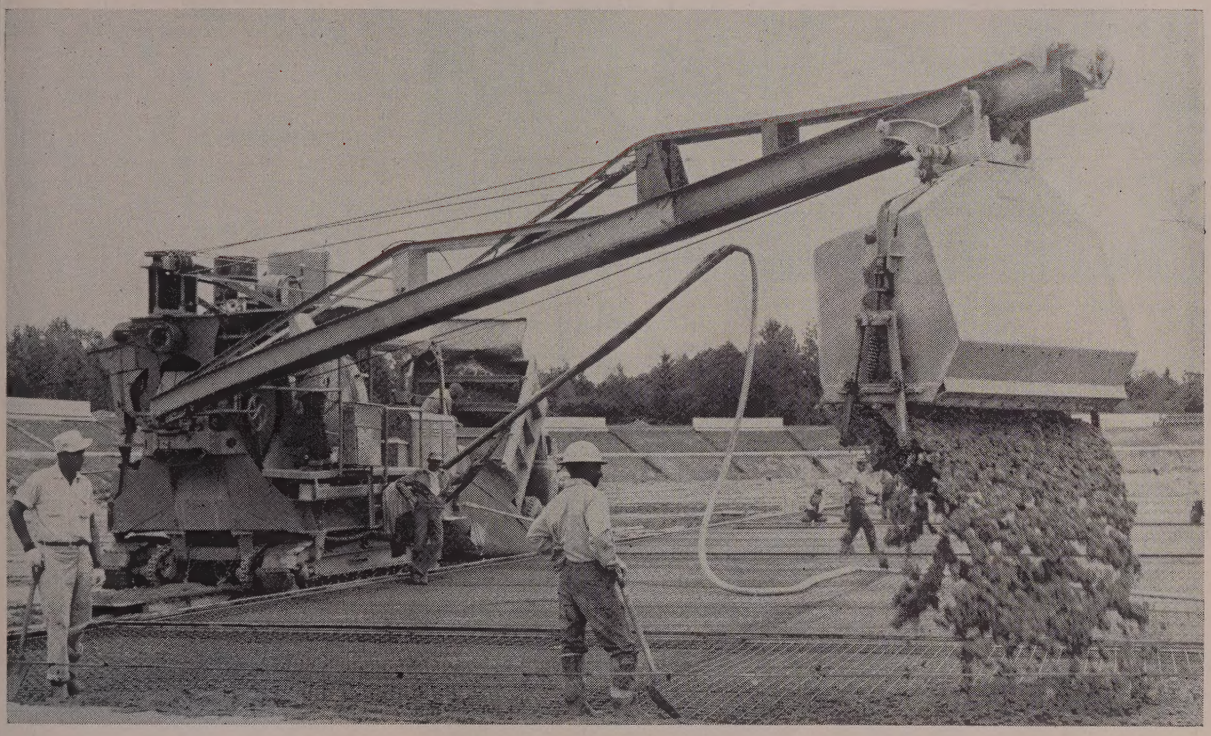
KING PUBLICATION

WESTERN CONSTRUCTION

NOVEMBER 1956



Extended boom spans wide slab

Pouring 40-ft. wide slabs on reservoir floor in Washington is speeded by 15-ft. boom extension requiring a 3-ton counterweight on paver. Total boom length is 45 ft., perhaps the longest ever used.

RECENTLY OFFICIALS of the Public Utilities Board of Tacoma, Wash., considered a bid submitted for the construction of a 100-million gallon reservoir. The bid was the lowest by $37,000 and about $50,000 below the estimate of the city's engineers.

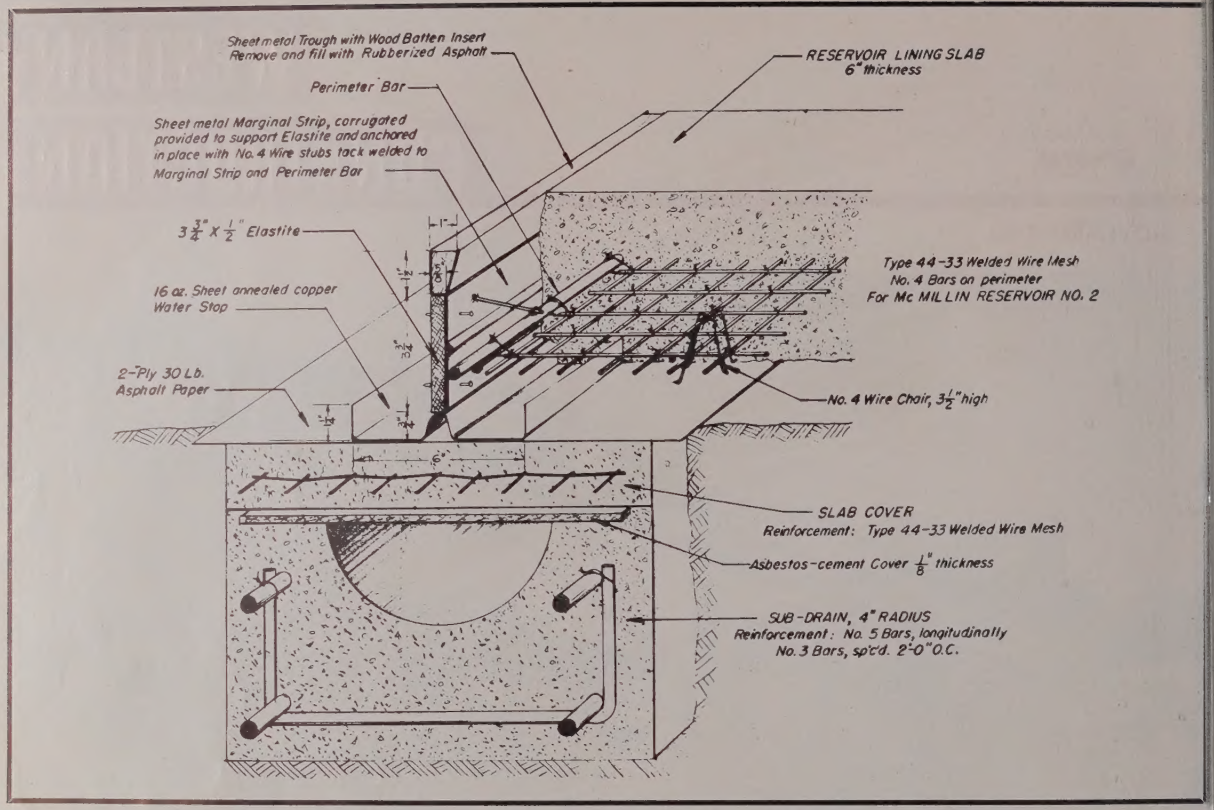
The utilities officials wanted to be absolutely sure that the low bidder, Cherf Bros. and Sandkay Co., Inc., of Ephrata, Wash., could complete the vital project in time. Julius A. Kuehl, superintendent of Tacoma's water division, visited the company's offices and a project near Ephrata, and returned with a strong recommendation. The company won the $829,000 job now under construction at McMillin, about 20 mi. southeast of Tacoma.

Cylinders are being tested right at the site to save an estimated $3,000; the boom of a dual drum Koehring mixer was extended 15 ft. to make it the longest in the world, and more than 450 cu. yd. of concrete are being laid daily.

When Erickson Bros. of Bellevue, Wash., finished removing 374,000 cu. yd. of earth, the Ephrata contractors completed moving their equipment to the site on July 15. An aggregate supply was located on city property within 1,000 ft. of the reservoir site and a wash plant was constructed at a cost of approximately $20,000.

Tim Corliss & Son, Sumner, Wash., is the subcontractor for the wash plant and dry batch plant. A Caterpillar D8 moves the raw aggregate into a grizzly feed which pours the material onto a 24-in. conveyor belt 90 ft. long. The belt carries the raw aggregate to a Washington Machinery Co. shaker and 18-in. sand screw. Four sprays, with pressure of 100 psi., wash the aggregate. Three spouts pour out ¾-in. and 1½-in. aggregate, and the sand.

Although the contract calls for 450 cu. yd. daily, the subcontractor has averaged about 600 cu. yd. for a 9-hr. shift. During one 10-hr. shift the crew, using five trucks, hauled 710 cu. yd. for lining and structures.



DETAIL OF TRANSVERSE EXPANSION JOINT SHOWING SUPPORTS SPOT-WELDED TO MESH WITH CLIPS

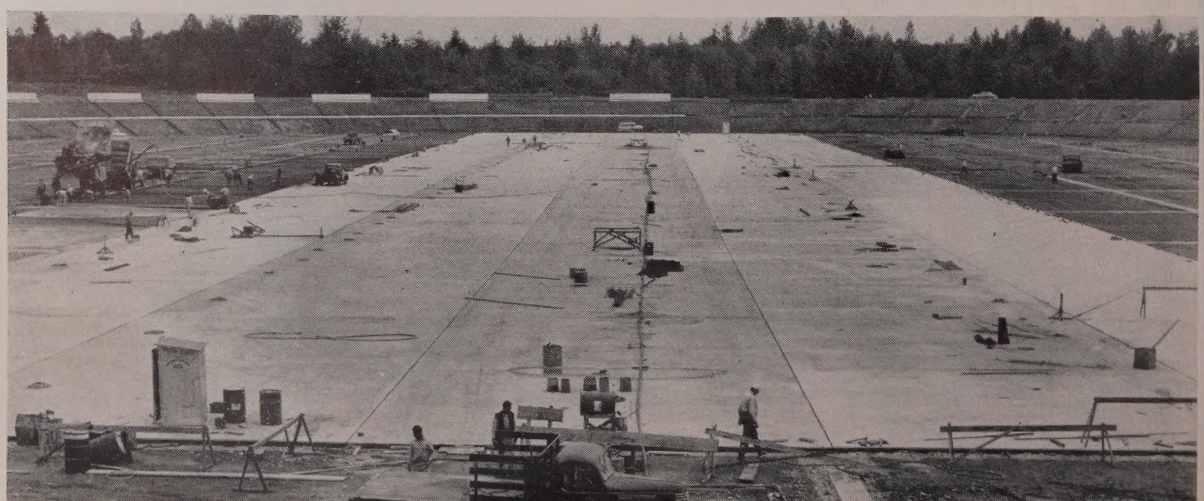
Material is hauled about 1,000 ft. direct to the dry batch plant, and piled near the 24-in. conveyor belt. A Hough front-end loader moves the aggregate to a hopper feeding the belt. All materials are batched separately by weight. The mixture contains 915 lb. each of ¾-in. and 1½-in. aggregate; 1,465 lb. of sand, and 611 lb. of cement. A bucket-line hauls cement to the top of the 500-bbl. silo. The dry batch is hauled to the Koehring dual drum mixer on the floor of the reservoir.

Prior to laying concrete, Cherf Bros. and Sandkay Co., Inc., solved two perplexing problems. The success of the job depended on making it possible to place concrete on the floor of the reservoir in a continuous pour in the same manner that a street is paved. Conventional paver mixers are designed to pave up to 25-ft. lanes, but the job called for 40-ft. lanes. The problems of paving continuously, and for the full width of 40 ft., were solved by extending the power boom, counterweighting the paver, and supporting the transverse expansion joints by means of a 3-in. continuous 26-gage sheet iron. This was secured in place by spot welding the clips to the imbedded wire mesh. (See drawing.)

Four miles of sub-drains were laid for the floor of the reservoir, which is 1,100 ft. long and 732 ft. wide. The contractor said the method of supporting the expansion joints has saved $3,000 on the job.

Without extending the boom of the Koehring dual drum mixer, it would have been difficult to pour much more than 150 cu. yd. for each 8-hr. shift. It was first considered to lengthen the boom to reach across the 40-ft. slabs and then place a support under the end of the boom to keep it from tipping. However, with this plan, concrete could not be spread evenly in front of the finisher.

BELOW—Overall view of the 1,100-ft. long and 732-ft. wide reservoir being constructed for Tacoma City Water Division. Cost of the project is about $1,200,000.



Thus, 15 ft. were added to the boom, giving it an over-all length of 45 ft. Three tons of counterbalance were placed on the mixer. The boom could then reach the far side of the slab by splitting batches to ½ cu. yd. per bucket. The incoming and outgoing winding drum was enlarged for the increased boom length and for the 24 in. in height added to the boom gantry.

For the finishing machine, the Clary power screed was selected since no other company manufactures such a machine with a 40-ft. span. None would guarantee to construct a finisher that would finish 40-ft. slabs to the tolerance of ⅛ in. in 10 ft. The crew consisted of two operators, an oiler, five spreaders, a dump man and laborer for cleaning trucks, three finishers, one pouring foreman and the job foreman.

The screed leaves an excellent finish. It is necessary only for the finishers to go over it lightly with metal bull floats and a burlap drag for the final finish required. Thus far, the screed has been used only for the floor of the reservoir. The contractor expects to use it also on the straight slopes of the lining, where the grade varies from 26 to 34 deg.

The average daily pour was 450 cu. yd., or 24,000 sq. ft. during a 10-hr. shift. The maximum pour was 550 cu. yd. Two 40-ft. aluminum bridges were made for the finisher and for applying the curing compound.

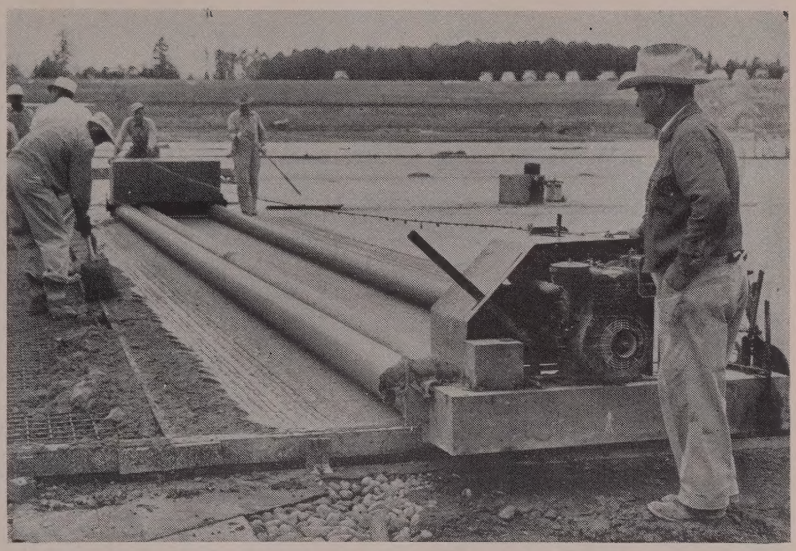
Cylinders are being tested at the site, instead of carrying the concrete samples in buckets. Tacoma's engineers rigged the cylinders into a push-cart type of vehicle simply by using a discarded bicycle wheel.

Concrete cylinders are stored in a moist air shed at 70 deg. F. Specifications call for the concrete to withstand 3,600 psi. after 28 days. All concrete on the job is air entrained.

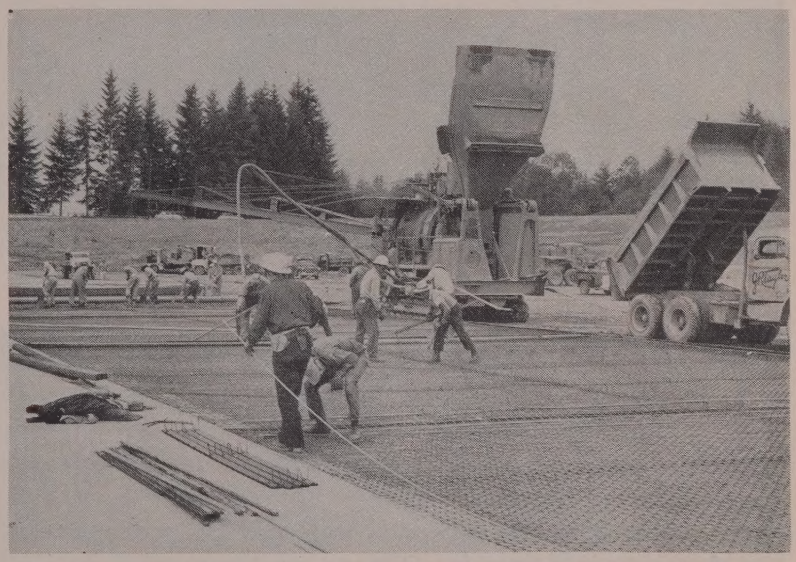
The entire project will require about 16,000 cu. yd. of concrete. Concrete work for the floor of the reservoir was finished Sept. 21 and the completion date was Oct. 31.

Jim Malone is the project manager for Cherf Bros. and Sandkay Co., Inc.; Oscar Verlo, project engineer; V. R. "Dutch" Stevenson, paving foreman; Harry Corliss, wash plant; John Musterd, batch plant manager; and Perry Mitchell, carpentry foreman.

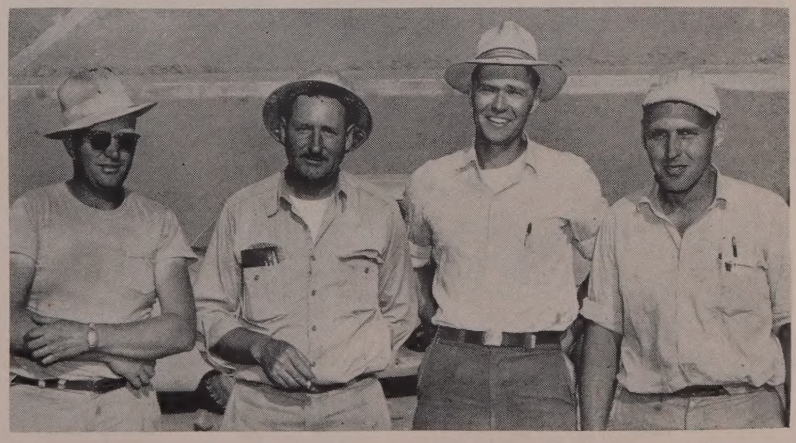
The project staff for Tacoma's City Water Division is headed by George E. Hopkins, chief engineer; Kenneth F. Olson, resident engineer; Richard Bannon, Ray Heffelfinger and C. N. Keightley, inspection; Wilbur Larson, aggregate plant; Janis Krumins, concrete testing; Ronald Jensen, chief of party; Vernon Meyer, transitman; Jerry Johnson and John Harnish, rod and chainman. W. A. Kunigk, former superintendent of the city's water utility, is consulting engineer.



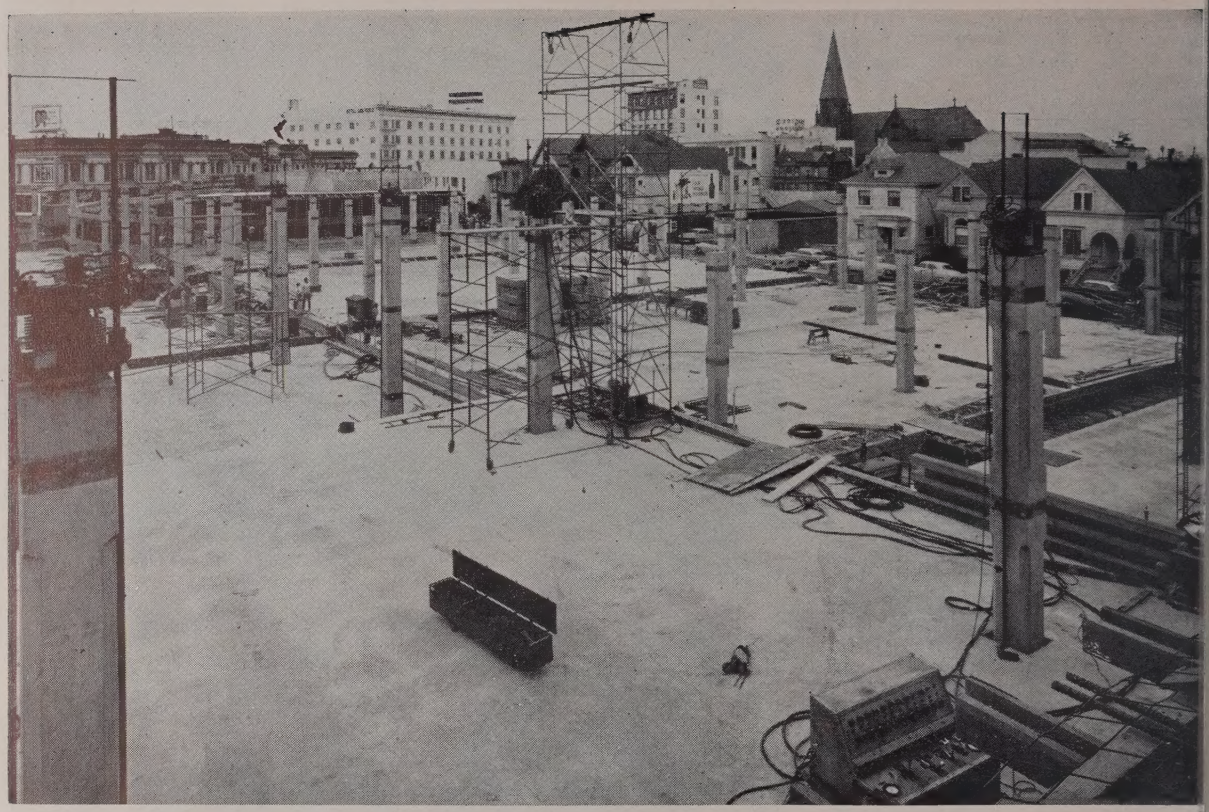
CLARY SCREED was built for this job with three rollers 42 ft. long. Rollers are moved by two 6-hp. Briggs & Stratton engines on one end and two 4-hp. B&S engines on other.



POURING averaged 450 cu. yd. per day, about three times the rate possible without the boom extension. At left, note marginal strips with wire stubs for welding to bars.



KEY MEN include (l to r) V. R. "Dutch" Stevenson, paving foreman, Jim Malone, project manager, Kenneth Olson, resident engineer for City of Tacoma, and Richard Bannon, inspector. Oscar Verlo is the contractor's project engineer.



OVERALL VIEW shows 20-in. square concrete columns, 30-ft. high rolling scaffolds used to position hydraulic jacks. Jacks, which can be seen on top of several of the columns, are newly-designed to accommodate wide concrete columns, can lift 75 tons.

Latest methods cut lift-slabs costs

Jacks on precast concrete columns lift 67 tons each for greatest loading ever. Newly-designed cardboard boxes keep concrete quantity within 1% of estimate. Used boxes are baled and sold as scrap paper. Lift-slab cuts job time by 50% on parking building.

CAREFUL JOB PLANNING and full use of latest lift-slab techniques have kept costs to a minimum for the Skaggs Pay Less Drug Store in Oakland, Calif. Almost 150,000 sq. ft. of floor area was lifted into place in a period of only 22 working days to provide parking space for 800 cars at a cost of about $800 per space.

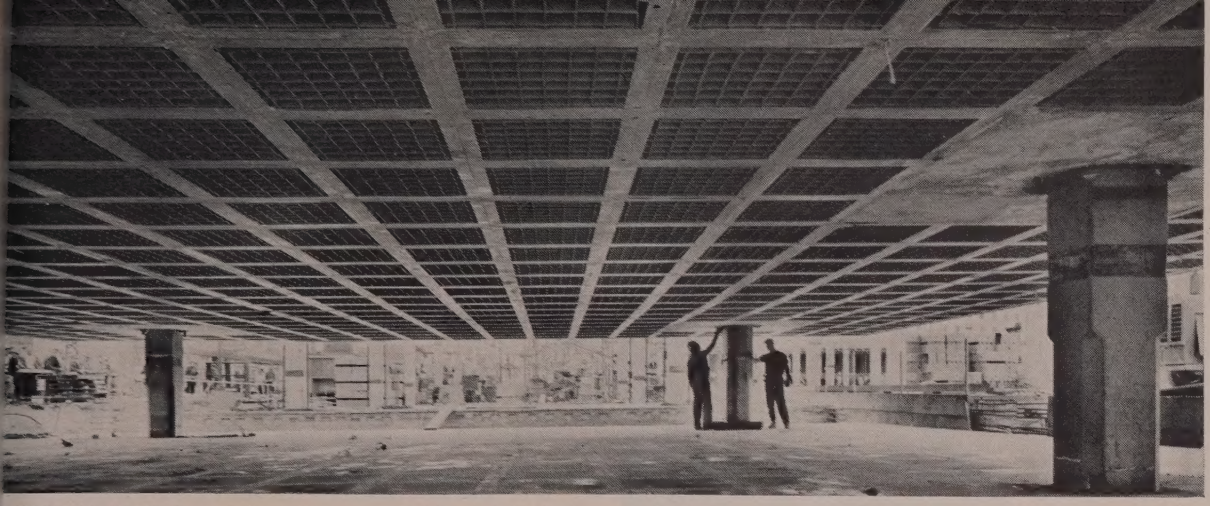
Precast concrete columns 20 in. square manufactured by Ben C. Gerwick, Inc., and delivered to the site by Bigge Drayage Co. were used instead of the more usual steel columns. Hydraulic jacks supplied and operated by Vagtborg Lift-Slab Corp., San Francisco, were especially designed for use with large columns.

The building is of split-level design. The four-level section is 490 x 60 ft. and the three-level section is 380 x 116 ft. There are a total of 66 columns, the biggest of which are 27½ ft. long and weigh 5¾ tons. Column spacing in the three-level area was such that the total load on some columns and jacks was 67 tons, probably the heaviest loading ever put on a lift-slab column.

Columns rest on concrete-filled bell caissons. To set anchor bolts in the concrete a plywood template was made with holes drilled in the proper locations. The anchor bolts were threaded and a steel base plate resting on set nuts was fitted over them. When the column was placed on the base plate a manual jack was used for final plumbing of the base plate and column, after which the set nuts were tightened against the plate above and below. Then Enbeco grout with the strength of 5,000 psi. furnished by Master Builders was placed around the bottom of the column and the steel base plate.

Howard Severance, superintendent for general contractor, Andersen-Westfall, gave the highest praise to the cardboard boxes used to form the waffle pattern on the slabs. More than 15,000 boxes were used, supplied by Gaylord Container Corporation, a subsidiary of Crown-Zellerbach. Average size was 30 x 30 x 13 in. The egg-crate partitioning within the boxes forms cells no greater than 4 in. square. This partically eliminated such failures as a workman putting his heel through the top of a box. The outer perimeter of cells had a maximum leg dimension of 1¾ in. This decrease in length gives the wall of the box greater strength to resist the concrete when it is poured into the joist. The corrugations in the wall of the box run horizontally rather than vertically, giving the wall of the box greater rigidity. In rainy weather, the egg-crates were set in water resistant envelopes.

A big improvement in field installation of the boxes was the use of the Raney Flange, developed by San Francisco architect Vincent Raney. The cardboard flanges are laid on the



CARDBOARD BOXES form waffle pattern on underside of slab. Rigid concrete columns and ¼-in. clearance between slab and columns called for precise casting technique. Boxes were strong enough to hold concrete quantities within 1% of estimate.

floor tile fashion and taped together. The reinforcing steel is placed next in the beam locations and then the flanges are bent up, the egg crate positioned inside and the box placed over the egg crate and the flanges. This is much faster than previous methods of placing the reinforcing steel after the boxes were set because the steel workers have no interference from boxes in placing the reinforcing bars.

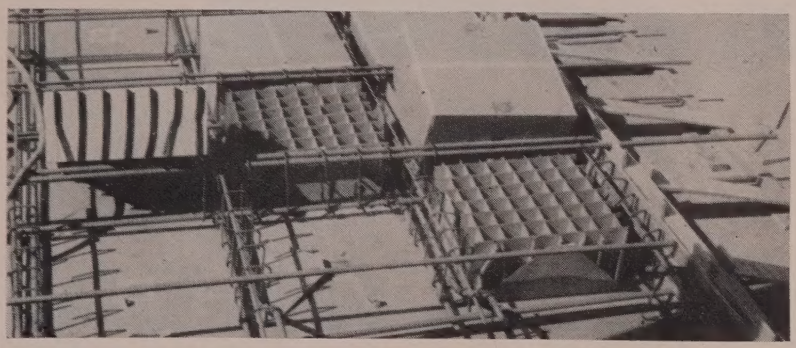
Usually, a contractor can expect about 5% over-run on concrete quantities when using cardboard boxes because of the sag of the cardboard under the weight of the concrete. In fact, on the first major box job in the West the over-run was 25%. But on the present project the amount of concrete used averaged out to within ½ of 1% of the estimated yardage.

When slab pouring started the careful advance planning became evident. In 22 days 22 slabs were poured, or about 140 cu. yd. of concrete per day. In that period 600 tons of reinforcing steel was positioned and 15,000 boxes were set in place. The smallest of the 22 slabs was 3,600 sq. ft. and the largest 9,400 sq. ft. Crews worked an 8-hr. shift, and consisted of 16 steel workers, 24 carpenters, 28 laborers and 8 finishers.

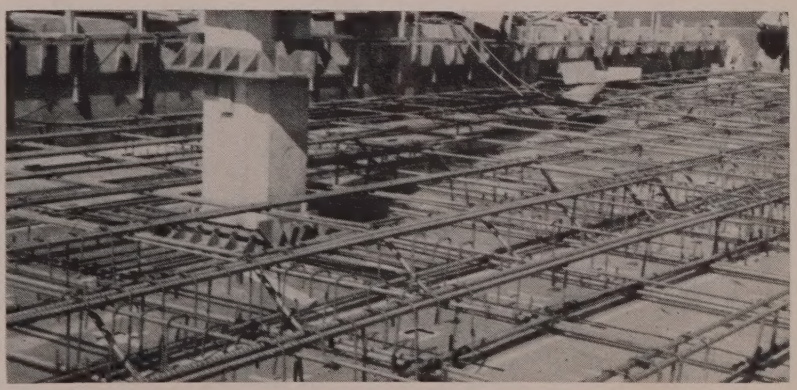
Abco No. 7 was the separating compound between the slabs. Around the edges of the slab and on the column capitals Visqueen polyethylene plastic sheeting was used to insure separation.

Vagtborg lifted 20 of the slabs in 4 work weeks. The jacks were set on top of the columns by using 30-ft. high rolling scaffolds made from Beatty Safway scaffolds. Greater precision is required in positioning and aligning the concrete columns than steel columns because of the greater rigidity of concrete. The greater elasticity of a steel column permits inaccuracies to be overcome during lifting. On this job there was only ⅛-in. clearance on each side between the columns and the cast iron rings in the slab, requiring close control on the part of the column manufacturer, Ben C. Gerwick. A maximum of 12 jacks were used on any one lift and all were controlled from a central console operated by Kevin Walsh.

The columns have steel angles cast in them flush with the face of the column at each floor level. When the slab is in position steel plates are welded to the angles which prevent the slab from moving. The plates bear against cast steel collars in the slabs. The collars weigh 330 lb. each.



FLANGES of cardboard boxes were placed first and taped together. Then steel is placed without the usual interference from boxes. There were no box failures.



STEEL IS PLACED, then flanges are bent up to receive egg-crate partitioning. Boxes are placed last. Flanges necessary for this technique were designed by San Francisco architect V. Raney.

Capitals were metal lath and cement plaster to provide fire protection for the exposed steel. Howard Severance of Hilp & Rhodes of San Francisco was loaned to Andersen & Westfall Co., Inc., of Portland, Ore., to act as superintendent for this one job. Art Heaney is office manager, Vernon White and Jack Backstron are carpenter foremen and Elmo Arnold is labor foreman. Superintendent for Vagtborg Lift-Slab Corp. was W. O. Miller, vice president of the firm. Kevin Walsh was job foreman for Vagtborg.

Ice dam checks groundwater flow

Construction of City of Seattle's Gorge High Dam features first use of freezing technique to control moving groundwater.

By C. R. HOIDAL
Design Engineer
Projects Division
Seattle, Wash.

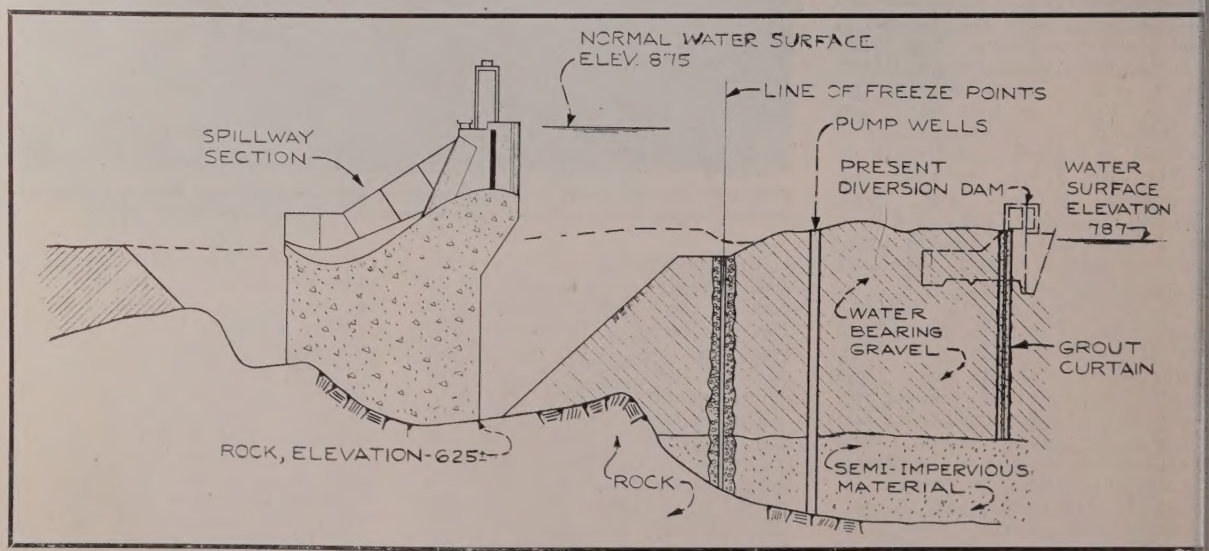
AFTER DIAMOND DRILLING had defined the location of bedrock at the City of Seattle's Gorge High Dam site on the Skagit River, it was found that the most favorable location for the dam was only 400 ft. downstream from the existing Gorge Diversion Dam. The Gorge Diversion Dam diverts water into a 2-mi. long tunnel delivering 6,000 cfs. at a hydrostatic head of 290 ft. to the turbines of the Gorge Power Plant. This plant has a present maximum generating capability of 108,000 kw.

The existing Gorge Diversion Dam is built almost entirely on river alluvium. Only a short section of the right abutment is on bedrock. Thus, the pool formed by this dam provides a source which continuously charges the downstream river sands and gravel with ground water.

Excavation for Gorge High Dam will be required to depths up to 150 ft. below the present river bed. This is 187 ft. below the water level back of the existing dam. The close proximity of Gorge Diversion Dam made it imperative here that precautionary measures be taken beyond the accepted practice for excavating to these depths. The slopes of the excavation had to be kept as stable as possible by preventing water seepage which could cause slipping or caving that would endanger the present dam.

Control of the groundwater by grouting of the alluvium, which consists of all kinds of materials varying from hard packed fine sand to gravel and cobbles and very large boulders, is impractical, if not impossible. Furthermore, there is no way to determine, in advance of excavation, the success of such grouting operation. The method which showed the greatest promise for success was to freeze an impervious curtain in the river alluvium to stop the flow of groundwater.

Research divulged that freezing had been used before in this country, Europe, and Canada to overcome groundwater problems in the excavation of deep shafts. However, no precedent was found where flowing groundwater was involved. The imposed hydrostatic head from the fore-



ICE BARRIER BELOW EXISTING DIVERSION SHOWS RELATION OF CURTAIN TO GROUND WATER AND NEW EXCAVATION

bay of Gorge Diversion Dam and the steep gradient of the Skagit River can only result in movement of the groundwater in a generally downstream direction. Due to the alluvial deposits not being arranged in any orderly manner, it can be assumed that the velocity of the groundwater flow is not uniform throughout the entire cross-sectional area of the river bed, but is more likely to be channelized through the formations of higher permeability.

The process of extracting heat from any volume, under static conditions, until temperatures below the freezing point of water is reached, is a simple problem in refrigeration. However, when the area to be frozen is continuously being supplied with heat from an outside source, that is, the heat brought in by the moving groundwater, the main problem resolves itself into that of dealing with groundwater flow.

This is being done at Gorge High Dam by a grout curtain from the end of the diversion dam to the rock face on the left bank, grouting with bentonite from the perforated 6-in. freeze point casings and by a series of 12-in. cased wells spaced about 50 ft. on centers 50 ft. upstream of the line of freeze points. The plan is to reduce the groundwater flow with the grout curtains and to intercept, with the pumped wells, enough of the groundwater that the refrigeration plant can reduce the temperatures at the ice curtain to below freezing. Observation wells have been drilled downstream of the freeze points to give additional data to determine at what level water should be maintained in the pump wells for minimum flow past the freeze points.

The design spacing of the freeze points, which extend from elev. 770 to bedrock, is 4 ft. on centers. Due to the difficulty of drilling the 6-in. cased holes plumb, a maximum spacing of 6 ft. was permitted between adjacent holes. Where required, additional holes were drilled to meet this tolerance. The freeze point consists of a 3-in. pipe, capped at the bottom end, which extends to the bottom of the 6-in. casing. Inside of the 3-in. pipe is a 1½-in. pipe extending to within 6 in. of the bottom of the 3-in. pipe. Brine enters from the 10-in. supply header through the 1½-in. pipe and rises to the return header through the annular space between the 1½- and 3-in. pipes. Each freeze point is connected in parallel with the supply and return headers.

The bedrock at the damsite forms two definite channels separated by a 120-ft. high rock "hump." The Gorge High Dam consists of a gravity section, containing the spillway, in the left channel and an arch section across the right channel, joining the gravity section and the right bank.

First stage diversion calls for unwatering the left channel to permit excavation for the gravity section and pouring concrete, with low blocks left to take second stage diversion.

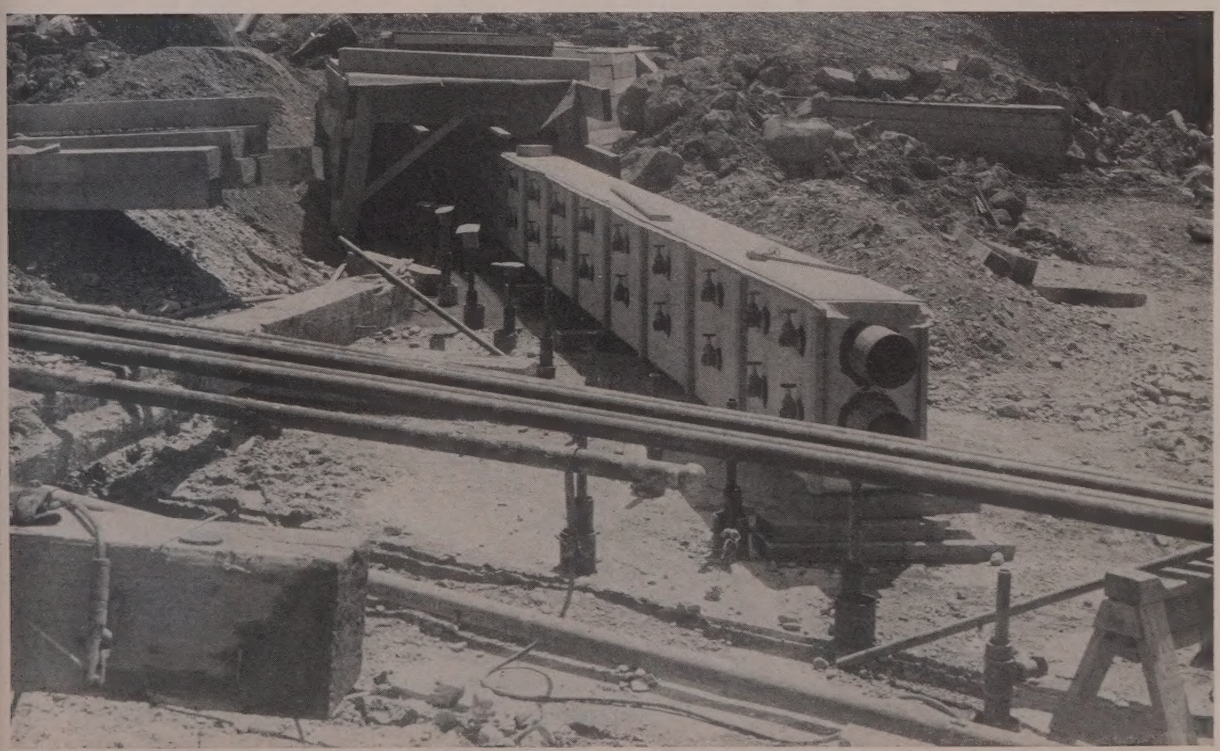
The freezing for first stage diversion consists of 143 holes totalling about 24,000 lin. ft. and varying from 50 to 250 ft. in depth.

The installed capacity of the refrigeration plant is 392 tons with a pumping capacity of 1,500 gpm. to circulate the calcium chloride brine. Provisions are made to measure electrically the temperature of the brine entering and leaving each point.

Model tests have been conducted which showed that thermocouples, installed within the 6-in. casing and only 1 in. away from the 3-in. freeze point, will give readings from which a temperature differential can be obtained between the temperature of the brine in the freeze point and the temperature at the thermocouple. This establishes a temperature gradient which can be projected out away from the freeze point and give a good indication of the distance the material is frozen.

Thermocouples, at each 15-ft. level above bedrock to elev. 740, have been installed about every 30 ft. throughout the length of the line of freeze points.

To date, as was expected, the thermocouple readings have revealed "hot spots" in the area of freezing where temperatures remain essentially static due to excessive groundwater flow. As these areas are defined they are dealt with by such means as regulating the forebay pool level, adding wells for additional pumping, grouting, or adding freeze points until progressive freezing is established.



ENCLOSED in the insulated box are a 10-in. brine supply line and the return header. The freeze points are shown projecting out of the 6-in. cased holes. This entire assembly is covered with a heavy timber structure, shown in the background, to permit movement of equipment.

County develops road improvement method that features —

Stabilizing with asphalt emulsion

By L. H. BRADLEY
Road Commissioner, Highway Department, San Joaquin County, Stockton, California

PROBLEMS of a county highway engineer differ in many ways from those of state highway departments. In fact, they are so different that topics discussed at many road conferences cannot be translated and put to practical use by those in charge of county road systems. Such subjects as traffic control, high-type plant mixes and details of soil analysis, of course, should be understood by the county engineer, but seldom do they help in his day-to-day road problems.

Getting a usable surface on a county road that will stand up for at least a few years with a minimum maintenance comes closer to being of direct interest to the county road engineer. At least, that type of information can be learned today and put to work tomorrow. For the benefit of those faced with similar county road problems the following review of a method for low cost surfacing and stabilization is offered with the hope that it will be of service.

More miles than funds

The need for developing an inexpensive method of strengthening and repairing the county road surfacing in San Joaquin County can be tied directly to a few simple figures indicating funds available and mileage. In this county formal contracts totaling about $300,000 are let each year meeting Federal Aid Secondary requirements on major county projects. Plans and specifications for these jobs include the latest thinking in design and construction technique. However, this $300,000 builds only about 10 mi. of road which is a cost per mile that cuts heavily into county road funds.

With a total budget of about $1,500,000 a year the remaining $1,200,000 must be spread to cover the betterment and repair of 1,500 mi. of poor road. This mileage relationship represents 150 times the length of road to be kept in repair for only four times the amount of money. This mileage figure does not include about 200 mi. of county highway built to a tolerable or better standard. The real problem and worry of any county engineer is keeping up the repair on the poor roads with the money left available for this type of work.

In many cases it is not a matter of the engineering problem because it is very obvious that the problem would be easy to solve if money were available. It is the cost of such betterments that drives the county engineer into experimenting with methods where he can secure the greatest good for the smallest expenditure.

Cost of putting down a base

For example, take a county road that is going to pieces because the base is not adequate for the truck traffic that developed. The answer is simple—except for the cost. Assume that about 4,000 tons of untreated rock base would be required per mile for a 5-mi. section at a delivered price of $2.50 per ton. This would represent a cost of about $50,000, an expenditure which would equal the total gravel budget of the entire county for a full year. It is this kind of situation which leads the county engineer to try and use material available at the site, if it can possibly be improved by treatment to serve the purpose.

At one particular location this problem and an emergency solution resulted in a method that was improved and used at other locations on our county roads.

In order to get some type of added base on a highway giving way under truck loads and resting on an unstable peat formation a cheap source of pit-run gravel was located and considered. It was a material that had been condemned for such use, and would not have been recommended by any rational highway engineer, but there was no other choice, with the dollar dictating. As a result, a blanket of this poor gravel was spread over the existing road with some effort to level the uneven surface. With the annual rainy season approaching the problem of stabilizing this gravel was serious. The answer was an experiment in using a dilution of asphalt emulsion (SS-1). This material was prepared by putting 200 gal. of the SS-1 in a 1,000-gal. water wagon, filling the balance with water. About 1 gal. of this mixture was placed per linear foot of road, or about 6 gal. per cu. yd. of the gravel.

The application of the dilute emulsion was followed by blading the top 3 in. of the gravel to assure a good mix and then giving it a light rolling.

To show that this was truly an emergency measure, there was only time to do about ½ mi. of the 5-mi. section before the rains came and drove the crews off the road. The following spring the work was inspected without much hope, but with considerable curiosity. The 4½ mi. which had not been treated were in bad shape, but the ½ mi. which had secured the stabilization treatment was in excellent condition. The surface was hard, firm and showed no distress other than slight abrasions.

To complete the program another 2 in. of material was placed and road mixed and finally a seal coat was applied. After a full year of heavy tonnage this section of road showed no distress. Because of its most undesirable foundation on peat this short section of our county road system has been repaired many times during

Fig. 1—Condition of the road before the start of improvement program. Note the lack of elevation, with irrigated fields on both sides. More than maintenance was required and cost was a governing factor.

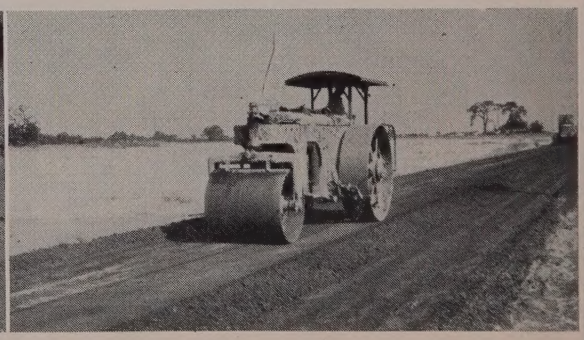


Fig. 2—After breaking up the existing mat with a Hyster Grid roller, it was rolled to secure compaction. All equipment is the type normally owned by counties and county engineers work with what they have.

Fig. 3—Gravel of a type normally considered sub-standard, but available and cheap, is deposited. Again, note how the problem is complicated by irrigated fields.

Fig. 4—Emulsified asphalt is applied from water tank mounted in truck. Rate is 0.7 gal. per sq. yd. for the 2-in. depth of material. Emulsion is undiluted.

past years and this latest effort appears to be more successful than any other. As a result, and with the experience used in applying and mixing a dilute SS-1 the process has been expanded into a regular tool of our county road department. The accompanying series of pictures shows another section of county highway improved the following year using this system with some refinements which naturally develop in any new procedure.

Steps in the procedure

The operations required for this type of improvement can be carried out by maintenance forces using equipment normally owned by any county. Motor patrols, water wagons and rollers are about the only units required for the average job.

The problem of adequate stabilization has been further complicated by the requirement of using "sand equivalent" road rock as now specified in Section 16 of the California Standard Specifications. This is quite another subject and has no place in this simple discussion of road-maintenance work, but it does result in material that is relatively low in fines and therefore lacking in some qualities of natural stabilization. We have found that it does not hold up under the protection of a seal coat, whereas in past years material that was permissible and available in our area had a PI of 6-8 and with a light roll and seal would provide 5 to 7 years of service that was almost maintenance free. Following this service it was customary to add a plant-mix surfacing if funds were available.

Since this application of a simple seal is no longer adequate with the required rock, stabilization becomes a necessity.

The various steps in stabilizing with emulsions are indicated by the photographs. Fig. 1 shows the road in its original condition. It indicates the serious breakup of the original mat and it should be observed that the elevation of the road is the same as the adjacent irrigated land. In fact, in many parts of the county the roads lie below the elevation of irrigated fields which tends to introduce a further problem in constant moisture being present in the sub-base.

Fig. 5—Mixing is the usual process, and is shown being carried out by motor graders working in tandem. If mixing becomes difficult more water is added, if the mix is wet it is allowed to dry out.

