drill length is 13 in.; longer drills are supplied on order. The line includes an adjustable drill stand for accurate positioning and positive feed at any angle.

. . . Circle No. 22

Custom-built lube-vans

The **Aro Equipment Corp.** now offers custom-built lube-vans for field maintenance of construction equipment. Van includes pump and reels of heavy-duty all-weather type, and has storage place for filters and other replacement parts as well as flood lights for night work.

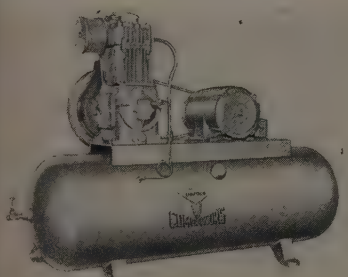
. . . Circle No. 22

Lift truck reaches 33 ft.

An enlarged version of the Economobile, job-site materials handling vehicle, is announced by **American Road Equipment Co.** Called the 620, the new model has a basic loading height of 20 ft., 6 in. with pallet forks. Two tower extensions increase lifting height to 30 ft. 6 in., and a crane hook attachment has a maximum lift height of 33 ft. Capacity is 4,000 lb. for the basic unit, scaling down to 2,000 at 30 ft. Overall structural strength of the 620 has been beefed up at virtually all points, and additional power is supplied by a 73-hp. Continental engine. Refinements include automatic self-leveling, improved hydraulics and valves.

. . . Circle No. 227

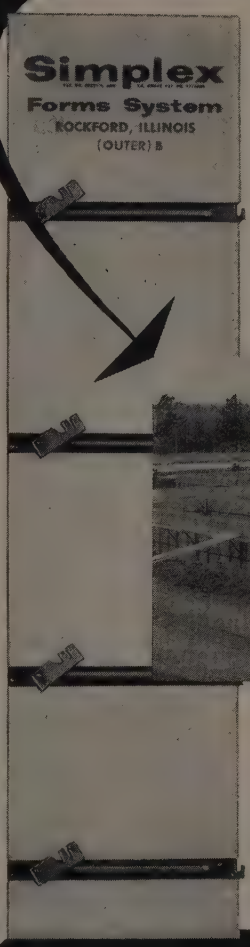
Lincoln adds compressors



A line of air compressors covering more than 200 models has been introduced by **Lincoln Engineering Co.** The new Lincoln reciprocating compressors are available with motor or engine ratings of ¼ to 20 hp., air displacement up to 92 cfm., and tank capacities to 200 gal. Both horizontal and vertical mounted tank models are equipped for automatic start and stop operation, and include many superior construction features.

. . . Circle No. 228

SIMPLEX FORMS
Provide Jet-Like Speed on Large AIR FORCE ACADEMY PROJECT



USED EXCLUSIVELY ON 1200-UNIT CAPEHART HOUSING JOB

When you've contracted to build 1200 units, speed, accuracy and economy are a must. That's why Del E. Webb Construction Co. and Rubenstein Construction Co. — a joint venture — selected 36 sets of Simplex Forms for this enormous Capehart project. Prior to getting underway, these contractors staged competitive tests, and only Simplex got the nod!

The project, which will house Air Force Academy personnel, is made up of single and multiple dwellings. Because heights varied from 3′ 4″ to 11′, Simplex 4′, 6′, 8′, and 10′ panels were used. No walers were required! Projects such as this prove once again that Simplex has the edge in the forming field . . . to do a *better job* at *greater profit!*

YOU CAN MAKE MORE MONEY WITH SIMPLEX

Best for Large Projects or for Small, Single Jobs

Forms in 10′, 8′, 6′, and 4′ Sizes • A Complete Line of Accessories

- Long-lasting, 9-ply 1⅛″ plastic impregnated plywood . . . outer plys won't peel.
- Heavy-duty steel backing bars run full width of panel to give added strength. Steel butts against steel as forms are locked together.
- Exclusive, patented locking levers. A tap secures or unlocks them . . . cam action pulls them together.
- Tie wires slip into position easily . . . break off cleanly.
- Lightweight panels! A 2′ x 8′ panel weighs less than 70 lbs. Easy to set, strip, or load.

THE WORLD'S FASTEST METHOD Simplex FOOT-A-MINUTE forms OF CONCRETE FORMING

WRITE TODAY FOR FULL DETAILS
SIMPLEX FORMS SYSTEM, INC.
5609 Industrial Ave.
Rockford, Illinois

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

New way to end engine rust

For combatting corrosion, rust and pitting in radiators and engine blocks a simple procedure has been introduced by **Radi-8.** This is a patented combination of natural metals fused and bonded together. The chemical principle involved is the same as that used to protect ocean vessels, and acts on an ion exchange, protecting metals by restoring their electron balance. The Radi-8 is guaranteed to end repairs resulting from rust and corrosion in engine systems. In addition, it ends scaling due to water impurities and eliminates the use of oily additives which tend to reduce engine cooling. The manufacturer claims the cooling system of engines remains in new condition. The result is better heat transfer between cylinders and cooling water, better lubrication because of lower cylinder wall temperature and longer ring life.

. . . Circle No. 229

Curved-shank ripper tooth

Caterpillar Tractor Co. has marketed a new curved-shank ripper tooth designed to reduce rock drag and slabbing and permit shallower angle of entry. Optional equipment for the company's No. 9 ripper, the curved tooth is made of tough steel plate mounted on a cast-steel clevis. It can be mounted in three ripping positions, and is said to do away with delays required to clear the tooth of bunched up material.

. . . Circle No. 230

Welder for hardsurfacing

A portable welder featuring a semiautomatic wire feeder has been designed for open arc hardsurfacing or submerged arc welding by **Hobart Bros. Co.** It is known as the Handomatic. Wire feed will handle tubular or solid wires in various diameters with speed controlled by single rheostat. Welder operates on continuous current up to 500 amperes, using flux type gun. Wire speed range at nominal 30 volts is 60 to 260 in. per minute. An optional gearbox gives stepped up range of 90 to 460 in. per minute.

. . . Circle No. 231

ANOTHER SATISFIED INSURANCE BUYER

STANLEY G. WULF, Vice President and General Manager of DeSanno Foundry & Machine Company, Oakland, says:

"Industrial Indemnity writes our workmen's compensation insurance and our general liability through Griswold, Withoft & Farley. We like Industrial's progressive nature. They give up-to-the-minute claims and safety engineering services; rehabilitation, too, if it's needed. They work closely with our insurance agent.* Together they've helped us earn a *sixteen percent reduction* in our experience rate. We also get maximum schedule rate credits for machine guarding. In our business that means more dollars left over for profits. Important? The people of Industrial Indemnity know it is."

*John L. Farley, Jr., of Griswold, Withoft & Farley

MODERN INSURANCE FOR MODERN BUSINESS

INDUSTRIAL INDEMNITY COMPANY

fire • casualty • bonds • workmen's compensation
sold by agents and brokers exclusively

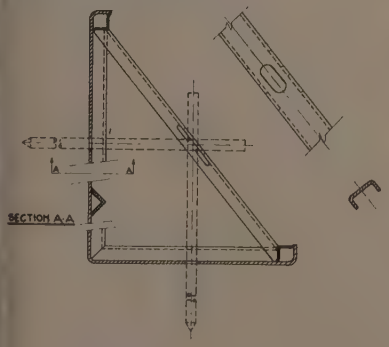
. . . for more details, circle No. 72 on Reader Service Postcard

Shredder for dirt, peat or clay

A power soil shredder which can handle dirt, peat or clay at up to 100 cu. yd. per hr. is announced by **Lindig Mfg. Co., Inc.** The wheel-mounted mobile unit features a patented dual rotor shredding assembly designed to allow stones and similar materials to pass through without damage to shredding hammers. Material is received in a 6 ft. hopper, and shredded material delivered by belt conveyor with a discharge height of 10.5 ft.

. . . Circle No. 232

Steel paving forms



Steel forms of unusual design for concrete highways or airport runways have been developed by **Fabricated Steel Service Inc., Highway Products Division.** Form incorporates box section rail construction with vertical angle stiffener. Strong design adds life to forms and insures meeting of state and federal specifications for concrete slabs.

. . . Circle No. 234

D-7 tractor redesigned

A new D-7 tractor with higher horsepower and with turbocharged engine is announced by **Caterpillar Tractor Co.** Drawbar horsepower has been increased from 102 to 112. Other new features include lifetime lubricated rollers, carrier rollers and idlers, new air filtration and improved power train components. The new D-7 has a substantially increased lugging ability. Drawbar pull increases 19.6% as the engine lugs down under load.

. . . Circle No. 235

SPEED CONSTRUCTION OF ROUND CONCRETE COLUMNS

County highway bridge, Galt, California. Designed by California Division of Highways. Thomas Construction Co., Sacramento, contractors.

Use low-cost, time-saving

SONOCO Sonotube® FIBRE FORMS

Approved by engineers and architects, and used by contractors everywhere, SONOTUBE Fibre Forms provide the fastest, most economical method of forming round columns of concrete.

The forest of columns supporting the bridge shown above were formed with 2000 feet of 16" I.D. Sonotube Fibre Forms.

Low-cost Sonoco SONOTUBE Fibre Forms are designed for use wherever round concrete columns are to be formed . . . in buildings, schools, churches, parking garages, bridges, overpasses, many other structures . . . and save time, labor and money!

Choose from 3 types: Seamless (premium form for finished columns), "A" Coated (standard form for exposed columns), or "W" Coated (for unexposed columns).

Sonoco SONOTUBE Fibre Forms are available in sizes from 2" to 48" I.D. Order in specified lengths or standard 18' shipping lengths. Can be sawed to size on the job.

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For information and prices, write

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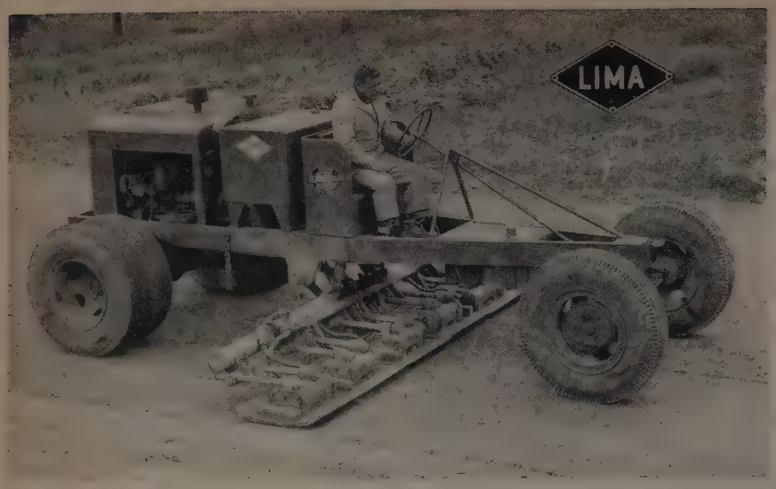
SONOCO
Construction Products
SONOCO PRODUCTS COMPANY

. . . for more details, circle No. 73 on Reader Service Postcard



Lima Roadpacker compacts gravel base, from bottom up by vibration, on Michigan highway job.

LIMA Roadpacker gives better compaction in fewer passes to cut costs for contractor

"It's a real timesaver, our Lima Roadpacker," says Vice President Jerry Gooding of O. E. Gooding & Co., Ypsilanti, Mich. "It's fast . . . gives us better compaction in fewer passes than would be required with other compaction equipment."

Variable widths, deep compaction

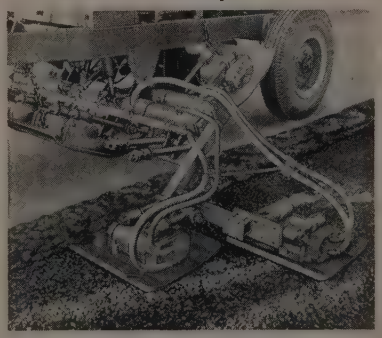
"We like the Roadpacker's ability to compact in varying widths with either 4, 5 or 6 shoes. We couldn't do this with the compaction equipment we had before.

"Vibration from those shoes really penetrates to do an efficient compaction job for us. We often get required 100 per cent density in one pass. In most cases, including sand, not over two passes are required."

Highway travel without permit

"The Roadpacker moves about the job, or from job to job, under its own power. That's an important saving in trailer rental costs and time alone. The shoes can be raised hydraulically. Operator can fold back end shoes in a few minutes for highway travel. Travel speeds up to 30 mph!"

Learn how you can cut your compaction costs by using the Lima Roadpacker for efficient high-density compaction. Lay fewer courses . . . compact up to 10 and 12-in. layers in fewer passes . . . compact in reverse as well as forward to end time-wasting deadhead backups. Get all the facts on the Lima Roadpacker—see your local Lima distributor or write us for free bulletin today.



Widener attachment — Vibrating shoes compact material in widening trench while Roadpacker runs on existing pavement. Easily adjusted for various width trenches. Ends need for expense of special trench roller.