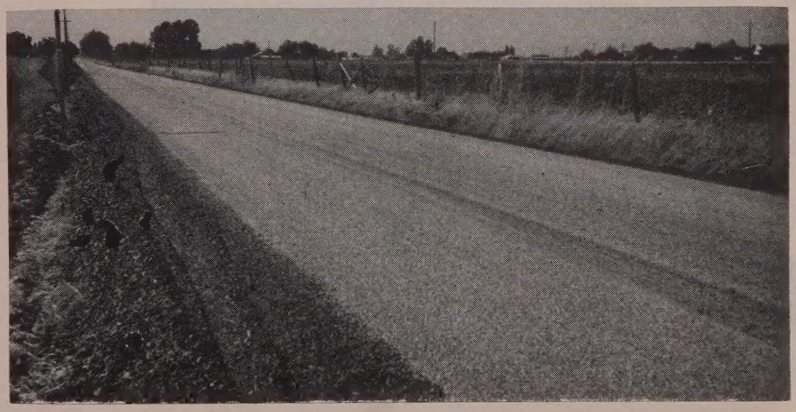


Fig. 6—Final result must be compared to Fig. 1 to appreciate the improvement. The seal coat is put on after a week or two of curing. The seal emulsion is diluted about 1 to 3.

Breakup of the old material is usually done most effectively with a Hyster Grid roller, which has proved for us a most efficient tool in this general reprocessing of bituminous surfacing. The old material is then rolled as indicated in Fig. 2.

Fig. 3 shows the dumping of the imported gravel, and again indicates the relative elevation of the road as compared to the irrigated area.

Fig. 4 shows the application of undiluted emulsion which is applied at a rate of about 0.7 gal. per sq. yd. for the 2-in. depth. There is nothing com-

(Continued on page 53)

Important reasons why it pays to use True Original Parts

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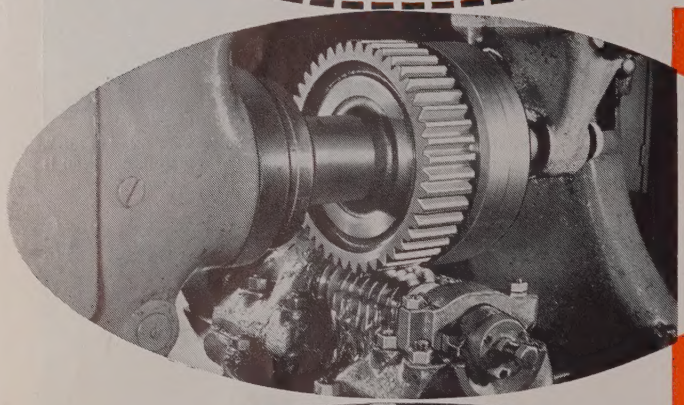

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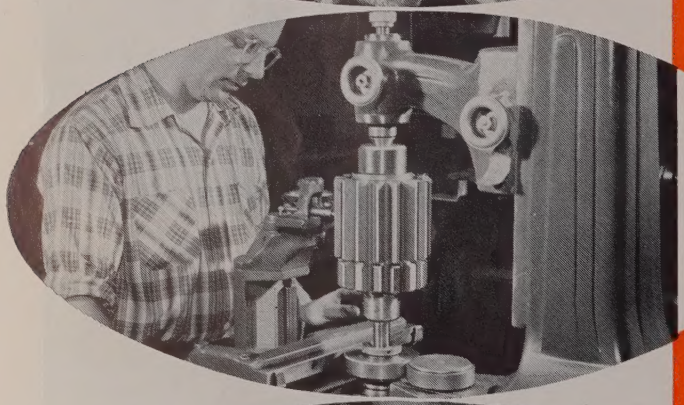

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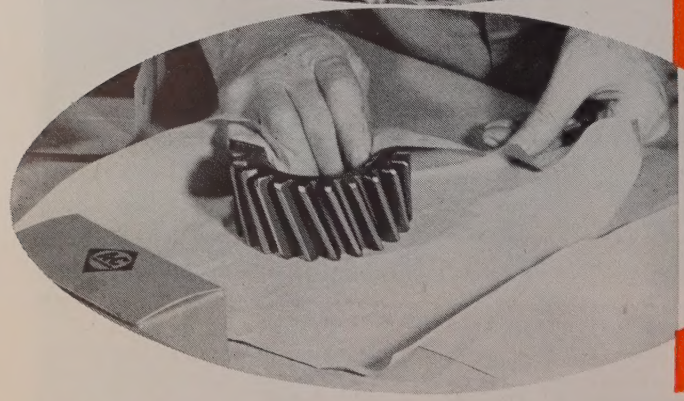

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WYOMING

Bureau of Reclamation inspector

— *looks at his job and its responsibilities*

By MARVIN J. HAWKINS, Chief
Concrete and Soils Control Branch
Columbia Basin Project
Bureau of Reclamation
Ephrata, Washington

THE INSPECTOR on construction of Bureau of Reclamation projects is a key man. Upon him rests in large part the responsibility of assuring that the construction is carried out in accordance with the terms of the contract. He is the "end man" in construction administration, and it is his job to see that the structures constructed for the Bureau are serviceable and durable.

The inspector must be technically proficient in his primary purpose of securing the contractor's full compliance with the specifications requirements. He must be equally proficient in his relationships with contractors in the carrying out of this basic objective. Good working relationships with contractors are usually reflected in better construction bids and greater competition in future work.

". . . what type of man qualifies . . ."

What type of man is qualified to become an inspector? The supervisor, in selecting an inspector, will analyze and weigh the more desirable qualities with which men are endowed and the undesirable characteristics which most men possess to some degree. The supervisor's analysis of the personal attributes and experience of an inspector may be outlined possibly as follows:

Is he of sound judgment? Are his judgment and decisions based on sound reasoning, precedent, and local conditions, or will he jump to hasty conclusions because they look good and sound big?

Does he have tact? In his approach to a problem, will be consider all of its aspects, particularly the other persons involved, or will he rush in "where angels fear to tread"?

Is he willing to learn, or does he think that he has reached the ultimate in knowledge?

Has he a quiet, friendly, and businesslike approach to people and their problems?

Will he be amenable to instruction and counsel, or will he consider any instructions, suggestions, or criticism as a personal affront?

Will he permit the contractor to choose his own methods of performing the work and decide only on the results obtained?

Does he keep abreast of current trends and developments, or does he say "to heck with it, I'm not being paid to learn. Let the big shots do it and they will tell me what to do."

Will he be just and fair in his decisions, and will they be within the limits of the specifications and current instructions?

These attitudes and attributes which the supervisor thus analyzes in selecting an inspector are extremely important. Successful inspection and carrying forward the management program of construction depend to a large degree on the personal characteristics of the inspector and his ability to work with others.

As soon as the inspector has received his project assignment, there are certain preliminary or preparatory steps that he should take at once to acquaint himself with the work assignment. He should become familiar with the specifications, plans, terrain, and proposed equipment and materials. Those items in the plans and/or specifications of which he is doubtful should be immediately discussed with his supervisor.

The inspector's principal responsibility is to secure compliance with the specifications. The inspector should take the position that, as long as the work required of the contractor is within the limits of the specifications, the contractor can make no valid complaint or file a justifiable claim. As the specifications are, is the way he bids the job. The owner is entitled to compliance, no more, no less.

The inspector also has an obligation to other bidders on the project. Any deviation or relaxation from the intent of the specifications is unfair to the unsuccessful bidders. They can say—and justifiably so—that, had they known noncompliance was to be permitted, they would have submitted a much lower bid.

As the work progresses, certain specification provisions may be modified or revised. These changes and revisions are essential; they are not the whim of someone in higher authority. They come about as more knowledge and experience are gained at the job site. It is the inspector's responsibility to keep abreast of these changes and see that the work proceeds in conformance with the revisions.

The inspector should bear in mind, too, that what was proper and within the limits of the specifications on the inspector's last assignment may not be proper on a new project. Moreover, the contractor on the new undertaking may not operate in the same manner as the contractor on the inspector's last assignment. In many instances, the inspector can have no interest in the methods used or the sequence of operations followed. There are some exceptions, and these are covered by the specifications. The inspector's chief interest is in the results obtained.

". . . contractor selects equipment."

The choice of equipment is the contractor's responsibility, provided it will carry out required work under the specifications. If the inspector can suggest equipment or modifications in construction techniques which can be used to better advantage, he

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may discuss them with those in charge in a wholly impartial way. However, he should clearly indicate that his suggestion is not a requirement if the results are otherwise acceptable.

It should also be no concern of the inspector how much profit the contractor makes. The inspector must remember that a contractor is in business to make a profit; it is indeed unfortunate for all concerned if he does not. If the contractor is not making a profit it is more difficult to obtain satisfactory completion and cleanup. Also, on his next undertaking his bid will be higher and his experience, known in contracting circles, will tend to make other contractors bid higher as well. In general, high profits are reflected in lower future bids, as more competition is encouraged.

". . . daily reports are vital."

The importance of daily inspection reports cannot be overemphasized. From daily inspection reports comes the information from which is computed the monies to be paid the contractor. Inspection reports should show facts, all of the facts, not personal opinions or hearsay. The reports should reflect compliance with the specifications and any instructions relative to construction procedure or policy. Only on this information can the supervisors intelligently plan, coordinate, and evaluate.

The inspector's reports should be written at the close of the shift, the day the work is performed. If the inspector postpones the writing of his report until the next day, it will lose its status of being an acceptable record or diary and deteriorate to the status of being but mere gleanings from memory. If the reports are properly and regularly written, they have considerable value to the employer, since they may be introduced as evidence in court action for settlement of a dispute which could arise between the contractor and the Bureau.

To sum up, in the writing of the daily reports the inspector must observe and stress the five W's—When! What! Why! Who! Where!

An important assignment of the inspector is inspection of excavation during earthwork operations. Two types of excavation, defined in most Bureau of Reclamation specifications, are "rock" and "common." Excavation requiring blasting, wedging, barring, etc., is classed as rock excavation, while all other material removed is normally called common excavation. Often a difference of opinion exists in the field between the contractor and the inspector about where common ends and rock begins. On some projects, the problem is multiplied by the addition of a third classification designated "intermediate." A thorough understanding of the definitions appearing in the specifications is required of the inspector if he is to define correctly and justly the material removed during excavation.

Equally important is careful inspection and control of earth placement on all fills for embankment, highways, and roads and all compacted backfill about and adjacent to structures.

The contractor is required to fulfill the earthwork and concrete provisions of the specifications as determined by standard testing methods. The field inspector should acquaint himself with the details of making concrete and soils control tests and with the methods of interpreting the results of the tests. He should give close attention to uniformity as this is one of the primary objectives of concrete control. The inspector's immediate concern is with the batch-to-batch and day-to-day uniformity. But, on a wider horizon, he should also strive for uniformly high standards of workmanship and for a uniform interpretation of specifications requirements.

Inspection of form work in concrete placement is equally important. There is but one reason for building a concrete form—to hold concrete in the desired shape. The forms must be tight and leakproof and have sufficient strength to hold the concrete. They should be true to line and grade, and the inspector should keep a constant check on the forms throughout the placement operation.

"Before the concrete is placed . . ."

Before concrete is placed by the contractor the inspector's items of chief concern can generally be grouped in the following order: (a) tightness, surface, cleanness, oiling, alignment, bracing, dimension, and insets of forms; (b) position, spacing, size, support, and cleanness of reinforcing steel; (c) preparation and wetting of construction joints and subgrade; (d) preparation for prompt and adequate curing. The form must be tight enough to prevent the loss of mortar during placing and vibrating, regardless of the type of finished surface specified. In general, these items need not be checked simultaneously, but they should be carefully considered as the sequence of operations progresses.

If any one of the inspector's many duties deserves special emphasis, it is that of guarding against segregation of concrete ingredients. Properly placed concrete is, of course, free from segregation. Segregation in concrete is caused in several ways. Use of high-slump concrete flowing laterally in the forms or use of sloping chutes to transport concrete from mixer to form will cause segregation. A good rule to follow is to place the concrete in the form as near to its final location as possible.

Curing is one of the principal control features that field inspectors are confronted with on concrete and soils operations. For example, the addition of sufficient so-called curing water to obtain optimum moisture for compaction of soils will require close scrutiny by the inspector, particularly if the contractor's water haul is a considerable distance. Curing of concrete according to the specifications should also occupy the continuing attention of the inspector.

In summary, the inspector carries the responsibility for seeing that proper results are obtained hour by hour, batch by batch, load by load, whatever the work may be.

The inspector has at his disposal a variety of tools, experience, and skills of the contracting officer's organization and the teamwork of the contractor's forces. It is his important role to see that the detailed contractual arrangements of this cooperative effort are welded into completed works of enduring value.

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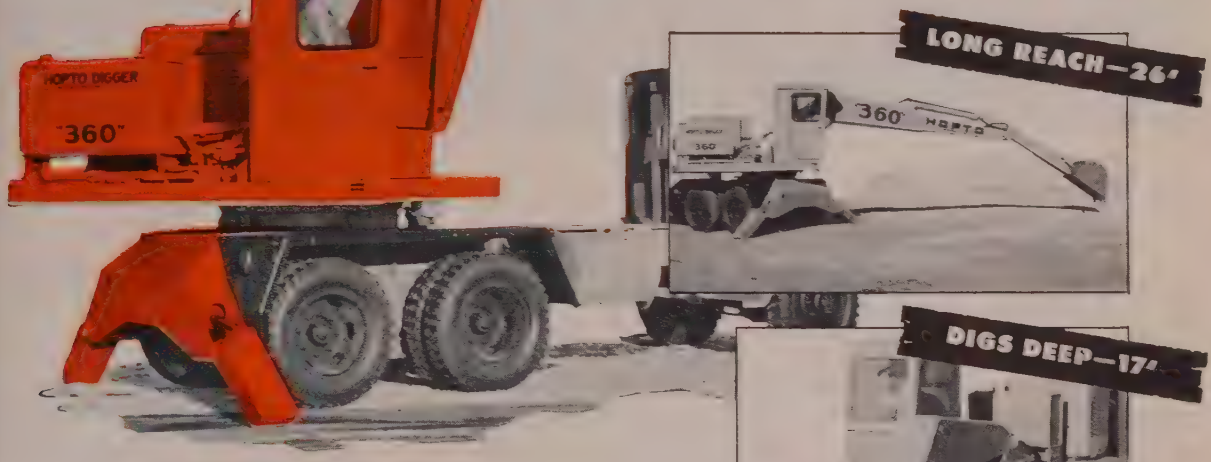

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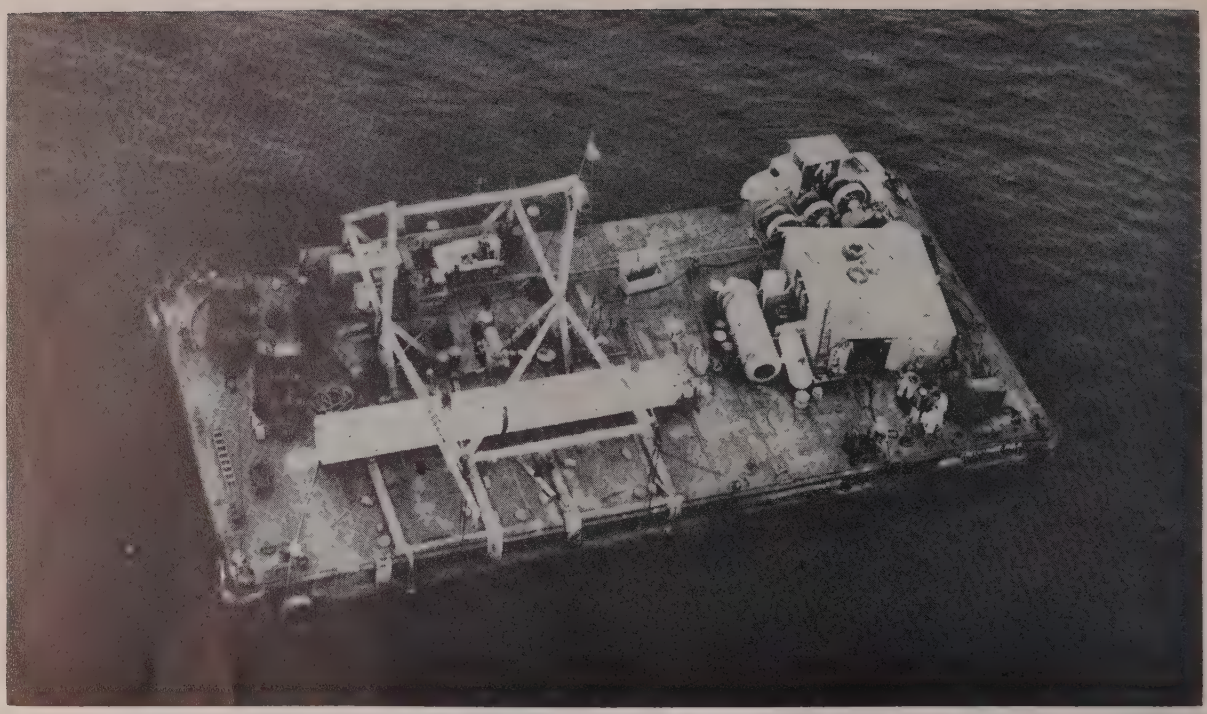


Los Angeles County Sanitation Districts find—

Derrick key to deep water pipe laying

Ocean outfall sewer of unprecedented length and depth successfully completed—job included placing 10,400 ft. of 60- and 90-in. concrete pipe in water up to 210 ft. deep—Keys to success were special derrick and close organization to minimize diving time.

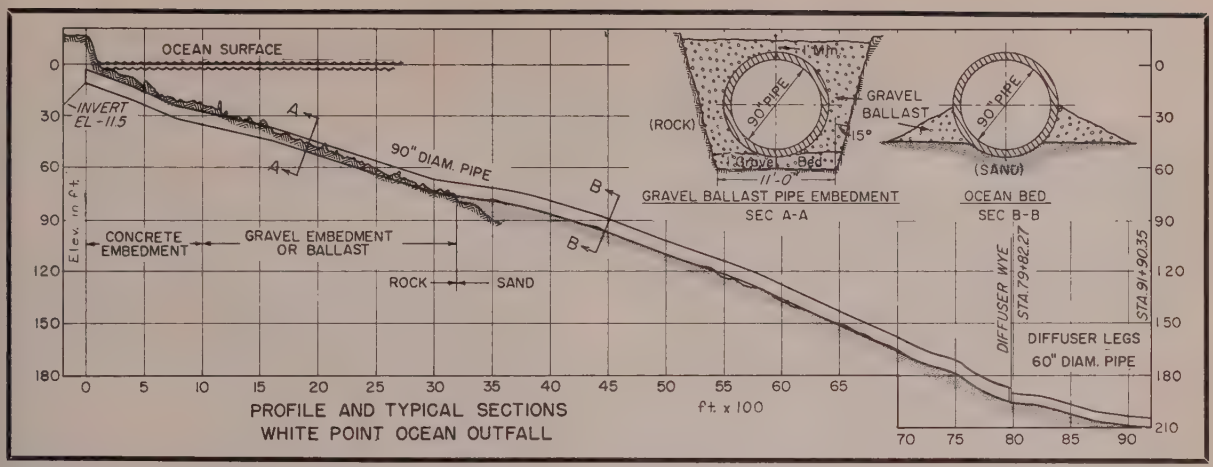
CONSTRUCTION of the longest and deepest underwater concrete pipeline ever attempted is nearing completion. It's an outfall sewer extending into the Pacific from White Point, west of San Pedro, Calif. The line consists of precast reinforced concrete pipe 90 in. in diameter extending 8,000 ft. from the shore to a depth of 200 ft. below the surface of the ocean. Here the line divides into two 1,200-ft. long legs 60 in. in diameter forming an angle of 127 deg.

The effluent will escape through 7½- and 6½-in. holes formed in each of the 60-in. pipe sections. In this way discharge will be distributed over the full 2,400 ft. of the diffuser legs. Engineers of the Sanitation Districts know, partly from experience gained from a similar outfall built nearby in 1954, that this type of diffusion is a satisfactory method by which to dispose of sewage which has been subjected only to primary treatment. (The 1954 project included pipe laying in water 160 ft. deep, which was probably a record for depth at the time.) The currents are generally parallel to and away from the shore as an additional safeguard against contamination near the shore.

In addition to the line under construction, the White Point outfall system includes two other lines which connect with the joint disposal plant north of San Pedro through a 5-mi. long tunnel under the San Pedro hills. The new line will connect with the disposal plant through a parallel tunnel now under construction **(Western Construction,** Sept. 1955). The system at present discharges 240,000,000 gal. per day peak flow into the ocean from an area of 617 sq. mi. with a population of 2,614,000. When the tunnel is completed and the new outfall put into operation the combined capacities of the outfalls and two tunnels will be 400 mgd. Completion of the project is scheduled for November of 1957.

Bids for the entire project were called for by the Sanitation Districts in 1954. Because of the many hazards and unknowns which must be allowed for in such an unprecedented open water job the estimates ran considerably higher than the engineer's estimate. For this reason the Districts elected to assume most of the risks by carrying out the work with their own forces, using, where possible, rented and maintained equipment obtained on a bid basis. However, the first 1,000 ft. placed from a trestle extending from the shore was built under a contract awarded to Healy-Tibbits Construction Co. of San Francisco. Pipe was manufactured and delivered by the American Concrete Pipe & Construction Company of Los Angeles. Both the 90- and 60-in. inside diameter pipe sections were 21 ft. long with wall thicknesses of 8 in. and 6½ in. respectively. Joint rings at each end of every pipe section were cast iron containing alloys of chromium, copper and molybdenum. In addition to a soft lead gasket with a fibre center at the joint there is a rubber gasket set in a groove to help obtain a watertight seal. There is no metallic connection between the pipe reinforcing steel and the cast iron end rings.

Each joint is given protection



FIRST 1,000 FT. were placed in a rock trench and covered with concrete. For the next 2,200 ft. the pipe was covered with gravel (section A-A, above). Beyond 3,200 ft. from the shore the pipe was placed directly on sandy ocean floor (section B-B, above).

against corrosion by a magnesium anode made by Dow Chemical Company. The anodes are manufactured in a curved shape to exactly fit the curvature of the joint ring. Each anode weighs 55 lb. and is designed to give protection for ten years.

For the first 1,000 ft. the pipe was placed in a trench excavated in the rock on the ocean floor. The pipe was placed on gravel and completely covered with concrete. This work was done under a contract by Healy-Tibbitts Construction Co., from a temporary trestle erected from the shore paralleling the line. The rest of the work was done by District forces using rented equipment.

From 1,000 to 1,600 ft. from the shore the pipe was also laid in a rock trench but covered with gravel instead of concrete. For the next 1,600 ft. the pipe gradually emerged from the trench until at 3,200 ft. from the shore it was placed directly on the ocean floor which from this point out is either sand or sandy bottom mud.

Excavation of the trench took from January to July of 1955. Blasting the rock was carried out with an unusual bomb made up of a ⅜-in. diameter pipe fuse and blasting cap assembly placed inside a 2½-in. pipe 2 ft. long with 5 lb. of 60% powder. The bomb was held in a mandrel chuck by ¼-in. lead dowels which would shear on impact when dropped on the ocean floor. The weight of the dropping mandrel imbedded the bomb in the shale rock and fired the fuse train which detonated the charge 1½ minutes after impact.

The entire 3,200 ft. of trench was excavated to about 2 ft. below grade before any pipe was placed. Then the floating equipment returned to the shoreward end of the trench and in August of 1955 pipe placing started. Before a section of pipe was placed it was necessary to remove by clamshell silt which had washed into the trench and to replace it with gravel up to the proper grade. A conventional floating derrick was used for this part of the work, doing both the excavation, backfilling, and pipe placing. It could handle only one section of pipe at a time.

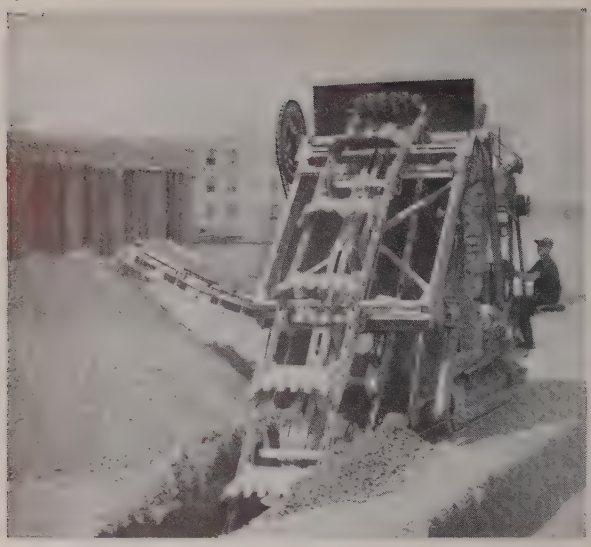
When the line emerged from the rock trench 3,200 ft. from the shore in March of 1956 a special derrick designed specifically for pipe laying was put into use. This was not possible sooner because the pipe laying rig had to double as a clamshell. The derrick has three main features: (1) It can handle easily two sections of 90-in. pipe 48 ft. long at the same time, a load of 75 tons; (2) it has two booms with separately controlled load lines for accurate manipulation of pipe sections at the bottom, and (3) the booms are short, avoiding the magnification of the motion of the water which results with a high boom. The efficiency of this rig can be appreciated by noting that the rest of the pipe laying, almost 10,000 ft. in depths ranging from 70 to 210 ft., was completed in about four and one-half months. A remarkable rate considering only a 40-hr. week was worked with one day every week or two lost due to rough water.

A swing-shift crew brought the derrick to the loading dock each day and loaded it with two double sections of pipe with the joint already made. In the morning, weather permitting, the derrick was positioned over the line, guided by a buoy attached to the previously placed pipe. A strongback, which was a built-up rigid truss, was lashed securely to the pipes by cables. The derrick picked up one of the pairs and lowered it to the ocean floor about 10 or 12 ft. away from the end of the line.

A diver was sent down to direct the further positioning of the sections. The barge captain, receiving information from the diver by telephone, brought the section into line by positioning the barge by means of quarter lines attached to each corner of the barge.

An inhaul cable attached to the strongback and running to a winch

BLASTING (left) for the rock trench was done with unusual bomb which exploded upon impact. Average charge was 5 lb. of 60% powder.
DERRICK WINCH (right) is modified Skagit model 140. Front drum is divided to operate topping lifts. Back drums operate two load lines separately.



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Equipped with single boom, Parsons big 310 Trenchliner excavates clean, smooth trenches 1½ to 4½ feet wide, at depths to 17 feet. It also takes dual digging booms for trenching 6 feet wide at 12-foot depth. Digging speeds range from 5 inches to 20½ lineal feet per minute. Reversible, power-shift spoil conveyor dumps to right or left of machine — gives 6 ft.-9 in. discharge height for truck-loading (8 ft.-3 in. with conveyor extension). Smaller Parsons models include ladder and wheel-types, crawler mounted, and the mobile, rubber-tired Trenchmobile®

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Johnson automatic batch plants, like the one shown here, accurately weigh out aggregates and cement ahead of heaviest paving schedules. This plant easily kept two 34-E pavers busy full time. During peak operation, it weighed out 1.38 cubic yards (5 materials per batch) every 20 seconds — averaged 10 seconds fill-time, 10 seconds discharge-time. Better get the complete story on Johnson automatic batch plants, with multiple arrangements of single-material batchers, one-man push-button control, one or two-stop charging. Available in all sizes and types.

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Bearings packed only once a year on Kwik-Mix 4PM plaster-mortar mixer

There's more work-time, less maintenance with Kwik-Mix 4PM mixer, because antifriction paddle-shaft bearings are packed in grease, multiple-sealed. No daily lubrication required. You'll also like the de-clutching arrangement on V-belt drive — readily engages or disengages the paddle-shaft. This 4PM has 4 self-cleaning blades, optional rubber tips, 38-inch charging height, bag-cutter on safety grill, full drum tilt either direction, 29-inch width, all-welded frame. Other plaster-mortar mixer sizes: 6-P and 10-P — also concrete, bituminous mixers, Moto-Bugs®

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TON OF STRENGTH *for every ton of payload capacity*

Koehring Dumptor stands up under heavy loading shocks because it's built for rock. Sides and ends of all-welded 6-yard body are heavily rib-reinforced. Double-plate bottom, lined with multiple steel beams, cushions shocks and impacts of shovel-loading ½ to 2½ yards at a single pass. Bolted or free-swinging kickout pan adds another ½-inch steel plate to Dumptor bottom for extra protection.

There's plenty of strength, too, in the heavily-trussed chassis to take constant pounding of heavy loading and rough, off-road hauling. Cast-alloy "I"-beam steering axle oscillates 21 inches, takes the twists and strains out of haul road travel. What's more, Koehring Dumptor has no leaf springs — just one big snubber-type chassis spring on the steering axle — none on the drive axle. Big drive tires eliminate the need for more springs, absorb loading and hauling shocks — save spring maintenance.

Even with all this heavy-duty strength, Koehring Dumptor still has more than 6 H.P. for every ton of loaded weight. It accelerates fast, pulls through soft ground with less shifting, climbs 24% grades fully loaded. If you have a tough hauling problem, better look into this heavy-duty 6-yard Dumptor®. You also get 1-second gravity-dump (no body-hoist maintenance), and same travel speeds forward and reverse for no-turn shuttle hauling.

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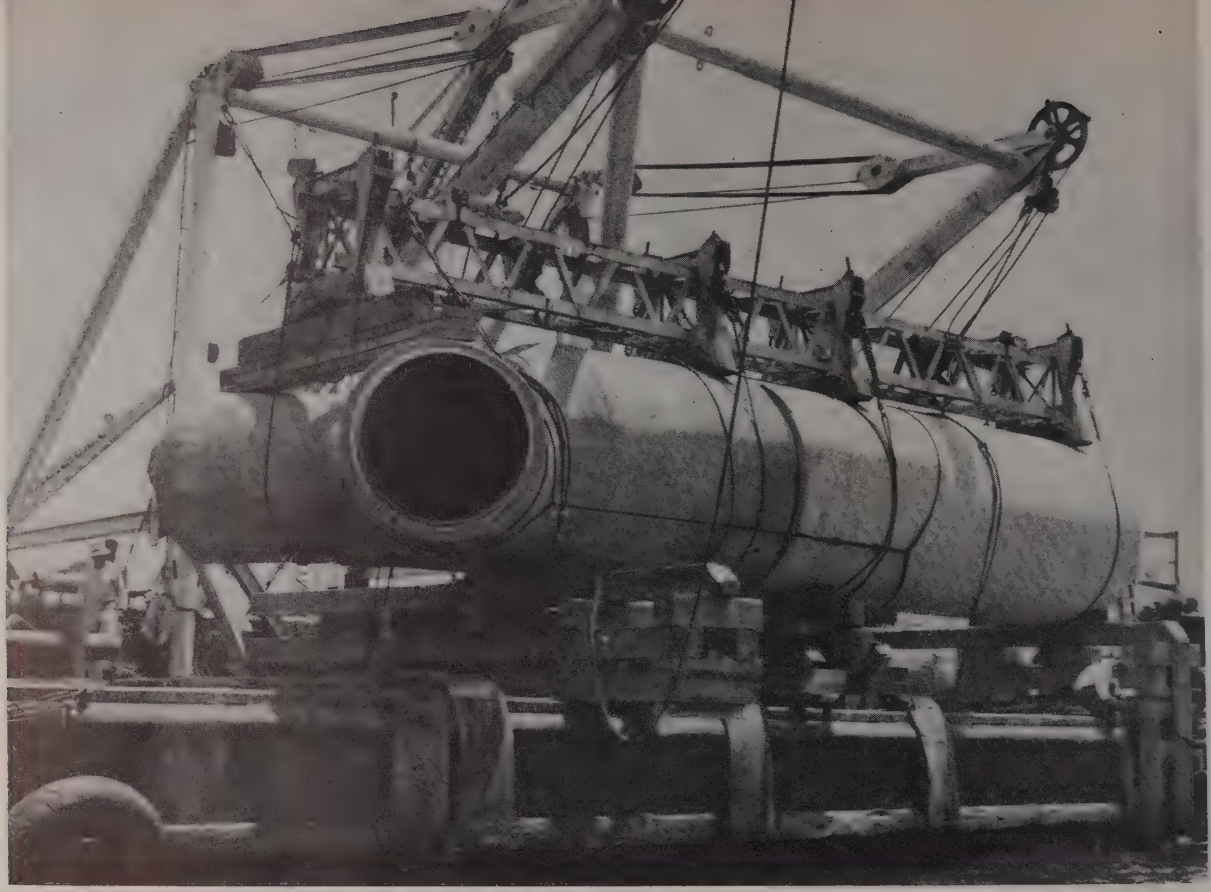


TOUGHEST TASK was placing the wye section, which contained two outstanding legs. To keep legs from hitting side of barge additional clearance was provided by building timber skids. Vertical skid is being placed at right. Skids were greased during pipe placement.

on the shore was used to draw the pipes together. The distance remaining between the pipes was relayed to the winch operator on the shore by two-way radio. It was found that the pipes would seat themselves in the joint more easily if they approached at a slight angle rather than directly on line. When the diver had poor visibility he kept track of the motion of the pipe by keeping his hand on the inhaul cable.

After the pipes were together the diver felt around the joint to make sure it was even. Adjustments were made by slightly repositioning the barge or by raising or lowering the far end of the pipe with the offshore derrick boom. Then the diver released four pelican hooks, freeing the strongback which was brought back to the surface for fastening to the next pair of pipes. The diver entered the pipes and made the lead-caulked joint with an air-operated tool, and, if necessary, used a high pressure waterjet to excavate a bell hole at the offshore end of the pipe. If everything went smoothly a good diver could direct the positioning of the pipe, release the strongback, and make the joint in 35 min.—the optimum for diving in 200 ft. of water.

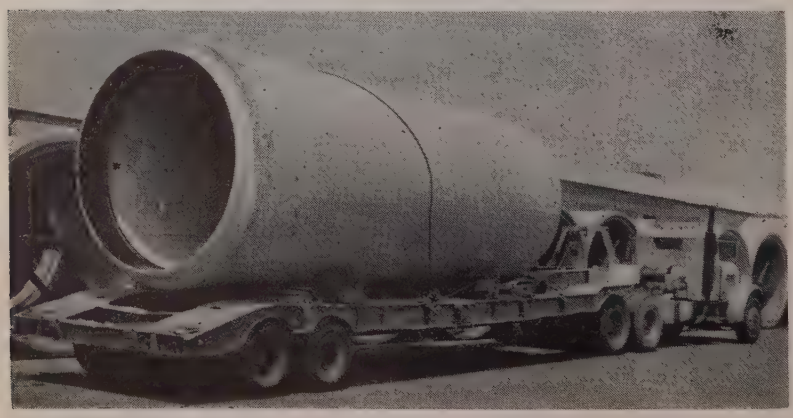
Ordinarily to bring a diver to the surface from such a depth would require keeping him 22 min. at 30 ft., and 28 min. at 20 ft. and 46 min. at 10 ft. However, the derrick barge was equipped with three decompression air tanks in which the diver spent about 1½ hr. after being brought directly up from 30 ft. Four divers and four diver tender teams were used for pipe placement after reaching a depth of 175 ft. The goal each day was to place two double sections.

When the wye (where the line divided into two 60-in. legs) was reached two 30-ton concrete thrust blocks were placed, one on each side of the wye. The inhaul cable was run through single sheaves on the blocks to permit use of the same method of drawing the pipes together.

In July tests were run using underwater TV equipment furnished by Underwater Surveys of San Diego. Visibility on the screen was excellent and engineers on the barge could often see as much or more than the diver. However, it was not feasible to use TV on the remainder of the project since it was already so highly organized that diver time could not be reduced.

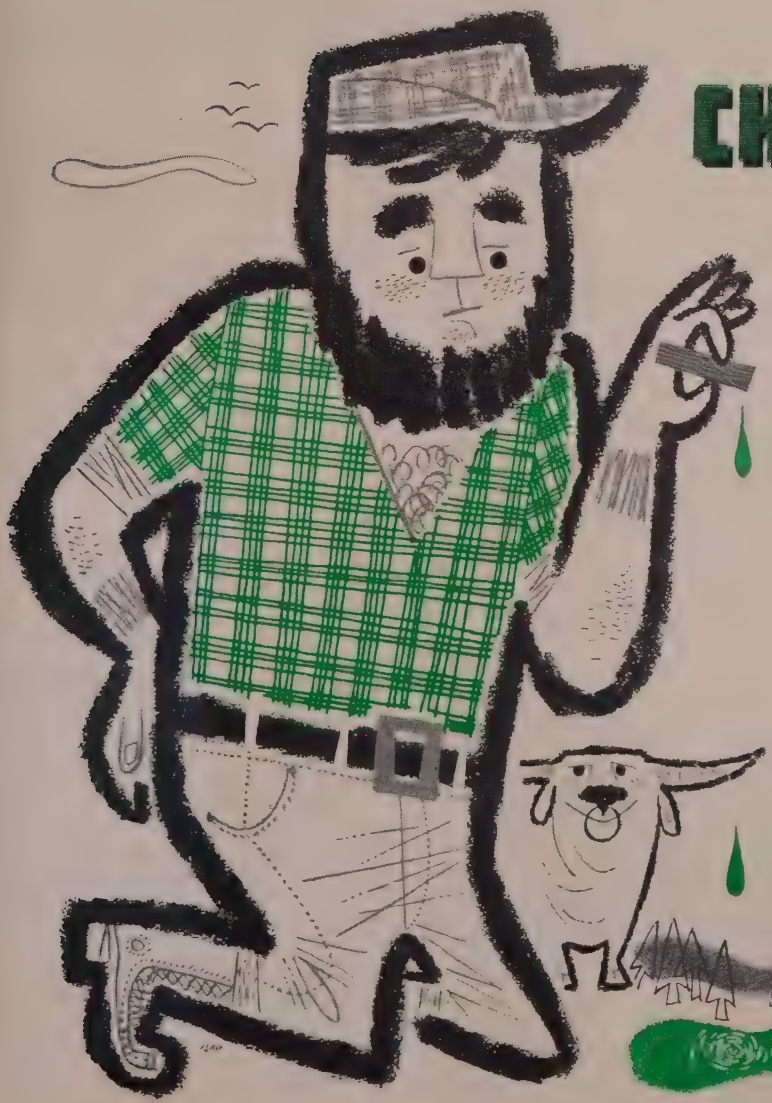
At present gravel ballast is being placed along the line—to spring line

(Continued on page 48)



PIPE SECTIONS were trucked from yard of manufacturer, American Concrete Pipe and Construction Co. First 1,000 ft., which were placed from trestle, were brought to White Point, the rest were brought to dock at San Pedro for transfer to derrick barge.

"Been settin' here, wettin' this fool stick for twenty years—and she ain't rotted yet." Paul Bunyan threw down the 12x12 Chemonited* timber in defeat. His disgusted sigh flattened 30 acres of prime Douglas fir. "Yessir, Babe, I been suckered again by a city slicker. That Baxter man bet me a year's free loggin' to a month in Frisco that that there stick would never rot—even in moist ground. On account of this new fangled presarvative, Chemonite* . . . Well come on, you lazy Blue Ox, let's get haulin' . . . "



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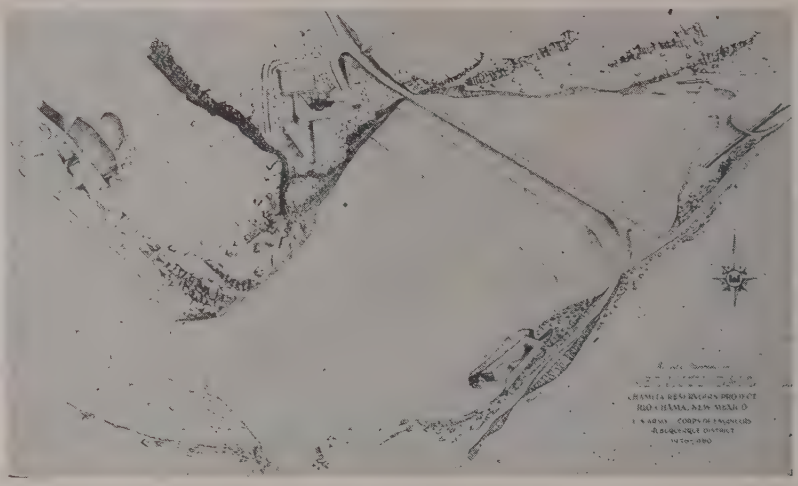
Abiquiu project in New Mexico

Diversion tunnel contract awarded to A. S. Horner to start earthfill dam for flood control on Chama River.



A $4,175,615 contract was awarded in August to A. S. Horner Construction Co., Denver, for the first phase of the Abiquiu Dam project, a major part of the overall Rio Grande Flood Control Project. The project is located on the Chama River above Espanola, about 30 mi. upstream from the point where the Chama River and the Rio Grande meet.

Work under this initial contract consists of construction of a concrete-lined tunnel 2,300 ft. long and 12 ft. in diameter with a vertical shaft 300 ft. high and 16 ft. in diameter through a bluff on the Chama River. This flood control outlet will be used as a by-pass for river flows during the construction of the dam.

The vertical shaft will house an elevator and the controls operating the flood gates which will be located in the horizontal tunnel. A concrete intake structure will be built at the upstream end of the tunnel and a flip-bucket will be constructed at the downstream end. The flip-bucket is a concrete trough designed to dissipate the energy of the high-velocity flows of the water coming through the tunnel. An operations building approximately 106 x 43 ft. will be built above the vertical shaft. Included in the operations building, besides the office, radio, boiler, generator and tools rooms, will be a shop measuring approximately 41 x 26 ft. and an equipment storage room measuring 36 x 30 ft. The shop section of the operations building will be two stories high and located directly over the vertical shaft. The remaining sections of the operations building will be one story high.

DON WILSON is resident engineer for Corps of Engineers on Abiquiu Dam project in New Mexico. He was resident on Jemez Dam.

The purpose of Abiquiu Dam is flood and sediment control. It was approved by the Flood Control Act of June 30, 1948, and subsequently by the Flood Control Act of May 17, 1950.

The construction period allowed for the first phase of the project is 750 days, or slightly over 2 years. The cost of the overall project including construction of the 325-ft. high earthen dam will be $15,000,000.

Funds have not been appropriated by the Congress for the construction of the dam itself. When built the dam will be of compacted earth and will rise approximately 325 ft. above the stream bed and will have a total length at the top of 1,500 ft.

Abiquiu Dam is presently scheduled for completion by the summer of 1960 contingent upon additional appropriations by Congress.

When completed the project will include an off-channel spillway in a natural saddle located some 4,000 ft. from the river, and all spill will by-pass the dam and cascade to the Chama at a point 2,000 ft. downstream of the dam. The Abiquiu Dam is strictly a flood and sediment control project. No permanent pool of water will be impounded by the dam.

As a major element of the overall Rio Grande Flood Control Project, Abiquiu Dam will be operated very much like Jemez Canyon Dam above Bernalillo, New Mexico. Major floods on the Chama River will be held in check by the proposed dam until such time as the Chama River downstream from the dam and the Rio Grande could take the additional flow without damage to existing levees or agricultural and urban areas. When completed Abiquiu Dam will be the second tributary of the Rio Grande controlled by a dam. Jemez Canyon Dam, the only completed element of the flood control phase of the Rio Grande Project, was completed in Oct. 1953.

Eventually the relocation of about 12 miles of highway and two R.E.A. cooperative power lines will be required. It is anticipated that contracts for the relocation of highways and power lines will be executed in the latter part of the present fiscal year.

Quantities involved in the Horner contract include 20,000 cu. yd. in the tunnel excavation and about 5,000 cu. yd. in the vertical shaft. About 1,500 tons of reinforcing and structural steel will be required, in addition to about 26,000 bbls. of cement and 18,000 cu. yd. of concrete.

Don Wilson, who supervised construction of Jemez Dam above Bernalillo, New Mexico, will be resident engineer.

Longest outfall

(Continued from page 46)

on the 90-in. pipe and to the bottom of the diffuser holes on the 60-in. section. A Michigan loader on the barge dumps gravel down a vertical 10-in. pipe which fits inside of a 12-in. pipe. The 12-in. pipe is positioned on top of sewer pipe by means of a steel bracket. The telescoping action of the vertical pipes compensates for the motion of the water surface.

A M Rawn is chief engineer and general manager of the County Sanitation Districts of Los Angeles County. C. R. Compton is assistant chief engineer, and Les Haug is construction engineer superintendent. Dan Boom is superintendent on the ocean work. Walt Miller is barge captain.

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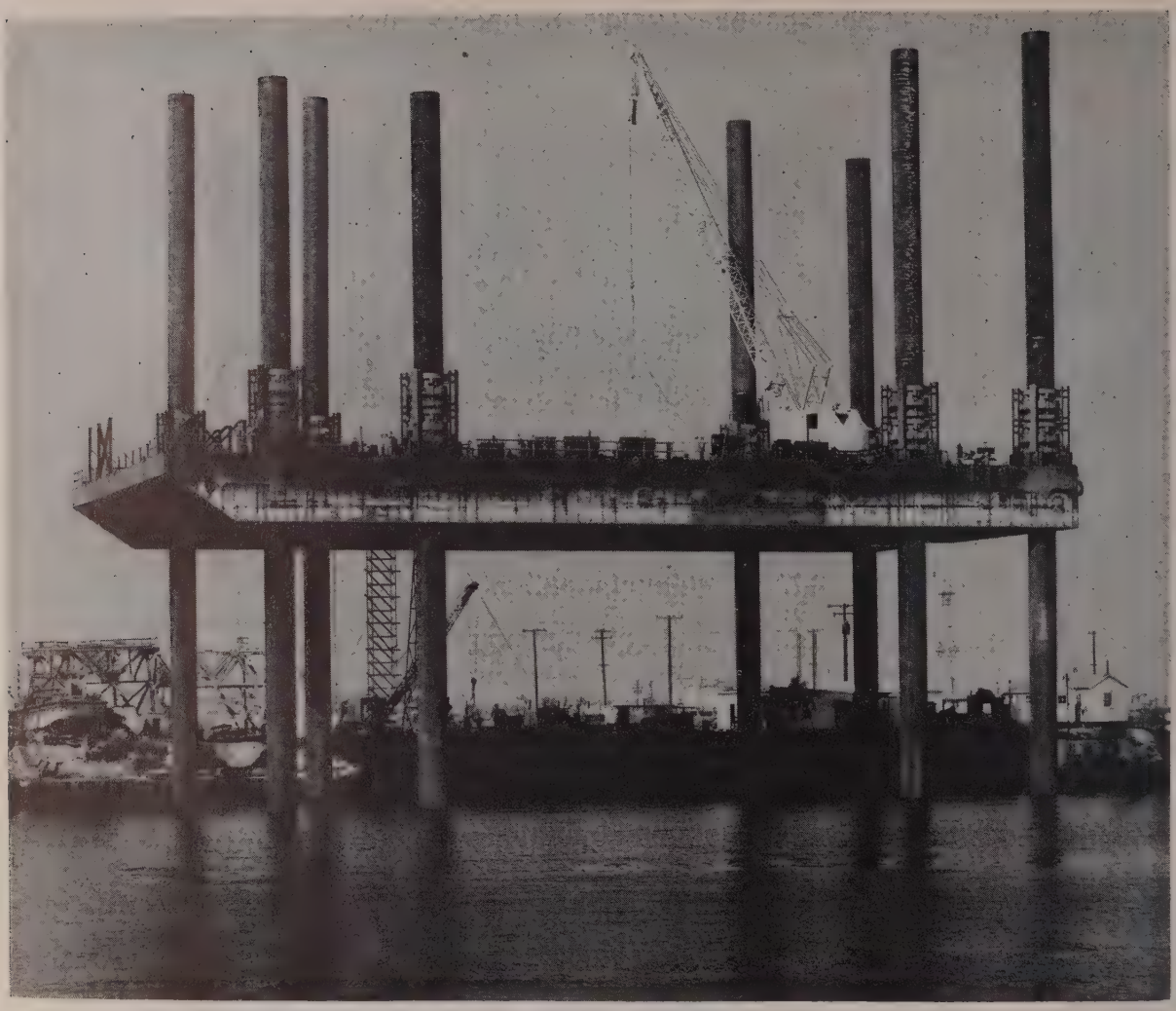


The Texas Tower comes West

Unusual structure is taking shape in Long Beach Harbor. Will be used as a movable platform in exploratory oil-well drilling in the ocean off Southern California. Air jacks on caissons lift 1,500-ton steel hull. Caissons are 6 ft. in diameter, 195 ft. long.

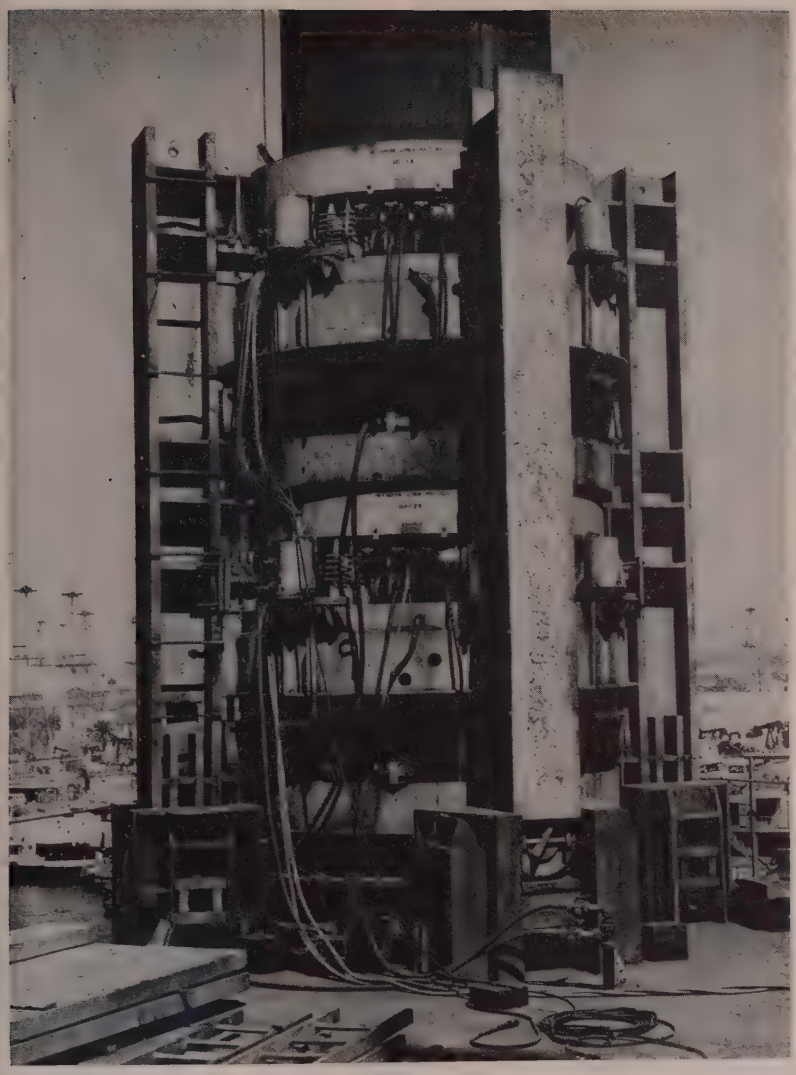
ONE OF THE MOST highly-publicized construction projects in recent years was the installation of Texas Tower radar island off Cape Cod. Part of the publicity was no doubt due to the fact that 37 visitors, including military personnel from the Pentagon were stranded on the island for a week during a storm. But aside from that the project was very interesting from a construction point of view—it's the largest structure ever installed so far from land under such hazardous water conditions.

Many of the main components used in the construction of the Cape Cod platform are now in Long Beach Harbor in Southern California where a similar platform is being constructed for use in offshore exploratory oil drilling. The unusual structure is owned and will be operated by Offshore Constructors, a joint-venture composed of Raymond Concrete Pile Company, DeLong Corporation, Healy-Tibbitts Construction Co., and Bechtel Corp.

The technique of securing a floating steel hull to the ocean floor by jacking down cylindrical steel caissons was first used in 1950 when DeLong, holder of patents on the process, installed a pier for the U. S. Air Force in Greenland. Other installations followed, notably 5 mobile drill barges now operating in the Gulf of Mexico and a pier installed for the Army at Whittier, Alaska, in 1953. In fact, the U. S. Army Transportation Corps holds several of the floating docks for use in emergencies.

The hull of platform now being outfitted for well drilling in Southern California is 100 x 200 x 13 ft. deep and weighs 1,500 tons. It was fabricated in New Orleans and floated to Long Beach via the Panama Canal. The caissons are 6 ft. in diameter and 195 ft. long. Because of their length they had to be cut into three sections for installation. Lifting and placing the caisson is being done with a 3900 Manitowoc crawler crane which will remain on the platform.

On each of the caissons are two 300-ton capacity air jacks. The air jack consists of three major compo-



TWIN AIR JACKS can lift 600 tons. The grippers of the jacks encircle caisson like innertubes. Bellows between jacks cause motion when expanded. Upper jack is tied to deck by vertical beams.

nents—the upper section contains an inflatable rubber gripper enclosed in a steel housing which is fastened to the platform with a structural tie-beam; the lower section of the jack is also composed of a rubber gripper in a steel housing; between these two sections there is an expandable and retractable bellows

Gripping Sequence

The lower gripper is expanded by high pressure air so as to grip the 6-ft. caisson. The air pressure on the upper gripper is thereupon relaxed. Air then forces the bellows to expand, which in turn pushes the upper gripper and the structure up 6 to 8 in. The upper gripper is then expanded, the lower gripper deflated and raised an equal amount by the contraction of the bellows, aided by a retraction jack. Compressed air is supplied by a battery of compressors, which produces air at over 200 psi. The air system is so arranged that all jacks can be operated by a central control or any pair of jacks individually, somewhat in the manner of lift-slab.

When the platform is positioned over its first test location sometime in November the caissons will be dropped to firm seating in the overburden. The jacks will then raise the pier to the correct level, simultaneously forcing the caissons downward as weight bears upon them. Depending on conditions the caissons can be moved from 5 to 10 ft. per hour.

The great advantage of the platform in this type of work is its mobility. The total elapsed time for repositioning neglecting travel time between the points, is only about 24 hr.

It is expected that the platform will be moved about once a month. About 45 men will be employed in the operation. When the platform is moved the caissons are drawn up flush with the bottom of the hull and extend 195 ft. above the hull bottom. The rig will never be more than a mile or two off shore so that crews will be able to return to land each night. There will be emergency accommodations, however, for 18 men.

General Superintendent for Offshore Constructors is George Bauer of DeLong Corporation.

County roads...

(Continued from page 35)

plicated or critical in this operation, and if the mixing becomes difficult more water can be added. On the other hand, if the mix is too wet a day or two of additional curing time is all that is required.

Fig. 5 shows the usual road-mix procedure with a tandem of motor graders. This process is continued to secure thorough mixing. As soon as mixing is complete the material is laid out and rolled. If the traffic produces some ruts in the surface additional rolling may be called for the following day. A seal coat is applied after one or two weeks of curing. This stabilization process results in a surfacing which would appear to be equal or even better than corresponding work carried out using the old rock specification and the simple seal coat treatment.

Fig. 6 indicates the finished job and should be compared to Fig. 1 by way of indicating the improvement resulting from this simple and relatively inexpensive procedure.

A further word might be added covering our use of an emulsion-mix for seal coats. The application requires no special equipment. Again, we use only the regular water wagon and the instructions to the driver are most simple. A specified number of gallons of SS-1 are first put into the water tank and then it is filled with water. The ratio of emulsion to water is about one of emulsion to three of water. Experiment has determined that this ratio will cement the seal chips but will not be tacky. The surface can be used immediately after spreading this dilute emulsion seal.

A final word of advice and caution in connection with the use of diluted emulsions. Using either SS-1 or SS-2 it is almost impossible to make a mistake in the proportions of the emulsion to the water. The amount of dilution, the method of handling and application can be varied in almost any manner and still will result in a good job. This is an advantage because it permits the engineer to use considerable flexibility in solving particular problems. There is only one final word of caution and that is never attempt to dilute the RS type of emulsion commonly referred to as the penetration type. Any dilution of this material is bound to end up in trouble.

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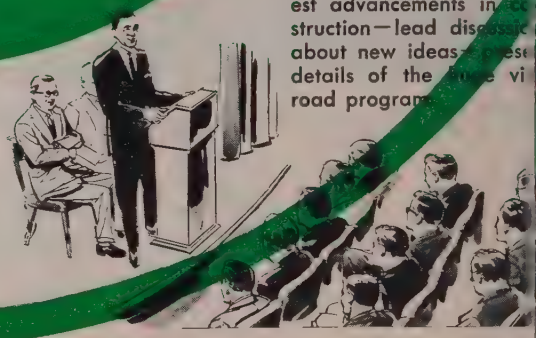

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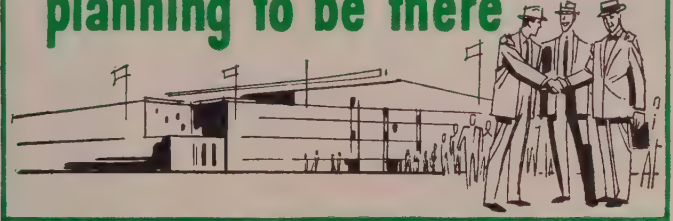

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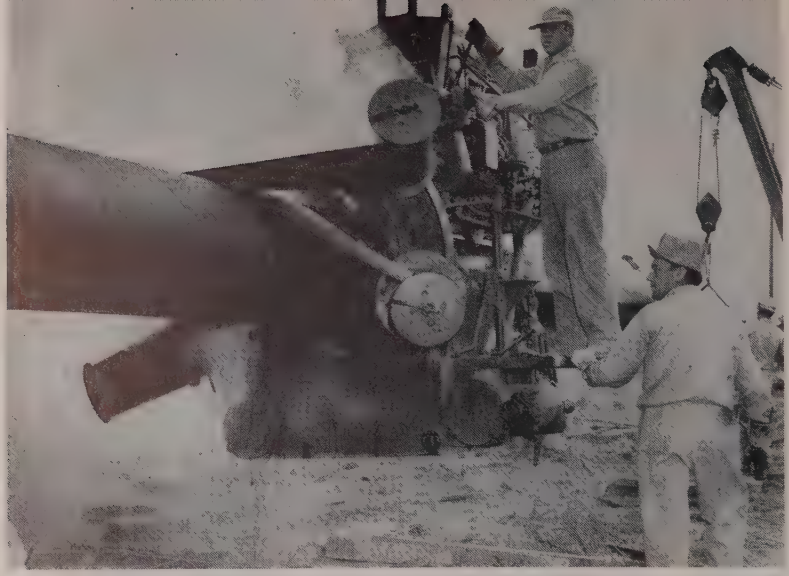

One of the most ambitious construction undertakings of recent years is drawing to a close, the $163,000,000 Pacific Northwest Pipeline from New Mexico to Washington. In just 18 months 1,487 mi. of main line and hundreds of miles of laterals have ben placed.

1,500—mi. pipeline nears completion

THERE ARE a lot of construction men with southern accents in the Northwest these days. They've followed the "Scenic Inch" pipeline, all the way from New Mexico to the Canadian border near Bellingham, Wash. They'll be returning to the Southland now, because work on the main line is nearly finished. In a little more than a year these men have pushed a pipeline nearly 1,500 mi. over some of the roughest country in the West (**Western Construction**, Oct. 1955, p. 21).

So, within a month, the Pacific Northwest, a region known for low cost hydroelectric power, will have natural gas for the first time. In addition to carrying gas from New Mexico, the line will connect with Canadian sources. When the entire network is producing at full capacity, somewhere around 600,000,000 cu. ft. of natural gas will be available daily.

The Pacific Northwest Pipeline was engineered by Fish Northwest Constructors, Inc., which awarded contracts as work progressed in sections ranging up to 120 mi. long. These are the firms that did most of the work: H. B. Zachry Co.; Montin-Benson Corp. & G. G. Griffis, Inc.; Curtis Construction Co., Inc.; Midwestern Constructors, Inc.; R. H. Fulton & Co.; River Construction Corp.

WATER CROSSINGS are always tough. This shot was taken when Engineers Pipeline Co., Ltd. crossed W. Waterway of the Duwamish River on a lateral for Seattle Gas Co.

STEEP AND MUDDY slope required connecting AC tractors by cable and a Carco winch.

OPERATING EASE, SAFETY:

Self-adjusting, 26-inch main-drum power clutch reduces lever-pull 90%.

Main operating levers on antifriction, self-aligning bearings.

Automatic crawler traction-brakes.

Torque converter optional.

SIMPLE, HEAVY-DUTY DESIGN:

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

Splined shafts, antifriction bearings.

Extra-long, extra-wide crawlers available to suit work conditions.

Welded, high-strength steels.

Butt-connected crane boom — safe, solid. Inserts easily changed.

405 WORK CAPACITIES:

20-ton lift crane capacity.

40 to 90-foot crane boom, or — 80-ft. main boom, plus 30-ft. jib.

1 to 1½-yard clamshell, dragline.

1-yard dipper as shovel, hoe.

K697R

HOW DEEP? *How wide?*

Combining extra digging power, strength and stability, Koehring 405 is *big-capacity* in every respect. As a 1-yard hoe, it reaches a long way down — 22½ feet below crawlers. Long reach puts spoil bank well beyond edge of cut. There's 12½-foot dump clearance for loading trucks. Close-coupled dipper digs 43 inches wide over side-cutters. Operators like its ease of control. *You'll* like its big capacity with every attachment.

Koehring 405 converts to 1-yard shovel. It also brings you *extra work capacity* as a lift crane, clamshell, and dragline — see ratings in panel. This is a new size in the Koehring heavy-duty line, worth looking into. Your Koehring distributor has more information that will interest you. *Call him today.*

AMERICAN MACHINE CO., Spokane, Washington
PACIFIC HOIST & DERRICK CO., Seattle, Washington
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WESTERN CONSTRUCTION EQUIP. CO., Billings,
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STANDARD MACHINERY CO., San Francisco, California
KIMBALL EQUIPMENT CO., Salt Lake City, Utah
NEIL B. McGINNIS CO., Phoenix, Arizona
THE HARRY CORNELIUS CO., Albuquerque, New Mexico
SAN JOAQUIN TRACTOR CO., Bakersfield, California
ENGINEERING SALES SERVICE, INC., Boise, Idaho
McKELVY MACHINERY CO., Denver, Colorado

Here's the business end of a heater

When you buy a heater, don't stand in front of it; stand behind it. All heaters are hot in front, but their value to you depends on the rear end.

If you want *circulated warm air* indoors, *powerful spot heating* outside, if you want to *dry plaster,* pour and *cure concrete* and *keep the job rolling* in any weather, you need a Master heater.

It's a compact furnace-on-wheels, with starter, fan, thermostat, filter, pressure atomizing burner, insulated fire chamber and all. It rolls into place, starts at the flip of a switch, needs no vent and burns low cost kerosene or fuel oil.

We think it gives you more good heating for your money than any other type heater. Write for the free folder "Summer Warmth in Winter" or call your Master Distributor and see if you don't agree.

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

Structural Design Chart—IV

By
THOMAS HARAN
Civil Engineer

FOR THE PAST three months illustrated data sheets of this author's interpretation of the structural design requirements of the ACI Building Code (ACI 318-5) have appeared in this magazine.

The sheets are intended as a ready reference for the experienced structural designer, for he is already familiar with ACI 318-51 (as well as other codes) and needs only to be occasionally reminded of certain minor requirements or recommendations by observing the details and notes shown on the sheets.

Recently, the American Concrete Institute adopted some revisions to ACI 318-51. However, since a period of two or three years will pass before these revisions are reflected in the various regional and municipal codes, the sheets of this series are being presented with no connotation of revisions.

Last month's sheet commenced the presentation of the methods of structural analysis for flat slab construction. This presentation is continued with the sheet appearing on the opposite page, which shows plan views of floors (or roofs) with moment coefficients for four general types of flat slab construction. These four cases can be interpreted to cover practically all of the conditions encountered in ordinary flat slab construction. This sheet concludes the first part of the series, the structural analysis of floor members.

Next month the series commences with the design requirements of floor members—"Structural Design of Floor Slabs."

●

EUGENE, Oregon, has awarded about $300,000 of construction contracts for improving its municipal airport. Bulk of the work will be carried out by T. C. Wildish of Eugene on a low bid of about $235,000, the work to include a 1,500-ft. extension to the main runway and the resurfacing of this runway.

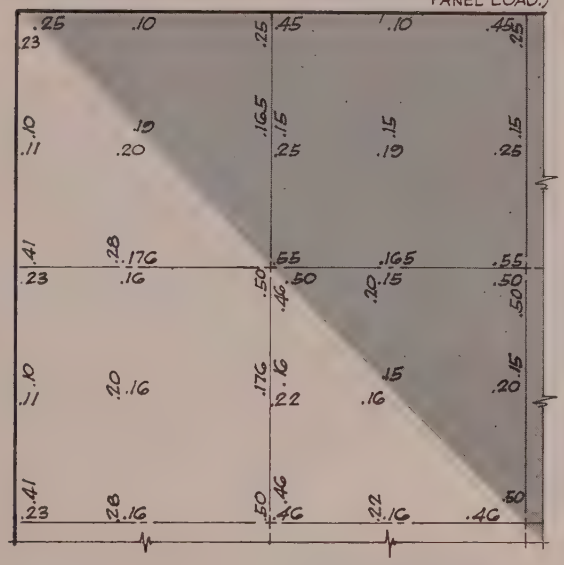
A.C.I. STRUCTURAL ANALYSIS OF FLOORS

Flat-Slab Floors — Continued

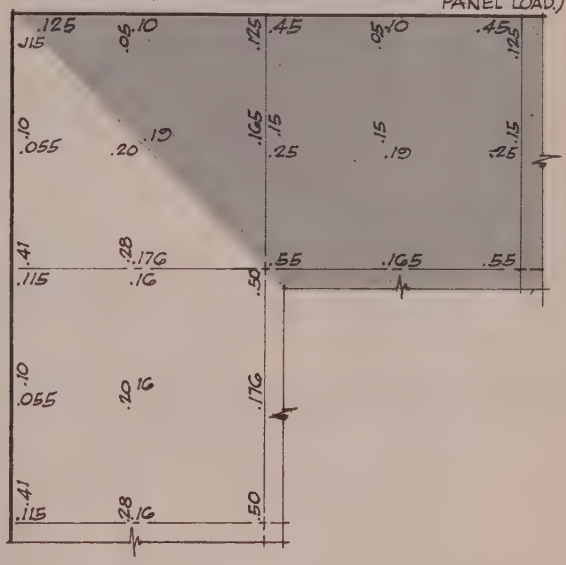
$M_{STRIP} = M_o \times$ COEFFICIENT $M_o = .09\,WL(1 - 2c/3L)^2$

STRIP COEFFICIENTS ARE SHOWN IN PLANS BELOW ⊥ L OF M_o. WHERE COEFFICIENTS ARE SAME FOR BOTH DIRECTIONS, ONLY ONE APPEARS.

R/C COLUMNS & EXTERIOR EDGE MARGINAL BMS. W/ $d \geq 1\frac{1}{2}t_s$ & $LL/DL \geq K_{COL}/K_{SLAB} \geq 1$ (DESIGN BEAMS WITH NO PANEL LOAD.)



R/C COLUMNS & EXTERIOR EDGE MARGINAL BEAMS WITH $d > 1\frac{1}{2}t_s$ & $LL/DL \geq K_{COL}/K_{SLAB} \geq 1$ (DESIGN BEAMS WITH 1/4 PANEL LOAD.)



TYP. INTERIOR PANEL

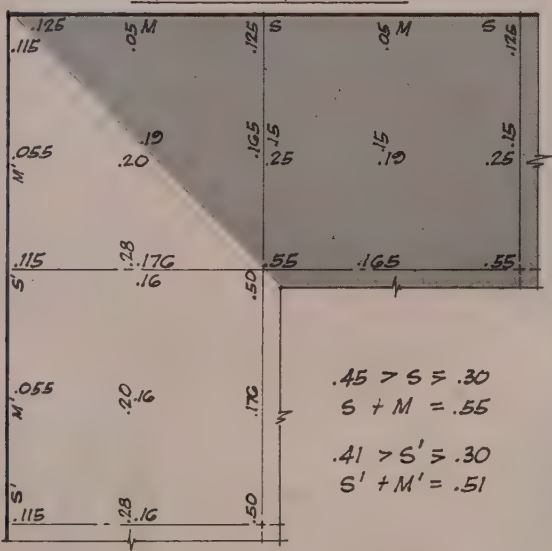
= DROP PANEL CONSTRUCTION

= BUILDING'S EXTERIOR EDGE

= COLUMN STRIP ℄.

If Middle Strip is continuous over Wall or Marginal Beam of $d > 1\frac{1}{2}t_s$, -M Coefficients are .208 & .195. For Marginal Beams of $d \geq 1\frac{1}{2}t_s$ use coefficients of TYPICAL PANEL.

R/C EXTERIOR BEARING WALLS WITH $LL/DL \geq K_{COL}/K_{SLAB} \geq 1$



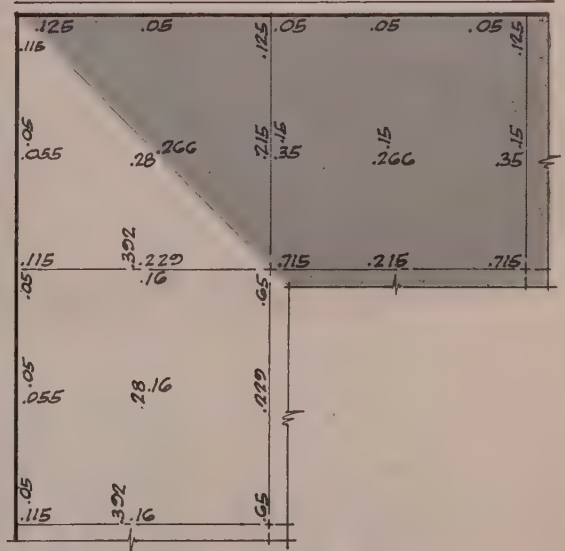
.45 > S ≥ .30

S + M = .55

.41 > S' ≥ .30

S' + M' = .51

MASONRY EXTERIOR BEARING WALLS & OTHER CONST. WITH LOW SLAB RESISTANCE.



T. HARAN

LOOK TO THE ALLIS-CHALMERS LINE . . . TO

Match the needs of your tractor

If you're looking for big capacity, mobility and wide-range versatility — at low cost — the tractor shovel you need is in the Allis-Chalmers line.

First — advanced-design features make Allis-Chalmers tractor shovels the most productive and widely accepted in earth-moving and material handling fields. Second — each unit offers a shovel that's a built-in part of the tractor — not just an attachment. Third — you have a choice of four sizes to match the needs of your jobs most efficiently.

You can increase Allis-Chalmers tractor shovel usefulness even more by replacing the standard bucket with a variety of quick-change attachments, such as a light materials bucket, rock bucket or rock fork . . . or by adding a rear-mounted ripper.

On every job, your Allis-Chalmers tractor shovel provides all these important advantages for you and your operator:

- Superior balance and low center of gravity
- Sure-footed stability with extra long track
- Greater strength with heavy, welded-steel shovel, side frames and low stabilizer
- Bucket design that makes loading and dumping fast, clean and easy
- Simplified hydraulics with 3-way, full-flow filtering
- Powerful, long-life Allis-Chalmers diesel engine
- All-steel main frame and one-piece final drive and steering clutch housing
- Timesaving service simplicity
- Heavy-duty roller bearing truck wheels
- 1,000-hour lube intervals on truck wheels, idlers and support rollers
- Better visibility, comfortable seats, and easy operating, accessible controls

HD-21G

torque converter drive
13-ft, 4-in. dump height
204 net engine hp
66,500 lb

4 YD

HD-16G

torque converter drive
12-ft, 3-in. dump height
150 net engine hp
47,800 lb

3 YD

shovel jobs

HD-6G

10-ft dump height
68.5 net engine hp
19,600 lb

1½YD

2¼YD

HD-11G

11-ft, 7-in. dump height
111 net engine hp
32,000 lb

Ask your Allis-Chalmers Construction Machinery dealer for the complete story and for a look at one of these great tractor shovels at work. And remember, your dealer is headquarters for factory-trained servicemen, factory-approved facilities and complete stocks of True Original Parts.

See your ALLIS-CHALMERS construction machinery dealer

ARIZONA
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NORTHERN CALIFORNIA
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Shasta Truck & Equipment Sales—Redding
Aikins Tractor Co.—Eureka and Willits

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

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

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

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

OREGON
Haupert Tractor Company—
Medford and Klamath Falls
Wood Tractor Company—Portland

UTAH
Cate Equipment Company, Inc.—Salt Lake City

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

WYOMING
Studer Tractor & Equipment Company—Casper

See the greatest display of construction equipment at the

ARBA Road Show next January

THE IMPRESSIVE DEVELOPMENTS in construction machinery since 1948 and the new models which 250 manufacturers will exhibit at the 1957 ARBA Road Show, staged after a lapse of nine years, will indicate how quickly productivity is being boosted. Describing the rapidity with which equipment has developed, Julien R. Steelman, president, The Koehring Company, said recently: "Fifty years ago, the typical road project was a slow-moving scene of men and mules. Today, it is a panorama of machines—big, fast and powerful. Fifty years ago, manual methods accounted for 95% of the work on highway jobs, and power equipment handled only 5%. Today, almost the opposite is true."

The mechanization of the road-building industry, more than any other factor, experts agree, is responsible for America's vast network of modern highways.

The steady rise in labor costs through the years has led contractors to demand more productive machines. Manufacturers have responded by designing equipment with more capacity, greater speed and versatility. An expert in the equipment field recently illustrated this trend by pointing out how the horsepower of tractors, for example, has been boosted periodically to offset increased labor costs:

In 1935, operators' wages were $1.09 per hour and tractor horsepower was about 95.

By 1941, wages had increased to $1.50 per hour and horsepower was boosted to 113.

By 1948, wages had increased to $2.25 per hour and tractor horsepower was boosted to 130.

By 1955, wages had increased to $3.25 per hour and tractor horsepower was upped to 230.

The success of this attack on road-building costs has been defined from time to time by objective leading engineers.

Two years ago, a group of cost experts in the federal Bureau of Public Roads sat down to compare 1953 costs with those of 1923. They found that if contractors were to use the same machinery and methods they employed in 1923, highway costs of $1.00 today would top $1.90 instead. The economy and efficiency of modern equipment makes the difference.

The economics of building with modern equipment has made it possible for engineers to design not only larger, but safer roads. Today, they can make deep cuts where a few years ago they would have had to build a by-pass. Engineers, knowing

1930—Gasoline power and steel wheels were standard on these models. This is the show that just beat the effect of the depression, which stopped all Road Shows for a decade.

1940—Held in the old International Amphitheatre in Chicago, this was the last one before World War II. Machines had grown in ten years; rubber tires and diesel power were standard.

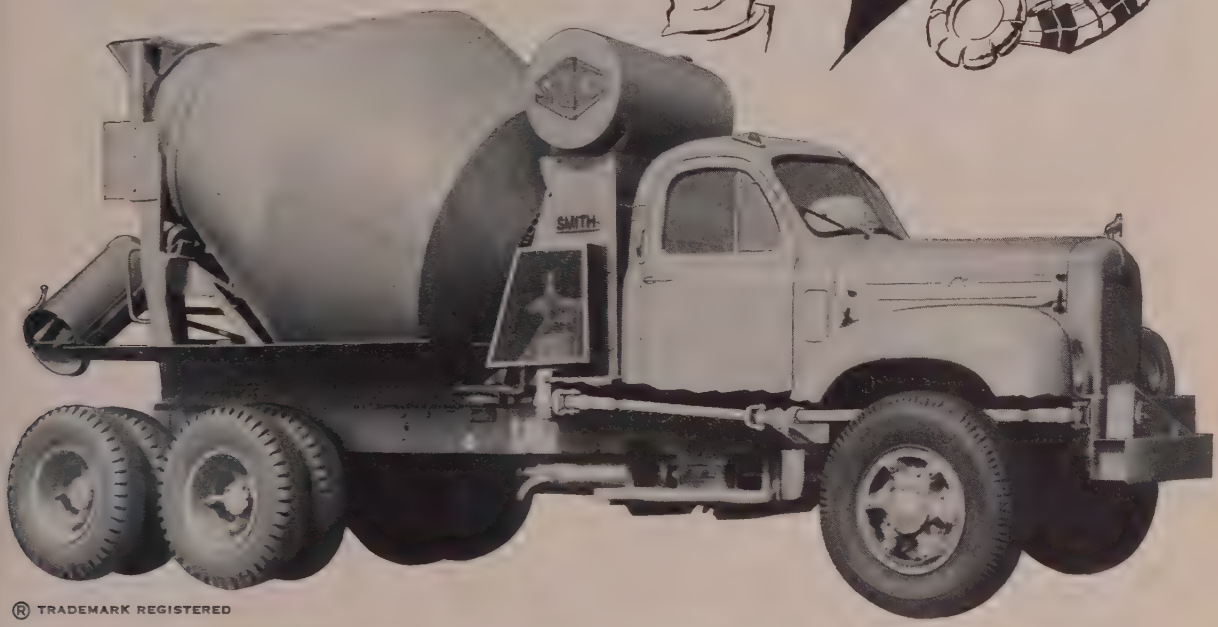
1948—"The World's Fair of the Construction Industry" as it was called was held in the summer outdoors. The 1957 show will again be indoors in Chicago's International Amphitheatre.

He'll live a lot longer ... and cost you much less!

SMITH

integral®

ONE FRAME FOR BOTH TRUCK AND MIXER — ONE ENGINE FOR BOTH



® TRADEMARK REGISTERED

This is a Smith INTEGRAL with front end power takeoff — one engine and one frame for both truck *and* mixer.

The photo has been cut away to show the drive shaft arrangement on the chain drive Integral.

Engine speed is reduced at the transfer case *before* the power goes into the shafts.

This means a slower shaft speed, which cuts wear tremendously on universal joints and bearings.

result? *Exceptionally long life, and astonishingly low maintenance cost.*

other features of the SMITH INTEGRAL

- Shorter center of gravity for better weight distribution.
- Lower height.
- Choice of integral mount, or with separate frame.
- Choice of chain or gear drive.
- Choice of sizes: 4½, 5½, and 6½ cubic yards (all with front end PTO).

For more information, contact your nearest Smith distributor, or write to the company.

THE T. L. SMITH COMPANY, Milwaukee 45, Wisconsin; Lufkin, Texas

Since 1900, the pioneer designer and foremost manufacturer of the world's finest mixers

Affiliated with Essick Manufacturing Company, Los Angeles, Calif.

Ad No. A8856-1P

FAST on the Job...EASY to Handle!

Added to the UNIT line of proven equipment, is the New UNIT CHALLENGER. Here's a modern 3/8-yard machine that provides a perfect combination of design and construction. Packed with new advanced engineering features: Self-aligning Hook Shoes . . . Force Feed Lubrication . . . Full Floating Trunnion-Mounted Tapered Drums . . . Torque Converter, etc., the New UNIT CHALLENGER is the most dependable machine that money can buy.

Bulletin C-800 completely describes and illustrates the New UNIT CHALLENGER.

Send for Bulletin Now

UNIT CRANE & SHOVEL CORP.
6421 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

Geared to boost your earnings!

A 8343-2½

the capacity of the contractor's fleet, no longer go over or around an obstacle in sharp, dangerous curves, but through it. Roads can be built wider, with adequate shoulders and approach lanes. With today's machines, it is no longer necessary to sacrifice safety for economy.

Under the big roadbuilding program, dozens of long-delayed projects are being launched across the nation. Contractors bidding on the new jobs will look first to their equipment fleet. One industry leader, Kenneth Lindsay, executive vice president of The Iowa Manufacturing Company, made this observation recently: "The contractors who make the most out of the National Highway Program will be those who have learned how to manipulate equipment—how to pick the right machine for the job at hand, how to set up the most productive combinations."

Launches big equipment year

The timing of the 1957 ARBA Road Show could hardly be more perfect to meet this high interest in equipment. Contractors and officials from city, county and state highway departments are vitally interested in the new machines scheduled for display in Chicago's grand International Amphitheatre. "No other occasion except a Road Show provides roadbuilders with the opportunity to see such a wide selection of machines," ARBA's Executive Vice President Louis W. Prentiss said this month.

Additions to power at Fort Peck Dam project

AN ADDITION to the power producing facilities at Fort Peck Dam in Montana which may ultimately cost $25,000,000 will be started during the year with a $500,000 appropriation made available to the Corps of Engineers.

Additional work to be carried out by the Corps of Engineers in Montana during the next 12 months will be a $350,000 construction operation for completing levee work near Havre. Some $200,000 is available for starting work on levees to protect Billings from Yellowstone River floods. Contract for this work may be awarded by June of 1957 and will be part of an ultimate levee improvement program at this site to cost more than $3,000,000.

At a future date work will be started on levees to protect Great Falls from Missouri River floods. Engineering work at the local level has been completed and made available for final study. Cost estimate is more than $2,000,000. Similar work at Miles City which may be scheduled for 1958 represents a total estimated cost of $1,400,000 for levees along the Yellowstone River.

BIG- Without BULK!

New 900 cfm AIRVANE Rotary

Here's a 900 cfm portable compressor that is only 12 feet long—that has a 14'10" turning radius—that is ruggedly built of high-strength steel—yet weighs as much as 3700 pounds less than other 900 cfm portables.

The new Joy 900 cfm AIRVANE rotary tows and maneuvers like ordinary 600 ft. machines, yet packs enough punch to power three heavy wagon drills . . . or seven light wagon drills . . . or ten hand-held drills.

EXCLUSIVE AIRVANE FEATURES:

THERMAL BY-PASS—an oil circulating system that provides immediate lubrication and temperature control under all weather conditions.

SPLINE COUPLING—does away with a clutch for more efficient power transmission.

Consult a Joy Engineer

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CORE DRILLS • BLAST HOLE DRILLS
PORTABLE HOISTS • FANS • BLOWERS • TUNNEL,
QUARRY, MINE EQUIPMENT

If a 900 ft. portable is in your plans to push along a tough job, better look at the latest—then put a JOY on the job.

Write today for full information. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Write for FREE Bulletin 129-25

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JOY

CONSTRUCTION EQUIPMENT MANUFACTURERS
FOR OVER HALF A CENTURY

WESTERN CONSTRUCTION NEWS

Activity under way at Glen Canyon

Access roads are the key, and involve the Bureau, two states and the Navajo.

THE DEPARTMENT of the Interior has approved an agreement with the State of Arizona regarding construction and maintenance of a 34-ft.-wide, 25-mi. access road to the site of Glen Canyon Dam and a bridge across the Colorado River, Commissioner of Reclamation W. A. Dexheimer announced recently.

At the same time, the Bureau of Reclamation has authorized award of a $1,156,244 construction contract for the first five miles of the access road. The contract goes to the Strong Company of Springville, Utah, on that firm's low bid.

The agreement with Arizona makes it possible to bring the road and bridge up to the standards of a primary highway—beyond the temporary construction needs of the Bureau—and is the first step toward a permanent "loop" off United States Highway 89—with terminals in Kanab, Utah, and Bitter Springs, Arizona—a distance of approximately 96 miles.

The highway and bridge will permit ready access to the dam site from presently existing improved highways, over which construction materials must be trucked from the railheads. The highway will also provide a tourist route to the scenic recreational area and reservoir created by the construction of Glen Canyon Dam.

Arrangement with Arizona

The arrangement with Arizona is made possible by an easement signed by the Navajo Tribal Council for use of lands to be crossed in the Navajo Indian Reservation. It is also keyed into participation by the Bureau of the Department of Commerce, which agency will provide additional funds needed to bring the Glen Canyon bridge to the standards of a primary highway.

The access road will run from Bitter Springs, on United States Highway 89 north of Flagstaff, to the Glen Canyon dam site on the Colorado River about 6 mi. below the Utah border. The Glen Canyon bridge will cross the canyon immediately downstream from the dam.

The understanding with Arizona calls for the State Highway Commission to bear 10% of the cost of the road. The Bureau of Reclamation will pay 90%. During the construction and completion of Glen Canyon Dam and powerhouse structure, the Bureau will pay 50% of the maintenance cost of the road. After completion, the road will be maintained at the sole cost of the State.

With respect to the bridge, the arrangement calls for the Bureau of Reclamation to pay from its own funds $1,800,000 (the amount a temporary bridge would cost), and the Bureau of Public Roads $600,000. The State of Arizona will pay the remaining costs, except in the event the costs should run over $3,200,000 —in which case the United States will pay 75% of the amount of such excess costs.

The Bureau of Reclamation has constructed a temporary access road from the bridge site on the northwestern side of the river about eight miles to the Utah border. The State of Utah recently completed a link of unimproved road from the border to Highway 89 at Kanab. Arizona has also completed a temporary road from the Gap, on United States 89, which is being used for access to the southeast side of the dam site.

At the present time, although it is approximately 1,200 ft. from one rim of the canyon to the other at the dam site, it is necessary for vehicular traffic to go 225 mi. to get from one side of the canyon to the other.

The Strong Co. will begin construction of the primary access road near Bitter Springs. Other contract awards for additional road work will

OIL-WELL DRILLING ISLAND WITH BUILT-IN SCENERY

Richfield Oil Corp. has awarded a contract to the Guy F. Atkinson Co. of San Francisco and Long Beach for construction of a drilling island on its 1,175-ac. state tideland lease offshore from Rincon approximately 9 mi. west of Ventura.

The island will consist of an outer ring of breakwater rock with a land filled center. It will be built in 45 ft. of water about 3,000 ft. southwest of Punta Gorda. Total area of the man-made structure will be about 3 ac. at the water line. Net working area will be slightly more than 1 ac. A small boat dock will be constructed on the east side to accommodate craft carrying crews and supplies.

While it is planned to drill at least 70 wells from the island, well heads and producing equipment will be concealed and will not be visible from the mainland, company officials said. Portable drilling masts will be used during the development program and there will be no permanent derricks on the island. Palm trees and shrubbery will be planted to give the structure the appearance of a natural island. Engineering design on the project was done by John A. Blume, consulting engineer of San Francisco.

LOOK AT THE BOULDERS THIS D9 IS 'DOZING!

When there's a tough job to do, Schmidt Construction Co., Grand Junction, Colorado, hands it to this power-packed giant

Power is what the Schmidt Construction Co. wanted when it purchased this CAT* D9 Tractor with No. 9S Load-Shape Bulldozer. And *power* is what the company is getting. Here, on a construction job involving about 75,000 cu. yd. of rock work on Bear Creek Canyon Road near Denver, the D9's punch really paid off. Granite boulders, shot from the mountainside, proved too big for a shovel or other machines to tackle. Working 8 hours a day, 6 days a week, the D9 handled them with on-schedule performance.

Built for big production in tough going, the Turbocharged D9 delivers 320 HP at the flywheel. To meet your needs, it is available with torque converter or direct drive. In spite of its weight—more than 29 tons—it works with the agility of smaller tractors. Hydraulic boosters provide power for steering, braking and master clutch use. Many other features also contribute to the D9's efficient, economical performance, among them:

- **For more working power, its Turbocharger, driven by engine exhaust, packs air into the engine according to engine load, not engine speed.**
- **Its constant power drive for rear-mounted cable control makes the operation completely independent of flywheel clutch or torque converter, boosting efficiency.**
- **Its in-seat gasoline starting system with single-lever control provides quick, sure starts.**
- **It's easy to service major drive components—oil clutch, torque converter, transmission and steering clutches each can be removed individually.**

Your Caterpillar Dealer, who backs all Caterpillar equipment with prompt service, will be glad to show you how the D9 can step up production and profits for you. Ask for a demonstration!

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

CATERPILLAR*

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

STEP UP PRODUCTION AND PROFITS WITH THE D9

follow. A contract for the bridge is tentatively scheduled for award in November.

Second low bidder on the road job was Morrison-Knudsen Co., Inc., of Los Angeles, California, with an offer of $1,232,190. Third low, with a bid of $1,300,198, was the Rogers Construction Company of San Diego, California. The engineer's estimate for the work was $1,014,633.

PUD seeks permit for Columbia River Dam

PUBLIC UTILITY DISTRICT No. 1 of Klickitat County, Wash., of Goldendale, Wash., has filed an application with the Federal Power Commission seeking a preliminary permit for the John Day Project on the Columbia River in Klickitat County, Wash., and Sherman and Gilliam Counties, Ore.

The proposed period would comprise a concrete gravity dam having a gated spillway section 1,310 ft. long an intake and powerhouse section 1,298 ft. long, and several connecting non-overflow sections aggregating 1,192 ft. in length, creating a reservoir extending 75 mi. upstream to McNary Dam; navigation lock chamber; and fish ladders.

The initial installation of the powerhouse would be 13 units rated at 85,000 kw. each. The turbines would be automatically adjustable six-blade type, rated at 134,000 hp. Plans call for the ultimate installation of 18 generating units.

Freight rates — A Western problem

AED of the Northwest hear report on this controversy affecting all construction at regional conference.

FREIGHT RATES—particularly those for equipment and materials shipped by rail from the East to the West—are of direct concern to everyone in the construction industry. Groups and committees of the Associated Equipment Distributors in the Northwest have been fighting against inequities and over-charges for several years (**Western Construction,** May 1955). The situation continues.

As a result, it was logical for Region 12 of the AED, at its recent annual conference, to have this subject brought up to date by H. H. Ellsworth, executive secretary, Utah Citizens Rate Association. His remarks follow:

The need for better freight rates in the intermountain area has been evidenced since the beginning of the transcontinental hauls by railroad. Prior to this time the boat lines hauled traffic from the Eastern ports to the Western ports and then moved the freight back inland at an additional charge. The railroads adopted this same rate making policy in order to meet the competition of the boat lines. There was no other competition in the intermountain area to compel a scale of rates which had its relationship to the cost of performing this service for the mileage of line over which traffic moved. Because of this method of applying transportation charges the shippers in the intermountain area formed an organization and went before Congress and succeeded in securing a change in the law which prohibited charging more for the intermediate territory than for the long haul territory.

Because of the effectiveness of this Association and the fact that the change in the law produced a great many more problems for the intermountain shippers, the Association was continued on a permanent basis as the Utah Citizens Rate Association and it has become an invaluable tool in assisting its member shippers with their transportation problems and generally representing the intermountain territory in transportation matters that involve the whole area.

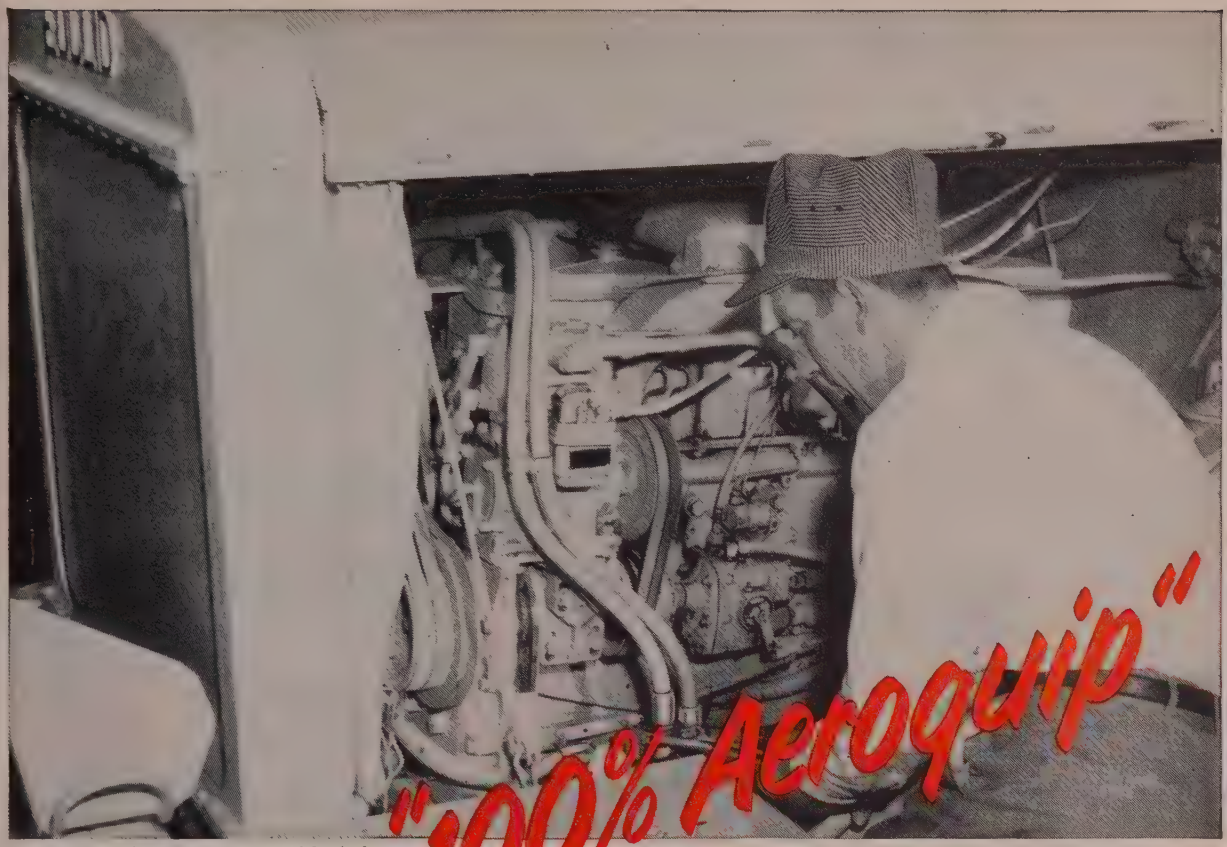
In 1939, the Southern governors went before Congress and secured a mandate to the Interstate Commerce Commission to make an investigation of the class rates throughout the entire United States. This case known as Docket 28300 occupied the better part of thirteen years and only covered the territory from the Atlantic Seaboard up to Denver. The Mountain-Pacific territory lying west of Denver was not involved in this investigation. As a result of Docket 28300 the rates Denver and east were reduced about 15% up to Chicago, the extreme Eastern lines were permitted to take an increase of approximately 15% in their rates. Rates in the South were reduced in about the same proportion as in the area west of Chicago.

The intermountain territory, already on a rate peak of some 15% higher than the rest of the United States, received a body blow as a result of this case. The reduction in the rates east of the line running north and south through Denver produced approximately a 28% rate hump at the border line and this produced an even greater disparity in the cost of laying goods into the intermountain territory from the East as compared to delivering them to the territory east of Denver. The addition of this burden on the shippers in the intermountain territory caused the Utah Citizens Rate Association to call together representatives from all of the intermountain states suggesting to them that they get together and file a case before the Interstate Commerce Commission requiring that the rates in the intermountain territory be reduced to a level which more nearly and fairly represented the costs of performing the service plus a reasonable profit to the railroads.

As a result of this conference the Emergency Committee on Intermountain Freight Rates was formed and a budget of some $40,000 was raised to make a study of the costs

GROWING PAINS FOR THE COLORADO PUMPING PLANTS

Additions are being built to the five pumping plants along the line of the Metropolitan Water District aqueduct from Parker Dam to Los Angeles—some 300 mi. As the first step, a 4-ft. reinforced concrete end wall of each plant has to be removed. To avoid damaging millions of dollars of pump and generator equipment at each plant, the 40-ft. wide and 45-ft. high end walls were first drilled and cut, then removed a section at a time, as shown at the Gene Pumping Plant. The wall sections weighing up to 10 tons are handled by a 25-ton Lorain Moto-Crane with a 50-ft. boom, owned by the Metropolitan Equipment Co. of Pasadena.



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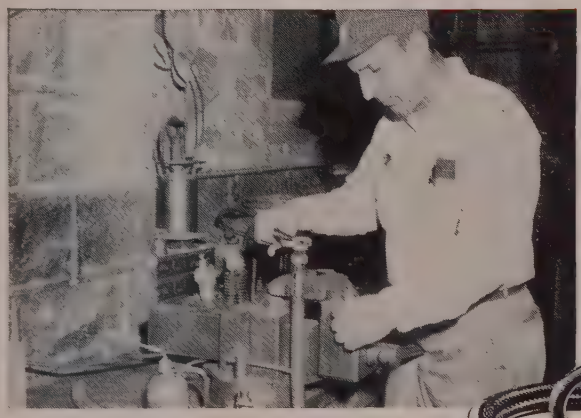

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of operating the railroads in the intermountain territory as compared to the rest of the United States. These cost studies revealed for the first time that the costs of operating the railroads within the western part of the United States was little different from the costs of operating the railroads in the Plain States.

This information was placed before the Interstate Commerce Commission in Dockets 30416 and 30660 known as the Mountain-Pacific Class Rate Cases. Much other evidence was put in by both the railroads and the shippers and after nearly four years of hearings, the Interstate Commerce Commission acquiesced to a demand by the Utah group and the Emergency Committee that an interim adjustment be made in the rates pending a final determination of what a proper rate structure should be by the Commission.