LIMA Roadpacker Distributors

Reno Equipment Sales Company, 1510 W. 4th Street, Reno, Nevada; **Feenaughty Machinery Company,** 112 S.E. Belmont Street, Portland 14, Oregon; **Evans Engine & Equipment Company,** 4300 11th Avenue, N.W., Seattle 7, Washington; **Bay Cities Equipment, Inc.,** 2792 Cypress Street, Oakland 7, California; **Bay Cities Equipment, Inc.,** 1178 West San Carlos Street, San Jose, California; **N. C. Ribble Company,** 1304 North Fourth Street, Albuquerque, New Mexico; **Smith Booth Usher Company,** 2001 Santa Fe Avenue, Los Angeles 54, California; **Modern Machinery Company, Inc.,** East 4412 Trent Avenue, Spokane 10, Washington; **Shasta Truck & Equipment Sales,** South 99 Highway, Redding, California; **Western Machinery Company,** 820 North 17th Avenue, Phoenix, Arizona; **Western Machinery Company,** 1111 West St. Mary's Road, Tucson, Arizona; **Evans Engine & Equipment Co., Inc.,** Post Road—Box 894, Anchorage, Alaska; **Faris-Moritz Equipment Company,** 5790 Colorado Blvd., Denver, Colorado; **Western Machinery Company,** 2300 South Main Street, Salt Lake City 15, Utah

LIMA Construction Equipment Division, Lima, Ohio
BALDWIN · LIMA · HAMILTON 5925

. . . for more details, circle No. 74 on Reader Service Postcard

Triple compaction in one unit

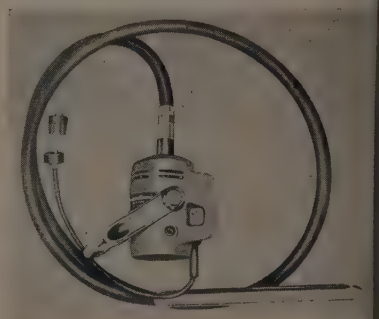
Three types of compaction, pneumatic, smooth steel rolling, and vibratory impact are delivered by one unit, the new Tri-Pactor, Model 7-19 TRI, introduced by **Seaman-Gunnison Corp.** Composed of smooth steel roll, 8-wheel pneumatic roll, vibratory element and prime mover, the unit weighs 7 tons

empty and 19 tons fully loaded. It is capable of delivering loading intensities up to 50 tons surface pressure. Compaction elements can be used in combination or separately. Vibration frequency can be adjusted from 800 to 1,400 vpm. Prime mover is integral with unit, available with diesel or gasoline engine, it is interchangeable with other Seaman-Gunnison equipment. Tri-Pactor is 72 in. wide, and can turn 180 deg. in an 18-ft. roadway.

. . . Circle No. 236

Flexible shaft vibrators

Two flexible shaft concrete vibrators for working in small areas and confined spaces have been introduced by **Thor Power Tool Co.** One model has five feet of flexible shaft, the other has ten. Both are available in head sizes of 1 in., 1¼



in., 1½ in., and 1¾ in. Powered by 1-hp. electric motor, they have impact of 10,000 to 12,000 vibrations a minute. Shafts can be extended to 20 ft. using Thor ball bearing connectors. The units are designed for working concrete in small access or tightly reinforced sections.

. . . Circle No. 23

Mobile batching plant

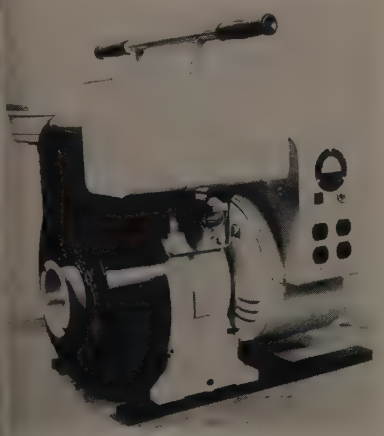
A compact 6-yd. batching plant mounted on wheels is announced **Aeroil Products Co., Inc.** Rated at 40 cu. yd. per hr., the plant has an

abrasion-resistant steel batching hopper with beam scale as standard equipment. (Dial scale is optional.) Belt conveyor is 24 in. wide with a 12-ft. normal discharge height. It runs on triple troughing idlers with extra idlers at loading point and a belt wiper at the head pulley. Entire unit is 7 ft. wide, 36.5 ft. long and weighs about 6,500 lb.

. . . Circle No. 238

New plants by Pacific Mercury

Including some outstanding design features, **Pacific Mercury** has added three new electric plants to its line. Outstanding feature of the new models is their ability to be



operated as a single 3-phase, full capacity circuit or as three single-phase circuits for handling single-phase apparatus. All of the models —6,500 AD-3, 15,000 AD-3 and 10,000 AD-3—are complete with gasoline tanks, circuit breakers and as many as 18 separate receptacles for power tools and equipment. Each unit also comes equipped with battery charger, built-in rpm. indicator and remote control plug-in receptacle.

. . . Circle No. 239

Four of Merritt-Chapman & Scott's seven 6-yd. Lima Type 2400 Shovels are shown working on the excavation site of the Niagara Power Project's main generating plant at Lewiston, N. Y.

Four contractors use 17 Limas on giant Niagara Power Project

Wherever there is a really tough job to be done—when high production, dependable heavy-duty service, rugged power, and low operating cost are essential—you are almost certain to find powerful Limas chosen for the task.

The $720,000,000 Niagara Power Project is a big job—one of the biggest. Four of the project's contractors are using a total of 17 high-output Limas on their jobs! The duty roster includes 11 big 2400's which can be used interchangeably as 6-yd. shovels, variable capacity draglines and cranes; one Type 802 50-ton crane; two 4-yd. Type 1601 shovels; one Type 1201 which can be used as a 3½-yd. shovel or 70-ton crane; and two 35-ton 54-T truck cranes.

Around the world, profit-minded contractors know from experience that it pays to buy Limas. They are quality-built throughout to deliver high production at low operating and maintenance costs.

Quality Lima Features

Here are a few examples of the superior features found in the Lima Type 2400—extra strong and rigid rotating base supported by oversize conical rollers in conjunction with double flanged heat-treated roller path and separate hook rollers; horizontal gear train and swing bevel gears are pump-lubricated in oil-tight case; anti-friction bearings are used throughout. Induction hardening of all wearing parts increases life. Crawler bushings are equipped with piston-ring type oil seals. Torque converter adjusts load speed to correspond with the resistance to moving the load—no engine stall.

Limas For Every Job

Profit with Limas—there is a type and size for every job—½ to 6-cu. yd. shovels, cranes to 110 tons crawler-mounted, 70 tons on rubber, variable capacity draglines. Investigate now! Contact your nearby Lima distributor or write us for full details.

LIMA Shovel Distributors

Our Seattle Office: 1932 First Avenue South, Seattle 4, Washington; **Our La Mirada Office:** 14120 E. Rosecrans Ave., La Mirada, California; **Feenaughty Machinery Co.,** 112 S.E. Belmont St., Portland 14, Oregon; **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; **N. C. Ribbie Co.,** 1304 North Fourth Street, Albuquerque, New Mexico; **Bay Cities Equipment, Inc.,** 2792 Cypress Street, Oakland 7, California; **Bay Cities Equipment, Inc.,** 1178 West San Carlos Street, San Jose, California; **McGaraghan Supply Company,** 529 Broadway, Eureka, California; **Evans Engine & Equipment Company,** 4300 - 11th Avenue, Northwest, Seattle, Washington; **Evans Engine & Equipment Co., Inc.,** Post Road—Box 894, Anchorage, Alaska; **Faris-Moritz Equipment Co.,** 5790 Colorado Blvd., Denver, Colorado; **Shasta Truck & Equipment Sales,** South 99 Highway, Redding, California; **Reno Equipment Sales Company,** 1510 West Fourth Street, Reno, Nevada; **Western Machinery Company,** 820 North 17th Avenue, Phoenix, Arizona; **Western Machinery Company,** 1111 West St. Mary's Road, Tucson, Arizona; **Western Machinery Company,** 2300 South Main Street, Salt Lake City 15, Utah

LIMA Construction Equipment Division, Lima, Ohio
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. . . for more details, circle No. 75 on Reader Service Postcard

Rotary compressor has new blades

A new line of rotary air compressors announced by **Davey Compressor Co.** feature the new "Perma-Vane" rotor blades. These are made

of special light-weight material designed for greater resistance than those in most similar machines. Patent has been applied for both blade design and material. Lightweight and minimum friction also reduce power requirements by the compressor and their design eliminates possibility of binding. The new line, with capacities from 125 to 600 cfm., is offered under the name of Davey Hydrovane Rotary.

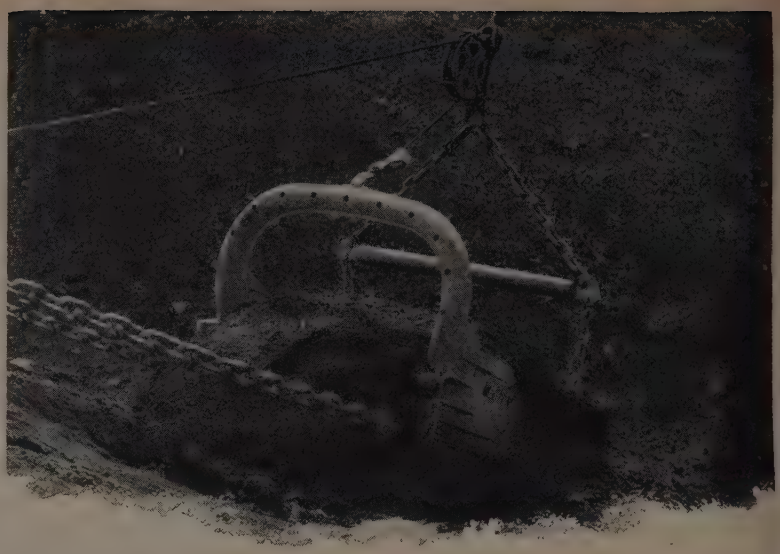
. . . Circle No. 240

Back hoe shifted by one man

A new Davis 220 backhoe which can be shifted to any of five digging positions by one man is announced by **Massey-Ferguson In-**

dustrial Division. Operator's seat and controls swivel with digging arm so that operator always faces assembly, allowing better vision and precise digging. Other improvements include increased operating pressure to 2,150 psi., larger bucket cylinder for faster dumping, and greater breakaway power up to 14,000 pounds.

. . . Circle No. 241



Bucyrus-Erie buckets have LOADING SPEED built in!

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

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

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

BUCYRUS ERIE ®

BUILDS BETTER EQUIPMENT

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

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GREAT NORTHERN TOOL & SUPPLY COMPANY
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THE COLORADO BUILDERS' SUPPLY COMPANY
Denver, Colo.; Casper, Wyo.

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

WEST COAST ENGINE & EQUIPMENT COMPANY
Berkeley, Calif.

CROOK COMPANY
Los Angeles & Bakersfield, Cal.

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

LANG CONSTRUCTION EQUIPMENT CO.
Salt Lake City, Utah

NORTHERN COMMERCIAL COMPANY
Seattle, Wash. (Alaska)

WESTMONT TRACTOR COMPANY
Missoula & Kalispell, Mont.

ROAD MACHINERY COMPANY
Phoenix, Ariz.

SANFORD TRACTOR & EQUIPMENT CO.
Reno, Nev.

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

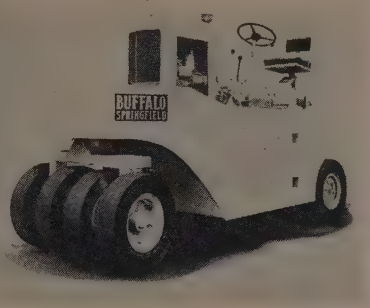
BUCYRUS ERIE®

DRAGLINE BUCKETS

. . . for more details, circle No. 77

3-10 ton rubber tire roller

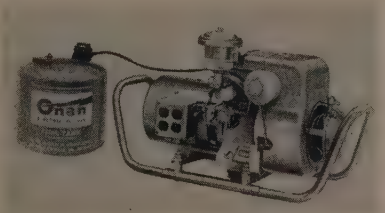
A 9-wheel self-propelled pneumatic tire roller of 3 to 10 ton, has been introduced by **Buffalo-Springfield Roller Co.** Designated PSR-9, it has three speed ratios up to 15 mph. forward and reverse. Drive



wheels are mounted on oscillating frames, with positive drive, sliding gear transmission and torque converter, powered by 6-cylinder gasoline engine of 73 hp. Clutches are hydraulically operated multiple disc type. Roller is equipped with hydraulic brakes, 360-deg. swivel seat, and hydraulically boosted steering system. Minimum weight is 6,500 pounds and maximum ballasted weight is 20,500 pounds. Tires are 7.50 x 15, six-ply (10-ply tires optional). Rolling width of the machine is 68 in., with 1-in. tire overlap. *. . . Circle No. 242*