A new scale of class rates was ordered into effect by the Commission and after two postponements was finally placed into effect September 1, 1956. This interim adjustment, while on a level somewhat higher than the Docket 28300 adjustment, provides a scale of rates substantially lower than ever before available to the intermountain territory.

This case has not only had the effect of making a tremendous reduction in the transportation costs of the shippers in the intermountain area, but also has for the first time in history made available cost studies of operating the railroads in different territories of the United States. These can now be used to determine more nearly what a proper freight rate should be and whether some rates are being applied which do not produce adequate revenue or which rates produce more than their fair share of the revenue needs of the railroads.

This was accomplished entirely through the cooperation of shipping groups throughout the intermountain area. This cooperation should be continued and can result in bringing about and maintaining rates which are equitable to the shippers in this area.

Flood control contract

CONTRACT for the construction of a bridge over the Los Angeles County flood control channel at 9th Street in Long Beach has been awarded to the Guy F. Atkinson Co. on its bid of $8,189,689. The award was made by the Board of Harbor Commissioners to the lowest bidder on the project and the work will include an underpass at the east approach. The project is estimated for completion in the spring of 1959. Prior to the actual award the commissioners indicated concern over the delay in acquiring rights-of-way for the structure and its approaches.

Pour roof, then excavate building

Unique procedure used for auditorium in Albuquerque—Cost of falsework for dome eliminated.

SIDEHILL MATERIAL left in place provided the support for casting a circular dome for the 6,000 seat civic auditorium built by the City of Albuquerque, New Mexico. This unique method of construction was developed to take full advantage of the site and the fact that the area required excavation either before or after the pouring of the concrete dome.

Briefly, the design consists of a 220-ft. diameter circular dome supported on 22 columns spaced equally about the circumference. Total rise at the center of the dome is 25 ft. and the shell is 5 in. thick. The ring girder at the line of concrete column is about 2 x 3 ft. in cross section and was heavily reinforced. In addition to this reinforcing the circular girder was stressed with 655 wraps of #8 gage high tensile wire (approximately 85 mi.) which provided post-tensioning.

The circular wrapping was carried out in a manner similar to the wrapping placed around circular water tanks from a rig that traveled around on the ring girder pulled by a crawler tractor. After the excavation was completed, which put the full deadload of the roof onto the beam, the wire wrapping was encased. The spring line of the dome corresponds approximately with the natural ground line and the estimate indicated that more than $50,000 could be saved by making use of this ground support with a small amount of additional fill required to properly shape the underside of the dome.

First operation carried out by the contractor consisted of excavating a trench around the circumference of the dome. On the high side of the sloping site this trench was as much as 40 ft. deep. Concrete footings were then poured in the bottom of this trench and concrete columns formed and poured. The sequence which was originally proposed called for pouring the shell of the dome and stressing with wire before the supporting columns were built. The contractor decided to get the footings and the columns done first to eliminate any possibility of movement in the supporting earth after the dome had been poured.

After the columns were poured up to full height the trench was backfilled and a small volume of fill material was added inside of the columns and properly shaped to match the underside of the dome along its outer edge.

The dome concrete was placed in four concentric pours. The outer ring, which is about 25 ft. wide, was poured against plywood, since this portion of the dome will be exposed. The remainder of the dome was cast directly on the earth fill, as this area will be concealed by hanging acoustical baffles. Total volume of concrete in the dome is about 800 cu. yd. and the design called for a concrete strength of 3,750 psi. at 28 days.

Following the curing of the dome concrete the fill material was removed by standard methods and the construction of the auditorium progressed in normal fashion. Before excavation started a rigid type of insulating material was placed over the dome concrete followed by white chip rock. This treatment was designed to reduce the volume of temperature changes.

Architects for the project are Ferguson & Stevens & Assoc. of Albuquerque. Fred Fricke of Albuquerque was structural engineer and the general contractor was Lembke, Clough & King, also of Albuquerque. The bid price was just slightly more than $1,000,000 and the award was made during August 1955.

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When your bid price includes specification compaction, will you use the old time-and-money-wasting method of rolling and re-rolling... OR WILL YOU CUT COMPACTION COSTS WITH A CEDARAPIDS VIBRATORY COMPACTOR?... the only pneumatic-tired compacting unit available that combines static weight with dynamic impact which imparts an additional 3% to 10% compaction over conventional static-weight rollers! Imagine a 60,000-lb. weight slammed against loose soil by a powerful vibratory thrust 600 to 1400 times a minute! It does more than just press the soil down . . . it actually rearranges soil particles to force out moisture and eliminate air voids. By changing the rate of vibration, decreasing or increasing the weight of the unit, and varying tire pressures from 50 to 100 lbs., the Compactor meets a wide variety of soil conditions.

Check the compaction job-report shown below . . . then ask your Cedarapids distributor for details about both 60,000-lb. and 25,000-lb. Vibratory Compactor models.

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Before a Cedarapids Vibratory Compactor was used on a highway job which was almost entirely new-location construction, the contractor had to *remove* two fill areas and then replace them, as he was unable to get the required 90% of density with another type of roller. By using the Cedarapids Compactor in the new fills, he was able to reach 90% density in one to two coverages over 4" lifts. The only time the contractor had previously been able to reach this density was when *more than 16 passes were made over each lift.* As he was being paid only his bid price, *and no premium for compaction,* his savings with the Cedarapids Compactor were substantial.

TABULATION OF COMPACTION TESTS

Date	5-31-49	6-1-49	6-1-49
Hole No.	36	38	39
Hole Location	Sta. 693 + 12	Sta. 686 + 25	Sta. 694 + 0
Hole Depth	7"	7"	7"
Type of Soil	Decomp. Granite	Decomp. Granite	Decomp. Granite
Depth of Lift	4"	4"	4"
Tire Pressure	100 lbs.	100 lbs.	100 lbs.
No. of Coverages	1-2	1-2	1-2
Speed	2½ MPH	2½ MPH	2½ MPH
Towing Unit	D-7	D-7	D-7
Percent Moisture	7.9%	6.4%	7.5%
% Compaction Std. AASHO Specified Mod. AASHO	90% Mod.	90% Mod.	90% Mod.
% Compaction Obtained	96.2%	93.3%	93.8%

IOWA MANUFACTURING COMPANY Cedar Rapids, Iowa

More hearings on Snake River dams

FPC takes more testimony on the hydroelectric controversy.

ANOTHER ROUND of Federal Power Commission hearings were scheduled last September on Pacific Northwest Power Co.'s application to build a $217,400,000 hydroelectric project on the Snake River below Hells Canyon. An FPC release late that month outlining subsequent hearings stated:

Following a five-week recess, the sessions may be stormier than those of mid summer when four-utility PNP presented its direct case for the two-dam plan at Mountain Sheep and Pleasant Valley in the controversial canyon dividing Oregon and Idaho.

The PNP project, largest ever proposed by private capital in the region, would generate 1,183,000 kw. Turbines and generators would be the largest in the world, and the 534-ft. high Pleasant Valley structure would be the highest of its kind in the United States.

In four weeks of summer sessions before FPC examiner Edward B. Marsh, company witnesses maintained that the PNP proposal offered a comprehensive plan of development and was the only project capable of relieving critical area power shortages in 1960, provided a license was granted promptly.

The generating firm was organized by Washington Water Power, Pacific Power & Light, Portland General Electric and Montana Power companies.

Their plan is opposed by public power groups led by the National Hells Canyon Association which has been unsuccessful in its similar fight against Idaho Power Co. at Hells Canyon.

PNP officials, whose firms have spent $2,000,000 in preliminary engineering on the big project, have charged repeatedly that the intervenors are trying to cripple the Northwest's important power program, and that already their delays have resulted in escalated project and power costs.

The intervenors' counter-charges are that the PNP plan does not offer comprehensive development.

But it has been indicated that this very subject would be aired later when the FPC calls witnesses from the U. S. Army Corps of Engineers on flood control and navigation aspects of the project, and others from fish and wildlife agencies relative to any fish problems involved.

Unless the sessions again drag longer than anticipated, another recess might be taken because, as presently indicated, FPC will not be ready to put on its technical witnesses until early November.

PNP, whose license application has been before the commission for over a year, had hoped to start construction on the Snake this fall.

Flood control project

THREAT of serious floods caused by forest fires removing protective watershed covering has resulted in the start of a $2,000,000 project in the vicinity of San Bernardino, Calif. The stripping of the watershed areas has exposed almost $10,000,000 of property to a serious flood threat. Contract for the construction of basins and channels has recently been awarded to T. M. Page Corp. and H. P. Kingsley as a joint venture in the amount of $910,000. Construction of flood control conduits will be carried out by E. A. Irish of Los Angeles at a cost of $1.175,000.

Work is to begin at once and is designed to provide basins for catching debris, concrete-lined channels, spillways and control installations to hold or divert runoff water from 10 sq. mi. of mountainous area. Martin A. Nicholas, chief engineer of the San Bernardino Flood Control District explained that acceptance of the program and beginning of the work followed years of engineering study and organization.

BPR takes over road program in Alaska

IN ALASKA the U. S. Bureau of Public Roads, under terms of the recent highway act, has taken over and consolidated with the Alaska Road Commission. Official announcement was made recently by Gov. Frank Heintzelman who stated that under the reorganization about $42,000,000 will be spent on the highways of Alaska in the next three fiscal years. All records, facilities and information on contracts of the Alaska Road Commission have now been transferred to the Juneau office of the BPR. This change moves Alaska road building from the jurisdiction of the Interior Department to the Department of Commerce.

No announcement has been made on changes in personnel and the ARC staff will carry out duties as they have in the past. There is a possibility that the Department of Commerce will appoint a division engineer for Alaska which would be a new division of the BPR. The BPR office in Juneau will report to the division engineer at Portland for the present.

CORRECTION: Error in bridge costs

Sir:

I read with interest the article on our spillway bridge at Santa Felicia Dam in the September 1956 issue. It is a concise statement of a job that turned out to be difficult out of proportion to its size.

There is one error in the article that might be misleading to others interested in comparative cost figures. It states that "The contract price for this bridge was $14,000 lower than the proposal of the second bidder, which was for a steel-type structure." The fact of the matter is that the second low bid of $50,000 was for the identical design by T. Y. Lin & Associates, but submitted by another contractor. The third low bid of $57,000 was for a steel-type structure.

Wm. P. Price, Jr.
General Manager & Chief Engineer
United Water Conservation District
Santa Paula, Calif.

WORK STARTS ON ROCK FILL DAM IN CALIFORNIA

More than 3,500,000 cu. yd. of rock fill will go into Wishon Dam at this site on the North Fork of Kings River. The structure is part of a major hydro development being carried out on that stream in the Sierra Nevada back of Fresno, Calif., by Pacific Gas & Electric Co. The Wishon Dam site is at elev. 6500 and next season will see major construction operations under way following preliminary work during the past months. Below Wishon Dam a 6.2-mi. tunnel will lead to penstock at the new underground Haas power plant.

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KENTUCKY QUARRYMEN SET RECORD FOR ECONOMY

Drill 830 feet in 4-day test at drilling cost of 4½c per ton

The figures at the right show what happened at the Nally & Boone Quarry, Greensburg, Ky., in a 4-day test of rotary rock-drilling with compressed air. Working in hard limestone, a Schramm Rotadrill mounted on Heavy Pneumatractor drilled 13 holes with a total footage of 830 feet. Approximate drilling cost per ton was 4½c.

One reason for this record is Rotadrill's speed in making hole; increased penetration rates of 55% to 66% are reported in hard limestone areas. Another reason is the easy maneuverability of the self-propelled Pneumatractor; it goes almost anywhere under its own power. Still another is quick set-up; simply raise the mast, level the rig, attach bit—in a matter of minutes.

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Look at the savings Nally & Boone got with their Pneumatractor Rotadrill.

13 holes, total footage	**830 ft.**
32 hours labor @ 1.25	$40.00
11½ hours labor @ 1.87 (overtime)	21.50
43½ hours depreciation @ 1.50	65.25
190 gallons of gas .30	57.00
Bit cost	207.50
1 gallon of oil @ .40	1.60
Total	$392.85
Cost per foot total elapsed time	.473
Drilling cost per ton—9 holes on 12′ centers	4-4/10 cents
Drilling cost per ton—4 holes on 10′ centers	4-7/10 cents

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First interstate work on Idaho highways

IDAHO will put under contract the first unit of the interstate system of the new federal highway program as soon as plans are approved by the BPR. Bids will be called for 7 mi. of four-lane highway east of Coeur d'Alene which will improve existing U. S. highway 10 providing a divided highway with more gradual curves through Fourth of July Canyon. More than $2,000,000 has been budgeted for this work by the State Highway Department. U. S. Highway 10 running east and west through northern Idaho is on the interstate system and will all be brought to a four-lane standard with limited access. To the west it will tie in to the existing freeway now leading into Spokane.

CALENDAR

Nov. 14-16—National Reclamation Association, annual convention, Salt Lake City, Utah.

Nov. 27-30—American Association of State Highway Officials, annual meeting, Traymore Hotel, Atlantic City, N. J.

1957

Jan. 17—The Beavers, second annual award dinner, Biltmore Hotel, Los Angeles, Calif.

Jan. 27-30—Associated Equipment Distributors, annual meeting, Conrad Hilton Hotel, Chicago, Ill.

Jan. 28-Feb. 2—American Road Builders' Association, road show and convention, International Amphitheatre, Chicago, Ill.

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

DEATHS

John D. Barney, 79, retired civil engineer, died recently. He retired in 1943 after more than 20 years service with the City of Los Angeles.

* * *

Alfred R. Serpa, 56, Hermosa Beach, Calif., superintendent of the Midwest Pipe Co., died after a long illness. He recently was in charge of steam construction of the Redondo and Etiwanda and similar plants in Southern California.

* * *

Frank G. Flickinger, 76, recently retired cement contractor of Hollywood, Calif., was found dead in his car, apparently the victim of a heart attack.

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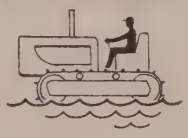

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Shell Research men knew ordinary lubricants often failed to stand up under rough operating conditions. So they set out to develop a lubricant which could "take it"—through dust, dirt, muck, water . . . even severe sidehill loading.

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Computer at Portland C of E office

Studies of Columbia River flow and power potential speeded by electronic calculator.

AS AN ANSWER to the shortage of experienced engineers, a heavy workload and limited time for completing studies in connection with the current review of the Columbia River 308 Report, the North Pacific Division of the Army Corps of Engineers has installed an electronic digital computer, according to Brigadier General L. H. Foote, Division Engineer.

The machine will speed the tremendous amount of computation and processing of data pertaining to power studies involving some 60 projects throughout the Columbia Basin. It will also be used to program and code hydrology problems in forecasting spring run-off of the Columbia River to better enable the Corps of Engineers to operate existing storage for flood control.

The new equipment will also speed the solution of earthwork problems involving cut and fill calculations on dam, and rail and highway relocation work. It will likewise be useful in connection with stream-flow and hydraulic problems involved in design, planning and construction of multiple-purpose projects, General Foote said.

The computer, sometimes called "electronic brain," is capable of solving with amazing speed mathematical problems that arise in engineering, meteorology, physics, statistics and other sciences. It has been installed in the Custom House where the Corps' division office is headquartered.

Although its principal use will be in connection with engineering studies, an investigation is being made to determine its possible use in accounting work also. Among the most significant features of the computer are its ability to check the accuracy of its answers and its magnetic-drum memory which can store up 20,000 characters.

Prior to installing the equipment, which is a type 650 magnetic drum data processing machine, a thorough investigation was made of the applicability of electronic computers to hydraulic operation and engineering problems connected with the control and use of water in a river-basin system. The practicability of use of the computer for time-consuming calculations in connection with engineering studies has been clearly established. Considering the growing shortage of engineers, the machine is doubly valuable at this time, General Foote said.

Second aqueduct needed to supply San Diego

RAPIDLY expanding water requirements of San Diego County have stimulated action for carrying out the building of a second aqueduct line to connect with the Metropolitan Water District system and provide a supply to meet population and industrial requirements until 1970. The project, with a total length of about 75 mi., would be built in two sections. The northern section of 35 mi. costing about $20,000,000 would be financed to a large extent through state funds provided by a bond issue.

The 40-mi. southern section, to cost about $25,000,000, would have to be financed by a local bond issue for San Diego and adjacent areas. The estimated construction time for the entire project is two years. Officials of the San Diego County Water Authority have warned repeatedly that the critical water shortage in the area will begin to seriously affect growth and expansion in the area in the very near future unless an increased supply of water from the Colorado River is secured from the Metropolitan Water District by the second aqueduct line.

L.A. freeway location has typical problems

TYPICAL problem faced by a highway department locating a freeway or limited access route through a highly populated area is well illustrated by the controversy raging over the re-routing of the Olympic freeway through West Los Angeles to the Coast. The California Division of Highways, at a recent public hearing, stated its preferential location, and indicated two alternative routes which had been thoroughly studied and considered to be secondary in total benefits. The route favored by the engineers was indicated as providing the greatest service to traffic and the highest return to the user. Furthermore, the planning engineers of the Los Angeles office indicated that the route would probably receive consideration as part of the interstate highway program and therefore secure valuable federal aid. The selected route has a length of 6.7 mi. with a cost estimate of $42,000,000. Admittedly, this represents a higher cost than the original location proposed down Venice Blvd. but the engineers contended that the higher return to the user would more than make up for the added cost.

Serious opposition to the proposed route was brought out at the public hearing. It was based on the fact that the location extends through or very near at least ten institutions, some of which are devoted to child care. The route also will affect the operation of a Junior High School recently completed at a cost of $2,000,000.

The entire controversy is typical of this general situation where property owners and institutions directly effected by a new location represent a minority with legitimate complaints as compared to the majority of the benefited public who rely on the state highway engineers to carry forward a fight for the location which has engineering answers and logic.

●

USING both hopper and hydraulic pipe-line dredges the Corps of Engineers will improve the channel of the Lower Columbia and Willamette rivers during the next fiscal year.

RECORD OFF-HIGHWAY HAULER WEIGHS 119 TONS LOADED

Powered by a Kenworth 803 tractor with 400-hp. Cummins diesel engine, this hopper trailer has a heaped capacity of 100 cu. yd. Trailer was made by Marion Metal Products Co. and will be used for hauling coal. Total weight empty is 50 tons, and the rig was delivered over highways with special permission. The trailer is 47 ft. long, 12 ft. wide and 13½ ft. high. Tractor has power steering, and the driver sits in a cab on the left side of the engine. Tires, 18 x 33, are all interchangeable, and the truck tires alone weigh almost 5 tons.

SECO SCORES ON PERFORMANCE FOR JEFFERSON COUNTY, OREGON

Photographed on-the-job Madras, Oregon

SCREENS APPROX. 100 TPH — 3/4" ROADBED GRAVEL AT COMPACT, MODERN COUNTY OWNED MADRAS PLANT

The SECO type S vibrating screen shown directly above the bin in the above photograph is operated by the Jefferson County, Oregon Highway Department.

SECO'S time-proven, fully controlled true circular action is paying off here in a highly satisfactory way. Like all SECO'S, this one is a smooth performer. While it delivers high tonnages of accurately screened material, it does it smoothly and effortlessly without unduly shaking the supporting structure.

Whatever your own screening requirements, it will pay you in better results to turn to SECO.

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BUFFALO 25, NEW YORK

State water plan ought to be flexible guide

THE CALIFORNIA WATER PLAN will better serve the people of the state as a broad, flexible and long-range guide for development rather than as a rigid directive, according to Walter Dreyer, vice president and chief engineer of PG&E. The statement was made at a hearing on the CWP conducted jointly by the State Department of Water Resources and the State Water Board. He complimented the various state officials and agencies for preparing a plan "probably without precedent in scope" which he said "translates an inventory of available water and an inventory of water requirements into an inventory of possible projects."

"The necessity for flexibility in future planning is well demonstrated by the record of past plans," Dreyer said. He called the State Water Plan of 1930 the best example of this.

"It was well conceived and provided a sound basis for the plans which finally evolved," Dreyer said. "However, very few if any of the proposed features were actually constructed of the size and capacity recommended in the 1930 plan."

The PG&E official called attention to water and power projects currently under construction or in the planning stage by various public and private agencies. He said that reservoir and hydroelectric capacities of these projects in the Central Valley Basin alone will more than double the existing capacities of the basin.

"California is not standing still in water and power development. It is progressing at a fast pace even while the state plan is being formulated and reviewed," Dreyer declared.

He said the plan can be "of great benefit and assistance" in solving California's water problems "if the report is properly utilized." He said the plan has been "devised as a broad, flexible, long-range plan which will provide a general guide for development of the waters of California" but that precautions should be taken "to ensure that this plan is not construed as a regulatory directive which could result in arresting progress in the currently active program and in future development."

Steel conference will review plastic design

UNIVERSITY OF CALIFORNIA Extension will present a one-day conference on plastic design in structural steel in San Francisco, November 14. The Structural Engineers Association of Northern California and the American Institute of Steel Construction are cooperating in presenting the conference. Program chairman will be Egor P. Popov, professor of civil engineering on the Berkeley campus of the University.

Purpose of the conference is to provide professional engineers, educators and building officials with the latest information available on plastic design in structural steel. The plastic design method (sometimes called limit design and having nothing to do with "plastics") utilizes the reserve ductile strength of steel in the design of continuous beams and frames. The utimate capacity of the structure as a whole is the design criterion, rather than the maximum allowable working stress as used in conventional methods. Recent advances in plastic analysis and design methods will be discussed.

ARIZONA HIGHWAY DEPT. BUILDS OVERPASS ON TUCSON-BENSON ROUTE
Including two 3-span continuous girders providing 38-ft. clear roadway width, and a half-mile of highway construction, this project is being carried out by Martin Construction Co. of Tucson. Contract price was $340,196, and the job is scheduled for completion next February. The location is just east of the junction of U.S. 80 and U.S. 89. *Wm. Willey* is state highway engineer of Arizona.

Activity gathers speed on Trinity Dam project

A $1,576,589 Bureau of Reclamation contract to build the Trinity Dam construction camp near Lewiston, California, has been awarded to the Barry J. Richards Company of Studio City, Calif. Secretary of the Interior Fred A. Seaton announced recently.

The Government camp, to be used as the administrative and construction headquarters in the construction of the 450-ft.-high, earth and rockfill Trinity Dam on the Trinity River, is the largest such Bureau camp to be established under one contract. The contract calls for construction of streets, alleys, drains, sewerage system, fences, electric utilities, residences, and administrative and service buildings.

The Trinity development will provide additional water for use in California's Central Valley, firming up supplies to make available a total of 1,190,000 ac. ft. of additional water yearly for irrigation, municipal and industrial use. The prime contract for Trinity Dam is scheduled for award in January 1957. A contract for a temporary diversion tunnel, to divert Trinity River from the damsite, was awarded in May 1956.

Second low bidder on the community facilities contract was the joint firm of Fred J. Early, Jr., Company and John Delphia, of San Francisco, California, with an offer of $1,746,454.

Rocky Reach Dam bid

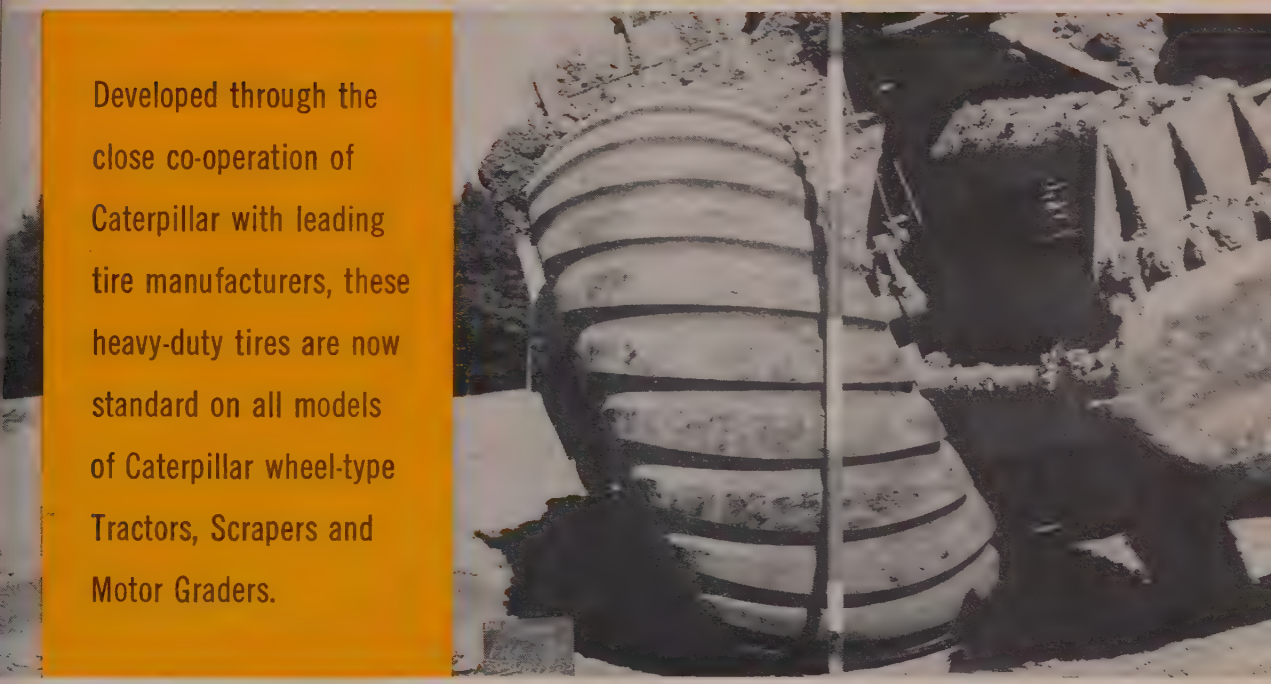
LOW BIDDER for the first stage of the Rocky Reach Dam on the Columbia River will apparently receive the contract on its figure of $12,048,000. Approval of the bid was recommended by Chelan County PUD No. 1 at Wenatchee. The low bidder is a joint venture combination including Arundel Corp., L. E. Dixon Co., Hunkin-Conkey Construction Co., and American Pipe & Construction Co. Stone & Webster Engineering Corp. are in charge of design and construction work.

Seadrome to be dredged

AT an estimated cost of $34,000,000 a Seadrome will be constructed in South San Diego Bay with the work to start next year. An appropriation of $4,500,000 has already been made for the initial dredging for a 15,000-ft. length of the seadrome and additional funds are anticipated to complete the project. Work will continue for about 2½ years.

Caterpillar "torture tests" prove advantages of earthmover tubeless tires

Developed through the close co-operation of Caterpillar with leading tire manufacturers, these heavy-duty tires are now standard on all models of Caterpillar wheel-type Tractors, Scrapers and Motor Graders.



Punishing tests of heavy loads and high speeds at the Caterpillar Proving Grounds on Cat DW21 Tractors and Scrapers prove that new tubeless tires set new endurance records for earthmoving—pay off in longer life and less down time. Large photo at top shows test of bead air sealing ability with heavy, sidehill loads.

The search for a better way never stops at Caterpillar. The result—a constant flow of improvements in earthmoving equipment that pays off in increased production and lower costs on your job.

These new tubeless tires are an example of Caterpillar's policy of leadership in action.

From the start, Caterpillar spearheaded the design of these tires. Exhaustive "torture tests," made at the Caterpillar proving grounds on CAT* DW21 Scrapers, proved that they were miles ahead of tires then in use. Under heavy loads and at high speeds, tubeless tires outlived tube type by 63%.

Now in use in the field for almost a year, tubeless tires are delivering the superior performance indicated by the tests. They eliminate an estimated 80% of down time caused by tubed tires. They are quicker and easier to mount. And they also give better puncture and blow-out protection.

Tubeless tires are now standard on Caterpillar wheel-type Tractors (drive wheels), Scrapers and Motor Graders. As a result, you can count on even greater production at lower cost with less down time from these heavy-duty machines. For complete information, see your Caterpillar Dealer!

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MODERN HEAVY-DUTY EARTHMOVING EQUIPMENT

LARGE CONTRACT AWARDS IN THE WEST

ARIZONA

Isbell Construction Co., Phoenix, submitted two low bids for road in Cochise County. $212,095 for 5½ mi. of grading and paving the Willcox-Chiricahua National Monument highway and $741,571 for 5.8 mi. of grading, surfacing and incidental work on the Benson-Steins Pass highway. A low bid of $416,622 was submitted by **Flickinger Bros. Contracting Co.**, Phoenix, for 3.7 mi. of grading and surfacing the Globe-Lordsburg highway in the city of Globe, Gila County. **Fisher Contracting Co.**, Phoenix, submitted a low bid of $357,073 for grading and draining about 1.2 mi. of the Phoenix-Globe highway in Gila County. A low bid of $359,596 was submitted by **Tiffany Construction Co.**, Phoenix, for grading and surfacing 7½ mi. of the Yuma-Casa Grande highway in Pinal County. **D. M. Bradley** and **S. R. Dysart**, contractors of Phoenix, submitted a low bid of $130,332 for grading and surfacing the Yuma-Parker highway in Yuma County. **Tom Mulcaire**, Cottonwood, submitted a low bid of $112,478 for 2.8 mi. of grading and surfacing the Pine-Winslow highway, Coconino National Forest, Coconino County. **Strong Co.**, of Springville, Utah, submitted a low bid of $1,156,244 for earthwork and culverts, Glen Canyon Unit, Ariz., and Utah, Colorado River Storage Project. A low bid of $128,849 was submitted by **Tiffany Construction Co.**, Phoenix, for grading and surfacing the Casa Grande-Picacho highway near Casa Grande in Pinal County.

CALIFORNIA

Fredericksen & Kasler, Sacramento, was awarded a $3,435,889 contract for 4 mi. of grading, paving and construction of five bridges, one pedestrian undercrossing and one overcrossing on U. S. 101, east of Kelvin Ave., in Los Angeles, Los Angeles County. **Charles L. Harney, Inc.**, San Francisco, received a $1,583,505 contract for 2 mi. of grading and paving and construction of 4 bridges in San Mateo County. A low bid of $2,143,-907 was submitted by **Vinson Construction Co.**, Phoenix, Ariz., for Putah South Canal and McCoy Creek Wasteway, Solano Project. **Cen-Vi-Ro Pipe Corp.**, South Gate, submitted a low bid of $2,854,115 for laterals and sublaterals, Shafter-Wasco Irrigation Dist. Friant-Kern distribution systems, Central Valley Proj. A low bid of $799,892 was submitted by **George Pollock Co.**, Sacramento, for Putah Diversion Dam and Putah South Canal, Solano Proj. **Krull & Pacheco** and **Close Building Supply, Inc.**, Hayward, received an $826,652 contract for grading and paving 1.2 mi. and widening a bridge in Alameda County. **Barry J. Richards Co.**, Studio City, submitted a low bid of $1,576,588 for streets, utilities, residences and misc. buildings, Trinity River Div. Central Valley Proj. **Griffith Co.** of Los Angeles submitted a low bid of $2,172,-044 for 1.6 mi. of grading and paving and construction of two bridges in Los Angeles County. **Harms Bros.**, Sacramento, submitted a low bid of $822,597 for grading and surfacing 6.5 mi. of roadway and construction of two bridges on Rt. 140, Mariposa County. **Fredericksen & Kasler**, Sacramento, submitted a low bid of $836,-656 for 2.8 mi. of grading, surfacing and construction of two bridges and one pumping plant in Tulare County. **McGillivray Construction Co.**, Sacramento, submitted a low bid of $536,-124 for 2.2 mi. of grading and surfacing in Sacramento County.

COLORADO

A $625,000 contract was awarded to **Schmidt Construction, Inc.**, of Arvada for 6.9 mi. of grading and surfacing in Routt National Forest, Routt and Rio Blanco counties. **Hinman Bros. Construction Co.**, of Denver, submitted a low bid of $366,000 for 3 mi. of grading and surfacing the Park entrance road, National Park, Montezuma County. A low bid of $369,550 was submitted by **Gardner Construction Co.** of Glenwood Springs for 1.1 mi. of grading, surfacing and structures in Mesa County. **Hoyle Lowdermilk, Inc.**, of Denver submitted a low bid of $464,718 for 16.3 mi. of grading, structures and surfacing in San Miguel and Montrose counties. **E. J. Rippy & Sons**, New Castle, submitted a low bid of $289,509 for grading, structures and surfacing in Dolores and San Miguel counties. A low bid of $266,192 was submitted by **Western Paving & Construction Co.** of Denver for widening Federal Blvd., 52nd Ave. to Speer Blvd., City and County of Denver. A low bid of $273,108 was submitted by **Pioneer Construction Co.**, Pueblo, for 4.4 mi. of grading and surfacing in Cheyenne County. **Carl V. Hill**, Greeley, submitted a low bid of $437,656 for grading, surfacing and structures in Mesa County. **C. L. Browning, Jr.**, contractor of San Antonio, Texas, submitted a low bid of $5,314,446 for construction of permanent family housing, MCA, Fort Carson, Colorado Springs. **Siegrist Construction Co.**, Denver, submitted a low bid of $165,562 for 8.6 mi. of grading, surfacing and structures in Custer County. **Charles Ramsey & Co.** and **Anthony Co.**, Lubbock, Texas, submitted a low bid of $877,227 for construction of Motor Pool facilities, Fort Carson. A low bid of $457,643 was submitted by **Mountain States Construction Co.**, Denver, for expansion of Base Utilities System, Fort Carson.

IDAHO

J. H. Wise & Son, Inc., Boise, submitted a low bid of $2,643,000 for construction of additions and modifications to the Assembly and Maintenance Building in the Aircraft Nuclear Propulsion Area of the Atomic Commission's national reactor testing station. **MacGregor-Triangle Co.**, Boise, received a $166,144 award for constructing the Black Canyon road in Targhee National Forest, Fremont County. A $233,543 contract was received by **Twin Buttes Construction Co.** of Fort Hall for constructing the Middle Fork Weiser road in Payette National Forest, Adams County. **Quinn Bros. & Robins**, Boise, submitted a low bid of $144,499 for extension of the "C" line canal pumping plant in the Payette Division, Boise Project. **Osberg Construction Co.**, Seattle, Wash., submitted a low bid of $497,980 for the three schedules for levee repairs along the Kootenai River in northern Idaho. **Fife Constuction Co.** of Brigham City, Utah, received a $79,142 contract for grading and surfacing in Caribou and Bear Lake counties.

MONTANA

J. F. England's Sons, Inc., of Rapid City, South Dakota, received a $219,-770 award for 6 mi. of grading and gravel surfacing the Fairview-Girard-West highway, Richland County. **Taggart Construction Co., Inc.**, of Cody, Wyoming, received a $327,131 contract for 6.3 mi. of grading and surfacing the Red Lodge-Columbus highway in Carbon County. **Walling Construction Co.** of Lewistown received a $232,182 contract for 8.5 mi. of grading and surfacing the Melville East and West highway in Sweet Grass County. **F & S Contracting Co.**, Butte, received a $428,237 contract for 5.1 mi. of grading and surfacing the Philipsburg-Anaconda highway in Deer Lodge County. **McLaughlin, Inc.**, Great Falls, was awarded a $686,-526 contract for 6 mi. of grading and surfacing the Babb-South highway in Glacier County. **City Constructors** of Great Falls received a $673,582 award for 5.7 mi. of grading and sur-

The Engineer's Report

CASE HISTORY

PRODUCT Chevron Starting Fluid

FIRM Larry Hendricks Construction Co., Mt. Vernon, Wash.

Special fluid starts shovel in seconds saves manpower, batteries in cold weather

PIPE LINES, ROAD CONSTRUCTION and general contracting jobs keep this ¾ yd. Bucyrus-Erie shovel working hard the year 'round. The Larry Hendricks Construction Co. uses 7-cc. gelatin capsules of Chevron Starting Fluid to get the rig's GM-371 powerplant into action fast in cold weather. Owner Hendricks says, "This shovel makes money only when it's working. I can't afford to waste man-hours or wear down batteries getting it started. With Chevron Starting Fluid one man puts it on the job in a few seconds, even in coldest weather. We like the capsules, too. They deliver a safe, controlled charge. Too much fluid makes an engine race, and that ruins bearings quick." Capsules are discharged through manual applicator installed in cab of excavator. (See arrow, right.) Chevron Starting Fluid atomizes at temperatures as low as -65° F. Fires under pressure or weakest engine spark.

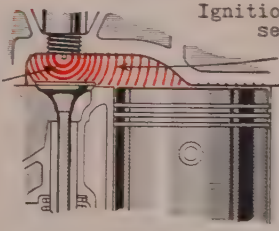
FREE FOLDERS tell more about the Chevron Starting Fluid and Chevron Pressure Primer System. Write or ask for them.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies listed below.

CHEVRON STARTING FLUID

Why Chevron Starting Fluid starts engines instantly

Highly volatile: 7 times more than gasoline



Ignition temperature several hundred degrees lower than diesel fuel

Contains wear-reducing lubricants

Additives inhibit ice formation

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facing in Cascade County. **Fred H. Slate Co.**, Portland, Oregon, received a $393,265 contract for 3.5 mi. of grading and surfacing the Garrison-Helena highway in Powell County. A $355,468 contract was received by **Norgaard & Hilling**, Williston, North Dakota, for construction of bridge and overpass in Roosevelt County. **Francis H. Holland**, Bozeman, received a $403,625 award for 7.4 mi. of grading and surfacing the Molt-Billings highway in Stillwater and Yellowstone counties. **Gibson Construction Co.**, Belgrade, received a $150,743 contract for 4.8 mi. of grading and surfacing the Wilsall northeast section of the Wilsall highway in Park County.

NEW MEXICO

A low bid of $288,966 was submitted by **Wilson Hockinson & Cantrall, Inc.**, Albuquerque, for earthwork, clearing and structures, Irrigation Rehabilitation Socorro Unit 1, Middle Rio Grande Project. **Jack Adams**, general contractor of Santa Fe received a $239,380 contract for 5.8 mi. of grading and surfacing 9 mi. north of Moses-North in Union County. A $690,194 contract was received by **Skousen Construction Co.** and **D. D. Skousen & Son** of Albuquerque for 7.4 mi. of grading and surfacing in San Juan County. **Henry Thygesen & Co.**, Albuquerque, received a $166,578 award for 1.2 mi. of grading and surfacing the bridge road over Rio Grande northwest of Anthony, Dona Ana County. A $178,428 contract was received by **Harry Trotz** of Lovington for 10 mi. of grading and surfacing the Hagerman-Easterly road in Chaves County.

OREGON

Morse Bros. and **Durbin Bros.** of Eugene submitted a low bid of $371,139 for grading and oiling the Richardson-Eugene highway. A low bid of $172,120 was submitted by **C. E. Leesberg** of Nyssa for grading and paving the Central Oregon highway in Malheur County. **A. H. Saxton & Son**, Portland, submitted a low bid of $161,859 for grading and paving the McKenzie highway in Lane County. A low bid of $243,600 was submitted by **Miller & Strong, Inc.**, Eugene, for tunnel relining on the Oregon Coast highway in Lane County. **Arthur Simonsen & Co.**, Baker, submitted a low bid of $156,520 for stone base and oiling Mt. Glen road, Union County. **F. L. Somers** of Medford submitted a low bid of $147,050 for grading and paving the Rogue River Loop in Josephine County. **Lee Hoffman Co.** of Beaverton submitted a low bid of $278,602 for schedules 1 and 2, earthwork and structures on the Rogue River Basin Project. (The engineer's estimate was $129,000). **R. A. Heintz Construction Co.**, Portland, submitted a low bid of $108,996 for construction of dumped stone revetment and drift barriers along the Albany channel, south of Corvallis in Benton County. **J. Bacaloff Co.**, Portland, submitted a low bid of $132,775 for raising and strengthening existing levee, placing stone revetments, replacing drainage structures and modifying Ross Slough tide box, southeast of Coos Bay, Coos County. **Guy F. Atkinson Co.**, South San Francisco, Calif., is low total bidder at $8,228,429 for construction of Portland General Electric Co.'s proposed North Fork and Faraday hydroelectric developments on the Clackamas River.

UTAH

Two contracts were received by **Union Construction Co.** of Murray, for roadwork in Garfield and Iron counties. $172,997 for 5 mi. of grading highway No. 54 in Garfield County and $128,990 for 1.6 mi. of grading and surfacing in Iron County. **Gibbons & Reed Co.**, of Salt Lake City received a $106,117 award for 1.3 mi. of grading and surfacing in Salt Lake County. **Ralph Child Construction Co.** and **Whiting & Haymond**, Springville, submitted a low bid of $411,362 for 17.4 mi. of grading and surfacing in Wayne County. **Gibbons & Reed Co.**, Salt Lake City, submitted a low bid of $595,900 for 1.9 mi. of grading and surfacing in Salt Lake County. **L. A. Young Construction Co.** of Richfield submitted a low bid of $89,439 for grading and surfacing 4.7 mi. of highway No. 309 in Millard County. **W. W. Clyde Co.** of Springville submitted a low bid of $250,000 for 7.6 mi. of grading and surfacing the Whitrocks Road Indian Reservation in Uintah County. A low bid of $152,346 was submitted by **Thorn Construction Co., Inc.**, of Springville for 9.2 mi. of grading and surfacing in the Wasatch National Forest, Wasatch and Duchesne counties.

WASHINGTON

General Construction Co., Portland, Ore., is low bidder at $1,028,466 for a 13-part revetment-repair project along the Columbia and Snake rivers above McNary Dam. A low bid of $613,029 was submitted by **Commercial Builders, Inc.**, Moscow, Ida., for construction of Frenchman Springs pumping plant, block 79, Columbia Basin Proj. **E-W Construction Co.**, Eugene, Oregon, submitted a low bid of $6,204,770 for Wahluke siphon, Wahluke branch canal and wasteway, Columbia Basin Project. **Erickson Paving Co.** of Bellevue, received an $826,545 award for 3.2 mi. of grading from Renton to May Creek in King County. A $477,954 contract was awarded to **Curtis Construction Co.**, Spokane, for 6.9 mi. of grading

LORAIN
SHOVEL-CRANE HEADQUARTERS

ANDREWS EQUIPMENT SERVICE OF WASHINGTON, INC.
Spokane, Wash.

CENTRAL MACHINERY CO.
Great Falls, Havre and Lewistown, Mont.

COAST EQUIPMENT CO.
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A. H. COX & COMPANY
Seattle 4, Tacoma, Wash.

P. L. CROOKS & CO., INC.
Portland 10, and Eugene, Ore.

GENERAL EQUIPMENT CO.
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- Big, 18" swing clutches—20% larger, fewer adjustments, longer life
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- "Hydra-Ease" control of crawler steering, tread lock, house lock and shifting of swing-travel jaw clutches
- 2 crawler speeds in both directions
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- New, square-tubular-chord clamshell and dragline boom—lighter, stronger, greater lifting capacities, greater bucket operating ranges
- Steel shell lagging for bigger cable on drag-in drum
- Power load lowering is standard

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THEW LORAIN

MIGHTY MONSTER on the Mississippi

Photo Courtesy of Dravo Corporation, Pittsburgh, Pa.

Standing beside the giant Owen Clamshell is Mr. George S. Covert, Director, Louisiana State Highways

Building the new $65 million Mississippi River Bridge requires the varied skills and services of many contractors, construction men and a vast array of construction equipment.

The noteworthy first phase of this tremendous undertaking was the construction of the four huge piers by DRAVO CORPORATION, PITTSBURGH, PA.

The largest pier will be as high as a 34 story building, with more than half of it under water.

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and surfacing from Rock Island Dam to Vulcan in Douglas County. **Strong & MacDonald** received a $439,404 award for 1.2 mi. of grading, surfacing and structures from Selah Creek North in Yakima County. A $328,493 contract was received by **C. E. Oneal** of Ellensburg for 4.8 mi. of grading and surfacing, Hattan Coulee to Lind Coulee in Adams County. **MacRae Bros.**, Seattle, received a $456,565 contract for construction of N. P. Railway and Eastside St. undercrossing, in Thurston County. A $343,745 award was received by **J. N. Conley Co.**, Portland, Oregon, for 3.4 mi. of grading and surfacing Dollars Corner to Battleground, Clark County. **Lewis Hopkins Co.**, Pasco submitted a low bid of $309,976 for Burbank Pumping Plants No. 2 and 3 and discharge lines block 3, Columbia Basin Project. **Scarsella Bros.**, Seattle, received a $248,909 award for 4.4 mi. of grading and paving in King County.

WYOMING

Etlin E. Peterson of Casper received a contract of $707,252 for 1.6 mi. of grading and surfacing the West Side Road in the Grand Teton National Park, Teton County.

ALASKA

Contracts awarded during August by the Alaska District Corps of Engineers for wide-spread parts of the Territory for the U. S. Air Force and Army: **Morrison-Knudsen Co.**, Seattle, Wash., received a $1,702,652 contract for paving hangar aprons at Ladd Air Force Base. Contracts for construction of four TACAN facilities (tactical air navigation) were awarded: At Northway $56,533 to **Doughty Construction Co.** of Spenard; at McGrath $63,103 to **Walsh & Co.**, Spenard. At Gulkana $48,500 to **Chris Berg, Inc.**, Seattle, Wash., and at Ladd Air Force Base $74,800 to **Fairbanks Builders** of Fairbanks. **B-E-C-K Constructors**, Seattle, Wash., for restoration of family housing units, $277,150, Eilson Air Force Base. At King Salmon Air Base $469,949 to **Morrison-Knudsen Co.** of Seattle, Wash. At Indian Mountain $875,000 to **Gaasland Co.**, of Bellingham, Wash., for a White Alice installation (one of the network of circuits supporting the Alaska air defense system). For manufacture of a test Nike prototype missile carriage, $62,750 to **Premier Gear & Machine Works, Inc.**, of Portland, Oregon.

●

THE City of Ontario, Calif., voted a $2,000,000 bond issue by majority of six to one to expand its airport. This local financing will be aided by about $1,000,000 from federal agencies and the total used to build new runways and a terminal building.

REPORTS from the COURTS

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

Procedure for securing relief from mistaken bids

In some quarters there is the notion that a contractor or subcontractor submits a bid at his peril; that his mistakes in pricing may be seized upon to his disadvantage. This is not the law in California. However, either through ignorance or mistake the contractor may become inextricably ensnared by his actions subsequent to discovering an error.

Generally, if a bid error is discovered after the bid is accepted, the contract signed and the work is in progress and the "owner" had no way of knowing of the error, the contractor or subcontractor must complete the job. If the mistake is found before work is commenced, there is a remedy; but at this stage the correct remedy must be chosen.

In the July 1956 issue of **Western Construction** we reported a case in which an improper remedy was sought after the discovery of a typographical error worth about $10,000.

In an earlier case[1] a contractor sued to cancel a bid and obtain a discharge on a bid bond after omitting an item of $301,769. The error was discovered several hours after bids were opened and the Los Angeles Board of Works refused to permit a withdrawal of the bid. The trial court held that the contractor was entitled to rescind under the particular circumstances. The judgment was affirmed by the Supreme Court.

Another case

A later case[2] involved a subcontractor's bid to the general contractor for steelwork. In confirming an oral bid the subcontractor failed to exclude an item valued at $11,300. The error was carried into the contract but work had not commenced. The subcontractor rescinded and successfully defended a suit against him by the general contractor.

The conclusion from these and similar cases is that the proper course is rescission. Just what is necessary to complete a recission at the proper time is too detailed and technical to review. However, these comments from the Supreme Court of California give the general idea:

"Relief from mistaken bids is consistently allowed where one party knows or has reason to know of the other's error and the requirements for rescission are fulfilled . . . "

"Rescission may be had for mistake of fact if the mistake is material to the contract and was not the result of neglect of a legal duty, if enforcement of the contract as made would be unconscionable, and if the other party can be placed in statu quo. . . ."[1]

A word of caution. In these cases there was substantial evidence of a bona fide mistake. Rescission is not a weapon for avoiding a sloppy, negligent or careless estimate or bid.

1. M. F. Kemper Constr. Co. vs. City of Los Angeles 37 Cal. 2d. 696
2. Brunzell Constr. Co. vs. G. J. Weisbrod, Inc. 134 C.A. 2d. 278

Mutual mistakes in contracts

In another report this month the problem of remedy when one party to a contract errs is reviewed. Another question is what is the remedy if both parties err on the same point. Is the contract invalid or can it be enforced? The case at hand involves the sale of standing timber but the legal principles are valid for construction contracts or any other contractual relationship.

The parties entered into the contract upon their mutual and mistaken belief concerning the quantity of merchantable timber. Somewhat as an afterthought the contract provided for prorata adjustment if the quantity of timber failed to yield $35,000. It developed there was only a third of the anticipated quantity.

The reviewing court recited these principles from Williston on Contracts. First: "Where both parties assume the existence of a certain state of facts as the basis on which they enter into a transaction, the transaction can be avoided by a party who is harmed, if the assumption is erroneous." Second: "Where the parties know that there is doubt in regard to a certain matter . . . , the contract is not rendered voidable because one is disappointed in the hope that the facts accord with his wishes. The risk of the existence of the doubtful fact is then assumed as one of the elements of the bargain."[1]

Since the parties, in their contract, contemplated the possibility of their assumption on quantity being in error the contract could not be avoided; it merely required an interpretation. There was no mutual mistake in writing down their intentions in the contract so the alternate remedy of reformation of the contract itself would not be proper.

Summarizing: if both parties are mistaken as to a material fact the contract may be avoided or some equitable remedy is available unless the contract contemplates the possibility of different facts or circumstances. If the possibility is contemplated, then the contract should contain adjustment provisions or the parties will be held to have undertaken the gamble and be bound. This is fundamental but is often overlooked in a great variety of contracts.

1. Raddue vs. LeSage 292 P. 2d 552

Unclarified exclusion in proposal proves costly

One of the most difficult problems of the general contractor working with the plans and specifications of a sizeable job is to secure bids from subcontractors that cover all of the work to be done yet don't overlap. The definition of the work may be extremely sketchy requiring a rough design and layout; or the specifications may be so complicated they cannot be fully digested in the time allowed to bid. In either situation it is wise to clarify the full meaning of an exception or exclusion contained in the proposal of a subcontractor before accepting it.

Confused subcontract

In Parnell v. Stanfield[1] the plumbing subcontractor excluded from his proposal "downspouts beyond five feet from the building" and "concrete work of any kind;" and submitted a bid of $63,312. This was an elementary school of various distinct units. The plans included a storm drainage system of concrete pipe. The plumbing contractor refused to install the storm piping although the "Plumbing Plot Plan" included a layout of storm drains and he conceded he was required to carry the sanitary sewer system of vitrified pipe beyond the building. The general contractor was required to complete the concrete storm system with another subcontractor at an additional cost of $7,700.

The job was governed by plans and specifications which were complex and not very clear. The trial court said that if no qualification had been made the storm drains would probably be included within the plumbing work; however, by giving meaning to the subcontractor's proposal it must have referred to the concrete storm drains and they were therefore excluded from his work. The judgment favorable to the subcontractor was upheld on appeal.

1. Parnell v. Stanfield 135 C.A. 2d 804.

SUPERVISING the jobs

Piedmont

Melbourne Garrett Selby Faris

Lee *Test*

McGee

Ray

As reported in these pages recently, **George "Pete" Piedmont** received the appointment as project manager for Morrison-Knudsen Co., Inc., awardee of the contract to build the $87,000,000 Noxon Rapids Dam and powerhouse on the Clark Fork River in western Montana for the Washington Water Power Co. General superintendent is **Robert B. "Bob" Test. Leland B. True** is project engineer. Other engineers are **Bob Melbourne**, cost; **Joe Garrett**; and **"Chuck" Faris**, dam division. Appearing with these three in the accompanying picture is **Bob Selby**, owner of Selby Drilling Co. Office manager is **W. H. Smith**, and the purchasing agent is **Fred Waldorf**.

Among the superintendents are **T. Bailey Lee**, excavation; **Joe Ray**, pipe; **Willis N. "Bill" McGee**, rigger; **Bill Haggerty**, electrical; **Jim Napper**, carpenter; **Archie Lamberson**, painter; **Lloyd Hixson**, concrete; **Bynum Swearingen**, swing shift; **Roy Smith**, plant; **"Red" Gibson**, truck, and **Mike Soreng**, ironworker. **Tony Zaversnick** is master mechanic.

Assisting as foremen are **Nick Piedmont**, general concrete; **Mike Lucas**, general labor, assisted by **George Dosen**; **Art Swanson**, mechanic; **George McDaniel**, excavation; **D. C. Trovillo**, lubrication; **J. C. Windle**, shop; **Herman Watson** and **Sidney Bartels**, carpenter; **Le Roy Fleischman**, electrical, and **George Dempsey**, ironworker.

* * *

R. F. Calou is superindending the $1,785,555 contract recently awarded to Fredrickson & Watson Construction Co. and Ransome Company. Job is being managed by **Oscar Fredrickson**, president of Fredrickson & Watson, sponsor for the joint venture, and consists of 1.2 mi. of grading, surfacing and construction of an undercrossing and one bridge to be widened in Solano County, Calif. Other key men are **Tom Bond**, timekeeper; **Joe Perry**, master mechanic; **John Owens**, grade foreman, and **Lyle Engle**, labor foreman. This is a 385-day project.

* * *

R. B. Cline, job superintendent; **Harry Llewellyn**, job office manager; **E. L. Allen**, foreman, and **H. R. Melton**, asphalt plant foreman, are key men working for Peter Kiewit Son Co. on a 6.3-mi. grading and surfacing job in Jefferson and Arapahoe counties, Colo. Work is being done at a cost of $191,190 and when it is completed in October will make for better driving to the site of the new Martin plant south of Denver.

* * *

Carl G. Pendleton and **Elbert Garner**, partners in Pendleton & Garner Construction Co., are in charge of the firm's $159,963 award for grading, surfacing and structures from Greeley west, in Weld County, Colo. They have the job about finished.

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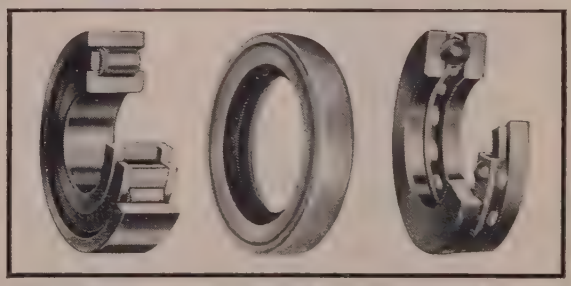

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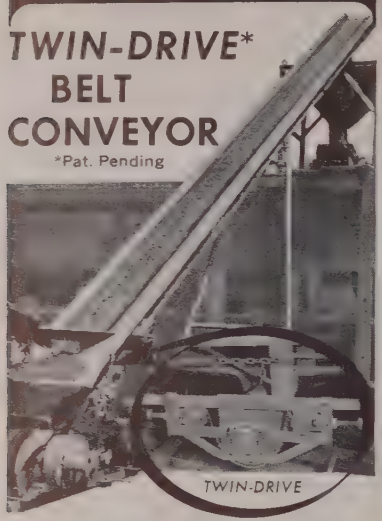

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Barney Hansen is superintendent, **Fredrick Pearson** is project engineer, and **Albert Saulsbury** is general foreman for E. M. Peterson, contractor with a $798,900 award for schedule A, tower, foundations, equipment building, etc., at White Alice facilities, Homer, Alaska. Work on this contract started in mid-June and is set for Nov. 1 completion.

* * *

Hubert M. Roth and **Hubert E. Roth** are acting as grading superintendents for Summit Construction Co. currently doing grading and gravel surfacing on 11.2 mi. of highway in Phillips County, Mont. This $473,766 job got started in July and will probably end in November.

* * *

Gilbert Robarge, job superintendent, and **Melvin Beach,** mechanical superintendent, are key men working for O'Neil Construction Co. on 7.6 mi. of grading and surfacing in Liberty County, Mont. This contract went to O'Neil on a low bid of $113,275. Work started on Aug. 1 and is now in the finishing stage. These two men will also supervise another O'Neil job now getting under way in Toole County. This is a $143,105 award for 10.4 mi. of grading and surfacing. Work here will probably extend to December.

* * *

Paul Taylor is supervising a $217,797 contract award to Armstrong & Armstrong covering 2 mi. of grading, structures and surfacing of the Angus—southerly road, in Lincoln County, N. Mex. **T. C. Carr** is bridge foreman. On a similar project which went to Armstrong at $664,888 for 2.4 mi. on the Organ—east road in Dona Ana County, **T. G. Moore** is in the superintendent spot, with Carr also acting as bridge foreman, and **Bob Dever** as grading foreman. Both jobs got under way in June, the first mentioned scheduled for completion in December, and the second one probably running till May next year.

* * *

C. D. Bisordi is project manager for S. S. Mullen, Inc., on building construction at Ladd AFB, Alaska, for the Corps of Engineers. General superintendent on the $15,357,000 project is **Nelson Straight. Joe Hall** is project engineer. Work, which is now in the completion stage, consists of three buildings, an 80,000-sq. ft. warehouse, ready rocket building and a flight simulator building.

* * *

Walter Estelle, plant engineer for Marquardt Aircraft Co., is key man on erection of first unit of RAM jet engine plant, Ogden, Utah. This $1,000,000 manufacturing plant is scheduled for completion in early 1957.

* * *

Harry Larsen is superintending a $273,972 contract for construction of a prestressed concrete bridge across the Yuba River at Simpson Lane east of Marysville, Calif. Contract is held by Ben C. Gerwick, Inc., and covers concrete piers, prestressed concrete T-girders, steel pipe piles. Bridge is 400 ft. long, five 80-ft. spans. Work got under way in September and will probably end February 1957.

* * *

Cy McLellan is supervising construction of a diversion tunnel and clearing 34 ac. at Cougar reservoir dam site on the South Fork McKenzie River in Lane County, Ore. Work on this 20 x 20-ft. unlined tunnel, with 165,000—200,000 unclassified and outside rock, started in June, with the finishing date set for next February. Other key men for the contractor, Northwood, Inc., are **Lorne Wakeling** and **Leo Lacasse,** walkers, and **Ted Webber,** mechanic foreman. Contract price was $571,636.

* * *

Afton Bohn, superintendent, is head man for Gibbons & Reed on this contractor's $364,592 award for 15.9 mi. of grading and surfacing west of Carlin in Eureka and Elko counties, Nev. Now in the finishing stage, job consisted of processing existing surfacing and adding Type 2 gravel base, trenching and placing plant-mix base, and constructing a Class F-2 plant-mix surface with Class A-1 surface treatment.

* * *

Art Gohde and **Les Ballif,** superintendent and engineer respectively, are key men on a $579,890 contract held by W. R. Cahoon Construction Co. for construction of American Falls pumping plant and discharge line, Michaud Flats Project, Idaho. Work has been under way since May and according to the contractor will be finished about August next year.

* * *

Max E. Jones is supervising a $253,843 award to Duffy Reed Construction Co. for 5.3 mi. of grading and surfacing in Butte County. Idaho. Assisting as foremen on the job, now about completed, are **Harry R. Merrick, Lester Allen** and **J. S. Book.**

* * *

Henry Sorensen, vice president of Sorenson Construction Co., with his general superintendent, **Jerome Funk,** is in over-all charge of a $188,932 recent award to the company for grading and surfacing 24½ mi. of roadway at the National Reactor Testing Station, Idaho. Another key contractor man is **R. M. Savage.** Asphalt plant engineer is **Walter Blotter,** and paving machine operator is **Merlin Hurst.**

* * *

Glen and **Henry Pierce** of the contracting firm of Pierce & Pierce are directing the $130,652 contract awarded them for clearing 178 ac. at Couger Dam on the South Fork McKenzie River in Lane County, Ore.

Other key men are **Vernon Ball**, on the power saw; **Imel Wall** and **"Red" Brauer**, rigging and line men; **Mel White**, first aid. **George Walker** is also on the job managing a subcontract. Job started July 1 and will be completed about Jan. 1.

* * *

John H. Lee, as foreman, is in charge of work on Jack Adams' contract 15 mi. east of Carlsbad, N. Mex. on S.R. 31, consisting of 8.4 mi. of grading and surfacing. Other key personnel on this job, now in the completion stage, are **Norman Eaton**, field clerk, and **George Adams**, grade foreman. Contract price $274,718.

* * *

Ed Cunningham, superintendent, assisted by **Orville Richardson**, rock drilling foreman, and **Dick Phillips**, grading foreman, is top man for Goodfellow Bros., Inc., on 4.1 mi. of grading and surfacing on PSH 8, Goldendale north, Wash., including oiling, surfacing, grading and T-beam bridge. The bridge work is subbed to Snook Brothers, and the surfacing and oiling to Columbia Asphalt Paving Co. Goodfellow received the award on a $704,099 bid, started the job in June and now has it about finished.

* * *

James Jones is superintending construction of the Shadle Park High School in Spokane, Wash. **Don R. Huey** is assistant superintendent. Other key men on H. George & Sons' $2,019,256 contract are **Jack Cave**, **Pen Whittaker** and **L. Farmer**, engineers; **John Young**, **Al Poage**, **Ted Engstrom**, **Bob Masters** and **Max Livingston**, carpenter foremen; **Ken Webster**, steel foreman, and **John Rubertt** and **Bob Miller**, labor foremen. Under way since May 31, contractor figures to have the structure erected about September next year.

* * *

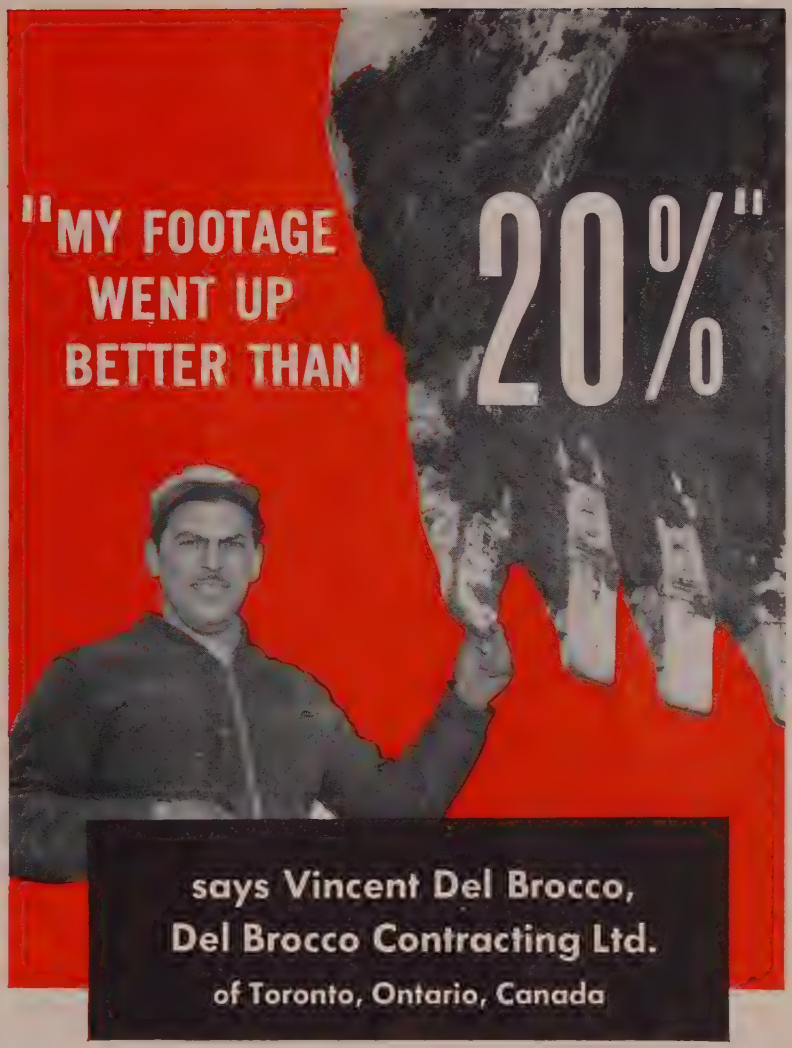
Tony L. Allen, superintendent for James P. Johnson, is finishing up an $85,168 contract for 2.5 mi. of grading and surfacing on the Santa Fe-Hyde Park road in Santa Fe County, N. Mex. Other key men: **"Hap" R. Fenner**, labor foreman, and **R. C. Cannaly**, crusher foreman.

* * *

Bill Paukovich is superintending a $115,913 street improvement contract for The Brannan Sand & Gravel Co. Work consists of excavating, new curbs and gutters, and asphalt paving within the city of Denver. **Karl Bromstrap** is engineer, and **Bill Thomas** is job foreman.

* * *

Edwin Jacobson, superintendent, with the aid of **Phillip Staley** and **Lawrence Petersen**, foremen, is supervising construction of a bridge and overpass in Rosebud County, Mont. for W. P. Roscoe Co. This job went to Roscoe on a low bid of $659,759 who expects to have the construction finished by Dec. 1.



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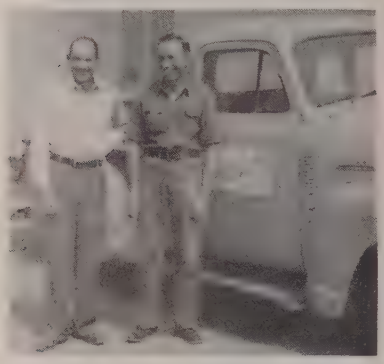
R. H. Hazard, project manager, **Don Tallman,** general superintendent, and **George Jones,** assistant superintendent, form the top trio on the 56-mi. road job from Tok Junction to Johnson River on the Alaska Highway, a $640,000 contract awarded by the Alaska Road Commission to S. S. Mullen, Inc. Started Aug. 1, the work consists of relining, grading, surfacing and paving with asphaltic concrete a stretch of existing Alaska Highway. Job is scheduled for completion about August next year.

* * *

Eddie Surufka (right) is superintending construction of a new highway and bridge being built by Charles MacClosky Co. for the California State Division of Highways at Guadalupe on State Highway 1. **Reuben Lesser** (left) is assisting as



foreman. This 141-ft. long riveted steel through-girder railroad bridge will carry the tracks of the S. P. railroad over the highway, and will eliminate a sharp curve and provide a wider roadway. **T. D. Inouye** is resident engineer for the State.

* * *

K. A. Ethridge, vice president of Tucson Pavers, Inc., is in charge of the company's recent award for grading and surfacing of a stretch of the Benson-Douglas highway in Cochise County, Ariz. This $96,304 job, on which **Ray Cox** is general superintendent, is now in the finishing stage.

* * *

Nick Kohler, superintendent, is head man on a $579,029 job of grading and surfacing of 3.7 mi. with plant-mix, including structures, on Highway 2 between Granby and Tavernash, Grand County, Colo. Grading foreman is **Louis Chinn;** timekeeper, **Joe Steinbach.** Work started in July and will probably end next June.

* * *

Robert Plummer, superintendent, **Roy Howard,** grading foreman, and **Paul Gasch,** timekeeper, comprise the key men on a highway job being carried out by Colorado Constructors, Inc., on Highway 2 in Routt County, Colo. This is a $318,616 contract for 1.8 mi. of grading, surfacing, and structures from Mount Harris extending west. With completion date set for June 1957, work got under way here in August.

* * *

Victor Valentine is project manager; **Gene White,** project engineer; and **John Hickox,** office manager, for Morrison-Knudsen Co., Inc. on contract for substructure for the Maple Street bridge, Spokane County, Wash. Bid price was $674,552. Work will probably be finished in December.

* * *

Harry Merrick, superintendent, and **Lester M. Allen,** crusher foreman, are winding up an $80,000 job of stockpiling approximately 15,000 tons of road aggregate located in the northern portion of the NRTS in Idaho, for Idaho Rock, Inc., contractor.

* * *

Clarence R. Webb, superintendent, heads the list of personnel on a Duffy Reed Construction Co. job in Nez Perce County, Utah. Contract was awarded at $627,306, and covers roadway, drainage, structure, etc. Foremen are **Don Turner, George Kochis** and **Joe Book,** with **Art Sabin,** drilling foreman.

* * *

Fred Voigt is superintending a job for Central Paving Co., a $307,503 contract for paving the Williamina-Salem highway in Polk County, Ore. **Art Trinckes** is foreman. **Arthur B. Woods** as president of the contracting firm has overall direction of the company's awards.

* * *

Marc Latham, general superintendent; **H. B. Raun,** engineer; **Ralph Brady,** carpenter superintendent, and **Victor Frank,** steel superintendent, comprise the key men for W. F. Maxwell Co.'s recent award at $1,098,618 for work on the Long Beach Freeway and including two Los Angeles River bridges and approaches and widening of another in the city of Long Beach, Los Angeles County, Calif. Work will probably be finished in July 1957.

* * *

Willis Smith is superintending for Fisher Contracting Co. a recent award for general road work on 6.2 mi. of new alignment on Highway 80, Yuma-Casa Grande, Maricopa County, Ariz. **Eugene Pierce** is field office manager for this $353,729 project scheduled for completion next March 31.

* * *

Page Thiers is superintendent on another Fisher Contracting Co. contract for surfacing 4 mi. of S.R. 77, Oracle Junction-Globe, Pinal County, Ariz. **B. H. Montgomery** is office manager for this job now in the completion stage.

* * *

M. O. Mittry, project manager, and **R. N. Mittry,** superintendent, are in charge of a recent award to O. K. Mittry & Sons from the California Division of Highways. Work is 1.5 mi. east of Oakdale, Stanislaus County, and consists of 4.7 mi. of grading and surfacing on untreated base and existing surfacing. Other key men on this $441,628 project are **H. Fausey,** grade foreman; **Ed Johns,** labor foreman; and **Tom Fraser,** master mechanic. Job has been going since August and will be in progress till April, next year.

* * *

A. J. Ingwersen, project manager; **P. D. Patterson,** general superintendent, **R. A. Downing,** supervising engineer, and **Ken Bergstrom,** office manager, comprise the top men for Morrison-Knudsen Co., Inc., on a $1,702,652 job which started in July at Ladd AFB, Alaska. Work consists of removal of existing bituminous pavement on two aprons and repaving with portland cement concrete, a year-long project.

* * *

Bill Atkinson has been superintending a $312,280 recent award to L. C. Smith Co. for State Highway resurfacing of about 39.3 mi. in San Francisco, San Mateo, Santa Clara and Santa Cruz counties, Calif. Foremen on the job, now about finished, are **Mike Shipely** and **Manuel Romero,** while **Vern Anderson, Oliver McDowell** and **Charles Day** are operators, and **Willie Flores** and **Ralph Esquivel,** screed men.

* * *

Joseph Roth, foreman, is a key man on a job of Siegrist Construction Co. now finishing in Washington County, Colo. Award was at $195,401, and was for 8.4 mi. of grading, surfacing and structures between Woodrow and Last Chance.

* * *

Wayne Lowdermilk is superintending Lowdermilk Brothers' recent award for 3.9 mi. of grading, surfacing and structures between Durango and Silverton in San Juan County, Colo. **Donald F. Barber** is timekeeper on this job, which got under way in August, with August next year set as the finishing date. Foremen are **J. O. Gibson,** grade, and **A. M. Jensen** and **J. T. Guthrie,** drill.

Crew is working six 10-hr. shifts in order to complete the upper 2 mi. from the summit of Molas Pass southward before snow flies. The remaining portion of the project is solid rock. Plans now call for continued drilling through the winter. Compressors will be housed in and air piped where needed. Equipment on the project: two 80-D Northwest shovels; two DW21s with 25-yd. Athey rock beds; four Euclid 18-yd. trucks, and eight compressors.

* * *

George Borovich, superintendent assisted by **Al Figueroa,** is handling Thomas Construction Co.'s recent $243,916 award for grading, surfacing and other slope protection and flood-damage repair near Douglas City, Trinity County, Calif. Crew started

Near Candlestick Point, outside of San Francisco, a 6-yd. 150-B loads borrow to help build a new freeway.

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On future jobs, figure the savings you can expect from Bucyrus-Erie Ward Leonard electric shovels. They are helping make a profit for more and more contractors.

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South Milwaukee, Wisconsin

working here in July and will probably be finished in December.

* * *

Cal Simmons is superintending a $355,254 job recently awarded to Cox Bros. Construction Co. for 3 mi. of grading and paving and a concrete bridge on State Route 58 in Kern County, Calif. This work comes under the general superintendency of **R. C. Reif.** Started in August, the job is scheduled for completion in December.

* * *

Phil Devish, superintendent for Platte Valley Construction Co., is in charge of work on $692,695 recent award for schedules 1 and 2, for earthwork, structures, relocating north grade raise, State Highway 87, Missouri River Basin Project, Wyo. Assisting are **Mathew Boyd** and **Ken Widick,** shifters-grading, and **Melvin Andrews,** culvert foreman.

* * *

T. O. Stewart and **E. H. Thomas,** superintendents for Rett Company, are finishing up on a $107,185 job near Doyle, Calif. Three concrete culverts are being repaired at various points along Long Valley Creek.

* * *

Frank Furman, project manager, **Hugh Davey,** general superintendent, **Wayne Waughtel,** engineer, and **Allen Howell,** grade superintendent, comprise the top personnel on a recent award which went to T. M. Page and H. P. Kingsley Co. at $821,644 and $88,521 for construction of schedules A and D, flood control, channels, dikes and levees, part of the North San Bernardino Flood Control Project in California. The job started in September and is expected to be finished in February.

* * *

H. D. Grass, superintendent, and **C. H. Strickland,** are key men working for Fredrickson & Watson Construction Co. on its runway extension job which got under way in July at the Naval Air Station at Moffett Field, Calif. This is a $1,957,777 contract which the contractor estimates will run until 1958.

* * *

Barney W. Deaver, Jr., is general superintendent of construction of an ice manufacturing plant and related facilities at Riverdale, Utah. Associated Refrigerating Engineers has the contract. Construction superintendent on this $1,000,000 job is **Newlin E. McKinney.** Work has been in progress since in August and is expected to be finished next March.

* * *

A. Cheitkow is superintending a $900,000 job in the hands of The H. K. Ferguson Co. covering designing and construction of a foundry building at Colton, Calif. Work got under way here in June, with April 1957 marked as the finishing date.

Walter Pritchett is superintending construction of a $2,500,000, 250-room motel under way since September at Phoenix, Ariz. Del E. Webb Construction Co. has the contract.

* * *

Glenn Tinker, superintendent for John E. Alexander, is in charge of a recent award to this contractor for construction of an over-crossing at Olympia, Wash. Pile-driving foreman is **Fred Allyn.** Structure is flat-slab, reinforced concrete on creosoted wood piling foundation. This $184,520 construction got under way in August and will probably be finished by late February 1957.

* * *

D. R. Burns is project superintendend on a highway grading and paving contract recently awarded to Gordon H. Ball and Erickson at $2,528,993. Other key personnel on the job are **Walt Phillips,** bridge superintendent, **Jay Row,** project engineer, **Fay Lacy,** master mechanic, and **W. H. Carson,** office manager. Work consists of 4.5 mi. of freeway with interchanges, ramps and frontage roads, three steel and two concrete bridges, at Atwater in Merced County, Calif. This is a year-long project which started in September.

* * *

Jerome Funk is general superintendent on a $349,399 job recently awarded Sorensen Construction Co. for construction of 20.6 mi. of plant-

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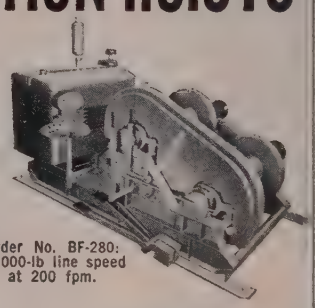

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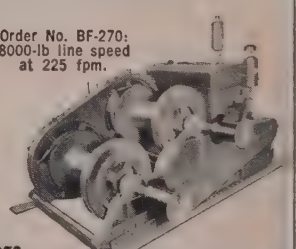

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mix surfacing on the Williams-Grand Canyon highway in Kaibab National Forest, Ariz. President of the company is **Leon Sorensen. Henry Sorensen** is vice president and is acting as master mechanic on this work, which is expected to be finished in December.

* * *

J. D. Proctor is general superintendent on construction of 35 mi. of roadbed and three bridges in Siskiyou County, Calif., a $951,500 project for which Peter Kiewit Sons' Co. holds the contract. Other key men are **Bud Real,** bridge superintendent; **Ike Taylor,** crusher superintendent; **Fred Nieman,** grade foreman; **Dick Hart,** carpenter foreman; **Norm Westling,** labor foreman, and **Ward Sammis,** master mechanic. About a year long job, contractor expects to finish in July, next year.

* * *

Herman Brenden, superintendent, **William Lundsford,** chief mechanic, **Norman Poirier,** foreman, and **James Hunt,** piledriver foreman, are key supervisors on an Alaskan contract which was awarded to Pacific Construction Co., contracting organization owned and headed by **James Lundgren.** Work consists of three bridges and related road work at Klutina and Tonsina rivers and Moose Creek. Work got under way on this $369,803 award in May and will be completed some time next fall.

* * *

Norman A. Martin, superintendent for Hans M. Skov Construction Co., heads the crew on construction of Wapato-Donald concrete bridge and approaches, Yakima County, Wash. Other key men on this $171,710 job which got started in August, and will finish in January next year, are **C. Johnny Zimmerman,** foreman, and **Ralph Deaver,** ironworker foreman.

* * *

Ralph Kriese is superintending a $212,095 award of Isbell Construction Co. for 5½ mi. grading and paving of the Willcox-Chiricahua National Monument highway in Cochise County, Ariz. Truck foreman is **E. J. "Lefty" Whitcomb;** plant foreman, **Harold Watts.** Job started in September and will probably be finished in January.

* * *

N. W. Axline, project manager, **G. M. Cossitt,** superintendent, and **A. C. Simson,** equipment superintendent, are key men for Tiffany Construction Co. on two contracts for grading and surfacing in Pinal County, Ariz., one at $359,596 and the other at $128,849. Scheduled for March completion, the job got under way in September.

* * *

W. Dale Dennis, partner and superintendent of G. D. Dennis & Sons, is in charge of a recent $192,942 award to the company for revetment construction of three locations along the South Santiam River, Ore. Job office manager is **"Chuck" M. Keyes** Other key men on the project, now about completed, are **Donald G. Dennis,** equipment superintendent, and **Lee Prock** and **Heber J. Memmott** foremen.

* * *

K. J. Rose, construction superintendent, and **Frank M. Sganga,** project engineer, are key men on the $741,571 recent award to Isbell Construction Co. for 5.8 mi. of grading surfacing and incidental work on the Benson-Steins Pass highway, Cochise County, Ariz. Assisting as foremen are **William S. Bodine,** general **E. J. Whitcomb,** truck, and **Harold R. Watts,** plant. Job started in September and will be finished about June next year.

* * *

Franklin Anderson, project superintendent, **John Johannesen,** project engineer, and **Thomas N. Beall,** office manager, are key men just finishing up on an Arrington Construction Co. contract covering extension of office building at the National Testing Station in Utah. Arrington won the award at $116,350.

* * *

Harold Stanley, superintendent and **Charles A. Hancock** are to supervisors for F. L. Flynn & Co. on a $138,868 construction of two bridges in Big Horn County, Mon

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

COST-PLUS UNDER FIRE—Two Alaska construction firms have informed the Fairbanks Chamber of Commerce that they feel a return to the cost-plus-a-fixed-fee method of letting construction projects in Alaska could mean ruin for small contractors as well as increased burdens on taxpayers. Chuck Taylor, spokesman for Reed & Martin, Inc., told the Fairbanks Chamber recently that "powerful construction companies" were "using their lobbying power in Washington, D. C. to eliminate competitive bidding through the Corps of Engineers in Alaska." (Competitive bidding for lump sum awards was instituted in Alaska at the close of World War II as a savings to the government.) Taylor charged that cost-plus before that time cost the government from two to five times more than a reasonable competitive bid.

WANTS PRESSURE—Burgess Construction Company was the other firm which made clear its objections to the cost-plus method of contracting in Alaska. Lloyd Burgess said he had given his views on the matter to the Alaska Chapter of the Associated General Contractors, but feels some pressure is needed directly in Washington. The issue first arose over proposed construction of seven military installations in the Aleutian chain which the Corps of Engineers assumed it would supervise. Upon seeking permission to fly contractors into the area to look it over, the Corps was informed the contracts would be let by Jan. 1 to a single contractor on a cost-plus basis.

ALASKA BOGEY MAN—The cost-plus "bogey-man" is scaring more than one Alaska contractor. The one facet of the situation which scares the anti-cost-plus contractor most is that pertaining to personnel. Some contractors fear that the cost-plus project can offer more overtime and other benfits, thus luring skilled workers away from lump sum projects where costs must be watched closely if the contractor is to make a profit. The Fairbanks Chamber of Commerce listened closely and with great interest to this line of reasoning. The Chamber board then voted to send a letter of protest (against cost-plus) to the U. S. Chamber of Commerce. The Chamber also plans to offer a resolution of protest at the Alaska Chamber of Commerce meeting scheduled soon in Seward.

DEATH OF AN AGENCY—The Bureau of Public Roads took over the Alaska Road Commission in the middle of September, but the changeover was so smooth nobody noticed it—not even the employees of the ARC. The BPR took over ARC as a result of congressional action which included Alaska in the federal aid to highways program for the first time. Personnel of the ARC are being integrated into the BPR's expanded program for Alaska. Future road construction planning in Alaska will be worked out jointly between the BPR, Alaska's governor and the Territorial Highway Board.

FUTURE ROADS—The future of road construction in Alaska will be a key subject at the All-Alaska Chamber of Commerce meeting in Seward. Among the speakers scheduled at the meeting are Charles D. Curtis, Commissioner of the Bureau of Public Roads and Brig. H. L. Mueser, commander of the Northwest Highway System who will come from Whitehorse, Y.T., to discuss access roads through Canada.

ALASKAN HAZARDS—One of the hazards of being a construction worker in Alaska is the bear problem. For example, a black bear recently interrupted work on the new runway at Elmendorf Air Force Base. Con Mosely, a laborer newly-arrived from Florida, saw the bear scamper across the strip as he worked. He and foreman Bo Henry spent most of their shift in a jeep chasing the animal out of a newly-built hangar and into the woods.

URBAN RENEWAL—This fancy term for slum clearance is being heard increasingly in Alaska. Both Fairbanks and Anchorage are actively planning urban renewal projects and other Alaskan cities are very much interested. Federal planning funds will be used to clear away blighted areas and rebuild them with substantial structures.

FUTURE EMPLOYMENT—John E. Croul, Jr., who has been manager of the Anchorage Chamber of Commerce for five years and now is morale, safety and security supervisor for Federal Electric Corporation in Alaska, recently outlined his views about future employment opportunities in Alaska. Croul believes that the future is bright for Alaskan jobseekers, and predicted that Alaska "will be the Bagdad of the modern world." Croul cited four factors needed to assist Alaska in providing more employment and progress—more risk capital, labor's adjustment from a short construction season to a year-around type of economy, political stability to be gained through statehood and better leadership to help accomplish economic growth.

HOSPITAL CONSTRUCTION—A public hearing was held in Juneau early in September concerning the 1956-57 plan for construction of hospitals and medical facilities in Alaska under the federal Hill-Burton program. Nearly $1,000,000 in matching funds on a 50% basis is available for construction of these facilities in the Territory. The Hill-Burton program is operated through the Alaska Department of Health.

PORT JOB BALKED—Construction of the Port of Anchorage has been delayed because of the tight money market throughout the nation, preventing sale of bonds for the project, according to City Manager George Shannon. Residents of Anchorage have passed two bond issues for the port, one for $2,000,000 in general obligation bonds and one for $6,800,000 in revenue bonds. Increase in discount rates by the Federal Reserve Board has acted to discourage sale of the bonds to investors, Shannon said. The money market, according to Shannon, has been getting gradually tighter for about six months. The condition is such that some cities have completely withdrawn their bonds, and have given up trying to sell them at present.

DREDGING PROJECT—A $4,000,000 dredging and harbor construction project for Anchorage has been recommended to Congress by Secretary of the Army William Bruckner. The recommendation was part of an engineering report submitted recently by the Army Engineers.

CONSTRUCTION NEWS NUGGETS—City of Fairbanks recently awarded a $270,000 sewer contract to Peter Kiewit Sons' Co. . . . Juneau is planning a $500,000 airport expansion program . . . An acute shortage of stenographer-typists, clerks and telephone operators is reported by federal agencies in the Anchorage area . . . Further increase in unemployment in the construction industry is predicted by the Territorial Employment Service during the next sixty days. The extent of unemployment will depend on weather conditions and effect of weather on suspension of work in the construction industry . . . The University of Alaska is one of the few schools in North America offering a course in permafrost. The course, in the geology department, is called "Geological and Engineering Problems of Frozen Ground." The study covers investigations of both seasonally frozen ground (seasonal frost) and perenially frozen ground (permafrost.) The course at the university includes data on distribution of permafrost, its thickness and characteristics and how it affects construction.

A typical Murray drilling rig powered with 220-hp. LRO Waukesha and 230-hp. V-12 Le Roi engine.

How a steak dinner saved me $1,000 a day!

by L. D. Murray, Murray Drilling Co., Houston, Texas

"Engine failure due to overheating used to be a big problem when I was drilling in West Texas... downtime was costing me as much as $1,000 a day.

"Conditions were the worst I've ever encountered before or since. There were no prevailing winds to head the engines into. We were drilling 13,700-foot wells at an altitude of 4,200 feet and temperatures often ranged upwards of 100°. Consequently, our engines were constantly running well above the boiling point and at times they'd pull the mercury down to 9 or 10 inches. You can guess the rest... with expenses running about $25,000 a year on each of six engines, we were not exactly getting rich.

"Well, one day I told a friend of mine about my engine troubles, and he told me if I'd buy him a steak he'd solve my problems. So I bought him that steak (it was even big by Texas standards), and he told me to try Union's T5X Motor Oil... just that and nothing more. So before we'd finished lunch, I ordered five barrels of T5X sent out to the rigs.

"From that day on, our engine troubles were over. Water temperatures held at 190° and oil consumption dropped from 10 gallons to 1, sometimes even half-a-gallon per day. Instead of changing oil every Sunday morning, we found we could run T5X Motor Oil 500 hours, changing it and the filters every third or fourth Sunday. And would those engines deliver on T5X! If I had to shut one down for any reason, the other two would pull the load.

"To make a long story short those engines stayed on the line for three years after that, using only T5X, and the only expense aside from routine maintenance was an occasional tuneup. I think that Union T5X is so far ahead of any other motor oil, it's impossible to compare them."

What more can we add except to remind you that T5X, the *amazing* purple motor oil, is immediately available from your nearby Union Oil representative.

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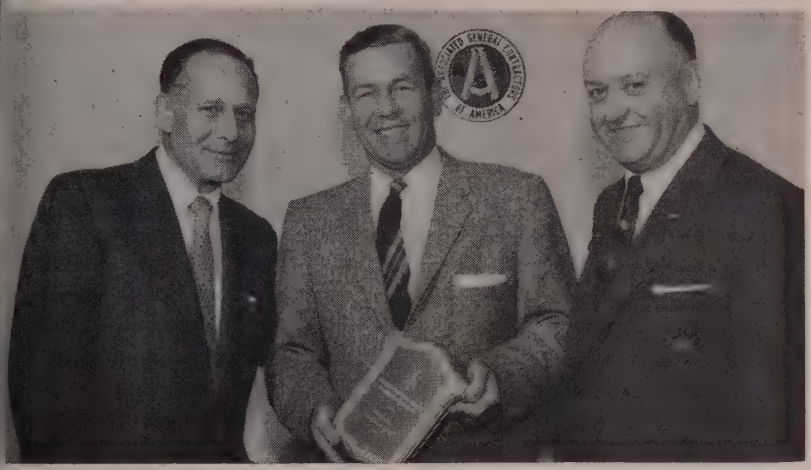
ENGINEERS on the move



OFFICERS of Northern California Chapter of the Associated General Contractors who received the 1956 California State Fair award for an "outstanding education exhibit." L. to r.: *Felix H. Siri*, vice president; *Gordon Pollock*, president, and *Milt Simpson*, treasurer. The exhibit was one of the two that attracted the largest audience. Of main interest was equipment on a simulated construction project.

The Asphalt Institute announces the assignment of **Fred N. Finn,** district engineer at Sacramento, Calif., as research engineer on the forthcoming $14,000,000 AASHO test road project in Illinois. In making the announcement, President **J. E. Buchanan** said Finn will be designated as Special Project Engineer during construction and operation of the asphalt test pavement now being built. The four-year test, sponsored by the American Association of State Highway Officials, is expected to get under way late next year.

Finn moves onto the test well qualified as an official observer for the Institute, according to **Arvin S. Wellborn,** chief engineer. He is a World War II Navy engineering veteran. In postwar years he served as a Navy airfield pavement specialist. He joined the field forces of the Institute in February 1954 from the University of California where he was a lecturer and research engineer in soil mechanics and asphaltic mixtures.

* * *

San Francisco Bridge Co. has been awarded a sustaining membership in the Society of American Military Engineers. **George Muhs,** vice president of the firm, accepted the certificate from **Comdr. William J. Valentine,** USN, vice president of the Society's San Francisco Post.

* * *

William L. Jensen, assistant city engineer of Hawthorne, Calif., has been named city engineer and head of the Department of Public Works of Monterey Park, Calif.

* * *

Herbert Nunn was recently appointed to succeed the late **Carl Skooglund** as city engineer of Vancouver, Wash. The post had remained unfilled since Skooglund's death in December 1954.

* * *

Harold B. Rightmire was recently appointed vice president of the construction firm of C. L. Peck. Over the past six years Rightmire had been a principal project manager with the firm on such Southern California projects as the Anheuser-Busch Brewery and Capitol Records buildings in Los Angeles, and the current construction of the Douglas Aircraft DC-8 plant in Long Beach.

* * *

Ellis L. Hatt of Tigard, Ore., has been awarded a fellowship at Harvard University's graduate school of public administration. He is one of ten federal and state government employees selected to participate in a new research and training program in the field of coordinated water resources development. Hatt has been in solid and water conservation work in the West for more than 20 years, and is currently serving as head of the Soil Conservation Service engineering and watershed planning unit, making his headquarters at the regional offices at Portland, Ore.

* * *

Lt. Robert G. MacLennan has been assigned to the staff of The Dalles Dam Project, with designation of shift engineer. He will be in the Portland District of the Corps of Engineers for approximately two years.

* * *

Lt. Col. William C. Gribble, Jr., is the newly assigned executive officer with the Alaska District, Corps of Engineers, transferring to the Anchorage office from the Atomic Energy Commission.

* * *

Caldwell, Mason and Muntz, architects and engineers, recently opened new offices at 4575 Pacific Blvd., Vernon, Calif. Headquarters of the firm were formerly in South Gate.

* * *

Engineering personnel changes announced by **G. Bryce Bennett,** State Highway Engineer of Idaho, are as follows. **James H. Cairns** has been made survey and plans engineer in the Boise central office. He had been district engineer at Shoshone in charge of District 2, and is being succeeded there by **Roy Jump,** senior resident. **Elwood H. "Woody" Gray** has been selected to replace Jump, and succeeding to Gray's former post at Burley is **Elmer M. Harding. Charles E. Aldrich,** who has been senior resident engineer at Lewiston since 1948, replaces **C. A. Kelly** as district engineer at Pocatello. Kelly retired after 30 years with the Department. **R. M. Parsons,** district engineer at Lewiston since 1955, has returned to Coeur d'Alene to accept assignment as senior resident under District Engineer **J. A. Phelps. Phil Marsh** was named his successor at Lewiston.

* * *

Newly elected officers of the Gunite Contractors Association of California are: president, **J. C. Fredericks** of F. W. Case Corp.; treasurer, **N. R. Sanders,** Johnson Western Gunite Co.; secretary, **James Enbody** of H. W. Enbody & Sons. **Stanley Zynda** continues as manager.

COL. PIERRE V. KIEFFER, JR., who recently arrived at Anchorage to assume duties as Alaska District Engineer. He succeeds *Col. Carl Y. Farrell.* Col. Kieffer is the sixth district engineer to head the Corps of Engineers in Alaska since the district was created in 1946.

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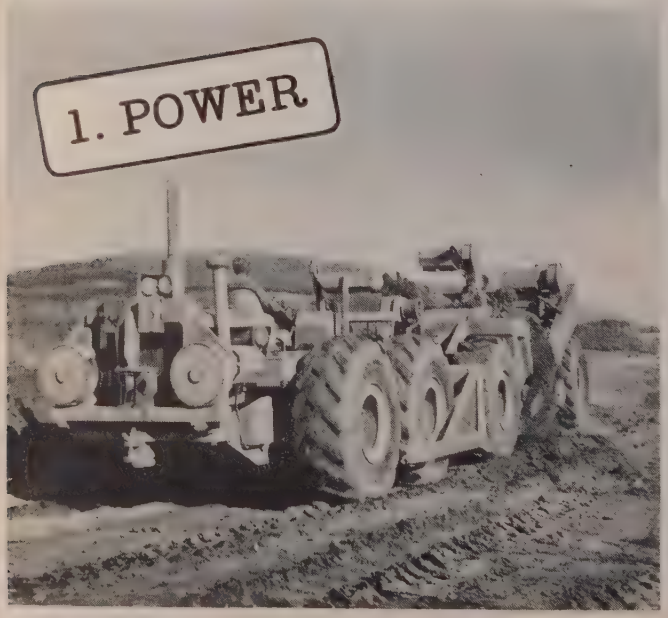
Today's demand for miles on miles of sup highways, more and bigger airports, dams a waterways, gigantic land-reclamation projects, a fabulous sub-division construction, has compel change to bigger yardage contracts with shor job-completion time-limits. The resulting need moving more yards in less time has created a n emphasis on the work dimensions of your hea duty earthmoving equipment.



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ver...208 hp — more than any vler tractor in its class...with less nds-pull in the starting speeds, but e pounds-pull in the working eds used most of the time. Opera- work at higher speeds, with more dage moved per day.

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ed...forward to 17.4 mph, and rse to 7.3 mph. Instantaneous shift ough constant mesh...no loss of nentum. Instant controls. Anti-fric- bearings throughout power train power loss, give more use of speed.

bility...Tournatractor travels e as fast as crawlers to reach on- job assignments and to travel job- ob under its own power. Saves time cost of hiring flatbed haulers and a help to load and unload.

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Husky, all-welded case...provides a sturdy base. Moving parts are held in perfect alignment, last longer. All parts easily accessible through handy cover-plates. No independent oscillating assemblies to spring out of line.

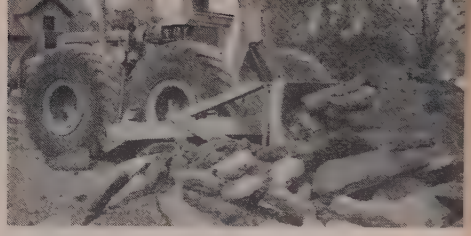
Anti-friction gear-trains . . . heavy-duty, precision-cut gears mesh smoothly. Special heat-treating produces wear-resistant surface on tough cores. Constant oil-bath reduces wear. Shafts ride on anti-friction bearings, reducing power-loss and wear.

Grouped lubrication through fewer fittings, oil enclosures, and far fewer moving parts, combine to save operator about 5 min. work-time each shift. Sealed protection keeps abrasive dust, mud, water and other elements sealed out...lubricants sealed in. Saves lubricants, saves time, saves wear.

4 tires vs over 500 track parts... four tough tires eliminate multitudes of exposed wearing parts such as track rollers, bushings, pins, shoes, and seals. Reduces service, cuts costs.

Safe to operate...low center of gravity, all-around visibility, accessibility and quick response of controls, make Tournatractor exceptionally safe to operate. Multi-disc air brakes have *four times* the braking surface of most heavy-duty tractors.

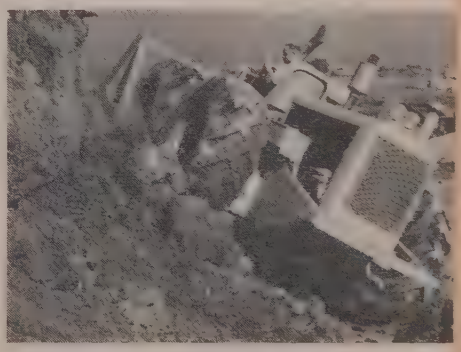
Interchangeable equipment...Bull-dozer, Angledozer, Root-Rake, Snow-Plow — all interchangeable — extend Tournatractor usefulness in a wide work-range. Tilt-mechanism and down-pressure attachment on dozer also available. Tournatractor pulls any type drawbar equipment.



Tournatractor can tackle tough jobs, such as breaking up rock-seams, pavement, etc. Faster push and return save time. On long cycles, on-job and between-job moves, Tournatractor speed is doubly important.

Tournatractor's sealed power-train permits travel through water, mud, dust without loss of power. Lubricants are not washed away nor filled with abrasives. Maintenance is less since 4 wheels do work of 500 track parts.

Tournatractor takes shortest route to job, via highway or cross-country. It drives through city streets without interference to traffic . . . big, low-pressure tires do no damage to black-top, curbs, or railroad-tracks.



Tournatractor travels and works over any type of footing to clear land, push-load scrapers, dig ditches, spread fill, stockpile materials, maintain haul roads, back-fill around culverts, pull other equipment.