Generating plant for emergencies

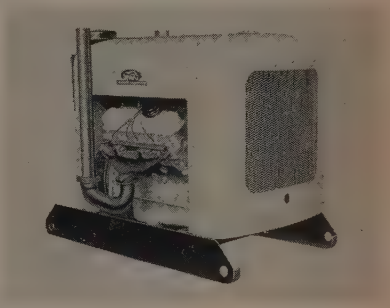
Light in weight and designed as a portable or emergency supply of power a 2,500-watt plant is announced by **D. W. Onan & Sons, Inc.** Weighing only 140 lb. the



gasoline-driven engine generator set can serve as a heavy-duty plant on a construction site or as a dependable source of standby power. Completely self contained the unit will run electric tools, lights or motors for contractors or can handle pumps or heating units. The contractor's model (illustrated) and a corresponding unit mounted on a fixed base are identical in weight and size with the exception of the carrying frame. Dimensions are about 24 in. long, 15 in. wide and 19 in. high. Each unit is equipped with a separate 5-gal. fuel can, which provides a longer run on one filling, with shorter time lost for refueling. The units provide either straight 115 v. or straight 230 v. or a combination of the two. The generator is direct connected to the engine. *. . . Circle No. 243*

New Ford power plants

Four new industrial power plants have been introduced by **Ford Motor Co. Industrial Engine Dept.** Engines include a 330-cu. in. diesel and three gasoline units of 401,



477 and 534-cu. in. displacement. All are skid mounted in sheet metal housing with instrument panel, electrical system and radiator assembly in the unit. They are available with special transmissions, torque converters and SAE housings which permit customized installation in most cases. Ford also makes six other industrial diesel and gasoline engines.
. . . Circle No. 244

Digger capacity increased

Barber-Greene Co. announces addition of a new wheel to its Model 774 wheel ditcher to increase its digging capacity to 30 in. wide and 7 ft. deep. New spoil conveyor design of the 774 now permits direct loading of trucks and eliminates rehandling of spoil material.
. . . Circle No. 245

Fork truck for rough terrain

Designed particularly for traveling in sand, mud or over rough terrain, the new **Clark** Ranger "60" fork lift truck has a 6,000-lb. capacity. It has been provided for use around building sites and other rugged locations and for use in all weather. It features high lift speed and short turning radius, in spite of its relatively long wheel base. The Ranger is also available in a 4,000-lb. model. *. . . Circle No. 246*

Lightweight asphalt paver

A lightweight asphalt paver designed to be towed and fed by a dump truck has been marketed by **H. S. Watson Co.** The model 1A-

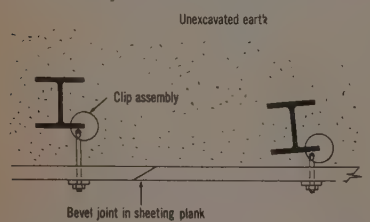
208 Rola Paver weighs 900 pounds and can be used and transported easily by smaller dumpers of the single-axle 3-yard type. Its width is within 96-in. restriction, and it can be used in narrow and congested areas. The paver hangs on the dump body tailgate during transport. . . . *Circle No. 247*

Form coating additive

A concentrated additive for mixing with fuel oil to treat wooden concrete forms has been marketed by **Brad Chemical, Inc.** Called Poly-Kote, the viscous, non-acid organic material is sold in gallon jars designed to be mixed with 54 gallons of fuel oil. Maker says Poly-Kote reacts with wood cellulose to form an impenetrable water-proof seal. Forms strip more easily and do not leave oily deposit. . . . *Circle No. 248*

Sheeting clip system

A new method of attaching wooden sheeting planks to soldier beams in excavation work is announced by **Contact Sheeting, Inc., division of Coakley & Booth, Inc.** Key to the new system is a circular steel



clip slotted to fit over the flange of the soldier beam, and a ¾-in. J-bolt hooked through a hole in the clip. Random length sheeting planks spanning two or more bays are placed against the face of the soldier beams, and held in place by high-strength steel cleats placed over the J-bolts protruding between the planks, and secured by a heavy nut. Clip assembly easily attaches to mis-aligned beams. System is said to be much faster and stronger than conventional method of wedging planks between flanges of soldier beams and hand packing, and is recommended by manufacturer for damp soils where ground can be pre-drained.

. . . *Circle No. 249*

Aluminum guard rail

An aluminum highway guard rail has been developed by **Aluminum Co. of America.** Rail is made of standard 13½-ft. lengths for installation on 12-ft. centers. Available in three thicknesses the Alclad-finish rails have tensile strengths of 65,000, 80,000, and 100,000 lb. Indi-

vidual section weighs about 40 pounds and can be handled easily by one workman. Aluminum bolts are used for rail splices and for attaching rails to posts. Traditional flared end, curved and median terminals are offered. Advantages cited include fast erection, low maintenance and high visibility.

. . . *Circle No. 250*

Sectional dozer blades

Bulldozer blades on all D8 and D9 dozers will be provided in multi-sections, according to an announcement by **Caterpillar Tractor Co.** These edges, formerly available in one-piece sections, are now available in one or two piece units for the D8s and one or three piece units for the D9s. They are easier to handle than the one piece edges which reduces time required for replacement or reversing. Weighing less than 200 lb., the sections can be transported in a light truck and installed by a 2-man team, without use of special hoist equipment.

. . . *Circle No. 251*

Equipment briefs

A new long span roof deck with depths of up to 7½ in. and capable of spanning 32 ft. has been introduced by **Fenestra, Inc.**

. . . *Circle No. 252*

Atlas Copco, Inc., has introduced compact air compressor designated ER-6 capable of delivering 1,075 cu. ft. of air per minute at 100 psi.

. . . *Circle No. 253*

New welded steel main frames, new drives and anti-friction bearings have been incorporated in the re-designed Muller hoists manufactured by **Muller Machinery Co., Inc.** The hoists have a capacity of up to 1,000 lb. at 200 ft. per min.

. . . *Circle No. 254*

A new waler bracket which holds two 2 x 4 walers and eliminates toe-nailing has been developed by **Superior Concrete Accessories, Inc.**

. . . *Circle No. 255*

A new 3-hp. electric motor operating on 110, 200 or 440 volts is now available for Maginnis self-propelled vibratory compactors, replacing the usual gasoline engine and clutch. Unit is manufactured by **Maginnis Power Tool Co.**

. . . *Circle No. 256*

A new model PL-10 "Power Buggy" with a 10-cu. ft. capacity and 5-mph. top speed is announced by **Aeroil Products Co., Inc.**

. . . *Circle No. 257*

New dies for the Hossfeld universal pipe bar and angle iron bender now permit the machine to make single and double scrolls in 2½ to 8-in. diameters. Literature available from **Hossfeld Mfg. Co.**

. . . *Circle No. 258*

A new high alloy, hard facing electrode, Stoody 2134, is now being marketed by **Stoody Co.,** after a year and a half of extensive field testing. . . . *Circle No. 259*

LeTourneau-Westinghouse Co., announces a new 360-hp. Model Tournapull with special optional Allison torque-converter.

. . . *Circle No. 260*

Safety stairways for standard 5 x 7 ft. stationary or rolling scaffolding towers has been developed by **Tubular Structures Corp.**

. . . *Circle No. 261*

New lever bars and handles are now being provided for **Thern Machine Co.,** lever hoists to increase their strength and operational ease.

. . . *Circle No. 262*

A new clutch steering mechanism called "Spot-Turn" is now available on Oliver OC-4 crawler tractors and OC-46 loaders. Literature available from **The Oliver Corp., Industrial Div.** . . . *Circle No. 263*

A 2-speed tangent screw for Paragon surveying transits that makes possible faster and more accurate vernier settings and telescope aiming has been announced by **Keuffel & Esser Co.** Screws can be adapted to K&E transits purchased within the past 5 years. Literature available. . . . *Circle No. 264*

A high strength "chemical bond" for fast, efficient splicing of waterstop has been announced by **The Gates Rubber Co.** The new splice is called "Kwik-Seal" and is said to be stronger than the waterstop material itself. . . . *Circle No. 265*

Two additives designed to increase the efficiency of "economy fuels" in diesel engines, have been marketed by the **Du Pont Co.** The materials are known as FOA-2 and DMD and are said to eliminate injector sticking and filter plugging. . . . *Circle No. 266*

A new plastic bell fitting which can be solvent-welded to plastic pipe is announced by **Carlon Products Corp.** The fitting permits joining of plastic pipe to cast iron pipe by means of conventional molten lead joints. . . . *Circle No. 267*

A new air powered paving breaker, Thor No. 125, featuring increased power has been introduced by **Thor Power Tool Co.** . . . *Circle No. 268*

A line of heavy duty shoring equipment made of steel tubing fabricated in panel sections has been introduced by **Waco Mfg. Co.** Panels are marketed for use in construction falsework. Each panel has a load capacity of 20,000 lb. . . . *Circle No. 269*

Transistorized circuits are now used in flasher light barricades made by **Electronics Specialties Co.** Literature available. . . . *Circle No. 270*

A front and telescopic hoist for 8, 9 and 10 ft. truck dump bodies has been developed by **Marion Metal Products Co.** The units feature easy attachment, light weight and fast action. . . . *Circle No. 271*

A trailer-mounted self contained kettle for melting tar, asphalt and bituminous compounds has been marketed by **Hauck Mfg. Co.** Kettle is of stressed skin design with internal tube heating system. . . . *Circle No. 272*

An industrial steam cleaner mounted on wheel dolly and designed for continuous production has been announced by **Turbo Machine Co.** The unit burns kerosene or fuel oil, weighs 600 lb. . . . *Circle No. 273*

Simplified fittings for installation of LP-gas carburetion systems which eliminate long water hose and cumbersome mounting plates has been announced by **Beam Products Mfg. Co.** . . . *Circle No. 274*

A versatile crawler drill jumbo with one or two jibs for single or multiple drillings has been marketed by **The Machinery Center, Inc.** . . . *Circle No. 275*

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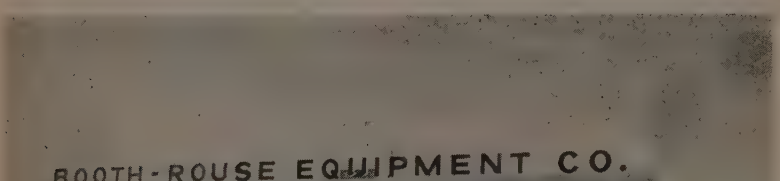
News of DISTRIBUTORS



NEW HEADQUARTERS of *Booth-Rouse Equipment Co.* (formerly Ray Corson Machinery Co.) at 5700 Eudora St., Denver, Colo. Distributor for many leading lines of heavy construction equipment, the company has been rendering sales and service to contractors in the Rocky Mountain area for more than thirty years.

Additional lines and men by Idaho distributor

Two additional accounts have been acquired by Southern Idaho Equipment Co., Boise: Pioneer Engineering Works and Wayne Manufacturing Co. This distributor also added two new men: Frank D. Masner, who is to cover Elmore, Ada and Canyon counties, and Z. W. Scott whose territory embraces Payette and Washington counties in Idaho, and Malhuer, Baker and Wallowa counties in Oregon.

L. B. Foster Co. adds sales rep

A new sales representative has been named by L. B. Foster Co. to serve in the company's Los Angeles office. He is Donald J. Cier, who will cover the Northwest territory. He was formerly employed as a sales engineer for Armco Drainage & Metal Products, Inc.

Dealer franchises offered by Superior Scaffold

With the expansion of Superior Scaffold Co.'s line to include products for all scaffolding purposes, together with lower unit production costs, the company has franchises available for dealers in the Southwest who wish to buy direct from the manufacturer and who are active in selling to the heavy contracting field as well as to light construction. A newly inaugurated program to aid dealers in setting up a scaffold rental business is also available. For more information, contact Robert E. Gray, Sales Manager, Superior Scaffold Co., 5624 Bankfield Ave., Culver City, Calif.

New distributor for Trojan tractor shovels

A new distributor has been appointed by The Yale & Towne Manufacturing Co. for the Trojan tractor shovel line for Northern California from the Oregon border south to and including the counties of Santa Cruz, Santa Clara, Merced, Mariposa and Tuolumne. The new outlet is Cook Bros. Truck & Equipment Co., Construction Equipment Division, with headquarters at Oakland.

In Southern California a new Trojan distributor has been appointed for Imperial and San Diego counties, namely, Tractor Supply Co., with headquarters at San Diego.

Distributor appointments by Pioneer

Announced by Pioneer Engineering, Division of Poor & Co., Minneapolis, is the appointment of Cate Equipment Co., Salt Lake City, to sell and service the Pioneer line in Utah with the exception of Carbon, Grand, Emery, Wayne, Garfield, Kane and San Juan counties. Also included in Cate's territory are Uinta County and the southern half of Lincoln County, Wyo.

The seven counties in southeastern Utah mentioned above will be covered by Cate-Carbon Equipment Co., Price, Utah, who will offer the complete Pioneer line to the construction industry in that area.

Toole distributes complete L-W line in Washington

Toole Corporation, 6615 Corson Ave., Seattle, has been appointed as distributor for the complete line of LeTourneau-Westinghouse earthmoving, hauling and grading equipment in the state of Washington. Although the Toole firm is recently organized, it is staffed by men long associated with the earthmoving and construction industries. President and owner, Arthur B. Toole, has a background of fourteen years experience in the heavy equipment business in Canada. Service manager Graeme E. MacKinnon is a 20-year veteran. Norm Siefarth, sales manager, was formerly a sales representative for Northwest Shovel in the Seattle area.

Galion increases Lang's Idaho territory

The Galion Iron Works & Mfg. Co., Galion, Ohio, has assigned seventeen additional Idaho counties to Lang Construction Equipment Co. for sales and servicing of Galion graders and rollers. To service these counties Lang is opening a branch office at Boise. They also have a branch office at Idaho Falls. Their main office is at Salt Lake City.

Vascoloy-Ramet appoints two to Western key positions

Charles L. Strohm has been appointed Western district supervisor of bit sales by Vascoloy-Ramet Corp., Waukegan, Ill. He will supervise all activities in the eleven Western States from Vascoloy-Ramet branch headquarters at 41 So. Auburn St., Grass Valley, Calif. Howard K. "Spot" Beasley was named field service engineer. He will service bit applications in both construction and mining fields in the same area.

Clark appoints Alaska dealer for Michigan line

Bashaw Equipment Co. of Anchorage, Alaska, has been appointed to sell and service "Michigan" tractor shovels, dozers, scrapers, excavator-cranes and tractor loggers throughout the new state, accord-

No area above the **Diamond**foot comes in contact with the soil to alter psi rating; further, rolling drag and material pick-up are minimized.

The leading and trailing edges of the **Diamond**foot make easy foot penetration and withdrawal in heavy soils.

Cross-section dimensions of the **Diamond**foot are greater than any cross-section dimensions of the tapered shank. Full compaction effort is always exerted at the foot face and not dissipated through shank contact.

New **BROS** relief shank tamping foot provides full compaction effort and less drag

● Stress-relieved shank of the new BROS Diamondfoot design has two major advantages for earthwork compaction. Here's why:

First; to produce the lbs. per sq. in. foot pressure required by subgrade sheepsfoot rolling specifications, the BROS design permits the *full* compaction force of the roller drum to be exerted at the *bottom* of the foot —and not dissipated by shank contact with the soil materials. **That's because the Diamondfoot has a larger cross-section than any cross-section of the reverse tapering *shank*.**

Second; this design minimizes rolling drag because in penetration and withdrawal, the Diamondfoot edge design provides the least disturbance to the soil. Too, by reverse tapering, the shank is load relieved and the heavy soil materials have little chance to cling.

Other important features of this engineered Diamondfoot Roller include: Unitized drum and axle; non-adjusting, sealed, self-aligning ball bearings, *outside mounted*. Adjustable and reversible cleaner teeth provide extra long service life.

BROS Diamondfoot Rollers range in sizes from 133 psi to 724 psi foot pressures. Your nearest BROS Dealer has all the details. Or write us. Worldwide sales and service.

BROS ***Incorporated***

ROAD MACHINERY DIVISION

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Write today for the full report on the Ohio tests and for complete new literature describing the new BROS SP-730 pneumatic roller. It's free of cost or obligation!

SHEEPSFOOT TAMPERS

ROLL-O-PACTOR

BITUMINOUS CIRCULATOR

VIBRA-PACTOR

9-TON SELF-PROPELLED ROLLER

9 AND 13-TON ROLLERS

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ing to announcement by A. E. York, sales manager of the Construction Machinery Division of Clark Equipment Co.

New Diamond T dealer announced

Diamond T Motor Truck Co., Chicago, announces the appointment of a new dealer for its line of heavy-duty gasoline and diesel powered trucks, Moab Truck Center, Inc., Moab, Utah.

California distributors add Hopto line

Continuing the expansion of the sales and service organization of The Warner & Swasey construction equipment divisions, I. T. White, manager of sales, announces the addition of two new Western distributors for its Hopto line in California. Western Traction Co. of San Francisco and Sacramento, which has been distributor for Gradall, will have the Hopto line in Northern California also. Brown-Bevis Industrial Equipment Co. of Los Angeles, San Diego and Riverside, now adds Hopto to its Gradall line for the territory lying south of and including the counties of San Luis Obispo, Kern, Inyo and Mono, including also four counties in Nevada.

Bostrom names new distributors

E. E. Richter & Sons, Inc., Emeryville, Calif., and Sound Truck Equipment Co., Seattle, Wash., have been named distributors for Bostrom Corporation's standard and knee action suspension seats for trucks, tractors and earth-moving equipment.

Wemco names distributor

Wemco, a division of Western Machinery Co., San Francisco, has appointed Seitz Machinery Co. of Billings and Great Falls, Mont., to serve the entire state except the six northwest counties with Wemco aggregate processing equipment.

Diamond expansion in Hawaii

Diamond Expansion Bolt Sales Co., Garwood, N. J. announces a new sales agent in Honolulu. Stocking a complete line of Diamond products will be John Grinnon, with offices at 712 Emily St., Honolulu.

Thomas Stowe accepts service manager appointment

Thomas J. Stowe has returned to Salt Lake City to accept appointment as service manager for Parker Equipment Co., construction machinery distributor. He was for several years associated with local distributors as a field service representative and most recently was assistant field manager for a major West Coast construction equipment manufacturer. Stowe recently returned from an extended tour of the manufacturing plants of several of Parker's major accounts.

Oliver Jessup heads new Air-Mac division

In charge of the newly established Construction Equipment Division of Air-Mac, Inc. of Oregon is Oliver C. Jessup, former president and sales manager of Contractors Equipment Corp. in Portland. This firm is discontinuing business and Air-Mac has agreed to dispose of its equipment inventory. Stanley McDonald is president of Air-Mac. He makes his headquarters in the main office in Seattle where the company has both a construction

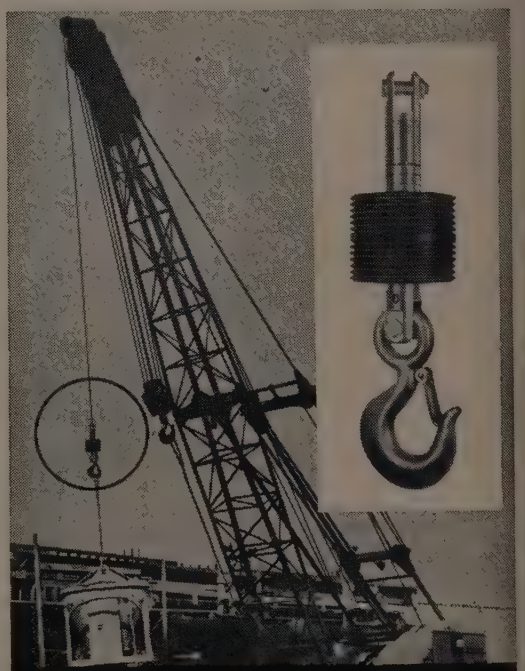
Maximum SAFETY plus SAVINGS

1. Matched set of angular contact bearings.
2. Practically friction free.
3. Seal keeps grease in, foreign matter out.
4. Faster hoisting due to non-spinning loads.
5. Faster load placement due to easy load turning.
6. Faster rigging due to elimination of cranky wire rope performance.
7. Elimination of twists and kinks means longer wire rope life.
8. Safer load placements due to non-spinning loads.

21 standard types available from ½ ton to 250 ton working load

Distributors

John Batchelor, Los Angeles, Calif.; **Weeks Howe Emerson,** San Francisco, Calif.; **Mallory Logging Equipment,** Portland, Ore.; **B & J Equipment,** Seattle, Wash.; **Power Rental,** Denver, Colo.; **Holland Equipment Co.,** Salt Lake City, Utah; **Fresno Wire Rope & Rigging,** Fresno, Calif.; **Western Machinery Co.,** Phoenix, Ariz.; **Mine Supply Co.,** Albuquerque, N.M.



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Electrocutions from accidental crane boom contact with overhead wires CAN be prevented. 50,000 Volt Protection. Seven sizes—5 to 35 ton. For whip line or load blocks.

Miller Swivel Products Inc.
P. O. BOX 938 · POMONA, CALIF.

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equipment and an industrial division.

At Portland, Jack Emahiser is general manager. Heretofore only industrial and materials handling equipment was merchandised here. With establishment of the Construction Equipment Division, the Portland firm is moving to larger quarters at 2727 S. E. Union Ave. Joining the new sales manager at the recently formed division are most of Contractors Equipment Corp.'s personnel, including Lester Grimm and Gordon Yerby, salesmen, and William Hocks, service.

Kwik-Mix appoints two distributors

Fincham Equipment Co., Denver, has been appointed distributor for all Kwik-Mix trademark products manufactured by the Kwik-Mix Co. Territory assigned to the new sales and service headquarters by the Port Washington, Wis., manufacturer, a division of the Koehring Company, covers Colorado and the southern half of Wyoming.

Announcement is made by the KA-MO Department of Kwik-Mix of the appointment of a new distributor for its boring and drilling equipment. The Fornaciari Company of Los Angeles will cover fifteen counties in Southern California and will include Clark County in Nevada. The firm will have exclusive distribution of products manufactured under the KA-MO trademark.

Welding equipment firm takes on Bear line

Balaam Brothers, Emeryville, Calif., has been appointed a distributor of King Brand surface aluminum welding wire in the Oakland-East Bay area, Kaiser Aluminum & Chemical Sales, Inc., announces.

Two Yale industrial distributors named

Machinery Center, Inc., Salt Lake City, has been named franchise representative for sales and service of Yale industrial lift trucks and tractor shovels in Utah, southern Idaho, and western Wyoming.

Likewise, Lift Truck Service Corp., with sales and service centers in Fresno, Modesto, and Stockton, Calif., has been named Central California distributor for Yale materials handling equipment.

ESSICK

VIBRATING COMPACTORS

COSTS DOWN—COMPACTION UP!

WITH ESSICK 54" VIBRATING COMPACTOR

CONTRACTOR REPLACES EQUIPMENT WORTH $67,200 AND DOUBLES PRODUCTION RATE—WITH HIGHER DENSITIES—FEWER PASSES—HIGHER LIFTS

On Texas State Highway 180, Fred Hall & Sons Contractor, were using two Model M tractors, three 10 ton pneumatics, one 3 wheel 10 ton roller, one 50 ton self propelled pneumatic, and one blade to compact crushed limestone with four different clay contents varying from 10% to 15%. They were having considerable trouble getting densities with 2" lifts and many passes of the 10 ton pneumatics, the 50 ton pneumatic on the third lift of 6", and a slushing and final rolling with the three wheel roller to slick off.

Three Essick VR-54 (54") Vibrating Compactors in triplex hook-up made two passes on the full six inch lift, with one more fast pass after a water slush to slick off. They got the required density of 140 pounds to the cubic foot, and increased material laid to twice the amount laid before. The three 54" Vibrating Compactors in triplex replaced $67,200 worth of other equipment—reduced operating costs—and doubled the rate of production.

ESSICK VIBRATING COMPACTORS

In any compaction requirement, ESSICK High-Frequency Vibrating Compactors will cut costs, increase production with higher lifts, fewer passes, higher densities, at a greater profit. ESSICK Vibrating Compactors are constantly increasing the profit of thousands of contractors like Fred Hall & Sons and can do the same for you.

4 models of Vibrating Compactors from 13" to 72" width

for compacting all types of fills, sub base, base materials, asphalt, and trenches

Also 14 Models of Tandem Rollers from ½ to 14 Tons.

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WHERE TO BUY GORMAN-RUPP CONTRACTORS PUMPS

These distributors offer the full line of Gorman-Rupp Contractors' Pumps. Most have rental service, too.

Andrews and Andrews Equip.
Portland

Andrews Equipment Service of Washington
Spokane

Bay Cities Equipment Co.
Oakland and San Jose

Brown-Bevis Industrial Equip. Co.
Bakersfield

The Harry Cornelius Co.
Albuquerque

Delta Tractor Co.
Stockton

Paul Droscher Sales
Redding

Faris-Moritz Equip. Co.
Denver

Flaherty Manufacturing Co.
Pocatello

Industrial Tractor Sales
N. Sacramento

The Lang Co.
Salt Lake City

Mid-State Truck & Mach. Co.
Wenatchee

Northern Commercial Co.
Seattle

Pacific Hoist & Derrick Co.
Seattle

Reno Equipment Sales Co.
Reno

Shasta Truck & Equip. Sales
Redding

Standard Machinery Co.
San Francisco

Starline Equipment Co.
Boise

Studer Tractor & Equip. Co.
Casper, Wyoming

Western Construction Equip. Co.
Billings and Great Falls

Western Equipment Co.
Portland and Eugene

. . . for more details, circle No. 82

Expansion at Weaver Tractor

Weaver Tractor Co. has expanded its rebuilding plant at Sacramento, Calif., with the addition of some of the most advanced machinery for the rebuilding of track rails, rollers and idlers. The latest addition is the twin ram hydraulic track press. The outstanding feature of this machine is its speed, resulting in time and money savings for the customer. Weaver is proud of its equipment and the quality of work turned out by its skilled, experienced personnel.

Superior Products Co. expansion

Superior Products Co., presently at 631 E. 8th St., Oakland, Calif., is expanding into larger offices and plant facilities located at 833 47th Ave., formerly occupied by McGuire Chemical Co. Superior is distributor for Sika products including Plastiment Retarding Densifier for concrete and Rugasol retardant coating for exposed aggregate surfaces on concrete. Various types of Superseal joint sealing compounds and other concrete specialties are manufactured by Superior Products Co.