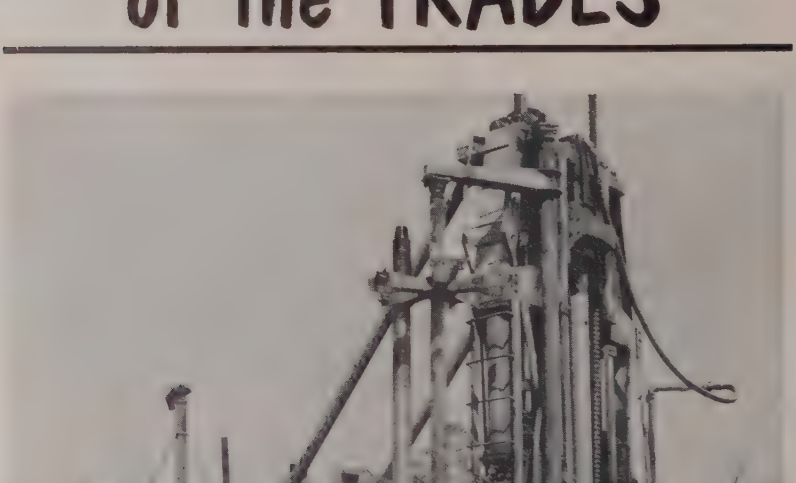
e Tournatractor rk on one of ur own jobs

The best way to judge today's improved Tournatractor is to see it in action on one of your own jobs. We urge you to contact your local LeTourneau-Westinghouse Distributor, or write the factory, and we will arrange to demonstrate one of these machines so you can compare its profit possibilities with your present heavy-duty tractor equipment.

Tournatractor, Angledozer—Trademark Reg. U.S. Pat. Off. CT-1104-G V

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

TRICKS of the TRADES



New rig replaces four wagon drills for blasthole drilling in sandstone

A NEW, DRY-TYPE rotary drill—the invention of a mine that saw its profits being eaten away by high drilling and blasting costs—is proving its superiority over wagon drills, churn drills, auger drills and many of the rotary drills now on the market. The new drill has proved so successful in drilling blastholes in overburden over coal seams that its inventor, the Robbins Coal Co., Oneonta, Ala., has set up a separate corporation, the Robbins Machine & Mfg. Co., Inc., to manufacture and market it for a tractor-mounted rotary drill application.

At the sandstone quarry of A. E. Burgess Contracting Co., producing soft sandrock for use as a base for Highway 78, production time has been halved by the Robbins drill. To produce the necessary 35,000 cu. yd. of shot rock the old way with wagon drills would take 6 weeks, according to Burgess' estimate. The new rotary lets them do the job in 3 weeks.

The soft sandstone is as hard to drill as some types of iron ore, because of its abrasiveness. However, A. E. Burgess estimates that one Robbins rotary drill will conservatively replace four wagon drills. In his own experience, one Robbins drill (the second one built by Robbins) mounted on a Caterpillar D8 Tractor, one compressor and two men—a driller and helper—have replaced two wagon drills, three compressors, two jackhammers, one small half-track rotary drill and nine men.

There are other advantages to the drill also. The rotary with a 7⅜-in. bit, drilling a larger blasthole than possible with wagon drills, permits blasting on a larger pattern. Whereas holes were spaced on 4-6 ft. centers before, now 14, 16 or 18-ft. centers are used. This effects a considerable savings in powder.

Although a smaller unit than most Robbins drills currently being built, Burgess' drill permits a maxi drilling depth of 65 ft. This offer advantage of being able to drill t full depth of cut instead of 12-1 lifts.

Burgess has tried this drill in a all the types of rock found in bama except hard granite. The speed of the new rotary has va from 1 ft. per minute in hard standstone to as high as 6 ft. per ute in softer formations. Limest hard and soft shales, conglome and other sedimentary rock are r ily penetrable. Adapters are now vided for mounting the drill on Caterpillar crawler tractors.

Power to drive the rotary co from the rear power takeoff of tractor through a Fuller K8 or transmission, with 4 speeds forw 1 reverse. Through a chain drive, transmission powers a right an connection to a square shaft runn the height of the drill unit. square shaft powers a sliding box which rotates the drill stee speeds between 25 and 120 rpm.

Hydraulic operations

Down pressures as high as 30 t on the drill bit are obtained by 8-in. hydraulic cylinders operating a 70-gpm. Hydraulic two-stage pu driven from power take-off of tractor. These hydraulic pistons o ate a rack and pinion that raise lower the drill pipe by two ch sprockets, providing the neces down pressure on the bit. Also means of hydraulic controls, th jacks can level the tractor for drill

A 600-cfm. air compressor fo air into the drill pipe to blow ch and dust away from the drill Some of the dust packs in cracks crevasses in the blasthole, making sides clean and smooth. The res thrown out at the surface by a d deflector. The compressor may either a separate unit or may mounted on the front of the trac

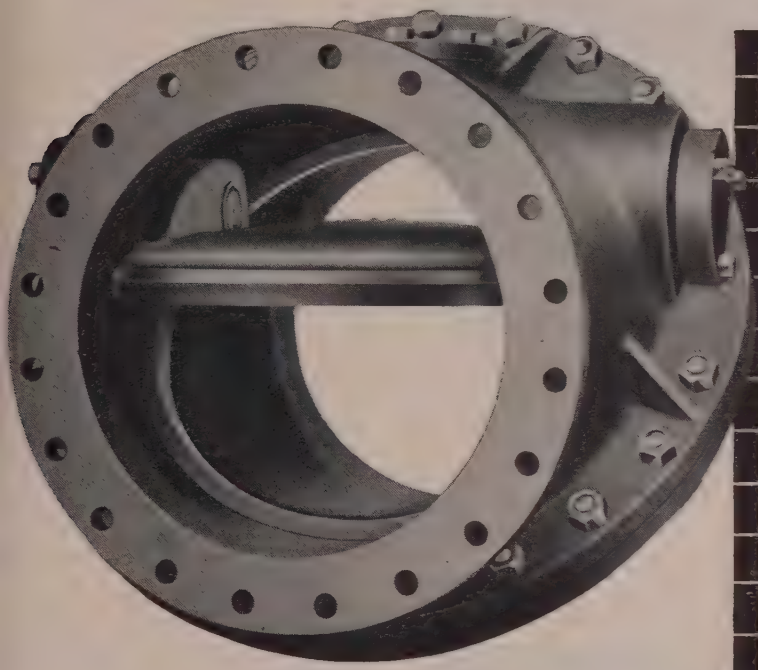
Tri-Cone rock bits are used. Robbins drill can handle bit s from 5 to 12 in.

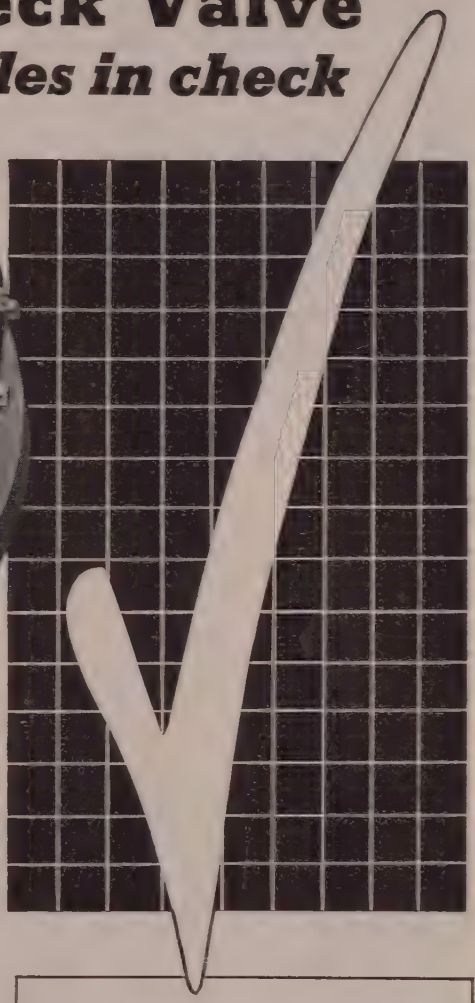
The 225-gal. hydraulic system a tank capacity of 150 gal. The pu maintains a flow of 70 gpm. throu the system. Protection of the draulic system is provided by a d type filter in the system itself an metal screen filter in the hydra tank.

The drill mast is hinged and can quickly broken over, making the tire unit portable on a low-boy i matter of minutes. The support braces on the latest models are sw eled so that they need not be remo for the break-over. A splined coupl on the square shaft eliminates c screws which would otherwise h to be removed.

The total weight of the Robb drill unit is approximately 24 tons, cluding ballast and oil, but exclud the tractor.

Check This Check Valve
and keep your troubles in check





Chapman TILTING DISC Check Valve

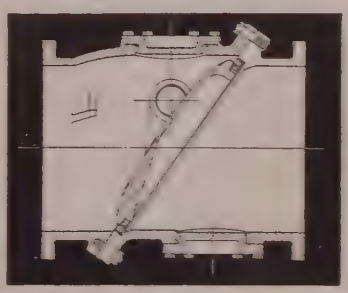
Everything works in your favor.

With Chapman's Tilting Disc Check Valve there's no vibration, no fluttering, no noise. There's no slamming, with usual piping arrangements, no banging to cause damage to system or valve. There's no grinding, scraping or wearing to either the disc or seat.

All of this means less headaches to you . . . both physical and financial headaches. The smooth, sure, quiet action means less, much less, maintenance over the longest period under toughest operating conditions.

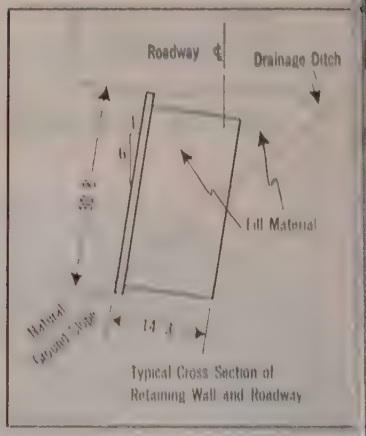
Chapman Tilting Disc Check Valves with money-saving advantages like these are available in iron and steel, with standard end to end, for handling fluids or gases under a wide range of pressures. They're listed and shown in our Catalog 30-A. Send for it and check the valves you need for replacement or new piping systems, right now.

The CHAPMAN Valve Mfg. Co.
INDIAN ORCHARD, MASSACHUSETTS



The Valve That Goes with the Flow

Here's the idea in back of it all. When the flow is on, "airfoil" disc is held firmly against stops in the body. When the flow drops, disc balances itself quietly on whatever flow there is. When the flow stops, disc drops quickly and tightly on special bevel seat. It's as simple as that. It's as sound as that. And valve men will be pleased when they see that enough room is given around disc to cut down flow resistance.



Metal bins solve access road problem

PACIFIC GAS & ELECTRIC CO., San Francisco, Calif., faced a tough problem in building an access road to its new Poe power project on Feather River.

The steep, rocky slope of the Feather River Canyon provided no level right-of-way that would permit the use of heavy construction equipment. Besides, use of the roadway would be limited, which would not justify costly side-hill cuts.

After careful study of the problem a metal-bin-type retaining wall was seen to be the best solution.

An Armco metal bin wall was installed on the downhill side of the road as seen in the accompanying drawing. This way it provided both a sturdy foundation for the road and at the same time helped gain enou space for the roadway. Native gra lar backfill material was tamped side and behind the metal bins up the road level.

Length of the wall is 1,000 ft., wh includes curves and elevation chan needed to conform to the contour the canyon walls. Corrugated me pipe was installed through the w at various points to supply drain outlets for the steep slopes above t road.

Gunite used for Arizona reservoir

THE CASA ADOBES WATER CO., a private company furnishing water to the community of Casa Adobes Estates, near Tuscon, Ariz., recently completed construction of an unusual reservoir. It was designed and constructed to make it possible to expand its capacity at a later date and it was built with air-placed or gunned concrete.

It was decided to build half of an eventually circular reservoir. It has a radius of 55 ft. (110 ft. diameter or straight side.) The pumping equipment is housed on the 110-ft. side of the reservoir so that when the second half is built, the pump house will be in the middle of the reservoir.

Management investigated the air-placed concrete method of construction and discovered that this process had many advantages to offer. Because air-placed concrete requires no pouring forms, a savings could be realized in time, materials and labor. Another fact was that the only excavating necessary was to dig out t ground to the shape and dimensio of the reservoir. Had poured co crete been used, it would be nec sary to excavate to greater dime sions, construct the forms, pour t concrete and then backfill to repla the earth around the outside of t structure.

Before the gunning began, a after the excavating had been co pleted, reinforcing wire mesh w laid over the bottom and sides of t reservoir.

The Whitaker Construction Co. Tuscon, Ariz., was contracted to the concrete gunning work. They e timated that a time saving of 50 was realized in using this method, well as an over-all cost saving of 38 over a formed job. A total of 250 c yd. of concrete were gunned using portable Airplaco concrete gunni rig consisting of a Model 1500 Nucr tor and a Model 405 Mix-Elvator. mix ratio of 4½ parts sand to 1 pa portland cement was used on the j at the recommendation of the eng neers.

After the concrete was gunned the desired thickness over the wi mesh, it was hand-screeded to smooth finish. Because of the flex bility of air placed concrete, the tw right-angled corners as well as th joint between the floor and wa were rounded off.

The Air Placement Equipment C Kansas City, Mo., were manufa turers of the Airplaco Nucretor an Mix-Elvator used on this job.

ermanent jacks will keep ank building from sinking

CKS, made by Duff-Norton Co., tsburgh, Pa., are keeping bank ets from sinking in a unique build- job.

Commercial groups at the new San ancisco International Airport, on n Francisco Bay, are building with eye toward a disturbing fact— ildings not on piling are expected settle 20 in. in the next four dec- es.

lled-in land will subside

The area, once tidelands and marsh, as filled in with six to eight feet of mpacted earth so that firms serv- g the heavily populated upper por- on of the San Francisco Peninsula uld locate near the new Airport erminal building. The filled-in land, us rainy weather and the pressure om new structures, gave contrac- rs some of their knottiest problems years.

Possibly the biggest problem of all as encountered by Bank of America designing its International Airport anch office.

A soil investigation showed that ver a 40-yr. span the bank's 150-ton ault would settle more than the rest f the branch building—so much, in ct, that there would be a 10-in. vari- nce between the two portions of the me building due to the difference in eight.

This would occur even though, as as recommended for all structures xcept the Terminal itself, the branch as constructed on a concrete mat.

The future was not promising. The ault could twist away from the bank. r if that didn't happen the vault ould sink so much more than the anking room that officials might ne day find themselves unable to pen the massive 3½-ton steel door.

Through its building agent, Con- ental Service Co. of San Francisco, ank of America decided on daring tion to solve the problem. It would loat" the heavy vault by using cks.

our screw jacks chosen

After studying available lifting de- ces, Continental's Specifications epartment chose four 100-ton Duff- orton Co. 126 RX air motor pow- ed screw jacks to do the job.

These jacks weigh 448 pounds and and 26 in. high. With a base diame- r of 13 in. and a head diameter 6⅛ in., each jack can raise 75 to 0-ton loads 14 in. in a few minutes.

Duff-Norton 126 RX jacks employ e screw principle with built-in ro- ry air motors.

To use them most effectively, the vault was built separately from the building proper, but in such a way that it adjoined the main building on two sides. Both parts of the building were placed on separate concrete mats.

The raft under the vault was de signed for a soil pressure of 444 lb. per sq. ft. The mat under the other part of the bank was designed for a soil pressure of 150 lb. per sq. ft.

How jacks were placed

Here's how the firm of Johnson and Mape Construction Co., Menlo Park, Calif., placed jacks under the Bank of America's heavy vault:

1. The concrete mat, the exact size of the vault base, was laid. Then a concrete box was poured atop the mat. This box had sufficient height to permit the jacks to operate.

2. A Duff-Norton jack was set in each of the four corners of the box.

3. An 18-in. thick reinforced con crete floor for the vault was poured on the jacks. On this floor, 18-in. vault walls and ceiling were erected. An equipment room containing an air compressor and related machinery was then installed on top of the vault.

Compressed air system

Control valves inside the vault regulate compressed air, which, in turn, controls the pressure in four separate air pipes connected to the jacks. The air compressor develops 230 psi., but a reducing valve brings compressed air to the jacks at only 90 psi.

Two spirit levels were set into the vault's concrete walls on both sides of the control valves. They enable bank officials to tell at a glance when the vault has shifted. A turn of the valve activates the jacks and the vault can be returned immediately to the desired position.

Matchmarks inscribed on the bank wall and vault wall facing the main banking room also indicate level changes.

So far, so good

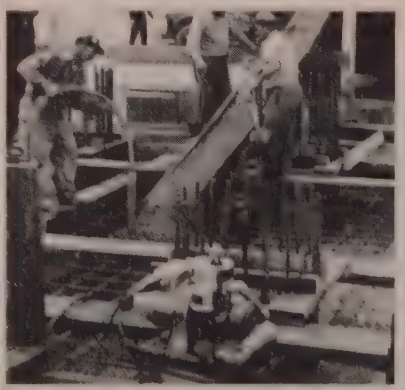
So far, the vault has settled about one inch more than the rest of the building, bearing out engineers' cal culations. The jacks have equalized the variance.

Imaginative planning is keeping funds at San Francisco Airport branch of the world's largest private-owned bank from going underground.

Full Line of Carryable Construction Equipment Now Offered by Homelite

Carryable Diaphragm Pump . . . This self-priming, 120 pound diaphragm pump will handle water in the thickest sand, muck, or mud. Capacity: 5,000 g.p.h. Size: 3". Complete line of centrifugal pumps are also available in sizes from 1½" to 3"

Chain Saws For Every Job . . . Now you can choose from a full line of lightweight, powerful Homelite chain saws. From 3½ to 7 horsepower . . . 19 to 29 pounds. Brush cutting and clearing attachments are available to handle all your cutting jobs

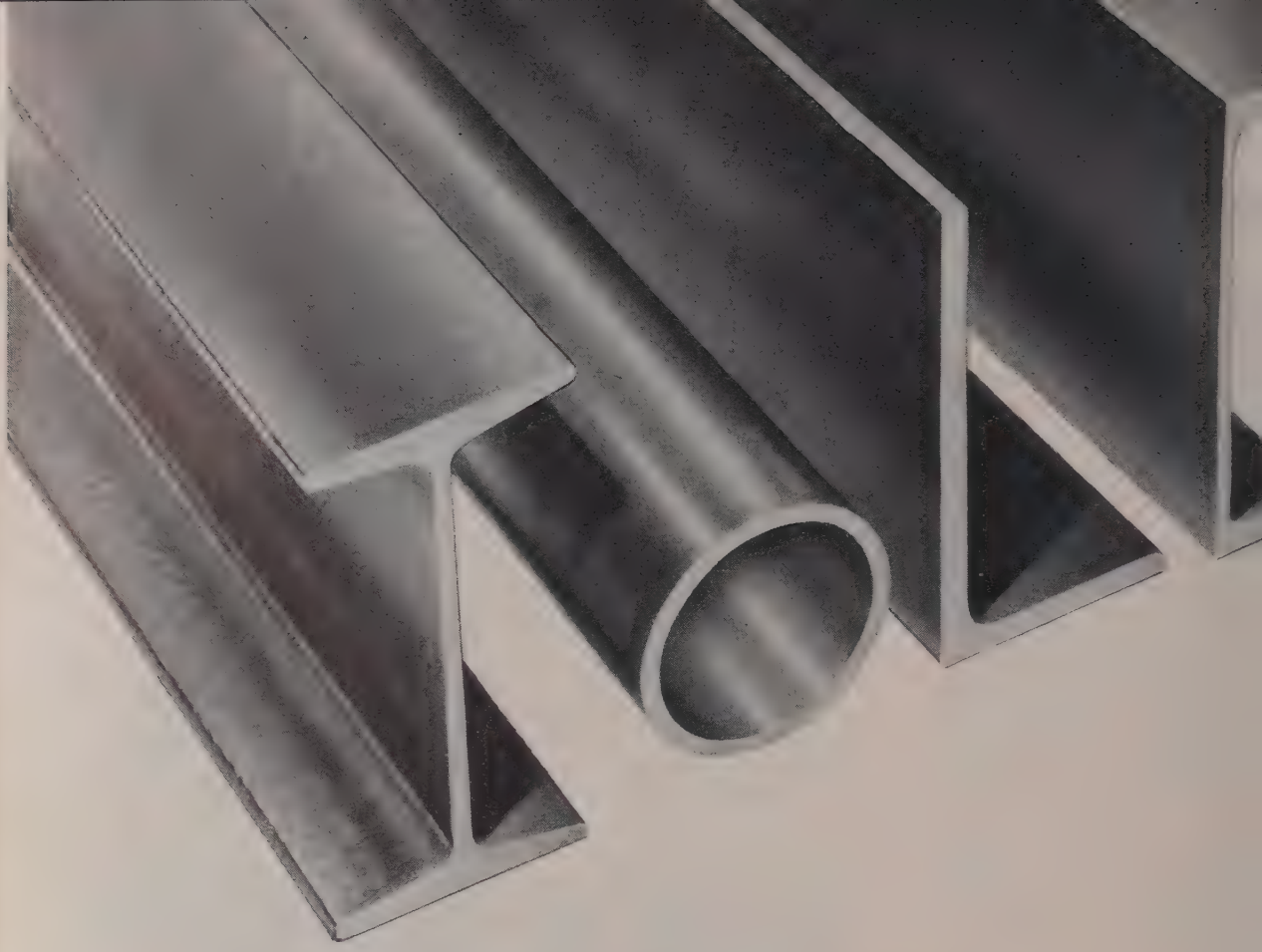


One-Man Electric Vibrator . . . It takes only one man to place concrete with powerful, Homelite high-cycle or universal electric concrete vibrators. Carryable Homelite generator provides power for high-cycle vibrators *and* 110 volt DC for all universal vibrators, tools and floodlights.

HOMELITE

a division of Textron Inc.

PORT CHESTER, NEW YORK



Men make the difference...

THE high quality of Kaiser Steel structural shapes is a product of the skills of master steelmakers.

Because of these men, and a fully integrated mine-to-market operation, Kaiser Steel provides western builders with structural shapes of the highest quality—the most complete line of structural shapes produced on the West Coast.

Kaiser Steel

built to serve the growing West

NEW LITERATURE

For your convenience in obtaining free copies of literature described, the company address is provided with each review.

"New Life for Old Machines"

This is the title of a new informative booklet issued by **Caterpillar Tractor Co.**, Peoria, Ill. The theme of this booklet deals with machines powered by engines such as cranes, crushers, and cotton gins. It is suggested that the customer or owner should periodically examine his operating cost in downtime and repairs. Several actual job installations are discussed using dollar and cents values. Form DE635.

Richmond Handbook

A complete run-down of the latest in job-tested concrete form-tying and anchoring methods is contained in a new handbook published by **Richmond Screw Anchor Co., Inc.**, 816 Liberty Ave., Brooklyn 8, N. Y. Containing 46 pages of information on the most up-to-date and economical concreting methods, the attractive 3-color handbook supplies essential data and drawings of procedures and devices used in concreting. Included are six pages of blueprints covering many aspects of form design and construction, and similar subjects. Many special charts and tables report on full statistical studies of pressures, loads and deflections in form design and give special information on fastenings and the properties of planks and timbers.

Hot oil heaters

A four-page, two-color brochure describing the Hy-Way automatic heating system for asphalt and concrete batch plants, melting kettles and other construction applications is available from **Hi-Way Heat Systems, Inc.**, Box 2494, Youngstown 9, Ohio. The folder contains illustrations and specifications of the models 45 RCH, 45 RCL and 35 RCG.

Jackson multiple compactor

A new, illustrated bulletin recently made available by **Jackson Vibrators, Inc.**, Ludington, Mich., demonstrates the many ways in which the six compacting units in the workhead of their multiple compactor may be arranged and rearranged to provide the most efficient coverage and consolidation of granular soils, rock, slag, sand or gravel—as used in sub-bases, bases of macadem pavement, pavement widening and fills of various kinds.

Salsbury bulletin

The Power Transmission Division of **Salsbury Corp.** announces publication of a four-page bulletin, No. 56-D-1, which illustrates and briefly describes the line of automatic clutches and transmissions presently offered by Salsbury. The folder is offered as a quick reference sheet to assist in the proper selection of clutches or transmissions for specific uses. Copies available from the company, 1161 E. Florence Ave., Los Angeles 1, Calif.

Detroit generator sets

The **Detroit Diesel Engine Division** of General Motors has issued a new brochure outlining its complete line of electric generator sets. The brochure includes specifications and illustrations of over 25 radiator and heat exchanger-cooled models ranging from 20 to 245 kw. Both 50 and 60-cycle and direct current units for emergency standby and continuous off-the-line use are represented. Copies may be obtained from Detroit Diesel distributors and dealers or by writing Detroit Diesel Engine Division, 13400 W. Outer Drive, Detroit 28, Mich.

Pneumatic controllers by Bristol

A 56-page bulletin describing the new series 500W pneumatic controller has just been announced by the **Bristol Co.** of Waterbury 20, Conn. Bulletin A130 is illustrated by more than 75 photos and drawings, describing the new high sensitivity, wide control-band controllers for temperature, pressure, flow, vacuum, etc. Sections describing control principles, and illustrating the various control modes available are included.

Victor hardsurfacing manual

Victor Equipment Co. has issued a comprehensive catalog of their hardsurfacing products. The loose-leaf manual is arranged according to industrial application; brick and clay, cement, coal mining, dredging, earth moving, metal mining and rock products. Complete instructions are given for the use, amount and application of each product and detailed drawings accompany the text. Alloy Rod & Metal Division, **Victor Equipment Co.**, Los Angeles, Calif.

Assets of hardsurfacing

Effectiveness of hardsurfacing in extending the life of equipment continually subjected to wear and impact in cement and aggregate plants is told in a brochure published by **Rankin Manufacturing Co.**, 616 South Marengo Ave., Alhambra, Calif. The brochure, Form 1500, presents case studies of hardsurfacing uses and contains photographs of actual applications. Examples shown include a gyratory crusher mantle, crusher rollers, mill hammers, screw flights and others.

High-strength bolting procedure chart

The Skidmore-Wilhelm Manufacturing Co., manufacturers of bolt-tension calibrators, announces the availability of a wall chart that gives complete, approved procedures for tightening high strength bolts including the latest information developed by the Research Council. The chart is divided into four major sections. The first part deals with methods of checking high-strength fasteners. The second and third portions cover correct calibrating of torque control and conventional impact wrenches. The final section gives instructions for the actual tightening process. The chart is available to everyone interested in the solution of high-strength bolting problems. **Skidmore-Wilhelm Manufacturing Co.**, 442 Green Road, Cleveland 21, Ohio.

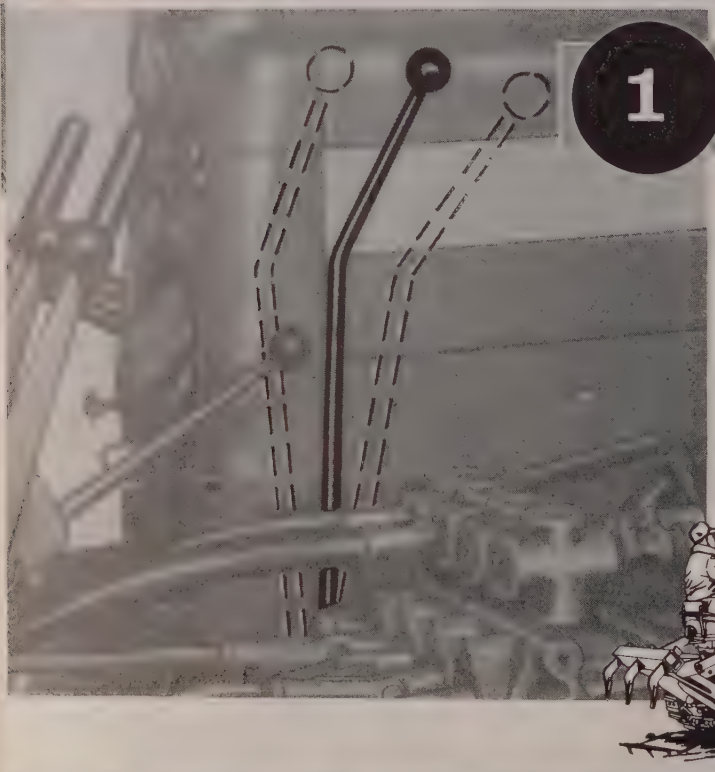
A.I.A. file sheets

A series of A.I.A. file sheets, printed on heavy card stock for reference filing are being made available at monthly intervals by the **Columbia-Geneva Steel Division**, United States Steel Corporation, 120 Montgomery St., San Francisco, Calif. Qualified engineers, architects, contractors and building inspectors are invited to submit their names for this mailing.

IH Skid-Shovel

International Harvester Co. has just published a four-page, two-color folder on the new 2¼-cu. yd. International Drott TD-14 four-in-one Skid-Shovel. Job-site photos illustrate the adaptability of the unit, in its quick change from Skid-Shovel to clamshell to bullclam to bulldozer. Request Booklet CR-521-F, Construction Equipment Division, International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

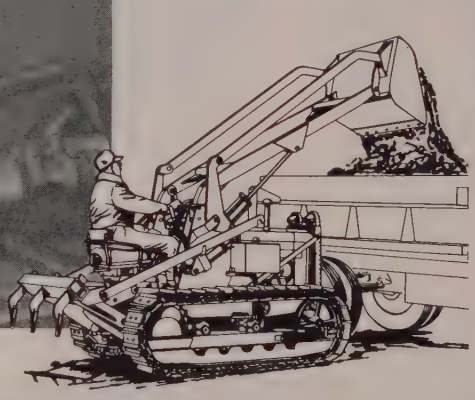
Now THESE New *Time-Savers* Ma
BETTER BUY



1

Time-Saving DIRECTION REVERS
for "420" Crawler and "420" Utility Tractors

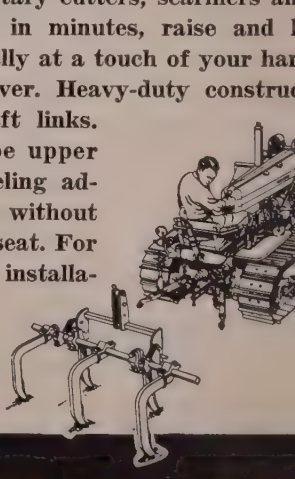
Lets you move forward or backward in the
speed—no time wasted shifting gears.
simply depress clutch pedal, stop tractor,
the handy direction reverser lever, release c
and off you go in the opposite direction. I
at left shows lever in neutral position. D
lines show revers
forward travel
tions. Available a
tional equipmer
"420" Crawler
Utility models.



3

Heavy-Duty 3-POINT HITC
for John Deere Crawler Tractors

Offers you the advantages of "pick up an
operation with a track-type tractor. You ch
tools such as rotary cutters, scarifiers an
tegral scrapers in minutes, raise and l
them hydraulically at a touch of your ha
a convenient lever. Heavy-duty constru
Telescoping draft links.
Turnbuckle-type upper
hitch link. Leveling ad-
justments made without
leaving tractor seat. For
factory or field installa-
tion on John
Deere "420" or
"40" Crawlers.



JOHN DEERE

JOHN DEERE *Quality-B*

hn Deere Industrial Tractors
HAN EVER !

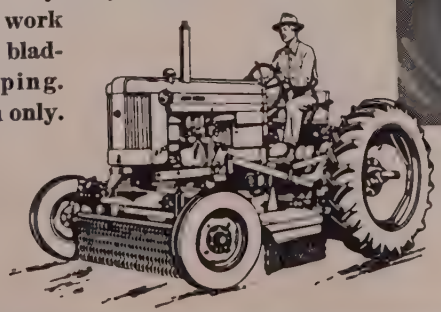
JOHN DEERE

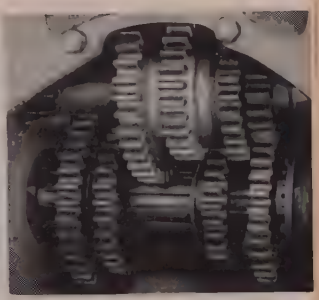
2 *Time-Saving* FOOT THROTTLE
for "420" Crawler and "420" Utility Tractors

ides you with foot control of engine speed. ates in conjunction with hand throttle to ase engine speed, and consequently ground- el speed, approximately 25 per cent—makes ible speeds up to 17 mph on the highway. helpful when maneuvering in close quar- Inexpensive. Easy ttach to tractor. ilable as optional pment for "420" wler and Utility els.

4 5-SPEED TRANSMISSION
for "420" Crawler and "420" Utility Tractors

es you an extra speed forward for increased satility in many operations. On Utility trac- s, the new speed is 6¼ mph and on the wler, 3⅞ mph. Regular forward speeds are: lity 1⅝, 3⅛, 4¼, and 12 mph; Crawler ⅞, , 3, and 5¼ mph. Quickly repays its small ra cost on such work nowing, finished blad- , and landscaping. tory installation only.





Showing 5-speed gearshift pattern (left) and view into transmission case (above).

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651 Brannan Street, San Francisco 19, California

Please send me your latest literature on:

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*Firm*_____

*Address*_____

dustrial Tractors

Steel jobs by CARCO

A new 16-page brochure published by the Structural Steel Division of **Pacific Car & Foundry Co.** includes photographs and descriptive data on outstanding structural steel jobs fabricated and erected by the Pacific Northwest firm. Included are examples of steel fabrication and erection for schools, dams, bridges and refineries. Copies may be obtained by writing to the Structural Steel Division, Pacific Car & Foundry Co., 120 W. Hudson, Seattle 4, Wash.

Torque-converter-drive on Allis-Chalmers tractors

A pocket folder, containing quick reference data on the torque-converter-drive now available on Allis-Chalmers HD-21 and HD-16 crawler tractors has been issued by **Allis-Chalmers Manufacturing Co.**, Construction Machinery Division, Box 512, Milwaukee 1, Wis. The brochure explains how the impeller, turbine and housing increase torque up to 4½ times in this new hydraulic turbine converter.

Detroit turbopower diesels

An illustrated brochure describing General Motors four and six-cylinder turbopower diesels has been issued by the **Detroit Diesel Engine Division,** Detroit 28, Mich. Specifications of these models ranging from 159 to 300 brake horsepower are fully described along with features of design and performance data. Copies may be obtained from Detroit Diesel distributors and dealers or by writing the company.

Profit-making attachments

"Speaking of Attachments" is the title of an eight-page booklet recently published by **Caterpillar Tractor Co.,** dealing with the profit-making aspects of earth-moving machinery attachments. The illustrated booklet, Form DE 589, demonstrates that the right attachment and the proper application combine to produce increased profit for the machine owner. Also included are tips on determining when and where attachments can be profitably used. Caterpillar Tractor Co., Peoria, Ill.

Dorr-Oliver slurry pump

Dorr-Oliver, Inc., announces the availability of a new, two-color, six-page bulletin, "The Oliver Diaphragm Slurry Pump." The bulletin describes the features, applications, sizes and capacities, special designs, installation instructions and power requirements of this slurry pump designed to operate without leakage at pressures up to 100 lb. Also included are photographs, wash and line drawings, and a graph indicating power requirements of the unit. **Dorr-Oliver Inc.**, Barry Place, Stamford, Conn.

Koehring power cranes for scrap yard work

A four-page bulletin summarizes Koehring Co.'s line of power cranes for scrap yard work. A handy reference table lists capacity ratings and makes recommendations for magnet and clamshell bucket sizes to be used with each of five models, ranging in lift capacity from 10 to 95 tons with boom lengths of 70 to 180 ft. Bulletin K476 is available from the **Koehring Co.**, Milwaukee 16, Wis.

Ford trucks for construction

A new booklet showing how to match the right kind of truck to any construction industry hauling job has been published by Ford Division of **Ford Motor Co.** The 20-page booklet shows a wide selection of specially built bodies together with Ford truck models best suited for the full range of operations in all types of construction work. Four special tables are included matching special dump body, rock body, ready-mix dump, and transit mix capacities to Ford's truck models. An over-all table shows general construction industry applications which are met by combinations of 25 conventional Ford truck models on eight different wheelbases, with six horsepower ratings ranging from 212-hp. V8 to 133-hp. six. Copies may be obtained from Ford dealers, or from the truck marketing department, Ford Division, Box 608, Dearborn, Mich.

Sta-Bilt equipment

New literature is now available describing the Sta-Bilt line of road construction and maintenance equipment manufactured by **Seaman-Andwell Corp.**, 13050 West Bluemound Road, Milwaukee 1, Wis. Bulletin TPS-B-34 describes the Seaman method of bituminous stabilization. The 16-page brochure offers complete information for reclaiming worn out bituminous pavement, flat-bed mixing, and soil bituminous stabilization with Seaman self-propelled Travl-L-Plant, and self-propelled Pulvi-Mixer. The brochure includes detailed diagrams, specification tables and job photographs. Literature is also available describing the Seaman-Andwell hydraulic spreaders and Pulvi-Loader.

Sealtight products

New literature has been issued recently describing the Sealtight line, manufactured by **W. R. Meadows, Inc.** Bulletin H56 describes and illustrates typical installations and features of Hydromat asphalt liners for irrigation, soil conservation, industrial and other purposes. An 8-page, illustrated brochure, 10a-Me, presents the Sealtight line of Premoul Membrane, Cocktite perimeter in lation, and catalytic binding asph Copies available from the manuf turer, 2-18 Kimball St., Elgin, Ill.

One-use drill bits

A comprehensive description Le Roi-Cleveland one-use drill b their construction, specifications, the preparation of drill rod sha is given in bulletin No. RD29 p lished by the **Le Roi Division, We inghouse Air Brake Co.**, Milwau 1, Wis. Photographs and drawi are used to illustrate the offset ga thinner wings, and steeper rea angle of the one-use bits. Specifi tions listing the different sizes color codes of available bits for ferent classes and sizes are includ

Unit crane and carrier

Complete information about Unit Model 510 crane and carrie given in a 12-page color broch published by **Unit Crane & Sho Corp.**, Milwaukee 14, Wis. The en unit and its component parts—r chinery, gear case, turntable, cr carrier, safety cab and attachme —are described in detail. Full sp fications and working ranges are included.

Power pipe pushing

A complete and authoritative bo let describing the techniques of po pipe pushing is now available fr **Mercury Hydraulics, Inc.**, manuf turer of the "Speed-Thru" hydra pipe pusher. Methods of installat and operating instructions for und ground installation of rigid and fl ible pipe or conduit, cable pulli oversize pipe and sewer pipe by t method are graphically present Mercury Hydraulics, Inc., 2440 Bl St., Denver 5, Colo.

Hyster lift trucks

Latest trends in lift truck des are shown in a new 12-page broch of industrial lift trucks manufactu by Hyster Co. Well illustrated printed in two colors, the booklet designed for quick reference of different Hyster industrial tr models ranging in capacity from 1, to 30,000 lb. Copies of the broch can be obtained by writing **Hys Co.**, 2902 N. E. Clackamas St., Po land 8, Ore.

IH off-highway trucks

International Harvester Co. now entered the off-highway haul field with two new 24 and 18-t trucks. A six-page, two-color fol is now available describing the 24-t model 95 and the 18-ton model Payhaulers. Close-up photograp and drawings illustrate the units. for Bulletin CR-495-F, Constructi Equipment Division, **Internatio Harvester Co.**, 180 N. Michigan A Chicago 1, Ill.

"SMOOTH AS STEAM" WITH S-5 HAMMER: 12" tubing is being driven to approx. 47′ for pier bearing piles for an approach to Cincinnati's Third Street Distributor. The "powerhouse" of this operation is the Jaeger "600" rotary, at right of the driving rig. The single acting Model S-5 McKiernan-Terry hammer, with a bore of 14" and a 3¼′ stroke, hits 60 blows per minute of 16,250 foot pounds when operated with Jaeger "Air-Plus" pressure.

Sixty 16,250 lb. wallops with 600 cfm of Jaeger air

To put 16,250 pounds of pile driving wallop into a McKiernan-Terry S-5 hammer, 60 times a minute, you need a 40 hp boiler or a Jaeger "600" rotary compressor.

The Jaeger rotary does the job efficiently and a lot more conveniently. It puts out 600 cfm of 100 lb. air with its 6-71 GM Diesel engine operating at only 1650 rpm. (Other "600" rotaries need 1750 to 1800 rpm.) Moreover, control of engine and compressor are so closely regulated to air demands that pressure is held constant even under the extreme fluctuations of pile driving. Engine speed modulation is smooth and stepless over the entire operating range.

You enjoy the same operating advantages on other types of air work and also in smaller Jaeger rotary compressors. It will pay you to get full details or demonstration from your Jaeger distributor—or let us send you Catalog JCR-5.

HOW TO OPEN TRENCH, FAST: Three miles of conduit trench, in a Tacoma, Wash. street, was a fast-moving job with two #25 Thor breakers powered at top efficiency by a Jaeger "125" rotary. Compressor holds 8 hrs. fuel supply and a full set of tools; weighs hundreds of pounds less than old types; is easily rolled along on retractable pneumatic tired dolly wheel.

Sold and Serviced by:

EDWARD R. BACON CO. ..... San Francisco 10
NELSON EQUIPMENT CO. ..... Portland 14
WESTERN MACHINERY CO. ..... Salt Lake City, Denver 4, Spokane 2 and Idaho Falls
SHRIVER MACHINERY CO. ..... Phoenix
D. COGGINS & CO. ..... Albuquerque
JAMES CASHMAN CO. ..... Las Vegas, Nevada
SMITH BOOTH USHER CO. ..... Los Angeles 54
A. H. COX & CO. ..... Seattle 4 and Tacoma
THE SAWTOOTH CO. ..... Boise and Twin Falls, Idaho
TRACTOR & EQUIPMENT CO. ..... Sidney, Miles City, Glasgow
CENTRAL MACHINERY CO. ..... Great Falls and Havre
WORTHAM MACHINERY CO. ..... Cheyenne, Wyo.

Clay conduit systems

The Stillwater Clay Products Co. of Cleveland, Ohio, is offering a new four-page brochure describing its line of vitrified clay conduit systems. The illustrated brochure entitled, "Go Underground with Stillwater Conduit Systems," describes the new Cert-A-Bar Tunnel and Lock-A-Bar Round Systems. Authoritative information on conduit design, installation, engineering, insulation, waterproofing specifications and fittings also is included. Copies available from R. Patrick Turner, Manager, Stillwater Conduit Division, **Stillwater Clay Products Co.**, 3334 Prospect Ave., Cleveland 15, Ohio.

TerraTrac crawler fork lift

A new 12-page booklet offered by **American Tractor Corp.**, Churubusco, Ind., contains helpful suggestions on mechanized handling of construction materials. Reprints of job-story advertisements which have appeared in various trade publications during the past year explain how contractors are using crawler-mounted TerraTrac fork lifts, with quick-change attachments, to cut handling costs and speed up movement of materials in mud, snow and rough terrain, with reported savings up to 10%. Copies available from TerraTrac dealers, or by writing the manufacturer.

Plastic waterstop for construction industry

A four-page brochure describing a new concrete expansion joint waterstop called Durajoint has been published by **Tecon Products, Inc.**, 304 South Alaskan Way, Seattle 4, Wash. Complete physical and chemical specifications of this plastic waterstop are given as well as working details and cross-section dimensions.

Valvoline rust preventives

Valvoline Oil Co. Freedom, Pa., now has available a new 16-page book explaining how to solve problems of rust with Valvoline Tectyl rust preventatives and rust removers. Chapters are devoted to: The Problem of Rust; Cleaning the Product; Materials in Corrosion Preventives; and How to Choose a Rust Preventive. Inserted in a pocket on the back cover are five comparison charts on Valvoline rust preventives giving pertinent information as to choice and method of application of the preventives.

Insulating structural panel

"Asbestos Transitop" is the title of a 36-page book dealing with this insulating structural panel for heavy and light construction. Published by Johns-Manville, the book deals in the first section with the basic physical characteristics of the panel and then describes its application in curtain wall construction over either steel or wood framing, as used for roof decks, and installed as interior walls. Copies of the brochure are available by writing **Johns-Manville**, 22 East 40th St., New York 16, N. Y.

Clark Transverter package

An eight-page, fold-out bulletin describes the new "Transverter" power train package designed by the Transmission Division of **Clark Equipment Co.** for off-highway and stop-and-go service. The three major components—torque converterm disconnect clutch and transmission—are illustrated. There is also a cutaway diagram of the assembled unit. Specifications and dimensions are indicated. Bulletin No. TV-100 is available from Transmission Division, Clark Equipment Co., Jackson, Mich.

Gruendler crushing plants

Literature on the Gruendler line of portable crushing plants is now available from **Gruendler Crusher & Pulverizer Co.**, 2915 No. Market St., St. Louis 6, Mo. Bulletin No. SP-56 describes the Gruendler single-pass portable crushing unit. Heavy-duty secondary crushers are covered in Bulletin BR-35-IB; and the All-Purpose mobile crushing plant is described in Bulletin No. BR-35-3. Information on smaller crushing units is given in an eight-page folder, No. E-10. Illustrations and specifications are provided for all units.

4 Men Install Armco Bridge Replacement in 3½ Days

Finishing up assembly of Armco MULTI-PLATE Pipe-Arch structure to replace old bridge in background.

Truck hoist is used to place individual plates into position.

In Ohio, an old bridge was too narrow and could no longer support the heavy loads of modern traffic. Replacement was necessary. Armco MULTI-PLATE Pipe-Arch, plus an earth fill, got the job.

Four men required only 3½ days to install the 70-foot-long Armco structure—without heavy equipment. A simple truck-mounted hoist was used to lift and position the pre-curved, corrugated metal plates. Bolting completed the job.

More Opportunity for Profit

With less installation labor—by inexperienced crews—it's easy to bid low with Armco MULTI-PLATE Pipe, Arch and Pipe-Arch. And if you want to make sure of your profits on a fixed-bid basis, Armco Construction Department is equipped to handle the job. This service is available only to Armco customers, and is non-competitive with prime contractors.

Armco MULTI-PLATE Pipe is available in a diameter range from 5 to 15 feet, with comparative sizes for Arch and Pipe-Arch structures. Write us for data.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
CALCO AND NORTH PACIFIC DIVISIONS
Berkeley • Los Angeles
Portland • Seattle • Spokane

ARMCO®
Armco MULTI-PLATE Structures

NEW EQUIPMENT

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

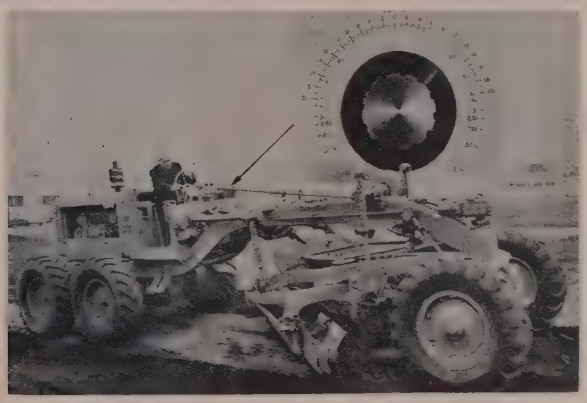
Higher lift for Michigan tractor shovels

Gondolas and high sided trucks can now be loaded directly by Michigan tractor shovels fitted with a new high-lift bucket. Designed by the Construction Machinery Division of Clark Equipment Co. for its Michigan

Model 175A tractor shovel, the new attachment increases dumping height of the bucket by 3 ft., 7 in. It raises the lower edge of the bucket to 12 ft., 1 in. Complete details of the new attachment can be obtained from **Clark Equipment Co.**, Construction Machinery Division, Pipestone Road, Benton Harbor, Mich.

Automatic blade control for Cat graders

A new automatic blade control made exclusively for Caterpillar No. 12 Motor Graders which keeps the grader blade at any desired slope regardless of unevenness of the terrain, has been developed by **Preco Inc.**, Los Angeles, Calif. The Preco automatic blade control, according to its manufacturers, has demonstrated its accuracy in controlling slopes to within ⅛ in. in 10 ft. It is claimed that an operator can finish a given grade in a single pass at higher speed and with extreme accuracy, when condi-



tions enable the blade to carry all the surplus material. The required time for finishing on highway grading jobs has been reduced by at least one-half as compared with the manual control of the grader. The operator merely selects the desired slope on a dial calibrated in both per cent of slope and slope ratio. The operator raises or lowers the blade as required to control the depth of cut, but the slope will remain as selected, regardless of how the grader frame may be affected by surface conditions. Any horizontal blade angle needed for normal grading work can be used by the operator, and slope position will be held to indicate setting by the automatic control. Inside and outside ditch slopes, as well as road surface slopes, can therefore be finished to the ratio desired. The automatic control can be overridden by the operator, or shut off to permit manual operation.