MANUFACTURERS

Personnel appointments by Western Machinery Co.

Announced at the Salt Lake Branch of Western Machinery Co. are promotions reflecting expansion of business activity, according to L. T. McGuire. George W. McClure has been appointed sales manager for the Salt Lake City office of the Industrial Sales Division. W. A. Bubel, former service manager, has been appointed sales engineer for the southern territory. Ace L. Ringwood, parts manager, has been promoted to plant manager, and R. P. Starr will handle all inside office sales of construction equipment.

McClure

Kozar

Symons promotes Kozar to district sales manager

Richard Kozar has been promoted to the position of Symons district sales manager for the Southern California area, according to announcement by John G. Symons, president of Symons Clamp & Mfg. Co. For the past four years Kozar has been a member of the Chicago area sales staff. His new address is 13429 Moorepark St., Sherman Oaks, Calif.

McMaster heads C.I.T. Portland

Randolph J. McMaster has been elected an assistant vice president of C.I.T. Corporation, the nation's largest industrial financing firm, and head of its Portland division, President Thomas E. Lenihan announces. McMaster joined C.I.T. seven years ago and formerly was a field representative and new-business manager of the Portland Division.

Spanall of Hawaii, Inc. formed

Graeme K. MacDonald, president of Spanall of the Pacific, Inc., Oakland, Calif., recently returned from the Hawaiian Islands where in conjunction with the well known firm of Castle & Cook, he assisted in setting up a new company named Spanall of Hawaii, Inc. The newly-formed corporation will be headed by Samuel T. Dickey of Castle & Cook, and will have the Hawaiian Islands franchise for marketing the Spanall method of horizontal shoring for reinforced concrete slab construction. As on the mainland, Spanall will be available in Hawaii on a purchase or rental basis.

Western regional head

G. A. Gilbertson, president o The Frank G. Hough Co., Lib ertyville, Ill., announces the ap pointment of Herman R. Brow as sales manager of the Payloade Division. Brown, formerly West ern regional manager, has been as sociated with Hough for fourteen years. In turn, the new sales man ager named Donald O. Ross a Western regional manager.

Lester Cole made vice president

Lester M. Cole, general sales manager of Warner & Swasey Co., was recently elected vice president in charge of sales, heading all sales operations of the construction equipment divisions: Gradall, Badger Hopto and Duplex. He also heads the various other divisions of the company.

Executive changes by Air Reduction Pacific

Announcement is made by H. P. Etter, president of Air Reduction Pacific Co., of a major change in the company's San Francisco staff organization. J. G. Bollinger, assistant to the president, was given the assignment of manager of production and distribution in addition to that of assistant to the president. L. J. Fife, until recently sales manager for the San Francisco District, was made manager of marketing for the company. Fife started with Air Reduction in 1939 and since then has served in several key positions. Bollinger has been with the Airco sales organization since 1926 except for two years with the Army Engineers during 1943-45.

Fluor promotes Calkins

L. O. Calkins has been appointed Western area sales manager for The Fluor Corporation, Ltd. In this position he will have authority and responsibility for all sales in the Western area, comprising roughly the Rocky Mountain and Pacific Coast states. Calkins started with Fluor in 1942. Advancing through several positions of responsibility, he was appointed district sales manager for the Rocky Mountain area in 1954. In 1955 he moved back to Fluor's Los Angeles headquarters.

Albert M. Guthrie dies

Albert M. Guthrie, newly appointed construction machinery general sales manager for Gar Wood Industries, Inc., died after a short illness at Pontiac, Mich. He had been associated with Gar Wood for twenty years and had been West Coast sales manager for the firm since 1952. He was in the process of moving from California to his new post at Findlay, Ohio, headquarters of Gar Wood's constructon machinery division, when stricken.

Cummins promotes two in sales

The promotion of G. L. Bego and R. W. Franck to new positions with Cummins Engine Co., Inc., Co-

FITS MORE JOBS . . . DOES EVERY ONE BETTER!

watson metco TELESCOPING VIBRATORY SCREED

FEATURES:

* EASY WIDTH ADJUSTMENT—Telescoping span eliminates investment in different-length beams, saves time changing beams, permits quick adjustment for variable curb widths.
* NO FORM DAMAGE—Beam does not overhang forms; practically no vibration is transmitted to form.
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* RE-TRANSMITTED WAVE PATTERN PRODUCES DEEP, UNIFORM COMPACTION—Center-box eccentric produces 8,700 vibrations per minute transmitted through double beam in an overlapping wave pattern that eliminates dead spots, spreads pile-up evenly, provides deeper compaction.

WHY GO ON LOSING TIME AND MONEY WITH OLD-STYLE SCREEDS? Put a WATSON-CMETCO to work now—you'll be set for practically any size or type of job in the future. Heavy duty Model 2B302 provides 15'6" to 23' beam length; Model 2B303, 22'6" to 36'. Light-duty models for tilt-up slabs and floor slabs provide 10'2" to 15', or 15' to 25' beams. Interchangeable beam sets, special crowned beams available. Also "Build-Your-Own" Economy Screed Kit. Write today for literature; address dept. W-5

Dealer Inquiries Invited

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Power Buggies • Telescoping and Economy Vibratory Screeds • Rola Pavers and Trench Boxes • Wood and Steel Tilt-Up Hardware • Bull Floats • Hoppers • Elephant Trunks and Chutes • Tampers • Hand Carts

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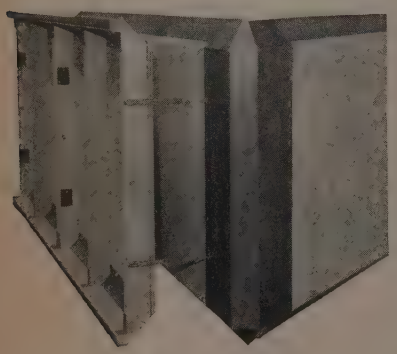
Stem Wall Forms

Symons Offers New Stem Wall Forms

Reduce Manpower... Cut Material Requirements... Stop Congestion

Symons now can offer a new stem wall form that can save as much as 25% in costs in viaduct and bridge forming.

This new form eliminates many of the costly features of conventional stem wall



Corner Set-Up with 4 x 8 Stem Wall Forms

forms. It is light enough so that men can handle it with ease. Panels are stronger so that tie spacing can be a minimum of four feet. Also costly walers are eliminated.

We invite your inquiries for complete information on the new Symons Stem Wall Forms.

Symons

SYMONS CLAMP & MFG. CO.

634 Williams Street
San Leandro, California

MORE **SAVINGS** FROM **SYMONS**

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lumbus, Ind., has been announced by C. R. Boll, vice president-sales. Bego has been made director of sales services and is responsible for directing all activities of the Sales Development Department and Cummins Diesel Sales Corp. Franck has been appointed new field sales manager and is responsible for fleet sales activities and Cummins' regional offices.

Parsons appoints Danford as Western representative

The appointment of R. H. "Dick" Danford as a district representative for the Western region of the United States is announced by R. E. Bansemer, sales manager for the Parsons Company, Newton, Ia. Parsons produces trenching equipment. Danford was formerly associated with Standard Machinery Co. of San Francisco in complete charge of the Parsons "Trenchliner" account. His complete knowledge of Parsons equipment and its applications will be of considerable aid to distributors, according to Bansemer. He will work out of San Francisco, with his business address being 77 Cliffside Dr., Daly City, Calif.

Leschen promotes Dow and Hartup

Gordon N. Dow has been named general manager, and R. Rex Hartup, general sales manager of Leschen Wire Rope Division, H. K. Porter Co., St. Louis, Mo. Joining Leschen in 1952 as a sales representative, Dow now assumes full responsibility for the operation of the division. Hartup, who will be in charge of sales for all Leschen products, has been with the firm since January 1958.

C. F. Boyd dies

Charles F. Boyd died in Miami, Fla., where he had gone to recuperate from a recent illness. Boyd was associated with The Galion Works & Mfg. Co. for 42 years, and for the past 12 years was vice president in charge of sales. Born in Orrville, Ohio, in 1896, he moved in 1906 to Galion where his father, the late D. C. Boyd, founded the Galion Iron Works.

Large attendance at Iowa Manufacturing Co.'s service schools

Iowa Manufacturing Co. announces that this year's attendance at its three service schools held at Cedar Rapids, Ia., was one of the largest since the first school in 1946. In addition to class-room sessions guided tours through the company's plant were conducted so that dealer representatives and customers would have a better understanding of the Cedarapids line of aggregate producing, bituminous mixing, and paving equipment.

Warner & Swasey reorganizes Western field offices

In the reorganizing of its territories and regional office set-up to handle the combined Gradall and Hopto lines of earth-handling equipment, The Warner & Swasey Co., Cleveland, Ohio, has divided

Sitter

Sehl

the country into eight territories, two of them in Western United States. A district office will continue to be maintained at Los Angeles, with regional offices located at San Francisco and Seattle. A newly established regional office at Denver, Colo., will cover the states of Montana, Wyoming, Colorado and New Mexico. E. J. Sehl has been assigned as district representative here.

In line further with this program of integration of field personnel, I. T. White, manager of sales for the construction equipment divisions, made these announcements. James J. Ferguson, who has been handling the Hopto line in the Seattle regional office, will add the Gradall to his assignment as district representative. Troy G. Sitter has been transferred to the post of district representative in the San Francisco regional office.

Monte Lindmoe named Yuba sales director

Monte Lindmoe, formerly executive vice president of Southwest Welding & Manufacturing Co., has been named vice president of Yuba Consolidated Industries, Inc., of San Francisco, and director of sales for all of Yuba's operating divisions and subsidiaries.

Tubular Structures holds Western meet

Some forty-six distributors and salesmen of Waco scaffolding, Jumbo shoring, the Tusky and Simba hoists attended Tubular Structures Corp. of America's Western equipment convention at the company's headquarters in Los Angeles. The companies represented came from all points throughout the West. Purpose of the meeting was to expand the knowledge, cooperation, and friendship between the manufacturer and his distributor.

Promotion and addition

Howard F. Peckworth, managing director of the American Concrete Pipe Association and the American Concrete Pressure Pipe Association, announces that John G. Hendrickson, Jr., formerly research engineer of the above associations, has been promoted to director of engineering-research of both groups. Peckworth also announces the addition of a new member to his staff: Harold A. Cloud, who will be assistant managing director of the American Concrete Pipe Association. Cloud was for three years a research engineer for Minneapolis Honeywell Regulator Co. before joining the ACPA.

Moline elects Carroll v.p.—marketing; Hipwell named sales manager

M. E. Carroll, general sales manager of Minneapolis-Moline Co., has been elected to the new office

Carroll

Hipwell

of vice president—marketing. In turn, Roger R. Hipwell, previously product and advertising manager, was named by Carroll to the position of sales manager-industrial and OEM division, with responsibility for the firm's district representatives who work with contractor equipment distributors.

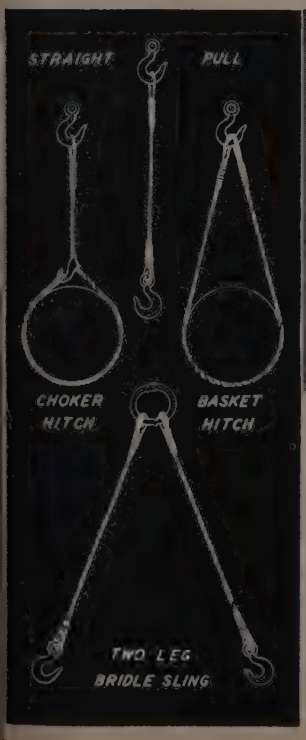
New district sales representative

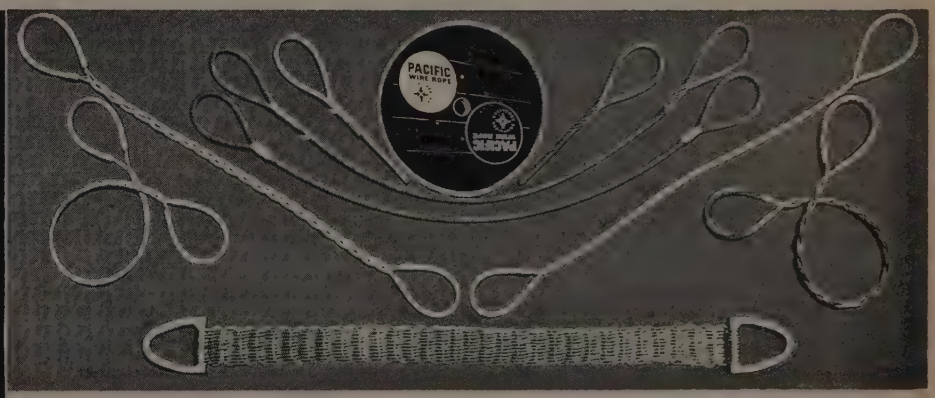
Huber-Warco Co., Marion, Ohio, announces the appointment of John K. Shoemake as a district sales representative. His territory includes the states of Montana, Idaho, Wyoming, Oregon, Washington, Alaska, and the province of British Columbia. At one time Shoemake was located as a salesman in the San Francisco area for Chicago Pneumatic Tool Co. He will make his headquarters in Seattle.