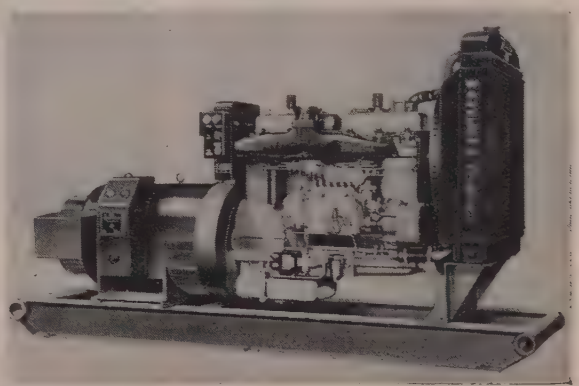
Fibre-glass trailer for rough terrain

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

inside is sufficient room to store surveying equipment, bed rolls, etc. Attached to the top of the trailer is a boat of laminated fibre-glass which forms an integral part of the unit. The trailer sells for about $1,500 and is available through **H. H. Huber**, 2401 E. 14th St., Oakland, Calif.

New Waukesha industrial enginators

A new line of industrial engine-generator sets with capacities of from 50 to 600 kw. has been developed by **Waukesha Motor Co.**, Waukesha, Wis. Illustrated is a typical Waukesha 148-Diesel series Industrial Enginator set. This series is available in capacities from 50 to 120 continuous kw. rating. The Waukesha 148 is available as a normal diesel with standard crankshaft, a normal diesel

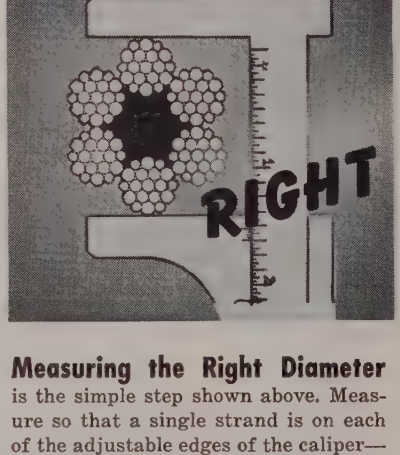


with counterbalanced crankshaft, or a turbo-supercharged diesel with counterbalanced crankshaft. The largest engine-generator set built by Waukesha is powered by the V-12 turbocharged model VLRDBSU rated at over 1,100 hp. for continuous duty.

Tuffy® Tips

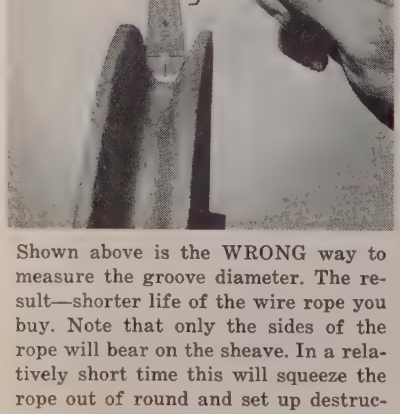
If Present Rope Is Correct Size, Measure with a Caliper

Measuring the Wrong Diameter is a common mistake that some buyers make when they order replacement rope. When the rope arrives, it turns out to be too small—even though a machinist's caliper was used to assure accuracy. It's an easy mistake to make, but it's just as easy to remember the *right* way and be sure you get the right size rope. Otherwise both the safety factor and service life of the rope will be reduced.

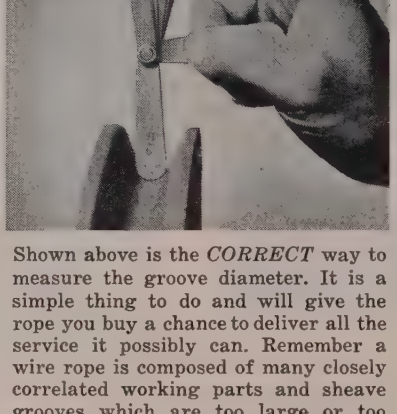


Measuring the Right Diameter is the simple step shown above. Measure so that a single strand is on each of the adjustable edges of the caliper—*not* two strands that measure as a flat side. The actual diameter of a wire rope is the same as that of the circle required to circumscribe it. The diameter of a wire rope is an important factor in determining the safe working load to be handled by your equipment.

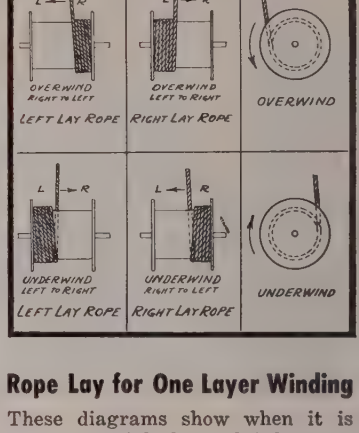
How To Measure Groove Diameter



Shown above is the WRONG way to measure the groove diameter. The result—shorter life of the wire rope you buy. Note that only the sides of the rope will bear on the sheave. In a relatively short time this will squeeze the rope out of round and set up destructive friction and stresses on the rope strands and wires. New rope is oversize and diameter of grooves on sheaves and drums should be slightly larger.

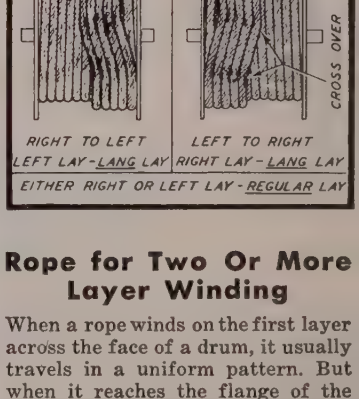


Shown above is the *CORRECT* way to measure the groove diameter. It is a simple thing to do and will give the rope you buy a chance to deliver all the service it possibly can. Remember a wire rope is composed of many closely correlated working parts and sheave grooves which are too large or too small throw them out of alignment. Just like any other working part on a machine, wire rope cannot do its best if it is misfitted.



Rope Lay for One Layer Winding

These diagrams show when it is best to use right lay or left lay rope on one-layer winding. The direction of winding is determined by standing behind the drum, looking toward the direction of the rope travel.



Rope for Two Or More Layer Winding

When a rope winds on the first layer across the face of a drum, it usually travels in a uniform pattern. But when it reaches the flange of the drum, the rope rides on the last strand of the first layer for one turn. Then, it slips into the grooves between each course of rope on the first layer. To move across the drum in this manner, the rope actually winds *back* a turn in each revolution. Then it must jump across *two* grooves in the first layer. This always occurs on the even-numbered layers, and often causes crushing. This abuse is minimized by use of properly designed grooves, spacers and lifters.

In Shoes Or In WIRE ROPE Misfitting Is Hard On The Pocketbook

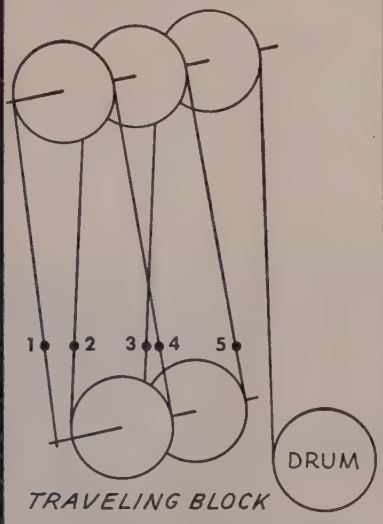
Replace Worn Sheaves

Check for sheaves that have been badly worn. Sheaves that have grooves corrugated by the rope lay impression should be replaced immediately before installing new rope. Since rope creeps to a certain extent on sheaves these grooves can actually cut the strands as the rope runs over. This will greatly reduce service life of *any* wire rope.

Breaking In New Rope

After a wire rope is installed, it is advisable always to run the new wire rope with a light load or with no load for a short period of time. This "breaking in" process gives the component parts of the rope an opportunity to adjust themselves to the conditions under which the rope is to operate. The time spent "breaking in" a wire rope will pay dividends in extra useful rope life.

How To Count The Number of Parts Supporting the Load



Draw an imaginary line across the parts of the rope supporting the load.

The wire rope on many machines is not used in a single or direct pull. It is often reeved through sheaves, which gives a mechanical power advantage.

Send For Free Chart Which Allows Easy Figuring of Actual Stress On Rope For Any Given Piece of Machinery Reeving From One to Eight Parts.

Don't Say "Wire Rope" – say Tuffy

Tuffy Slings & Hoist Line

Machine braided slings that consistently keep costs down, keep safety records clear. A tough, flexible hoist line. A balanced team.

Tuffy Scraper Rope

Special construction assures resistance to drum crushing and the strains caused by angle pulls through swivel-mounted sheaves, rapid line and shock of load on slack line.

Tuffy Dragline

Outer wires offer large area to resist abrasion . . . inner structure made for flexibility. The result is a rope that casts freely, fights off shocks and line pulls.

Tuffy Dozer Rope

Get extra dozer rope service — mount a 150' reel of Tuffy on your dozer, feed through only enough to replace damaged section on the drum. ½" and 9/16".

Your Tuffy Distributor Works to Learn Your Business

When new equipment comes out, he has already checked into it . . . finding out why it does the job better, how it works. Why? Because he's interested in earning your continued patronage. And part of that service is helping you out with fast answers *when* you need them—especially right answers to your wire rope problems. Give him a call.

union Wire Rope corp.

2146 Manchester Avenue Kansas City 26, Missouri

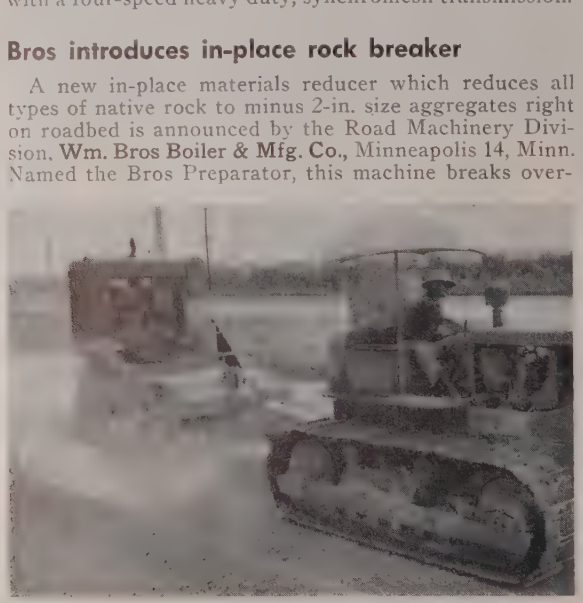
4

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

boosted to 16,500 lb. on the 155-in. wheelbase model and to 17,000 lb. on both the 171-in. and 195-in. wheelbase models. In the new heavier duty line there will be four chassis and cab models. Gross vehicle weights are 18,000-19,000 lb. Standard engine will be the 289-cu. in. V-8 used with a four-speed heavy duty, synchromesh transmission.

Bros introduces in-place rock breaker

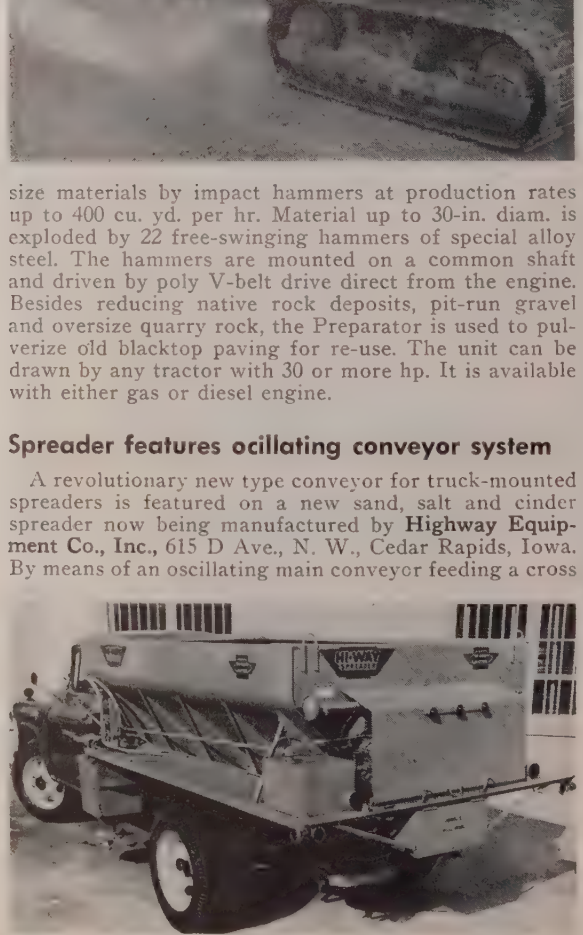
A new in-place materials reducer which reduces all types of native rock to minus 2-in. size aggregates right on roadbed is announced by the Road Machinery Division, **Wm. Bros Boiler & Mfg. Co.**, Minneapolis 14, Minn. Named the Bros Preparator, this machine breaks over-



size materials by impact hammers at production rates up to 400 cu. yd. per hr. Material up to 30-in. diam. is exploded by 22 free-swinging hammers of special alloy steel. The hammers are mounted on a common shaft and driven by poly V-belt drive direct from the engine. Besides reducing native rock deposits, pit-run gravel and oversize quarry rock, the Preparator is used to pulverize old blacktop paving for re-use. The unit can be drawn by any tractor with 30 or more hp. It is available with either gas or diesel engine.

Spreader features ocillating conveyor system

A revolutionary new type conveyor for truck-mounted spreaders is featured on a new sand, salt and cinder spreader now being manufactured by **Highway Equipment Co., Inc.**, 615 D Ave., N. W., Cedar Rapids, Iowa. By means of an oscillating main conveyor feeding a cross



oscillator, material is delivered to the spinner disc. The oscillating conveyor system eliminates chain and rubber belt conveyors completely. The model Y is a completely self-contained unit and can be mounted on a truck chassis with only four bolts. The hydraulic system is driven by an air-cooled gasoline engine mounted at the rear of the unit. Special design enables the model Y to spread from one lane to an entire four-lane highway while traveling in the right lane.

Republic offers steel rock bolts

Capable of sustaining a 40,000-lb. pull-out in har rock, a ¾-in. steel rock bolt with forged anchoring hea and expansion shield is made available for tunnel wor and general construction purposes by **Republic Ste Corp.'s** Bolt & Chain Division, Cleveland, Ohio. The bo provides support by tying rock together. It is intende to provide maximum shoring safety in stratified ar unstratified rock for ribs, walls, and roofs in all typ of tunnels, aqueducts, building foundations, dams ar other permanent construction.

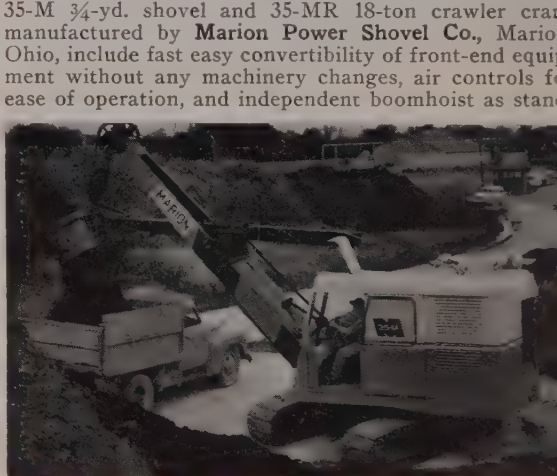
Littleford redesigns small tandem roller

A redesigned 2-3 ton portable tandem roller has ju been announced by **Littleford Bros., Inc.**, 502 E. Pea St., Cincinnati 2, Ohio. Known as model 157, it offe such design improvements as Steelite valves and no positive valve rotators on the Wisconsin engine whic

assure longer and more even wear; a twin disc clute for smoother rolling operation; and a new horizont type steering, in place of manual steering, which offe part-time power steering for easier operation. The r designed model 157 is the smallest of Littleford's line portable tandem rollers which include the new mod 160, 3-5 ton roller; and the model 185, a 4-6 ton rolle

Marion ¾-yd. shovel and crawler crane

Principal design and construction features on the ne 35-M ¾-yd. shovel and 35-MR 18-ton crawler cra manufactured by **Marion Power Shovel Co.**, Mario Ohio, include fast easy convertibility of front-end equi ment without any machinery changes, air controls f ease of operation, and independent boomhoist as stan



ard equipment for power up, power down control of th boom. The self-cleaning, non-clogging crawlers feature drive sprocket design that sheds dirt and close-space shoes to prevent wedging of materials. Anti-friction bea ings are used on high speed rotating parts and hoo rollers.

Royal Cord Air Hose

WEAKLINGS DON'T LAST HERE...

It takes U. S. Royal Cord (the air hose built like a tire) to handle jobs like this—to take the worst kind of punishment *wherever* air lines are used. The cord construction increases resistance to internal pressure, yet produces a hose of extreme flexibility. U. S. Royal Cord has remarkable resistance to blows or bruises caused by blasting, or by heavy tools falling on the hose or by trucks and other vehicles running over it. *Never needs cribbing.* Its smooth, brown cover is the *toughest* ever put on a molded hose. No matter how great the shock, no matter how excessive the pressures on any job, U. S. Royal Cord is the *quality* air hose that pays off—in jobs performed and in long life. It proves that it never pays to buy cheaply-constructed hose.

U. S. Royal Cord Air Hose is obtainable at any of the 28 "U. S." District Sales Offices, at selected "U. S." distributors, or by writing U. S. Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, N. Y.

Mechanical Goods Division

United States Rubber

Cat electric set for D342 diesel engine

A new 100-kw. self-regulated diesel electric set has been added to the expanding line of Caterpillar-built power generating equipment. Known as the Cat D342 Electric Set, the new unit uses a self-regulated generator designed specifically for the Cat D342 diesel engine. It features extremely close voltage regulation and in most cases is capable of filling the needs of applications now served by externally-regulated units. Voltage drop and terminal voltage can be adjusted on the new generator to meet the needs of special installations. After adjustment, the controls are locked and no further adjustments are required. **Caterpillar Tractor Co.**, Peoria, Ill.

Frohring batch-type mixers

A complete, new series of batch-type mixers is announced by **R. L. Frohring Machine Co.**, Newbury, Ohio. The new units range from 3 to 5-cu. ft. capacity in both tractor-mounted and conventional types. Prices begin at $79.50. Featured is the firm's industrial-type tractor-mounted Redi-Mixer which is operated and transported entirely by tractor power as an integral implement, thus eliminating the need for wheelbarrows, manual mixing, carrying, etc. The bowl rotates during the dump, insuring a complete, clean discharge. No wheels or trailer needed; it rides suspended above ground at rear of tractor. The entire unit is raised and lowered for loading and dumping by tractor's hydraulic equipment.

Tubeless tires for Cat machines

Tubeless tires are being offered as standard equipment for many wheel-type earthmoving machines manufactured by **Caterpillar Tractor Co.**, Peoria, Ill. Caterpillar is the first major manufacturer to make this step for such a broad line of machines. The innovation is offered at no increase in price. Cooler running, easier repair and a much slower loss of air in the event of puncture are some of the features of tubeless design. Wide base tubeless tires are offered in standard tread patterns. Unless a tube is incorporated, the tubeless tire cannot be mounted upon the rims designed for tube-type tires.

New dump features on TerraTrac loader

A mechanical "knockout" action which jars wet clay, muck, etc., out of the bucket instantly at all dumping heights from 2 ft. up to full lift height is a new design feature on the TerraTrac crawler tractor-loaders. According to the manufacturer, **American Tractor Corp.**, Churubusco, Ind., this ejection method has been achieved by use of extra-large tilt-cylinders and by revamping the dumping mechanism, so tilt arms strike ends of lift arms as bucket swings into fully dumped position. Other aids in dislodging hard-to-dump materials are increases in the bucket dumping and grading angles of the loader and reversible tilt arms on larger TerraTrac models.

Earth-boring machine on turntable base

A truck-mounted earth-boring machine with hydraulic turntable base and swivel action that permits operation at any angle over a full 180-deg. arc without having to move the truck itself is one of the latest additions to the line of Highway Trailer Co.'s Utility Division. Hydraulic extension action also gives the earth borer an extra 22-in. reach within its operational radius. The unit is capable of digging holes from nine to 36 in. in diameter and up to 10 ft in depth—in any soil and on any level. The swing base earth-borer can be mounted either on a single rear axle or tandem truck. **Highway Trailer Co.**, Edgerton, Wis.

Stumping block for crawler tractors

Rockland Allied Equipment Company announces the production of a new type three-in-one stumping block, designed to reduce working time as much as 30%. Constructed so that it may be used as a digging, splitting, or battering ram tool, this stumping block grips into the stump, preventing unnecessary skidding and wear on your tractor. The Rockland stumping block is manufactured for all-sized crawler-type tractors and may be mounted on any specified land-clearing rake, bulldozer, or angle-dozer blade. The stumping block may be mounted on any portion of rake or blade by means of pins, which may be easily removed when not needed. Further details available from **Rockland Allied Equipment Co.**, 3778 West Colonial Drive, Orlando, Florida.

Ratchet lever hoist has 30-ft. lift

A light weight 1½-ton capacity ratchet lever hoist unit is being offered with a standard lift of 30 ft., which makes it ideally suited for long pulls and lifts, thus eliminating the need for any staging. Manufactured by **Lug-All Co.**, of Haverford, Pa., this new model 3000-30 weighs only 13¾ lb. and includes a highly flexible aircraft cable that permits lifting, pulling or lowering a 1½-ton load a distance of 15 ft. or a ¾-ton load a distance of 30 ft. Outstanding features include a rugged, protective type main frame of high grade aluminum alloys that allows instant inspection and easy cleaning, oiled-for-life bearings, stainless steel springs, three workable hooks, smooth operation in any position and a built-in pulley that can be used as a snatch block in close quarter work. Another new unit with the same basic design, the Lug All Model 2250-38, weighing only 13½ lb., offers a 19-ft. lift or pull with a capacity of 2,250 lb., and a 38-ft reach with a capacity of 1,125 lb.

Shuttle transmission for Case tractors

Now standard equipment on a Case Model 420 and 425 industrial tractors is the new Case four-speed shuttle transmission. To reverse the tractor, the operator no longer needs negotiate the entire gearshift pattern. The gearshift lever only selects the gear ratio for the job. The operator uses only the clutch and forward-reverse lever to change direction of travel in any gear, shortening cycle time on every back-and-forth job like loading and lifting. The reverse speed is 20% faster than the corresponding forward gear for further reduction of time between loads. **J. I. Case Co.**, Racine, Wis.

Timken rock bits

The **Timken Roller Bearing Co.**, of Canton, Ohio, announces a new line of rock bits to be manufactured at Colorado Springs, Colo. The new

"They haul the biggest payloads of any trucks I've ever used"

—says Angelo Cataldo, Cataldo Construction, Revere, Mass., about his 15 new GMC W674 tandem dumps

HAULING 20 TONS OF FILL AT A CLIP, these brand-new GMC W674 tandems are speeding work on the new Revere Beach Parkway overpass in Everett, Mass. And they're handling these extra-size loads without overloading or spillage problems. The trucks Cataldo previously used on this job had had almost continuous trouble on both these counts.

"GMC WAS THE ONE MAKER WHO DESIGNED JUST THE TRUCK I WANTED," says Cataldo. "It carries the maximum weight allowed in Massachusetts. It meets all the State specs. In fact, it's made to order for just the kind of problems we have in the Boston area."

HEAVY TRAFFIC—NARROW BACK ROADS—RUGGED OFF-THE-ROAD CONDITIONS are all included in the 35-mile round trip between pit and dumping point. Each of the Cataldo GMC W674's—powered by a rugged 225-h.p. engine—makes at least 6 round trips a day. Other timesaving GMC haulers are available all the way up to 63,000 GVW-90,000 GCW.

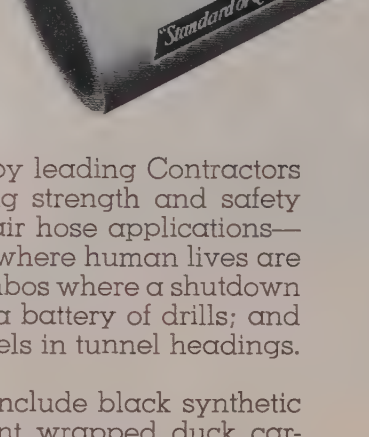
GMC TRUCK & COACH
A General Motors Division

EXTRA SAFETY ...For Your Caissons and Manifolds

"ALLGOOD CORD"

"Standard of Quality"

AIR HOSE



This is the hose favored by leading Contractors because of its outstanding strength and safety for three most important air hose applications—supplying air to caissons where human lives are at stake; feeding air to Jumbos where a shutdown would effect not one but a battery of drills; and as a main air line to shovels in tunnel headings.

"Allgood" specifications include black synthetic tube; special kink-resistant wrapped duck carcass; wear-resistant white rubber cover. Made in sizes 1½" to 4", inclusive, in maximum lengths of 50 feet.

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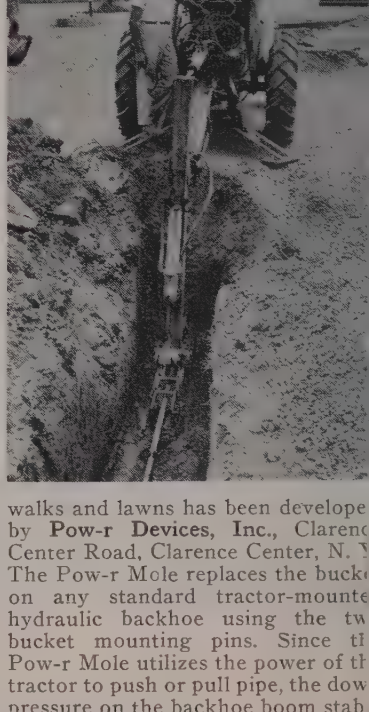
Timken tapered socket carbide inse rock bits can be removed from th drill steel and discarded witho throwing away the drill steel. Fou point cross bits give longer life an greater footages between sharpen ings. The new bits are now availab in sizes 1¼, 1⅜, and 1½ to fit th popular ⅞ hexagon or ⅞ quart octagon tapered drill steels.

One man pipe pusher

A compact new divice for pushin in water and gas lines and pullin copper or lead lines up to 3 in. diameter under roads, streets, sid



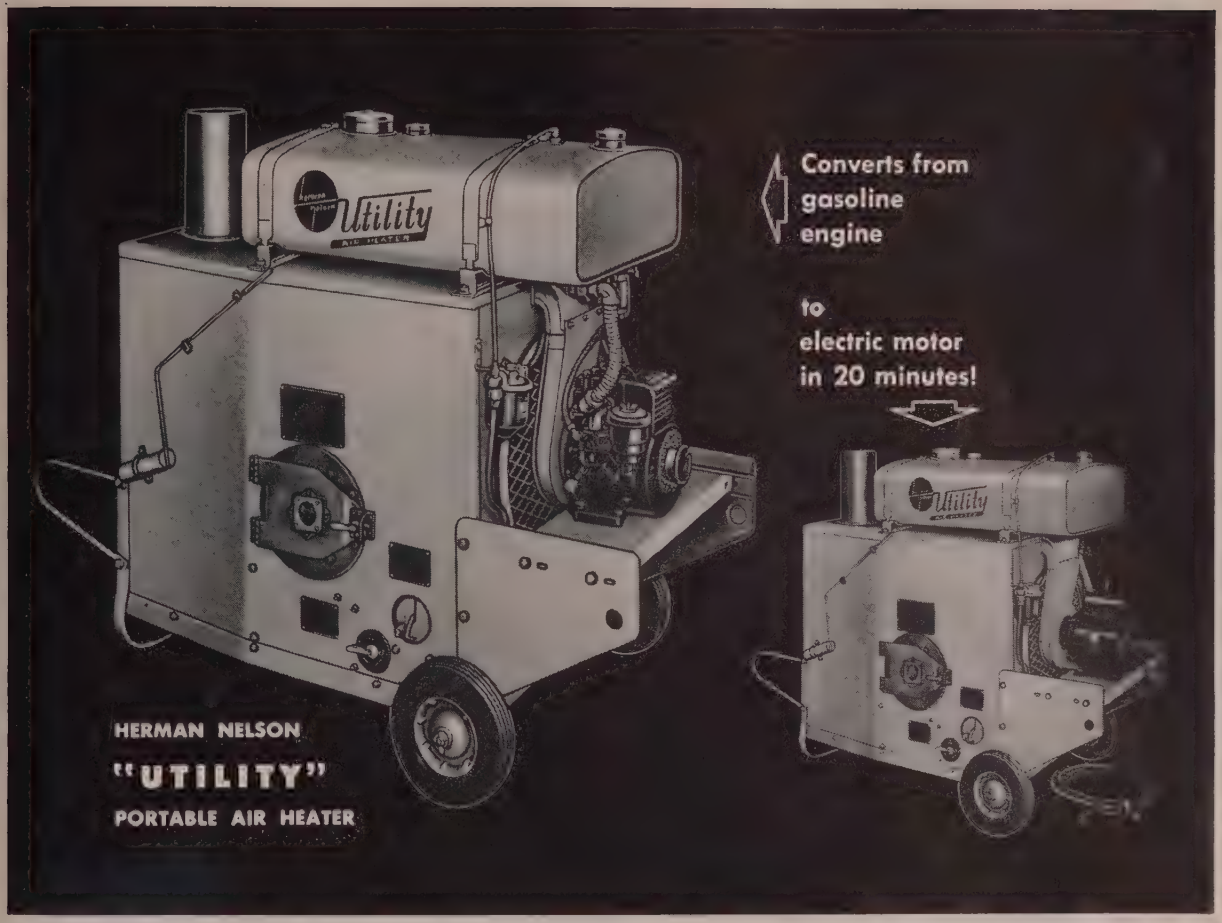
walks and lawns has been develope by **Pow-r Devices, Inc.**, Clarenc Center Road, Clarence Center, N. The Pow-r Mole replaces the buck on any standard tractor-mounte hydraulic backhoe using the tw bucket mounting pins. Since th Pow-r Mole utilizes the power of th tractor to push or pull pipe, the dow pressure on the backhoe boom stab lizes the unit while in operation. N other equipment such as air compre sors, jack hammers, or winches needed.

Tubeless tires for Cat scrapers

New tubeless tires are now stan ard equipment on all Caterpillar N 462 and No. 70 scrapers, according t an announcement by **Caterpilla Tractor Co.**, Peoria, Ill. The ne tires are similar to those which ha been in use for some time on Cate pillar scrapers designed to match th smaller sizes of Caterpillar trac type tractors and all sizes of Cate pillar rubber-tired tractors. Expe rience with the new tubeless tires ha shown that they can reduce dow time caused by tubes more than 80%

Flashing light has mile range

An emergency flashing lante visible for over a mile, has been d



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The "Utility" operates overnight without re-fueling. Also operates with either gasoline or fuel oils, without need of adjustments. You can use it with or without ducts, and with or without venting, depending on job or location. Has automatic overheat cut-off, and safety trip valve that shuts fuel off when the prime mover stops. Has manual heat control, and self-cleaning burner. 75,000 to 425,000 BTU capacity. Stop in now—see the complete Herman Nelson line!

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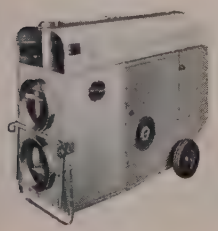

"DE LUXE" MODEL
Oil Fired. Electric motor powered. 280—450,000 BTU capacity. Completely automatic operation.

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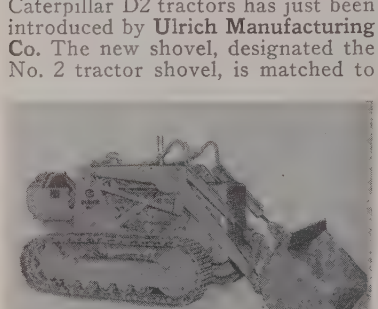
PORTLAND, Oregon	Loggers & Contractors Machinery Co.
SACRAMENTO, California	Edward R. Bacon Company
SALT LAKE CITY, Utah	Arnold Machinery Company
SAN FRANCISCO, California	Edward R. Bacon Company
SEATTLE, Washington	A. H. Cox & Company
SPOKANE, Washington	Western Machinery Company
TACOMA, Washington	A. H. Cox & Company

veloped by **Burgess Battery Co.**, Freeport, Ill. The new Radar-Flash is powered by a unique two-in-one dry battery incorporating two six-volt lantern batteries wired in parallel. The light-head attaches to the unified battery-and-case with two screw caps; no wires or spring contacts are needed to make the electrical circuit. The lantern, complete with battery, retails for $6.40.

Shovel attachment for Cat D2 tractor

A tractor shovel for new long track Caterpillar D2 tractors has just been introduced by **Ulrich Manufacturing Co.** The new shovel, designated the No. 2 tractor shovel, is matched to



the D2 tractor with long, non-oscillating tracks, built specifically for shovel work, and is powered by the Caterpillar No. 44 hydraulic control. The bucket has 35 deg. of tip-back at ground level, dumping height of more than 10 ft., dumping reach of nearly 3 ft., and a discharge angle of 80 deg. The new shovel was designed especially for equipment users who require a small, low-cost, high production unit capable of handling many jobs. Additional information is available at all Caterpillar dealers or by writing Ulrich Manufacturing Co., Roanoke, Ill.

New line of truck tires for heavy-duty equipment

A new line of truck tires with a steel wire shield between tread and carcass, designed especially for transit mixers, dump trucks and heavy service equipment has just been announced by **United States Rubber Co.**, 630 N.W. 10th Ave., Portland, Ore. The steel shield protects the tread from cut and rupture damage, and virtually eliminates groove cracking, according to the manufacturer. An extra-deep tread gives much greater mileage on the new Super Fleetmaster tires. Wide angle grooves minimize stone retention, and the three-rib tread increases stability and improves steering. The tread has numerous biting edges to reduce skids and to provide traction both on and off the highways. The steel shield Super Fleetmaster is available in sizes from 7.50-20 through 11.00-24. Larger sizes, ranging from 12.00-24 through 16.00-25, have a nylon cord body and are primarily for off-the-road use.

IH tractor adapted for trenching

Auburn Machine Works, Inc., has converted the International 300 Utility tractor into a trenching machine. A geared spacer, with all gears running in oil, has been inserted behind the tractor transmission. This spacer

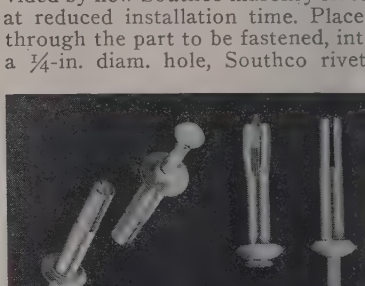
lengthens the wheelbase 6 inches and puts more weight on the front wheels thus providing smoother digging and straighter trenches. Hydraulic drive provides power for propulsion at any digging speed up to 600 ft. per hr., depending on soil conditions. The hydraulic boom lift operates the digging boom in a 190-deg. arc by means of one control lever. The new machine is capable of digging trenches 6 to 14 in. wide and up to 6 ft. deep. Installation can be made at point of sale or at the factory of the Auburn Machine Works, Inc., in Auburn, Neb.

½-ton roller

A new ½-ton roller complete wit 3-hp., 4-cycle, air cooled engine has been introduced by **Clevelan Formgrader Co.**, Avon, Ohio. Th new roller, called Poweroll, is mad with a 3/16-in. steelplate roller drun and rolls a 35-in. wide path. The uni uses a chain drive with forward neutral and reverse transmission. I weighs only 500 lb. when empty an approximately 1,260 lb. water fille

Time-saving rivets

A tight, form fastening is pro vided by new Southco masonry rivet at reduced installation time. Place through the part to be fastened, int a ¼-in. diam. hole, Southco rivet



are secured merely by hitting the pi with a hammer. The pin expands th shank of the rivet, deep in th masonry, to make a firm grip. Onl one piece is handled, there is nothin to lose or fit together. To remove, th pin is drawn out, then rivet, wit claw of hammer. **Southco Division South Chester Corp.**, Lester, Pa.

Davis loader and back-hoe adapted to IH 300 tractor

Adaption of the Davis Loader and the Davis Back-hoe for the new International 300 Utility LP gas model tractor is announced by **Mid-Western Industries, Inc.**, 1009 South West St., Wichita, Kansas. The standard models of the Davis equipment are readily fitted to the new tractor because there is no bracing that fits across the top of the tractor where the LP gas tank is installed. The Davis Loader and Davis Back-hoe utilize a common hydraulic syste and their framework fits together s that they form a protective crad around the tractor. The Davis Mod 102 Loader features a 11-cu. ft. ma terial bucket with multiple attach ments for extreme versatility. Th Davis Model 185 back-hoe has a exclusive right angle digging featu for tractor mounted back-hoes, an will dig 13 ft. deep at any spot on 180-deg. arc.

The 201-E is a highly portable plant. The frame is extra strong to hold rigid alignment of all equipment and drives. A rocker beam with full width axles supports most plant weight. Four wheels, each with dual tires, oscillate separately to compensate for rough terrain.

sh-button Controlled, Diesel Electrically Operated, and rtable AUSTIN-WESTERN 201-E high speed crushing plant

a high output, mobile crusher to furnish large ities of accurately sized specification material at ost? Then check the all new Austin-Western 201-E Diesel electrified, push-button operated, portable, l circuit crushing and screening plant.

ation of all plant components is fully electric. Indi- l electric motors power all operations through short ed V-belt drives. Mechanical loss through clutches, , etc., is eliminated. Constant-top speed operations e maintained at low cost.

ngle, convenient push-button station controls the Standard, interchangeable motors and electrical ols are used on the 201-E to eliminate costly down

ency of the plant is increased by using these electric drives because all components operate at top efficiency at all times . . . regardless of crusher loads, thereby delivering top production of accurately sized aggregates.

These are just a few of the benefits that are yours with the *electrified* 201-E. Get the full story on the many ways this highly portable plant can boost your output of accurately sized specification material while cutting operating costs. See your nearby Austin-Western distributor . . . or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio, for illustrated booklet.

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New coagulation basins to increase capacity of Louisville Water Company facilities in final stages of construction.

How Pre-Fab Forms Saved Time, Material on Water Plant Job

When the Henry G. Bickel Company and the Charles A. Connel Company were awarded the contract for the Louisville Water Company coagulation basins at Louisville, Kentucky, they selected the Uni-Form Panel System to form the 200,000 sq. ft. of contact area the job required.

As the job started, it soon became apparent that the Uni-Form Panels, which require minimum alignment and bracing on 1 side only, were going to produce very satisfactory savings in time, labor and material. Form erection went fast because Uni-Form Panels are assembled and locked into a tight rigid form with Uni-Form Ties which were supplied in exact lengths to provide automatically accurate thickness of both battered and straight walls.

One side of the form was erected, permitting easy, unhampered placement of reinforcing. Since specifications did not permit use of chutes or tremies, pouring pockets were provided as the forms were closed.

Fast erection and stripping features of the Uni-Form Panel System enabled the contractor to form the entire 200,000 sq. ft. of contact area with only 14,000 sq. ft. of Uni-Form Panels. Panels were used an average of 14 times without the necessity of maintenance or repair.

Uni-Form Panels are versatile, high speed forming tools. They're used by successful contractors everywhere to form every conceivable type of construction. They are rented or sold through Universal Distributors and Branches located from coast to coast. Call or write your nearby Universal Distributor or Branch for complete details on Uni-Forming—the modern way to form concrete.

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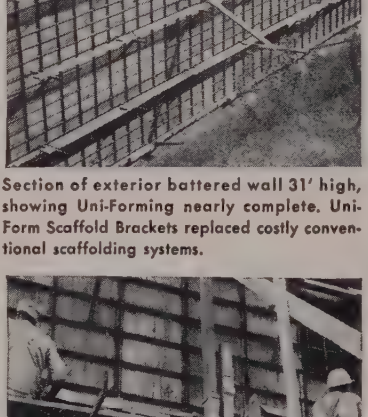

Section of exterior battered wall 31' high, showing Uni-Forming nearly complete. Uni-Form Scaffold Brackets replaced costly conventional scaffolding systems.

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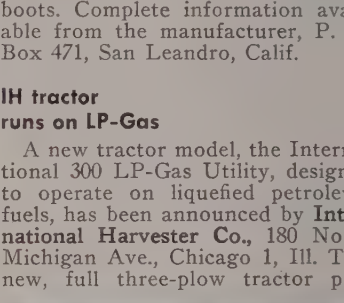
2221 N. Albine Ave., Portland 12, Oregon.

Heavy-duty ripper for large tractors

A new single-tooth, heavy-du ripper, capable of being used on t largest types of tractors built, is n available from **Columbia Industr Services, Inc.** The new ripper, des nated Model 2000-C, is adjusta and interchangeable on D-8, D HD-19, HD-20, TD-24 and oth tractors of similar size and hor power with blades of 29 to 61 in. height. Recommended for the roug est construction jobs, the Mo 2000-C ripper features a wear col of special design for greater prot tion to the leading edge of the sha It is also equipped with self-sha ening, reversible, replaceable w boots. Complete information ava able from the manufacturer, P. Box 471, San Leandro, Calif.

IH tractor runs on LP-Gas

A new tractor model, the Inter tional 300 LP-Gas Utility, desig to operate on liquefied petrole fuels, has been announced by **Int national Harvester Co.,** 180 No Michigan Ave., Chicago 1, Ill. T new, full three-plow tractor p



vides approximately the same hor power as the gasoline-powe International 300 Utility and ha 23.3 water-gal. capacity fuel ta mounted in the tractor hood. F tures of the new model include 12-volt electrical system, micron type fuel filter, and a complet sealed fuel system with a special ta and controls.

Generating plants are gasoline powered

A new line of gasoline engi driven generating sets of 35,000-w capacity has been announced by **U versal Motor Co.,** Oshkosh, W Designated the 720 series, th plants are powered with 6-cylinc 4-cycle, water-cooled engines of 3 cu. in. size which develop 72 hp. 1,800 rpm. The generators are fo pole, revolving field type alterna with direct connected exciter. Be ings are of the double shielded bearing type with sealed-in lubric for minimum maintenance. Stand 720 series plants are 60 cycle, eit 240-volt 3-phase, 3 wire, or 120/2 volt 3 phase, 4 wire and are also av able in 50 cycle frequency mod

own Easters" extend the nation's t major Asphalt-paved Turnpike

ember Maine opened this sweeping ssway.
nds the original 45-mile Maine Turn-iles . . . Portland to Augusta.
tion's first major Asphalt-paved Turn-as an enviable record for safety—for evenue. Asphalt construction saved 00,000 in first costs — maintenance e been low—income is years ahead of ement needs. What better endorsement lt construction for the new Extension?

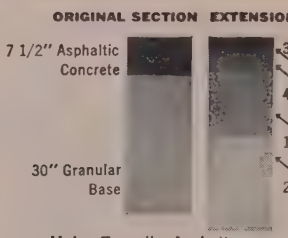
s lay groundwork for ter record on Extension

engineers, looking for even better nce, made three moves in designing and-Augusta Extension.

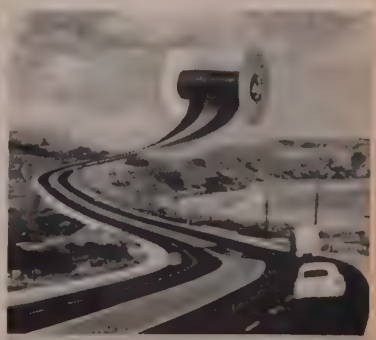
1. ***They depressed the median strip.*** This measure reduces material needs, improves drainage, simplifies snow removal.
2. ***They reduced wearing course thickness*** and at the same time "beefed" up base structure by penetrating it with Asphalt. This move both cuts cost and aids flexibility and strength. (See chart for details.)
3. ***They paved inner and outer shoulders.*** As the WASHO TEST shows, this adds greatly to pavement life and cuts maintenance costs. It also improves safety.

Low construction cost has already justified these measures. Maintenance costs and safety figures are expected to follow suit.

For low road costs and high road performance follow Maine's lead. Adapt modern Asphalt construction to *your* roads.



Maine Turnpike Asphalt pavement designs.



Ribbons of velvet smoothness . . .
MODERN **ASPHALT** HIGHWAYS

THE ASPHALT INSTITUTE, *Asphalt Institute Building, College Park, Maryland*

Internal vibration for slab paving

A new full-slab paving vibrator attachment is being produced by **Maginess Power Tool Co.**, 154 Distl Ave., Mansfield, Ohio. The new attachment, called Hi-Lectric, is reputed to provide uniform internal vibration throughout the slab because its vibrators operate completely submerged below the concrete thus providing a homogeneous mixture of mortar and aggregate from base to surface. The Hi-Lectric consisting of motor-in-head vibrators spring-mounted on 28 to 30-in centers on a sectional tubular steel frame, mounts directly on any spreader or finisher. The attachment is suitable for use on any width pavement slab up to 25 ft. and from 4 to 19 in. deep.

Portable blast cleaner

Now available from the manufacturer, **Safetee Products Co.**, is the Cyclone blast cleaner designed to clean steel, concrete and any other material of rust, mill scale, old cement, paint corrosion. This portable rig is recommended for use in blasting off traffic lines and parking stripes, in cleaning water meters, valves, pipe, flanges and pumps, and in the removal of rust and corrosion caused by hydrogen sulfide and other corrosive chemicals in a sewage treatment plant. For full details, contact the manufacturer, 173 14th St., San Francisco 3, Calif.

Socketless fittings for truck air brake hose

A new truck air brake hose, No. 2550, with detachable, re-usable socketless fittings has been developed by **Aeroquip Corp.** of Jackson, Mich. Designed to meet SAE and ICC specifications, the hose is used for tractor-trailer, axle brake chamber, and tractor service line connections. The

socketless fittings are designed for any standard connection, and are available with male pipe or swivel. Gladhand connections are also available. The one piece fitting may be assembled merely by pushing the hose on the fitting; there is no need for a clamp, bolt, lug or socket. To reuse the fitting, the hose is slit at the fitting and pulled off.

New Worthingtoon paver

Worthington Corp. of Harrison, N. J., announces the availability of a new Dual Drum road paver incorporating seventeen major design modifications and operational features. The 34E Dual Drum is reported to be the fastest operating unit on the market with its engine speed now increased from 1,400 rpm to nearly 1,800 rpm., supplying added power for pulling out of heavy subgrades. New hydraulically operated steering brakes replace the foot operated mechanical brake. Other features of the paver include a new four-strand chain drive to replace the old triple-strand drive, thus increasing the drive from the speed reduction unit to the countershaft and a 700-gal. auxiliary water tank that has been redesigned to eliminate buckling due to water surge and the possibility of welds cracking.

Canton clips for wire rope

Canton Manufacturing Co., manufacturer of holding and binding products, have added wire rope clips to their line. A complete range of sizes are available for wire rope diameters from ⅛ in. up to 1½ in., 16 sizes in all. The Canton wire rope clips are plain self-colored finish, cadmium plated or hot dip galvanized. The U-bolt portion is heavy steel with malleable saddle shaped to fit wire rope strands giving maximum grip. For additional information write **Canton Manufacturing Co.**, 2408 13th St., N. E. Canton 5, Ohio.

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Fresno, Cal. Branch
2550 Church Street
Phone: 4-6551

Los Angeles, Cal. Branch
1444 So. Alameda Street
Phone: Richmond 7-6181

Oakland, Cal. Branch
850 Ninety-second Avenue
Phone: Lockhaven 9-3333

Phoenix, Ariz. Branch
902 South 7th Street
Phone: Alpine 8-6961

Portland, Ore. Branch
700 S.E. McLoughlin Boulevard
Phone: Olive 4-5461

W. Sacramento, Cal. Branch
3600 West Capitol Avenue
Phone: Gilbert 3-3906

Salt Lake City, Ut. Branch
1082 South 2nd Street West
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2411 Sixth Avenue South
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Send full information on Fruehauf Construction Trailers!

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Portable drilling system

A compact, portable rotary drilling system weighing only 125 lb. which removes all cuttings from the hole by vacuum has been developed by **Houston Tool Co.**, Santa Susana, Calif. Known as the Mighty Midget,

the gasoline powered rig is quick to set up and the rotary table can be swiveled to drill at any angle, vertical or horizontal. The vacuum system requires no water. High velocity air cools the bit and lifts the cuttings internally through the drill stem. The Mighty Midget drills a 1¾-in. hole up to 100 ft. deep in dry formation and utilizes a 9-hp. McCulloch engine. Literature available.