Blaw-Knox appoints sales engineer

Robert H. Meyer has been named a construction equipment sales engineer for Blaw-Knox Co., Pittsburgh, Pa. Assigned to the firm's Chicago regional office, his area includes Wyoming, Colorado and eastern Montana, as well as the Dakotas, Minnesota and Nebraska. Blaw-Knox offers a complete package of equipment for construction of concrete or bituminous roads, highways and airports, and for the production of ready-mixed concrete.

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





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

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

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50th Anniversary

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only
$189.50

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- Pinpoint accuracy
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New, Transistorized
LEAK DETECTOR
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Dept. WC-1, Palo Alto, Calif.

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NEW! EFCO BRIDGE COLUMN FORMS

EFCO Bridge Column Forms used on New Orleans overpass save time and labor. Precision construction permits quick, easy stripping as shown. Adaptable to a wide range of uses. Ideal for forming pier nosings when combined with regular EFCO Forms.

MAIL COUPON TODAY

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Box 128-V
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Des Moines, Iowa

Please send information on EFCO Bridge Column Forms, and address of nearest sales office.

Name.....
Firm name.....
Address.....
City..... State.....

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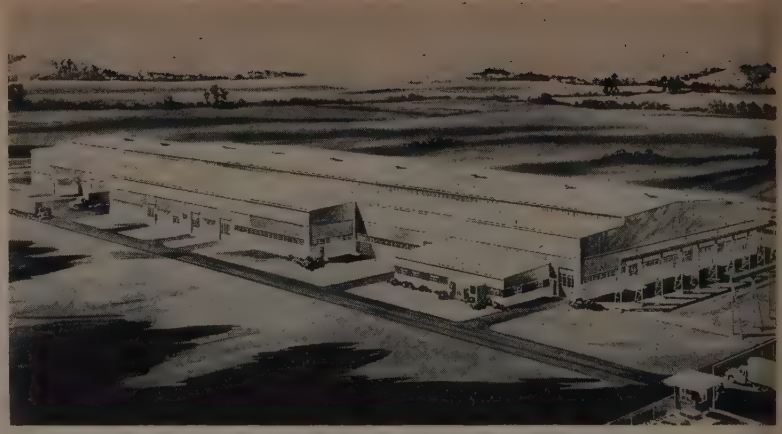

FRUEHAUF TRAILER'S WESTERN PLANT

Fruehauf's new Western factory well under way

Construction on Fruehauf Trailer Co.'s newest West Coast factory is on schedule, according to William E. Grace, president, and the first trailer will roll off the ultra-modern assembly lines by autumn. Located in the Vina Vista district of Ontario, Calif., the new plant will produce 25 different models for Western operation. Founded in 1914, the company has been in business in California since 1935, and has outgrown the facilities of the Los Angeles plant, according to Robert D. Hill, vice president — finance. S. K. Porter is vice president and general manager of the Pacific Coast Division.

Grace

Porter

A-C sales appointment at Oakland

Carl G. Meyer is appointed materials handling sales manager of the Allis-Chalmers Manufacturing Co., branch in Oakland, Calif. He comes to the West from a like position in A-C's Atlanta, Ga., branch.

Phoenix sales staff expanded

Expansion of its Phoenix district sales staff by the appointment of Charles C. Corley, formerly with Junction Bit & Tool Co., is announced by Atlas Copco Pacific Inc. He will work with construction firms in Arizona and New Mexico.

New company formed in the West

Gordon I. Gould, internationally known in the mining industry, announces the formation of Aggregate Engineers, Inc. The new company will function as engineers, designers, fabricators and sales representative to the rock industry. E. J. Marriott, formerly vice president of Standard Machinery Co., is vice president and manager. Offices are at 58 Sutter St., San Francisco.

Sales executives appointed by Noble Company

The Noble Company, manufacturer of concrete batching plants and materials handling equipment, announces the appointment of Van Barber as Southwest regional sales manager of the batching plant division with headquarters in Oakland, Calif.

Gordon Rowand named operations manager at Spokane

Gordon W. Rowand has been appointed operations manager of the Spokane, Wash., office of Western Machinery Co. Formerly sales manager for Link-Belt Speeder Corp., he replaces H. A. Myers, now managing the Denver office of Western Machinery Co.

McCaffrey names Salyers sales rep

Appointment of Tom Salyers as sales representative for M. P. McCaffrey, Inc., Los Angeles, is announced by Tom McCaffrey, vice

president. Salyers will cover Orange County and the southern part of Los Angeles County. The pioneer Southern California firm manufactures clamshell and dragline buckets, crane and jib booms, and allied equipment.

Marion advances Mike Geller

Myron "Mike" Geller has been named sales manager for small machines by Marion Power Shovel Co. He had been assistant sales

Myron Geller

manager for the past fourteen months. In announcing the advancement, A. F. Busick, Jr., executive vice president and general manager, said Geller will be responsible for the sale of Marion machines in the ¾ to 4-cu. yd. range.

John Buscovich gets promotion

John P. Buscovich has been named superintendent of industrial relations for the South San Francisco plant of Consolidated Western Steel Division. He succeeds the late William I. Farmer at the U. S. Steel facility.

White Truck Division elevates Charles Moss

Charles W. Moss has been promoted to service sales manager of the White Truck Division of The White Motor Co., Cleveland, Ohio, succeeding Harold Haldeman who has entered White's management sales training course. Ralph Carter has been promoted to assist Moss.

Personnel changes at United Concrete Pipe Corp.

Ben Jaffray has been appointed plant superintendent of United Concrete Pipe Corp.'s main plant at Baldwin Park, Calif., according to announcement by Lloyd Earl, president. Also announced is the appointment of Tod Johnston as general manager of the corporation's Northwest operations.

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Spitzer Elect'l Co., Denver, Colo.

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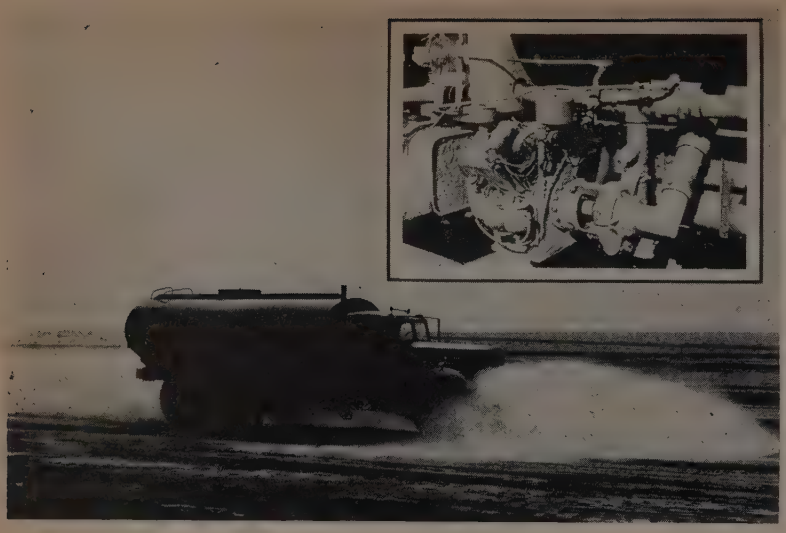

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He couples an American-Marc AC-2 Diesel directly to a Berkeley 800-gpm. centrifugal pump rated for water truck service. Regular truck diesel fuel is used, eliminating any temptation to "borrow" gasoline from auxiliary fuel tank. Close-coupling the pump eliminates troublesome belts and drive shaft, with their attendant alignment problems.

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. . . for more details, circle No. 90

NEW FILMS

A new film "What's in a name?" has been produced by Gardner-Denver Co. to show how a firm celebrating its Centennial grew from a one-room shop into a world-wide company serving the world's basic industries. The 17-min. sound and color film describes the development of Gardner-Denver since its founding in 1859 with a governor for steam engines as its first product. Today G-D makes a line of equipment for construction, mining and general industry. This film can be obtained for showing without charge to interested groups by writing **Film Library, Gardner-Denver Co.**, Quincy, Ill.

Two new motion pictures released by **Caterpillar Tractor Co.** are "Report on the Giant" and "The New D8 Series H". The first reports on work being done by Cat D9s throughout the United States. This 17-min. sound and color film shows the giant of the crawlers at work on tough jobs, while superintendents explain what their D9s are doing, why they chose them, and what features of the 320-hp. crawlers are most important. The other is a fast-paced color motion picture which follows development of the new tractor from the engineer's drawing board through research testing at proving grounds and on-the-job site. Arrangements to see the films can be made through your Caterpillar dealer.

"Magic Highway USA" is the story of our highways, symbols of our Nation's progress – their past, present, and their future—presented by Walt Disney in a 29-min. film in technicolor. Film can be rented for $10 a day, or leased for longer periods. Full information can be secured from **Walt Disney Productions, 16mm Film Division,** 500 S. Buena Vista Ave., Burbank, Calif.

The Asbestos-Cement Pipe Division of **Keasbey & Mattison Co.** announces the availability of a new sound-color 16-mm movie highlighting the manufacture, as well as field installation, and advantages of asbestos-cement pipe. The 15-min. movie is available for showing to groups upon request to Keasbey & Mattison's San Francisco district office.

IF YOU HANDLE **EXPLOSIVES**
the **MODEL 'C'** is worth
your life and money

Millions of pounds of explosives have been loaded by the MODEL 'C' Loading and Tamping Machine without one single accident.
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UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—Concrete freeway and bridges

California—San Bernardino County—State. Winston Bros. Co. of Monrovia was low of nine bidders for a 4.4 mi. project involving construction of grade separation structures and paving portions of freeway with concrete on cement treated base.

(1) Winston Bros. Co.	$1,467,980
(2) Fredericksen & Kasler	1,507,025
Griffith Co.	1,527,446
Matich Constructors	1,536,502
Charles MacClosky Co.	1,547,762

		(1)	(2)
32,500 sq. yd.	Remove concrete pavement	$ .69	$ .60
	Clearing and grubbing	50,000.00	48,000.00
	Dev. wat. sup. & furn. wat. equip.	20,000.00	35,000.00
25,500 M gal.	Applying water	1.00	.02
53,000 sq. yd.	Compact. original ground	.04	.03
30,000 cu. yd.	Roadway excavation	.48	.50
8,500 cu. yd.	Structure excavation	1.30	1.75
7,950 cu. yd.	Structure backfill	2.60	3.25
6,700 cu. yd.	Ditch & channel excavation	1.00	.90
690,000 ton	Imported borrow	.32	.44
53,000 ton	Imported base material	.74	.85
75,000 sq. yd.	Prepar. excavation slopes (eros. cont.)	.05	.05
52 ton	Straw	49.50	60.00
3,850 lb.	Seed, Type A	.18	.20
1,650 lb.	Seed, Type B	.40	.50
12 ton	Commercial fertilizer	145.00	165.00
32,700 sq. yd.	Mix. spread & compact. C.T.S.	.21	.30
1,000 bbls.	Portland cement	4.10	3.80
44 ton	Asphalt emul. (pt. bdr. & fog sl. ct.)	38.00	65.00
27 ton	Liq. asph. MC-2 (cur. sl.)	38.00	42.00
87 ton	Liq. asph. SC-2 (pr. ct.)	38.00	40.00
915 ton	Pav. asph. (P.M.S.)	5.50	5.60
17,500 ton	Min. aggr. (P.M.S. Type B)	5.50	5.60
450 ton	Min. aggr (P.M.S. open gr.)	5.50	5.90
90 sq. yd.	Plac. P.M.S. spillway d'ndrains	1.55	1.00
400 sq. yd.	Place. P.M.S. median gutters	1.55	1.00
6,800 lin. ft.	Plac. P.M.S. dikes	.25	.22
1,050 sq. yd.	Sterilizing soil	.18	.20
7,300 cu. yd.	Cl. B conc. (pavement)	14.00	15.00
9,800 ea.	Pavement tie assemblies	.55	.50
1,300 cu. yd.	Cl. A conc. (structures)	58.60	48.00
35 cu. yd.	Cl. A conc. (foundations)	40.00	33.00
	Cl. A conc. (bridges) (4,580 cu. yd.)	253,480.00	193,000.00
30 ea.	Furn. precast prestres. conc. gird. (81 in.)	1,455.00	1,500.00
52 ea.	Furn. precast prestres. conc. gird. (68 in.)	1,190.00	1,250.00
82 ea.	Erect. precast. prestres. conc. girders	50.00	130.00
145 cu. yd.	Air blown mortar	40.60	45.00
970 lin. ft.	Rubber waterstops	1.70	3.00
153,000 lb.	Bar reinf. steel	.14	.13
	Bar. reinf. steel (bridges) (715,000 lb.)	84,000.00	87,000.00
1,700 sq. yd.	Mesh reinforcement	.93	.90
4,130 lin. ft.	Furn. conc. piling	3.50	3.65
2,105 lin. ft.	Furn. steel piling	4.00	4.15
294 ea.	Driving piles	63.00	65.00
19,000 lb.	Misc. iron and steel	.27	.23
940 cu. yd.	Cl. B. conc. (curbs & gutters)	28.00	30.00
41 ea.	Survey monuments	13.00	15.00
3,983 lin. ft.	Metal plate guard railing	3.75	3.45
1,316 lin. ft.	Steel railing	7.25	7.65
109 ea.	Guide posts marker and horizontal refl. units	6.00	6.50
48,300 lin. ft.	72 in. chain link fence	1.30	1.35
280 lin. ft.	18 in. R.C.P.	6.25	5.65
540 lin. ft.	24 in. R.C.P.	7.80	7.20
20 lin. ft.	30 in. R.C.P.	9.80	10.00
70 lin. ft.	33 in. R.C.P.	11.40	10.50
406 lin. ft.	36 in. R.C.P.	13.00	12.00
304 lin. ft.	42 in. R.C.P.	16.00	15.50
38 lin. ft.	12 in. C.M.P. (16 ga.)	3.00	3.30
42 lin. ft.	18 in. C.M.P. (16 ga.)	4.00	4.60

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Quick starts with a minimum of battery drag is one of the money-saving advantages of Zoildeez. Balanced to give you best performance under both cold and hot operating conditions, this supreme quality engine oil burns clean and won't thin out. Protects rings, valves and cylinders, keeps the entire engine in top condition. Master mechanics and maintenance men agree—you get better protection, better performance with Zoildeez.

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124 lin. ft.	24 in. C.M.P. (14 ga.)	6.00	7.00
1 ea.	Entr. taper for 8 in. met. pipe	40.00	70.00
48 lin. ft.	8 in. C.M.P. downdrains	3.00	2.30
1 ea.	Downdrain slip joint for 8 in. metal pipe	40.00	30.00
1 ea.	Downdrain pipe anchor for 8 in. metal pipe	19.00	30.00
100 lin. ft.	Salv. 18 in. C.M.P.	1.30	1.15
927 lin. ft.	Salv. 24 in. C.M.P.	2.00	1.15
	Finishing roadway	4,600.00	2,200.00
670 lin. ft.	Raised traffic bars	1.50	2.20
1,487 sq. yd.	Bridge shoulder treatment	1.00	.35
	Steel sign structures	7,700.00	8,000.00
2 ea.	Transplanting palm trees	150.00	165.00
1 ea.	Adjusting manhole to grade	80.00	110.00
	Hwy. light & sign illum. sys.	27,660.00	32,000.00
	Traffic sig. sys. & hwy. lighting	15,000.00	14,000.00

HIGHWAY—4.1 mi. of concrete freeway

California—Santa Clara County—State. Gordon H. Ball, Gordon H. Ball, Inc., Ball & Simpson & Lew Jones Construction Co., a joint venture, was low of 9 bidders at $3,870,610 for 4.1 mi. of divided 4-lane freeway in and near San Jose. Project includes grading, surfacing with Portland cement concrete, plant-mix surfacing, and 10 major structures.

(1)	Ball, Simpson, & Jones	$3,870,610
(2)	Fredrickson and Watson & Ransome	3,915,333
	L. C. Smith, Caputo, & Cambrian Gateway	3,978,065
	Stolte, Inc.	4,114,970
	Peter Kiewit Sons' Co.	4,164,901

		(1)	(2)
100 ea.	Portable barricades	$ 40.00	$ 40.00
13,000 lin. ft.	Remov. traffic stripes	.12	.13
85 lin. ft.	Remov. raised traffic bars	.20	.54
4,100 sq. yd.	Obliterating detour	.10	.15
1,200 sq. yd.	Shattering conc. pavement	.25	.30
	Clearing and grubbing	8,800.00	50,627.28
	Dev. wat. sup. & furn. wat. equip.	110,000.00	64,300.00
39,000 M gal.	Applying water	.01	.01
425,000 sq. yd.	Comp. original ground	.04	.04
685,000 cu. yd.	Roadway excavation	.41	.44
22,650 cu. yd.	Structure excavation	2.30	3.80
14,500 cu. yd.	Structure backfill	3.15	5.00
5,450 cu. yd.	Ditch & channel excav.	.50	1.17
25,000,000 sta. yd.	Overhaul	.003	.0038
475,000 ton	Imported borrow	.90	.73
219,000 ton	Imported subbase mat.	1.27	1.30
55,000 ea.	Ice plant cuttings	.02	.03
2,600 lb.	Seed	.22	.24
56 lin. ft.	2 in. galvanized pipe	1.00	1.40
353 lin. ft.	2½ in. galvanized pipe	1.35	2.00
120 lin. ft.	3 in. galvanized pipe	1.55	2.50
1,200 lin. ft.	4 in. asbestos pipe	1.15	1.60
89,500 sq. yd.	Mix., spread. & compact. cem. tr. subgrade	.23	.25
63,000 sq. yd.	Mix., spread. & compact. 0.58 ft. thick or less C.T.B.	.31	.26
126,000 sq. yd.	Mix., spread. & compact. over 0.58 ft. thick C.T.B.	.38	.36
15,800 bbls.	Portland cement	4.00	4.50
212 ton	Asphaltic emulsion (cur. sl., pnt. bdr. & sl. cts.)	47.00	48.00
90 ton	Liquid asphalt, MC-2, (cur. sl.)	55.00	55.00
60 ton	Liquid asphalt, SC-1 (pr. ct. & pen. tr.)	50.00	40.00
1,590 ton	Paving asphalt (P.M.S.)	6.30	36.00
31,800 ton	Min. aggregate (P.M.S.)	6.30	4.00
1,200 sq. yd.	Placing P.M.S. median paving, dwndrn. & ditch lining	1.00	1.15
9,200 lin. ft.	Placing P.M.S. dikes	.25	.22
390 ton	Screenings (sl. ct.)	10.00	7.50
19,900 cu. yd.	Class B conc. (pavement)	15.00	15.70
14,000 ea.	Pavement tie assemblies	.28	.43
	Class A concrete (bridges) (7,050 cu. yds.)	374,750.00	369,000.00
580 cu. yd.	Class A conc. (struc.)	69.00	65.00
2,675 lin. ft.	Rubber waterstops	2.50	1.45
	Bar reinforcing steel (bridges) (975,000 lbs.)	120,960.00	118,000.00
57,000 lb.	Bar reinforcing steel	.13	.14
440 sq. yd.	Membrane waterproofing	4.00	4.00
435 sq. yd.	Protective covering	2.00	1.70
34,425 lin. ft.	Furn. concrete piling	3.96	3.80
766 ea.	Driving piles	67.50	74.00
	Structural steel (2,650,000 lbs.)	415,000.00	423,000.00
	Steel sign structure	64,387.00	66,000.00
	Pump. plant met. work	3,000.00	3,700.00
34,500 lb.	Misc. iron and steel	.28	.30
	Cleaning and painting structural steel	40,000.00	27,220.00
2,920 cu. yd.	Class B concrete (curbs and gutters)	33.00	35.00
390 cu. yd.	Class B concrete (sidewlks. & isl. pav.)	31.00	27.00
1,400 ea.	Curb dowels	.10	1.00
3 ea.	Stand. curb openings	22.00	27.00
23 ea.	Survey monuments	17.50	18.00
10 cu. yd.	Broken concrete riprap	15.00	22.00
5,514 lin. ft.	Steel bridge railing	8.00	8.20
2,755 lin. ft.	Met. plate guard railing	3.15	3.40
710 ea.	Guide posts, markers and horiz. refl. units	6.00	6.60
34,500 lin. ft.	72 in. chain link fence	1.45	1.50
350 lin. ft.	Remov. & reconstruct. chain link fence	.90	1.10
1 ea.	Chain link gate (12 ft.)	100.00	110.00
1,056 lin. ft.	12 in. R.C.P. (Class III)	3.25	2.50
264 lin. ft.	12 in. R.C.P. (Class V)	3.00	2.70

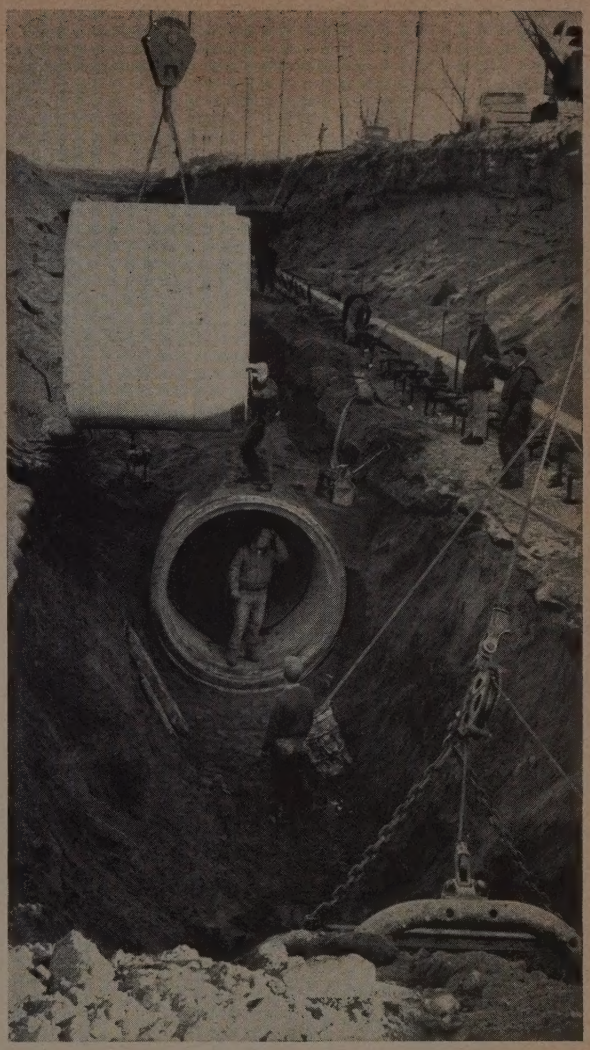
3,960 lin. ft.	18 in. R.C.P. (Class III)	3.85	4.00
428 lin. ft.	18 in. R.C.P. (Class V)	4.30	4.40
1,192 lin. ft.	24 in. R.C.P. (Class III)	4.80	6.40
1,156 lin. ft.	24 in. R.C.P. (Class V)	5.50	6.50
1,444 lin. ft.	27 in. R.C.P. (Class III)	5.30	6.70
1,484 lin. ft.	30 in. R.C.P. (Class III)	6.30	8.30
96 lin. ft.	30 in. R.C.P. (Class V)	7.30	8.60
324 lin. ft.	39 in. R.C.P. (Class III)	10.00	11.90
72 lin. ft.	39 in. R.C.P. (Class V)	13.50	14.00
248 lin. ft.	48 in. R.C.P. (Class III)	12.80	14.80
572 lin. ft.	12 in. C.M.P. (16 ga.)..	2.90	2.90
230 lin. ft.	18 in. C.M.P. (16 ga.)..	3.95	4.20
130 lin. ft.	18 in. x 11 in. C.M.P. arch (14 ga.)	4.40	4.50
22,520 lin. ft.	8 in. P.M.P. underdrains	1.80	1.90
41,000 ton	Filter material	2.20	2.40
	Finishing roadway	5,000.00	14,300.00
265 lin. ft.	Raised traffic bars	1.95	2.00
520 lin. ft.	10 in. vitrified clay pipe.	3.75	3.20
656 lin. ft.	18 in. vitrified clay pipe.	6.95	7.00
1,456 lin. ft.	30 in. vitrified clay pipe.	15.50	18.00
36 lin. ft.	27 in. casing pipe	11.00	15.00
13 ea.	Adjust. manhls. to grade	55.00	85.00
71 lin. ft.	Standard brick manholes	35.00	37.00
41 lin. ft.	Special sanitary brick manholes	53.00	41.00
	Highway light and sign illumination system ...	88,000.00	88,000.00
	Modify. traffic signal systems and highway lighting..	10,000.00	8,200.00
	Temp. traffic signal systems and highway lighting..	8,000.00	7,800.00
	Drainage pumping equip.	24,400.00	24,000.00
	Pump house elec. equip.,	9,000.00	8,200.00
	Engine-generator set ...	11,500.00	11,400.00

HIGHWAY—6.299 mi. of highway in Wyoming

Wyoming—Carbon County—State. Read Construction Co. of Cheyenne, lowest of 8 bidders, was awarded a $1,281,063 contract for construction of a 4-lane Interstate highway on the Rock Springs-Rawlins road.

(1) Read Construction Co. $1,281,063
(2) Morrison-Knudsen Co. 1,317,468
W. W. Clyde & Co. 1,390,635
Big Horn Construction Co. 1,433,780
LeGrand Johnson Const. Co. 1,517,837

		(1)	(2)
852,000 cu. yd.	Excavation	$ .332	$ .30
28,900 M gal.	Watering	2.00	2.00
942,200 cu. yd.	Embankment compaction	.03	.05
5,185 cu. yd.	Backfill compaction	1.10	2.20
1,030 cu. yd.	Excav. for pipe culverts.....	2.00	2.00
302,500 cu. yd. mi.	Cubic yard mile haul.....	.10	.14
0.63 mi.	Old road obliteration	400.00	400.00
130 hr.	Scraper operation	14.00	15.00
130 hr.	Patrol operation	10.00	12.00
60 hr.	Bulldozer operation	14.00	15.00
90,500 cu. yd.	Strip. & storing topsoil.....	.20	.20
90,500 cu. yd.	Replacing topsoil	.24	.24
170 acre	Seeding (Crested Wheat Grass).	25.00	60.00
75 hr.	Road leveler operation	15.00	12.00
90,000 ton	Sel. mat. surf.—Type 2.....	.51	.45
10,200 ton	Crushed gravel base course (1 in. max.)	.68	.78
6,075 ton	Asphaltic material AC-PM	24.50	25.00
230 ton	Asphaltic material AC-Tack	35.00	28.00
375 ton	Asphaltic material RCF-Seal ..	41.00	38.00
600 ton	Asphaltic material MC-Prime ..	35.00	32.00
38,000 ton	Plant mixed S C (incl. haul)..	4.00	3.18
1,250 ton	Sand (incl. haul)	4.00	3.80
290 ton	Stone chips (Type B) (incl. haul)	7.00	4.60
1,000 ton	Stone chips (Type C) (incl. haul)	5.35	4.00
6,700 lin. ft.	Shaping and tamping curb.....	.20	.60
718,500 T mi.	Haul of surfacing material....	.09	.07
95,000 ton	Plant mixed B C (stabilized)..	2.00	2.50
3,160 lin. ft.	24 in. C.M.P.	6.50	6.50
302 lin. ft.	30 in. C.M.P.	7.80	8.00
626 lin. ft.	36 in. C.M.P.	12.00	13.00
316 lin. ft.	54 in. C.M.P.	20.00	21.00
84 ea.	24 in. C.M.P. flared end section	51.00	55.00
6 ea.	30 in. C.M.P. flared end section	80.00	85.00
14 ea.	36 in. C.M.P. flared end section	122.00	125.00
60 lin. ft.	50 in. x 31 in. C.M.P. arch culverts	15.00	16.00
2 ea.	50 in. x 31 in. C.M.P. arch flared end section.....	125.00	130.00
168 lin. ft.	8 in. nestable C.M.P.	4.00	5.00
152 lin. ft.	132 in. structural plate pipe (38-510)	87.00	90.00
168 lin. ft.	150 in. x 95 in. S P pipe arches (48-410)	86.00	85.00
196 lin. ft.	169 in. x 105 in. S P pipe arches (58-410)	97.00	90.00
Lump sum	Remov. exist. structures	1,500.00	4,000.00
90 lin. ft.	2½ in. galvanized iron pipe....	1.40	2.00
140 cu. yd.	Grouted riprap	23.00	30.00
3,000 lin. ft.	Metal plate guard fence.....	2.65	3.00
74,000 lin. ft.	32 in. woven and 3 barbed wire fence	.32	.30
85 ea.	End panels	15.00	15.00
110 ea.	Brace panels	12.00	14.00
3 ea.	20 ft. galvanized steel gates....	75.00	125.00
6 ea.	7 ft. - 9 in. x 24 ft. - 0 in. heavy duty cattleguard	1,000.00	1,100.00
350 ea.	Type A reflec. guide posts.....	7.00	6.50
320 ea.	Type E reflec. guide posts....	3.00	6.50
55 ea.	Right-of-way markers	10.00	15.00
2 ea.	Reinf. conc. project markers....	35.00	30.00
400 cu. yd.	Concrete block riprap	30.00	75.00
Acct. Force	Misc. force account items.....		
110 lin. ft.	Relaying pipe	2.50	2.50
736 lin. ft.	12 in. C.M.P.	3.40	4.00
40 ea.	12 in. C.M.P. flared end section.	23.00	25.00



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PROJECT: STORM DRAINS FOR MINNESOTA STATE HIGHWAY DEPT., BLOOMINGTON, MINNESOTA. CONTRACTOR: BARBAROSSA & SONS, INC., ST. CLOUD, MINN.

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DAM—Enlargement of Mathews Dam

California—Los Angeles—Metropolitan Water District. A contract has been awarded to Winston Bros. and Green Construction, a joint venture and low of 9 bidders, in the amount of $7,583,866, total for both schedules, for the construction of enlargement of Matthews Dam and Dike, part of the Colorado River Aqueduct system.

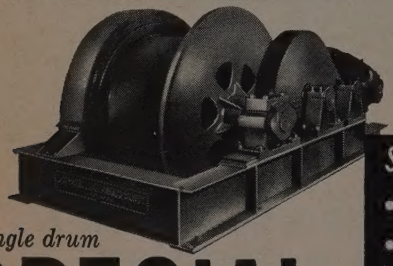
(1) Winston and Green	$7,583,866
(2) Westbrook and Morrison-Knudsen	7,666,762
Fredericksen & Kasler and Isbell	7,688,850
Macco and MacDonald & Kruse	8,564,489
Teichert & Son, Bevanda, Wood, & Alwood	9,085,290

SCHEDULE 1

		(1)	(2)
40,000 cu. yd.	Stripping for borrow pits and quarries — unclass...	$ .40	$ .40
100,000 cu. yd.	Excav. for embank., found., common	.75	.50
1,000 cu. yd.	Excav. for embank., found., rock	5.00	6.40
3,400 cu. yd.	Excav. for embank. cutoff walls, unclassified	20.00	4.65
900 cu. yd.	Excav. in exist. dam embank. for pave. slab ftg., unclass.	3.00	.35
1,000 cu. yd.	Excav. for dam embank. toe drains, unclassified	4.00	15.00
40,000 cu. yd.	Excav. exist. embank. matl. for enlarge. of dam, unclass.	.60	1.30
1,200 cu. yd.	Excav. for rdways, unclass.	1.00	1.20
15,000 cu. yd.	Borrow for rdway. embank.	.70	.60
2,700 cu. yd.	Fill along cutoff walls	2.00	1.00
50,000 cu. yd.	Earthfill in embank., mat'l. from req'd. excav.	.20	.25
1,600,000 cu. yd.	Earthfill in embank., mat'l. from bororw areas	.63	.50
18,000,000 sq. yd.	Rolling embank. mat'l.	.0006	.0006
1,500 cu. yd.	Spec. compac. of earthfill	2.00	6.40
20,000 cu. yd.	Rock blanket, 24-in. on embank., mat'l. from excavation	.40	1.15
45,000 cu. yd.	Rock blanket, 24-in. on embank., mat'l. from quarries	1.90	1.25
110,000 cu. yd.	Rock in drain zone	2.50	2.90
80,000 cu. yd.	Rock in filter zone	.52	.60
110,000 cu. yd.	Rock in transition zone	.52	.60
9,000 cu. yd.	Sel. rdway base mat.	1.70	.60
23,000 sq. yd.	Road-mix surfacing, 3-in.	.70	.50
5,000 sq. yd.	Road-mix surfacing, 2-in.	.50	.35
5,000 sq. yd.	Asph. conc. pave., 3-in.	1.00	1.40
500 lin. ft.	Furn. & install. drain pipe with uncemented joints: 8-in. dia.	3.00	1.40
3,300 lin. ft.	12-in. dia.	4.00	2.75
800 cu. yd.	Furn. & place gravel for toe and other drains	6.00	10.00
60 lin. ft.	Furn. & install. 3-ft. dia. conc. pipe for manholes	22.00	29.00
120 cu. yd.	Furn. & place cemented pea gravel incasement	22.00	35.00
100 ea.	Drill weep holes in parapet	12.00	3.50
3,400 cu. yd.	Conc. in cutoff walls for embankment	22.00	38.00
11,800 cu. yd.	Conc. in berm and embank. pave. and ftg. walls	17.00	22.25
1,400 cu. yd.	Concrete in curbs	60.00	58.00
2,250,000 lb.	Fur. fab. & place reinf. steel	.12	.12
4,500 lin. ft.	Furn. mat'l. & const. fence on dam curb	1.20	1.45
2,600 lin. ft.	Construct. reservoir fence	1.20	1.45
	Concrete posts for guard rail:		
400 ea.	Fur. & install. along rdway	20.00	20.00
40 ea.	Furn. & del. to stor. yard	15.00	9.00
5,270 lin. ft.	Furn. & install met. gd. rail	2.00	2.00
65,000 cu. yd.	Excav. for spillway, unclass.	1.70	2.18
180 cu. yd.	Excav. for spillway cutoff walls, unclassified	20.00	17.50
300 cu. yd.	Excav. for footbridge pier & abutment, unclass.	2.00	7.00
750 cu. yd.	Backfill at structures	2.50	1.20
Lump sum	Rem. conc. in exist. spillway	50,000.00	21,038.00
Lump sum	Remov. conc. & mtlwrk. in exist. outlet tower	7,500.00	2,700.00
Lump sum	Rem. exist. susp. bridge	5,000.00	4,000.00
180 cu. yd.	Conc. in cutoff walls for spillway	28.00	50.00
2,200 cu. yd.	Conc. in spillway crest and lining	55.00	57.00
475 cu. yd.	Conc. in bridge abuts., pier, and retaining walls	60.00	50.00
190 cu. yd.	Conc. in prestressed beams for highway bridge	90.00	116.00
360 cu. yd.	Conc. in exten. to exist. outlet tower	150.00	116.00
420,000 lb.	Furn., fab., & place. reinforced steel	.12	.14
8,500 lb.	Furn. & place high-tensile steel strands	.50	.40
65,000 lb.	Furn., fab., & place reinforced steel	.20	.16
175,000 lb.	Furn. & install. steel footbridge & oper. platform	.35	.35
53,000 lb.	Install gate valves	.10	.20
Lump sum	Install. crane in outlet tower	2,200.00	3,500.00
Lump sum	Install. pump on bridge pier	500.00	350.00
Lump sum	Install. pump in outlet tower	900.00	475.00
33,000 lb.	Install. District furn. misc. metalwork	.45	.38
Lump sum	Fur. & install elec. facilities	8,000.00	8,750.00
	Drill grout holes:		
14,000 lin. ft.	To 30 ft. depth	2.20	2.30
7,000 lin. ft.	30 ft. to 60 ft. depth	2.20	2.30
5,500 lin. ft.	60 ft. to 110 ft. depth	2.70	2.90
10,000 lb.	Furn. & install. grout pipe and fittings	.90	.90
6,500 sk.	Pressure grouting	2.20	2.30
21,000 bbls.	Furnishing cement	3.90	5.25

SCHEDULE 2

30,000 cu. yd.	Stripping for borrow pits and quarries, unclassified.	.40	.40
140,000 cu. yd.	Excav. for embank. found., common	.46	.50
1,000 cu. yd.	Excav. for embank. found., rock	5.00	6.40
200 cu. yd.	Excav. for embank. cutoff walls, unclassified	20.00	17.50
2,500 cu. yd.	Excav. in exist. Dike No. 1 embankment for pave. slab ft. wall	3.00	.35
6,000 cu. yd.	Excav. of exist. embank. mat'l. for enlargement of Dike No. 1	.40	.70
7,500 cu. yd.	Excav. for rdwys., unclass.	1.00	1.20
200 cu. yd.	Fill along cutoff walls	2.00	1.00
110,000 cu. yd.	Earthfill in embank. mat'l. from required excav.	.20	.25
2,800,000 cu. yd.	Earthfill in embank. mat'l. from borrow areas	.55	.50
36,000,000 sq. yd.	Rolling embank. mat'l.	.0006	.0006
1,000 cu. yd.	Spec. comp. of earthfill	2.00	6.40
145,000 cu. yd.	Rock blanket, 24-in. on embank. from quarries	1.90	1.50
400,000 cu. yd.	Rock in drain zone	2.50	2.90
230,000 cu. yd.	Rock in filter zone	.52	.60
410,000 cu. yd.	Rock in transition zone	.52	.60
4,100 cu. yd.	Fine rock blanket, 12-in.	1.00	2.90
12,300 cu. yd.	Riprap	1.90	2.90
6,400 cu. yd.	Sel. roadway base mat'l.	1.70	.60
25,000 sq. yd.	Roadmix surfacing—2-in.	.50	.35
19,000 sq. yd.	Asphaltic conc. pave.—3-in.	1.00	1.40
370 ea.	Drill weep holes in parapet	12.00	3.50
	Drill. grout holes:		
4,000 lin. ft.	To 30 ft. depth	2.20	2.30
2,000 lin. ft.	30 ft. to 60 ft. depth	2.20	2.30
1,600 lin. ft.	60 ft. to 110 ft. depth	2.70	2.90
3,000 lbs.	Furn. & install. grout pipe and fittings	.90	.90
2,000 sk.	Pressure grouting	2.20	2.30
220 cu. yd.	Conc. in cutoff walls	27.00	54.00
19,600 cu. yd.	Conc. in berm & embank. pave. & footing wall	17.00	22.25
1,700 cu. yd.	Concrete in curbs	60.00	58.00
2,650,000 lb.	Furn., fab., & place. reinforced steel	.12	.12
480 lin. ft.	Drill. 24-in. dia. relief wells	8.00	11.00



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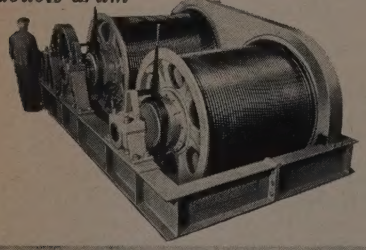

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