Steering wheel puller

The problem of pulling steering wheels has been made easy with a new puller announced by the **Owatonna Tool Co.**, 389 Cedar St., Owatona, Minn. The OTC steering wheel puller has adjustable legs to permit use on practically every type of steering wheel regardless of the number of spokes and can be used as a two or three jaw puller. A steel ring against which the pull is made is split to slide past the steering column easily. Quickly set in place, a few turns on the forcing screw eases the wheel off without damage. The OTC steering wheel puller can be used on most makes of cars, trucks and tractors.

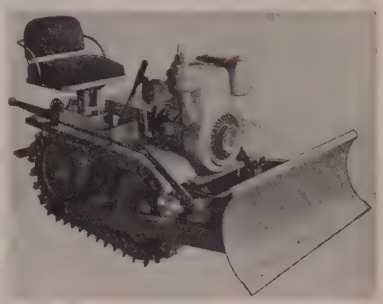
New Kwik-Mix concrete mixer

Latest addition to the Kwik-Mix line of quality concrete mixers is a

popular priced Model 3½-S tilt-type unit according to a recent announcement made by **Kwik-Mix Co.**, Port Washington, Wis. Called the "Dandie Junior," the new mixer has a capacity rating of 3½ cu. ft. of mixed materials plus 10% overload. Frame, mixing drum and yoke are fabricated of box-section steel, all welded for maximum strength and minimum weight. Powered by a standard-make 2.2-hp. air-cooled gasoline engine, or optional electric motor, with single V-belt power transmission, the Dandie Junior has 40-in. charging height and 17-in. drum opening for fast, easy loading.

Light-duty riding crawler

The Laytrac G-2, a small riding crawler tractor designed for use on jobs where heavier equipment would be unwieldy and uneconomical, is 5 ft. 8 in long, weighs 925 lb. includ-



ing drawbar and blade, and is powered by a 9-hp. Clinton air-cooled engine. The V-belt clutch is pedal-controlled. The transmission is a Borg-Warner T-92, providing three speeds forward, one reverse. The machine turns in its own length. A single lever controls the friction cone steering clutches and the hand brakes, which have individual bands on final drive sprockets. Full information can be obtained from **Laytrac,** 2548 Airport Way, Seattle 4, Wash.

Instant scaffolding device

A handy scaffold accessory is the recently improved "Double-Grip" Stud Scaffold Jack now being marketed by Superior Scaffold Co. The Stud Jack can be quickly hung, without nails, on any exposed stud to provide instant scaffolding at a fraction of the usual cost. Also important is the safeguard that this Stud Jack complies with state safety codes which require hanging scaffolds to be anchored around, or through the stud. These Stud Scaffold Jacks may be ordered from local building material dealers or **Superior Scaffold Co.,** 5624 Bankfield Ave., Culver City, Calif.

Lightweight trucks by Autocar

New lightweight models for additional payload advantages have been announced by Autocar Division of **The White Motor Co.** These new models have been made available for a variety of heavy-duty applications with either axle-forward or axle-

Everything

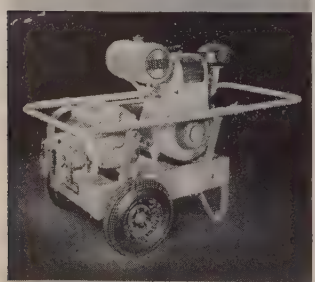
FOR MORE PROFITABLE PAVING

JACKSON PAVING TUBE (INTERNAL TYPE)

Jackson Multiple Vibratory Compactor

JACKSON SIDE FORM VIBRATOR

JACKSON VIBRATORY SCREED



JACKSON POWER PLANT

MACADAM BASE COURSES, SUB-BASES, SOIL-CEMENT PAVING, FILLS

The JACKSON MULTIPLE COMPACTOR has now thoroughly demonstrated that it is by far the most advantageous equipment for achieving or exceeding specified densities in rock, slag, sand, gravel . . . all granular soils used in waterbound and penetration macadam construction, and in filling the voids in rock and slag courses with fines. The Jackson does it in about half the time required with other types of equipment. It is equally efficient for consolidating large granular soil fills such as bridge approaches and kindred projects.

JACKSON INTERNAL TYPE PAVING TUBE

Supplied with extraordinarily powerful motors, no concrete highway or airport paving job is too tough for this improved machine. Tubes vibrate deep in concrete, quickly plasticizing harsh dry mixes in slabs to 24" thick and as wide as 25'. It saves time, saves cement; provides greater density and compressive strength. Cuts spreading costs where no spreader is used. The tube is made up of one unit as shown for each 5'-0" (maximum) of slab width. Usually attached to front of finisher and controlled by finisher operator. Power is supplied by a Jackson Power Plant mounted on the parent equipment.
Use of a JACKSON Side Form Vibrator on standard finisher assures thorough consolidation and plasticity of concrete at side and center forms — with no "missed" spots. Labor savings effected quickly repay cost of equipment.

MUNICIPAL PAVING — BRIDGE DECKS, ETC.

For jobs of this type a JACKSON Vibratory Screed and Portable Power Plant is the most convenient, productive and inexpensive outfit you'll find anywhere. Strikes off to any crown, undercuts at curb and sideform, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 feet wide, and it may be rolled back for second passes on 4 rollers.

PORTABLE POWER: Thoroughly reliable, time-proved plants in capacities of 1.5 to 7.5 KVA . . . equipped with permanent magnet generators requiring no maintenance or adjustment. They provide both single and 3-phase 120V., 60 Cy., AC and may be used for lights as well as operating all JACKSON equipment.

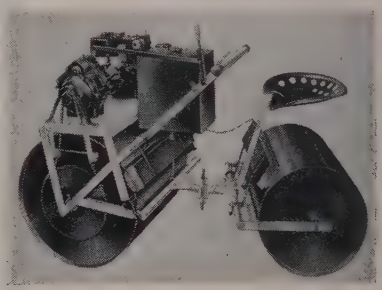
FOR SALE OR RENT AT YOUR JACKSON DISTRIBUTOR

JACKSON VIBRATORS, INC.
LUDINGTON MICHIGAN

back models. The lightweight models —DC-102TL and DC-10264L tandem axle—haye all-aluminum driver's cab which features a strong but lightweight aluminum skin over a girder-type frame of aluminum alloy. Formed channels are heli-arc welded. The aluminum skin is riveted to the frame, using an aircraft production technique. This permits flexibility and stress absorption without danger of cracks and accomplishes a weight saving of 20% in the cab structure. Aluminum is employed in various parts of the engine, in the chassis crossmembers, transmission case and cover, fuel tank, front and rear axle hubs, hood and front bumper.

Tandem power roller by Midland

A new series of power rollers called Moto-Roll, are being produced by **Midland Products Co.**, Midland Park, N. J. Included in the line is a ½-ton tandem model designed to



provide economy, speed and efficiency on smaller asphalt paving jobs and all phases of landscape rolling operations. Because of its size and maneuverability, hand tamping of confined areas is all but eliminated by this machine. The roller can follow right behind the rakers. There is no waiting period required for the asphalt to set. The compaction provided is adequate to compress the asphalt without squeezing towards the edges. The forward-reverse transmission provides an equal speed ratio in both directions.

Diesel fuel additive cuts engine wear

A new diesel fuel additive, designed specifically to increase the operating efficiency of diesel engines is currently being marketed by **Harflo Products,** 2609 Jenkintown Road, Ardsley, Pa. Fuel-Aid is a combination of carefully selected high-grade compounds that are completely combustible with diesel fuel. It is non-explosive, non-poisonous, non-corrosive. contains no sulphur and will not affect the cetane rating or efficiency of diesel fuel. When used as directed, Fuel-Aid will eliminate clogging of injectors by carbon, gum and wax, and aid in proper complete combustion. Fuel-Aid can be added directly to the fuel tank or mixed with the diesel fuel. Two quarts are added to the first 50 gal. of fuel. Thereafter, only one quart need be

Here's how the WHITE 9000 pays off—

United Ready Mixed Concrete Co., Inc., of Southgate, Calif., steps up payload capacity to 26 tons with their new White 9000TD, powered by a JT-6B Cummins Diesel Engine and equipped as a 3-axle dump truck and transfer trailer combination.

You asked for it and White built it, just the way you wanted. Every inch . . . every pound is engineered for economy and maximum payload in the White 9000. Strong, lightweight materials, ideal weight distribution, high-mileage power, low maintenance costs—add them all up and you get substantial payload profits, lower cost per mile and longer equipment life.

From the first time you put the new White 9000 on the job, you'll agree—White has another winner, and *so do you!* See your White Representative today!

26 TON PAYLOADS with DIESEL POWER Efficiency!

White

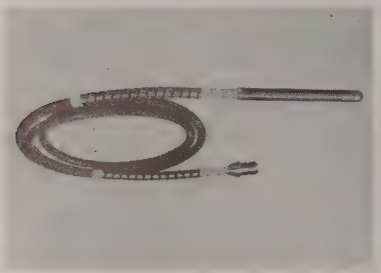
THE WHITE MOTOR COMPANY
CLEVELAND 1, OHIO
Factory Branches, Distributors and Dealers Everywhere

FOR MORE THAN 55 YEARS THE GREATEST NAME IN TRUCKS

added to each 125 gal. of fuel. Fuel-Aid is available in quarts, gallons, five and fifty-five gallon drums.

High-speed concrete vibrator

A new concrete vibrator with a 1⅜-in. head diameter has been announced by **Vibro Plus Products, Inc.**, of Stanhope, N. J. The new head operates on the exclusive, patented "Rollgear" principle which converts



motor speeds of 3,600 rpm. into vibrator speeds of 12,000 vibrations per min. This high vibration speed at relatively low motor speeds gives high efficiency at low operating and maintenance costs. It is simple in design with a direct connection between power source and vibrator shaft. No V-belts or clutches are needed. The entire line of Vibro Plus concrete vibrators features complete interchangeability of power units. Electric, gasoline or pneumatic power may be used. Vibrator heads run dry, with no lubrication needed and all vibrator shafts are prelubricated for six months use without attention. All Vibro Plus shafts and heads are fully guaranteed for six months, including free maintenance.

Straight bulldozer blade for Cat Traxcavator

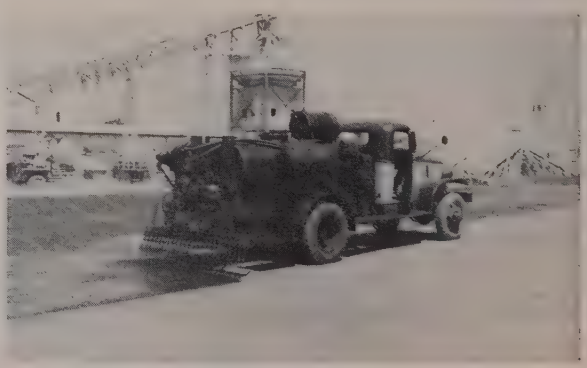
A new 104-in.-wide bulldozer blade attachment for the No. 977 Traxcavator has been announced by **Caterpillar Tractor Co.**, Peoria, Ill. Owners can now select the most suitable of two different dozer arrangements for the increasingly versatile No. 977: the new straight bulldozer blade attachment and the previously introduced No. 977A angling blade bulldozer. The straight blade is useful for leveling, clean up, and backfilling operations usually accomplished with the Traxcavator bucket. Its greater width makes it more efficient than the bucket for these jobs. This new bulldozer attachment fastens to the lift arms with a bracket arrangement at the same point where the bucket connects. The blade is easily adjusted by operating the standard hydraulic bucket controls.

New sump pump by Le Roi

A new, air-operated sump pump has been placed on the construction market by the **Le Roi Division,** Westinghouse Air Brake Co., Milwaukee 1, Wis. The pump is rated at 340 gal. per min. against a 10-ft. head. It is available in either steel or bronze. Features of the new pump, which operates with a maximum head of 95 ft., include light weight construction, low air consumption, a governor-controlled

motor, and a built-in lubrication system. The pump has a base diameter of 8 in. and is 23 in. high. Net weight of the steel model is 56 lb.; the bronze model weighs 75 lb.

Distributor and "Pulvimixer" apply and mix Bitumuls to restabilize old pavement that has been scarified and bladed.



Distributor applies Bitumuls (diluted 2 parts SS-1 to 1 part water) as a prime on a waterbound base.

Salinas, California uses a single grade of Bitumuls® to solve five paving maintenance problems.

Salinas, California, has a problem: annexation of outlying residential developments has vastly expanded and complicated the street maintenance job without materially increasing available funds.

Civic officials, looking for ways to simplify and standardize maintenance operations, found one answer in Bitumuls SS-1. It's an asphalt emulsion that can be handled and used without heating, in small quantities or large. They store Bitumuls in one large 25,000 gallon tank; use it for patching, tack coats, prime, seal coats and surface treatments, and for stabilizing the miles of sub-standard pavements that annexations have "contributed" to their street system.

Salinas likes the obvious economies of using Bitumuls for all these jobs. If yours is a growing community, you'll want details. There's a Bitumuls Engineer near you who will supply them. Call him, today, or write: **American Bitumuls & Asphalt Company, 200 Bush Street, San Francisco 20, California.**

Bob Ridell, Sales Engineer for American Bitumuls & Asphalt Co. (left) discusses plans with Thomas A. Dunne (second left), Director of Public Service, and his assistants.

NEW CONVEYCO HIGH SPEED-BIG CAPACITY
BATCH PLANT SYSTEM

Features Easy Highway Portability
*PLUS LOW SET-UP COST

SERVICE ROCK CO.
P. O. Box 309 RIVERSIDE, CALIFORNIA
COLTON RIVERSIDE FONTANA

September 21, 1956

The Conveyor Company
3260 East Slauson Avenue
Los Angeles 58, California

Attention: Mr. W. E. Saxe, President

Dear Walter:

It is a pleasure to let you know that our new CONVEYCO Portable Batch Plant has been set up and is operating very satisfactorily.

In response to your inquiry, we estimate our site set-up cost on this plant will not normally exceed $700.00, and the take-down, including loading, should not exceed $200.00.

We have successfully, and without variation, batched a 1-1/3 yard batch every twenty (20) seconds on using three (3) sizes of aggregate.

Yours very truly,

SERVICE ROCK COMPANY

P. M. Hayden
Vice President

PMH:gjb

Keep Your Plant Close to the Job . . .
For Paver Dry Batching, or Truck Mixers

A big capacity plant design to move on highways on its own wheels. Users report exceptionally Low Costs for set-up on job site and take-down for moving. Truck, dry batch, or mixer truck hauls are kept to a minimum.

Self-contained Patented 500 Bbl. Cement Silo — Fully portable traveling as a semi-trailer. A weather-proof bulk cement storage unit.

Batch Bin, Gates, Fully Enclosed Operator Platform and Air System — Travel on own wheels as semi-trailer . . . meeting highway clearance requirements. Loads by radial belt conveyor or front end loader.

Portable Truck Dump Hopper — Permits unloading from rear end or bottom dump trucks.

Self-Propelled Radial Conveyor — Loads batch bins as well as stockpiles materials. Travels as a semi-trailer.

Automatic Operation — Manual or any combination of Conveyco automatic weighing and recording systems available as specifications require.

Learn How This Plant Can Increase Your Profits

CONVEYCO

THE CONVEYOR COMPANY
Engineers and Manufacturers
3260 E. Slauson Avenue • Los Angeles 58, California

The Conveyor Co.
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Los Angeles 58, Calif.

CONVEYCO

I would like to know more about Conveyco's profit-making Portable Batch Plant. WC-11

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When steel frames can be simplified . . .

Have more useable space . . . better appearance . . .

Yet erected for less cost . .

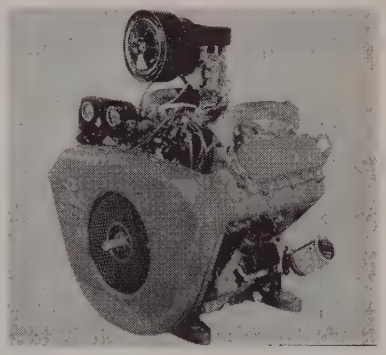
WHY shouldn't you design for welding

Ask
THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio

Pioneer in welded structural design . . . for lower cost

Lycoming announces new engine

A new valve-in-head, compact four-cylinder V-type engine designed for all general applications in the construction field is being produced by Lycoming Division, **Avco Manufacturing Corp.**, 550 S. Main St., Stratford, Conn. Designated model CV4-180, the engine delivers



70 hp. at 3,000 rpm. The new four-cylinder engine features interchangeability of major component parts with its counterpart, the C2-90 model 30-hp. engine, such as the aluminum cylinder head of valve-in-head design, cylinder barrels, pistons, forged connecting rods, bearings, valves, etc. A full pressure lubricating system is employed. A four throw, three main bearing dynamically counter-balanced crankshaft and twin three bearing camshafts are included in the engine design. All engine accessories are flange mounted and gear driven from the timing gear train housing.

Bantam goose-neck crane for low clearance jobs

A new 15-ft. goose-neck crane attachment, featuring low clearance for in-plant and yard materials handling, has been announced by the **Schield Bantam Co.**, Waverly, Iowa. The new attachment features a minimum working clearance height of 10 ft. 5 in. when mounted on the Self-Propelled Model CR-35 Bantam, for which it was designed. Working radius at this clearance height is 17 ft. 6 in., and travel-with-load crane capacity is listed as 4,675 lb. In addition to the self-propelled model CR-35, the new attachment may also be used with any of the other Bantam models, including the crane-carrier mounted Model T-25 and the crawler-mounted Model C-25. A maximum lifting capacity of 6 tons is listed for the boom.

New plastic waterstop

Now on the market is a plastic waterstop made of Polyvinylchloride for use in the construction of dams, reservoirs, bridges and below grade formations. This material, called Durajoint, has been designed with a hollow center bulb and ribbed projections on either side, thus ensuring a complete seal. Polyvinylchloride fuses together with additional heat so that the material can be spliced to any specified length. The removal of forms cannot damage PVC as it is resilient and durable. Literature and free samples available from the manufacturer. **Tecon Products, Inc.**, 304 South Alaskan Way, Seattle 4, Wash.

Quick starting for engines

Start Pilot, a permanently installed device which provides quick starting for all gasoline and diesel engines, is now being distributed throughout the United States by the **Wilco Co.** and **Start Pilot Corp.** Start Pilot injects a small quantity of ignition-promoting fluid as a fine spray, mixed with air, into the engine intake manifold, supplying quick starts, at temperatures as low as minus 60 deg. F. The kit consists of the main unit containing the capsule chamber and the hand-operated double action air pump; a spray nozzle which is screwed into the engine intake manifold, and copper tubing which connects the pump unit to the spray nozzle. Additional information available from **Wilco Co.**, 4425 Bandini Blvd., Los Angeles 23, Calif.

Electronic device spots ignition faults

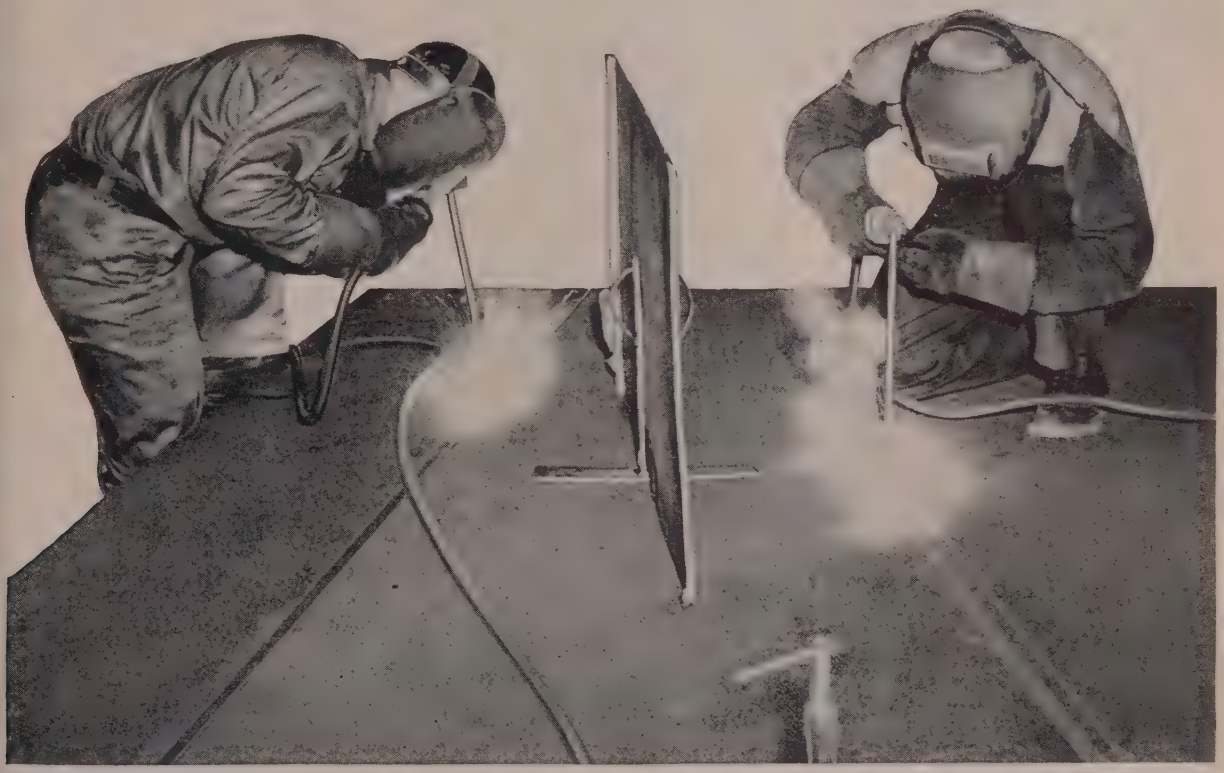
An instrument which detects ignition faults electronically is being manufactured by **Allen B. DuMont Laboratories, Inc.**, 750 Bloomfield Ave., Clifton, N. J. The EnginScope

is connected to an ignition system by two simple signal clips. Throughout the testing procedure the leads are never moved from their original connection points. Ignition troubles show up on the instrument's TV-like screen in the form of patterns of light. By observing these patterns the mechanic can tell in a few seconds the location and nature of many engine faults. It can detect a wide variety of engine ailments including fouled, misfiring, open or shorted spark plugs; defective coils, condensers, wiring and switches; worn distributor cam and shaft bearings and burned distributor points.

New Ruhr grapple

Ruhr Industries, 1411 Walnut St., Philadelphia 2, Pa. announce the new Ruhr Model M-1 Grapple. The M-1 has five, six or eight tines, de-

AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . . AN AIR REDUCTION PRODUCT



Fabricating ½-inch wrought iron pier plates with "Easyarc 12" electrodes. Powdered metal electrode coating actually becomes part of the weld deposit.

Easyarc 12 can cut welding costs in half

Airco's "Easyarc 12" contact electrode cuts welding time and costs two ways. (1) The electrode deposits more metal per kilowatt of arc energy than *any other welding process.* This is because the powdered metal coating actually becomes a part of the weld. (2) The "Easyarc 12" electrode can carry a higher current than conventional electrodes, without danger of breakdown. Users have reported cutting their production costs in half by using time-saving "Easyarc 12" electrodes. And you get all these other advantages:

Restrike — No need to trim electrode to restrike. A light touch will restore the arc.

Slag removal — Many users have found the fast cooling of Easyarc welds causes slag to curl up of its own accord. A slight rap knocks it off.

Appearance — "Easyarc 12" leaves a clean, smooth bead contributing to the over-all appearance of the finished product.

To help you select the *right* electrode for your welding job — whatever it may be — write for Airco Electrode Pocket Guide. It's free! Address your nearest Airco office. Ask for Catalog #1318. All Airco Electrodes are available through your Authorized Airco Dealer.

AIRCO

AIR REDUCTION PACIFIC COMPANY

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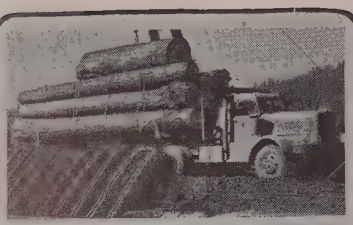
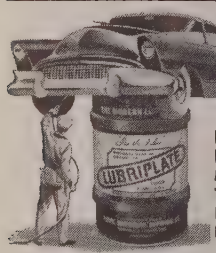


"THIS LUBRICANT DOUBLES THE LIFE OF GEARS"

—says TRINITY ALPS LUMBER CO.
Hayfork, California

"Our trucks have a forty mile county road logging haul over adverse grades, each truck making two complete round trips each working day. Our shop foreman in charge of maintenance, reports that with the use of LUBRIPLATE Lubricants there has been a minimum of truck down time and replacements of bearings and gears. The double reduction gears with LUBRIPLATE APG-140 has shown a saving of fifty per cent over previous operations."

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE



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LUBRIPLATE H. D. S. MOTOR OIL . . . *needs no additives*

LUBRIPLATE DIVISION, Fiske Brothers Refining Co.
Newark 5, N. J. *or* Toledo 5, Ohio

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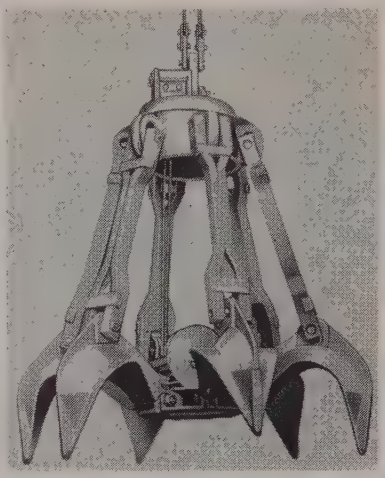
LUBRIPLATE
THE MODERN LUBRICANT

pending on the size of the grapple. Each tine is independent of each other and is positively activated to dig deep into object or material. Final



resistance is met with a grip of up to 50 tons. Features of the new M-1 include: vertical slideways with "barrell-type" bushings for maximum vertical and angular tine movement; one-piece top head with spun, flanged and dished head for rigidity and strength; rocking sheave blocks at top and bottom of grapple for bigger loads at any digging angle. Wear plates of manganese steel are available for heavy model grapples. Available in sizes from .33 to 3.3 cu. yd.

Frameless dump trailer boosts payload

An entirely new tandem-axle frameless dump trailer has been put on the market by **Anthony Co.,** Streator, Ill. A redistribution of weight, a greatly simplified lifting mechanism and the complete elimination of conventional trailer frames combine to make possible an additional legal payload of 2,000 lb. more than conventional semi-trailers. The body serves as its own frame, the axle as the hoist hingepoint. The high tensile steel body, Anthony RL-66, is 21 ft. long with a capacity of 17 yd. The Anthony model TA 83149 Teleramic hoist has a rated capacity of 25 tons.

High power radiophone

A mobile two-way radio rated at 100 watts transmitter power output on any channel in the 25-54 megacycle frequency band has been announced by **Motorola Electronics Inc,** 4501 W. Augusta Blvd., Chicago 51, Ill. The new radiophone incorporates a highly efficient dynamotor-vibrator power supply which, at a power intake equivalent to conventional 60-watt mobile radios, provides full rated transmitter output.

(Advertisement)

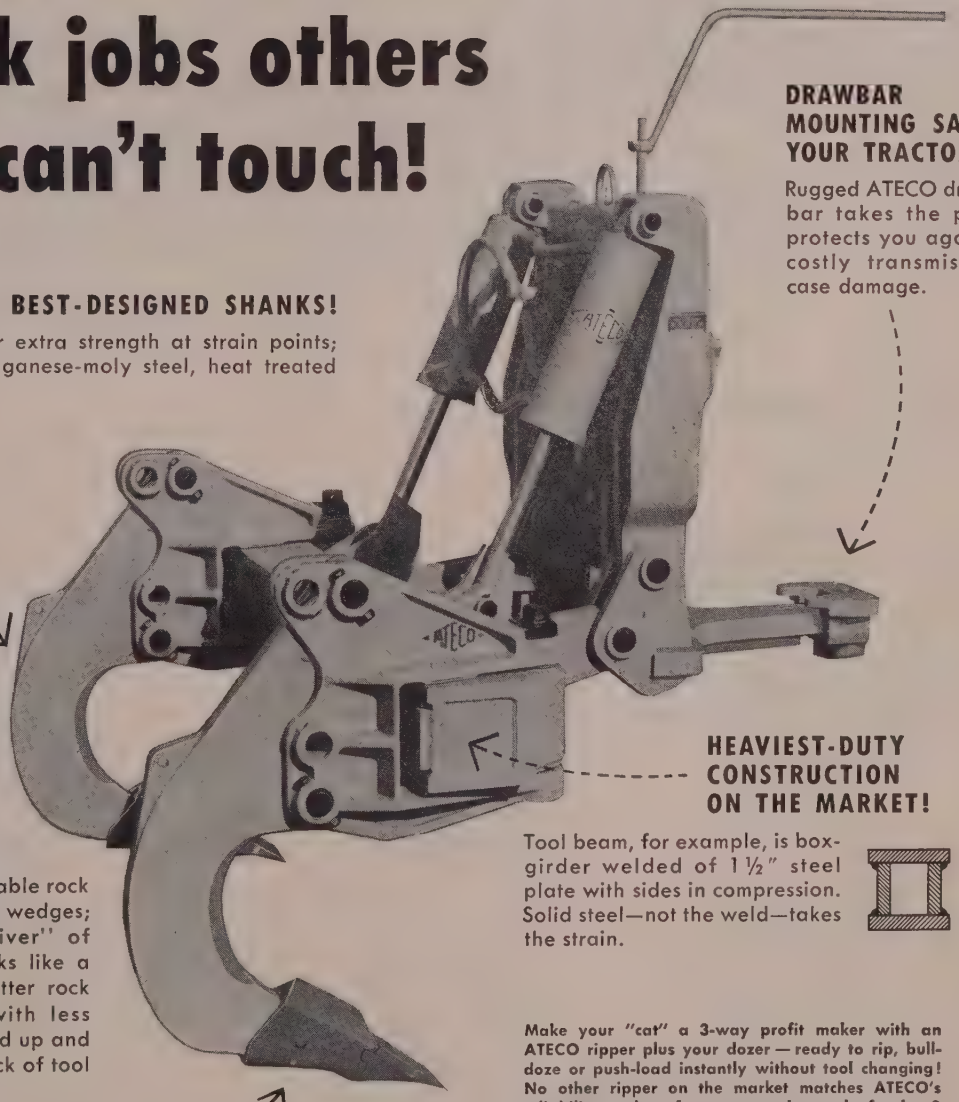
WATER MAIN TRENCH for a new suburban development off Southern State Parkway on Long Island, N. Y. is being dug by this Cleveland 95 "Baby Digger" owned by Grella Brothers, excavating contractors of Glen Cove, N. Y. Commanding a wide range of trench sizes from 11 inches to 24 inches wide and down to 5½ feet deep, the compact maneuverable 95 is an ideal machine for all types of city and suburban trenching jobs. It's easily moved from job to job at safe legal limit speeds. Your local distributor will show you how Clevelands *dig more trench . . . in more places . . . at less cost.*

THE CLEVELAND TRENCHER CO., 20100 St. Clair Avenue, Cleveland 17, Ohio

Here's why

ATECO **ROCK RIPPERS**

lick jobs others can't touch!



DRAWBAR MOUNTING SAVES YOUR TRACTOR!

Rugged ATECO drawbar takes the pull, protects you against costly transmission case damage.

TOUGHEST, BEST-DESIGNED SHANKS!

Contoured for extra strength at strain points; made of manganese-moly steel, heat treated four times.

HEAVIEST-DUTY CONSTRUCTION ON THE MARKET!

Tool beam, for example, is box-girder welded of 1½" steel plate with sides in compression. Solid steel—not the weld—takes the strain.

OUTPERFORMS 'EM ALL! Replaceable rock points have splitting wedges; underground "quiver" of curved shanks works like a jackhammer to shatter rock and shale fast, with less power. Rock is rolled up and out in the clear, back of tool beam.

Make your "cat" a 3-way profit maker with an ATECO ripper plus your dozer — ready to rip, bulldoze or push-load instantly without tool changing! No other ripper on the market matches ATECO's reliability and performance — why settle for less? Promptly available for Caterpillar D9, D8, D7 and D6 tractors — see your Caterpillar dealer or write today for literature.

39

ATECO **TRACTOR EQUIPMENT**

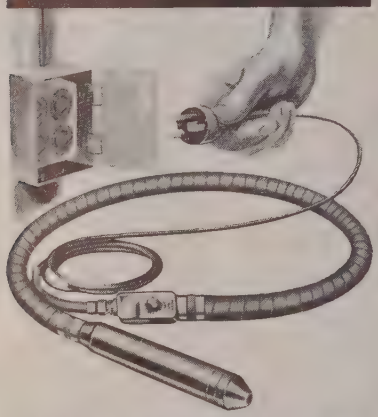
American Corporation

Designers and Manufacturers Since 1920

9131 SAN LEANDRO BOULEVARD • OAKLAND 3, CALIFORNIA

Mall

JUST PLUG THIS NEW UNIVERSAL *MOTOR-IN-HEAD* VIBRATOR INTO ORDINARY 115 VOLT OUTLET



IT'S EASY ON THE FORMS, TOO!

Now, you can forget your expensive generating equipment . . . even eliminate it entirely. The new MALL Universal motor-in-head vibrator operates off any standard 115 volt current. There is another big advantage: it is easy on the forms. 10,000 vibrating frequencies per minute are highly effective but gentle enough not to damage forms. A sealed, shock-proof switch and a thermal overload device to protect against overheating are important safety features. Write for complete details and a FREE copy of the new Mall Construction Tool Catalog.

MALL TOOL COMPANY
Division of Remington Arms Company, Inc.
7706 South Chicago Avenue, Chicago 19, Illinois
Gentlemen: Send your new catalog containing complete information about MALL construction tools.
Name_____
Address_____
City_____ State_____
CU-220

News of DISTRIBUTORS

NEW SALES facilities of Essick Machinery Co. in Santa Ana, Calif., offering complete sales, service, and rentals on all lines represented by the firm, including the recently acquired Schield-Bantam line, as well as Essick manufactured products. *James H. Essick* is sales manager of the heavy equipment division of the firm, as recently announced by *H. S. Mulhollen*, manager.

Nordyke made Idaho sales manager

The appointment of J. E. "Dyke" Nordyke as Idaho sales manager for Intermountain Equipment Co. is announced by Philip A. Dufford, general manager of the company. Nordyke has been associated with Intermountain since 1932. During his long service he has worked in various capacities and has a broad knowledge of the construction equipment business. In his new post he has under his direction the sales activities of sales personnel in the Boise area, as well as that covered by the Pocatello branch. At Boise he will work under the general supervision of A. Aldecoa, branch manager, and at Pocatello will coordinate his efforts with those of Branch Manager E. A. Collins.

J. E. Nordyke

Chico firm appoints and promotes

Recent developments at Sierra Tractor & Equipment Co., Chico, Calif., include the following appointment and promotions. J. W. Kurtz has been made vice president of the firm, in charge of the parts and service departments. W. D. O'Donnell, formerly parts manager of the Chico store, is now general parts manager in charge of the four-store operation. Promoted to field representative in the Redding area is Ed Miller, former outside field serviceman. Jack Vasconcells has been promoted as manager of the parts department in the Chico store.

Rasmussen improves facilities

Rasmussen Equipment Co. of Salt Lake City, Utah, has added to its facilities a new 70 x 20-ft. steel fabricated warehouse with overhead crane to give faster and more complete service on construction supplies.

Branch opened by Bay City

Bay Cities Equipment, Inc., with headquarters at Oakland, Calif., has opened a new branch at 1178 W. San Carlos St., San Jose, with C. H. Close as manager. Here complete sales, service and parts are available to the construction industry of the area.

New salesman appointed

Spencer "Penny" Root is the new salesman appointed to cover the eastern section of Colorado for Constructors Equipment Co., Inc., now in their new building at 3611 Walnut St., Denver 5, Colo.

Spokane firm expands facilities

Construction Equipment Co. of Spokane, Wash., has added a new large showroom and all new office space to their present building. The firm is headed by Harry H. Ferris, president. Jon B. Funk is treasurer; James R. McCollim, general manager; Francis M. Sauser, office manager. Francis A. Borden and Donald R. Smith are salesmen.

Sales addition and new account

John Johnson has been added to the sales force of Hamilton Engine

KOLMAN 101 Conveyor-Screen Plant Does MAN-SIZE Job with Ease!

KOLMAN Model 101 Heavy Duty Conveyor equipped with 31½ h.p. gasoline engine, gravel trap for dozer loading, and KOLMAN Vibrating Screen model SB-80, 8′x48″.

Clay Screened and Loaded in RECORD TIME on Healy Construction Co. Job in South Dakota

This KOLMAN Model 101 Portable Conveyor-Screen Plant keeps trucks moving at a fast clip loading and screening clay for road binder material on a J. L. Healy Construction Co. job near Pickstown, S. Dak.

The dozer trap permits fast and efficient loading. It's built onto the conveyor tail section and is fully portable along with the rest of the equipment. The trap is constructed of steel so it can be buried and loaded with a dozer. It is provided with grizzly bars to stop the passage of large rocks, with buckboard planking above the trap, and a steel regulating door to control the flow of material onto the belt. The trap is also available with a plate feeder installed.

Another reason for big production with this portable conveyor-screen plant is the rugged screening action of the KOLMAN Vibrating Screen. This SB-80 is a big screen, 8′x48″, providing over 30 square feet of screening area and every inch of it delivering vigorous vibrating impetus —pushing even such tough materials as clay through at record rates.

Convenience features on the Model 101 Conveyor such as the Head Pulley Clutch and Motor Controls at ground level permit one operator to handle it with speed and ease. Production is at peak efficiency; excessive wear and maintenance costs are reduced to a minimum.

Model 101 KOLMAN Portable or Stationary belt conveyors are available in 18 to 42-inch widths and in lengths as desired.

SEND for FREE literature

KOLMAN Manufacturing Co.

5670 W. 12th St. Sioux Falls, S. D.

Send literature on following:

( ) 101 Heavy Conveyor
( ) Vibrating Screens
( ) 202 Junior Conveyor
( ) Traps ( ) Feeders

Please quote.....size or.....capacity

Name.....

Address.....

City.....

See Your Nearest Dealer

CALIFORNIA

FRESNO—Allied Equipment Company
LOS ANGELES—Brown-Bevis Industrial Equipment Co., 6550 E. Washington Street
MARYSVILLE—Valley Truck & Tractor Co., 100 D Street
OAKLAND—Spears-Wells Machinery Company, 1823 West 9th Street
SACRAMENTO—Sacramento Valley Tractor Co., Broadway & 19th Streets

IDAHO

BOISE—The Sawtooth Company, 1115 Grove Street

MONTANA

BILLINGS—Hall-Perry Machinery Co.
BUTTE—Hall-Perry Machinery Co.
GREAT FALLS—Hall-Perry Machinery Co.
MISSOULA—Hall-Perry Machinery Co.

NEVADA

ELKO—A-D Machinery Company

OREGON

PORTLAND—Contractors Equipment Corporation

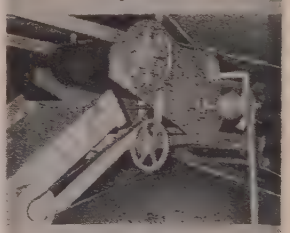
WASHINGTON

SEATTLE—Air-Mac, Inc., 3838 4th Avenue South

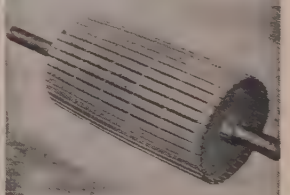
ALASKA

FAIRBANKS, ANCHORAGE—The Carrington Company

Folding feature permits weight of screen to be shifted back under conveyor.



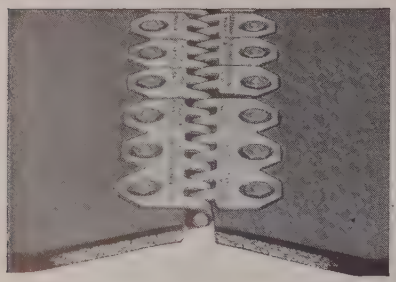
Head pulley clutch permits operation of screen while conveyor belt is idle.



Bar type head pulley eliminates the necessity of lagging. Extended shaft.

Self-cleaning wing type tail pulley protects belt against stone cuts and bruises.

NEW...



500X
FLEXCO HINGED
BELT FASTENERS

for ditching, trenching, grading and other earth moving equipment

★ *Make smoother joints*
★ New Nylon covered cable pin
★ No pin migration
★ Complete packaged joints

Standardize on
FLEXCO 500X Fasteners

★ Packaged joints — complete, convenient, no waste.
★ New Power Tools cut application time.
★ Stocked by leading distributors.
★ Field engineers are ready to assist you.

(Fasteners also available in bulk — nylon covered cable pin stock in 100 ft. and 200 ft. rolls.)

Ask for Bulletin No. 500X
See Your FLEXCO Distributor

FLEXIBLE STEEL LACING CO.
4704 Lexington Street • Chicago 44, Illinois

FLEXCO Hinged
500X Belt Fasteners

Sales, Inc., to cover the Allis-Chalmers Manufacturing Co.—Buda Division engine account in the Portland territory, calling on equipment manufacturers, machinery houses, contractors, etc. Johnson has considerable experience in the heavy equipment field and diesel engine business, having originally started some fifteen years ago with the Buda Company on drilling rigs and pumping units. He also sold earth-moving and heavy shovel equipment when connected with a distributor organization. Hamilton Engine Sales was recently appointed distributor in the Oregon territory of Torcon products manufactured by the Clark Equipment Co.

Blakemore buys out Ferguson

John F. Blakemore, president and general manager of Ferguson & Blakemore Machinery Co., Oakland, Calif., has acquired all of the interest of E. M. Ferguson in this firm.

New salesman; new line

Lee Redman Co., Phoenix, Ariz., announces the appointment of Edward T. Fitzgerald as city sales representative in Phoenix for industrial supplies and equipment. Company also announces the acquisition of the complete scraper line manufactured by the Wooldridge Manufacturing Division, Continental Copper & Steel Industries, Inc., Sunnyvale, Calif.

Salesman added; branch opened

Cramer Machinery Co., Portland, announces that Bill Kempthorn has joined them as city salesman. Also announced is the recent opening of a new Cramer branch at Eugene, Ore., managed by George Groom.

New location and organization

Atlas Equipment Co., division of Wheeler-Kershaw Co., now occupies new and separate quarters, independent of the parent company, at 1411 South Redwood Road, Salt Lake City. Taking over the reins of the new organization as general manager is James M. Walker. He is well known in the Intermountain

James M. Walker

area and was formerly owner and operator of James M. Walker Co. Serving with him at Atlas are M. H. Anderson, sales manager, assisted by T. Upton Ramsey. Howard Western is in charge of parts and parts sales. Anderson comes to Utah from Phoenix, Ariz., where he was general manager for Cook Bros. Equipment Co. for several years. Ramsey and Western have been associated with Wheeler-Kershaw for some time. Atlas currently is Utah distributor for Pioneer pavers, crushers, hot plants; Cleveland trenches, Buffalo-Springfield rollers, Challenge mixers; Cataphote paints and signs, Elgin sweepers and Leach Packmasters, Esco manganese, and Standard Steel kettles.

EFFECTIVE Sept. 1 the Archer Tractor & Machinery Co., 1118 So. Main St., Salt Lake City, Utah, was appointed exclusive distributor for the Euclid Division, General Motors Corp., in the entire state of Utah and portions of Nevada and Wyoming. Every member of the staff of this new organization has had many years of experience in the construction equipment field. *W. D. "Win" Archer* is president of the new company. He is well known in the Salt Lake area, where since 1936 he has held key sales and management positions with distributors. *Paul A. McDonald,* vice president, brings to the company years of varied experience both in construction and construction machinery business. He has been with Euclid since 1948 and recently was branch manager at Emeryville, Calif. *Fred B. Evans,* with years of equipment business experience in the Intermountain region, is secretary-treasurer. Service manager is *C. F. "Bud" Payne.* He has had twenty-four years in equipment. *Art Smart* is parts manager.

At these TOUGH WEAR points, specify "THE TOUGHEST STEEL KNOWN"*

Sprockets
Amsco® Manganese Steel sprockets and replaceable rims, hardfaced with Amsco "Economy Hardface C", give 3 to 4 times the life of ordinary sprockets.

Rollers, Idlers
Automatic build-up, then hardfacing with Amsco AW-79 Rod, gives twice the wear of original parts, saves 50% on replacement.

Track Shoes
Manganese Steel construction, with grouser bar integrally cast, and holes counter-sunk so bolts can be re-used. For temporary repair, grouser bar is torch cut and welded to shoe.

End Bits
Corner inserts of Amsco Manganese Steel add extra service life to blade. Amsco HF-40 hardfacing further increases wear resistance.

Scraper Blades
Amsco Manganese Steel gives longer lasting "bite". Amsco HF-40 is ideal for hardfacing.

*AMSCO MANGANESE STEEL . . . plus AMSCO HARDFACING

Shown above are just a few of the "tough wear" points where Amsco products can save you money. Whether for original parts, or for build-up and hardfacing, specify Amsco Manganese Steel and Amsco Hardfacing for maximum operating economy.

We'll be glad to give you full information on Amsco Tractor Parts, Hardfacing Materials or Automatic Welding Machines. Just call your nearby Amsco representative, or write us direct.

OTHER AMSCO PRODUCTS

DIGGING: backhoe buckets—dippers and parts—repointers—dragline bucket parts—dragline chain—sheaves—pinions.

CRUSHING: concaves—mantles—jaw plates—mill liners—hammers.

HANDLING: truck bed liners—grizzly parts—car wheels and liners—sheaves, gears, pinions.

WELDING: automatic and semi-automatic welders—hardfacing rod—manganese plates and shapes.

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS; JOLIETTE, QUEBEC

AED Region 11 holds annual conference

Meeting hears AED national president discuss distributor problems and BPR Division engineer on the highway program—Plans made for tri-regional conference in 1957.

With a registration of over 100, Region 11 of the Associated Equipment Distributors held its annual conference in Yosemite National Park, September 21-22. Beal Shaw, regional director, conducted the business sessions. The conference was attended by S. F. Laskey, national president of AED, and J. R. Borchert, national treasurer. A feature of the program was an afternoon devoted to "down-to-earth" discussions of distributor problems with attendance restricted to members of AED. The usual social events included the annual dinner.

The most important subject presented at the meeting was the effect of the national highway program on the states in Region 11 which was reviewed by Raymond Archibald, division engineer, Bureau of Public Roads, San Francisco. He estimated the funds which will be available from the Federal program for the next several years and then answered many questions on various aspects of the subject, indicating the interest of the distributors in this expanding field of construction activity. James I. Ballard of **Western Construction** reviewed the outlook for other types of construction activity.

Another feature of the program was the subject "What the Contractor Expects Of the Distributor" which was presented by Gordon Pol lock, George Pollock Co., who is president of the Northern California Chapter AGC.

President talks

Stan Laskey reported on current developments in and affecting AED. Of immediate importance to Region 11 was the vote which is now being taken among all AED members as to the possibility of having a national convention in Los Angeles in 1960.

The largest and most serious problem affecting all phases of the construction industry, including the distributors, is tied up in the one word "finance" according to Laskey. Manufacturers are endeavoring to secure additional financing for improving or expanding their plants; contractors are looking for further financing in connection with bidding jobs and purchasing more equipment; distributors are searching for additional financing in connection with their sales and also to build their own servicing facilities. He indicated that if financing is adequate the construction industry can take in stride the expanding Federal highway program during the coming years.

NATIONAL PRESIDENT *Stan Laskey* of Fargo, No. Dak., speaks to the conference. Taking notes is *Beal Shaw*, Director of Region 11, who presided at sessions.

DISCUSSING AED affairs are *Irv Kraemer*, Buran Equipment Co., co-chairman of the national AED-AGC Committee; *J. R. Borchert*, national treasurer; *Laskey*.

***RAYMOND ARCHIBALD*, division engineer of the Bureau of Public Roads at San Francisco, speaks on the significance of the highway program.**

TIME OUT for golf: *Bob Logan* of Western Construction, *Al Hahn* of Edward R. Bacon, *Ed. Grant* of C. H. Grant Co. and *W. D. Beasley* of C.I.T.

In closing he pointed out several factors which tend to reduce the profits of the distributor: (1) Contractors are increasing in size and tending to place a financial strain on distributors, (2) New contractors will be coming into the picture with a minimum of capital representing a further strain on financing and relations with older contracting organizations. (3) Anticipation of the growing construction market will tend to sponsor new distributors and new financing organizations. (4) Manufacturers may develop such a high output as to overload distributors with heavy inventories.

Irv Kramer, chairman of the distributor section of the National Joint AED-AGC Committee reviewed the work of that committee pointing out that organization and policies were fairly well established at the national level whereas there has not been a corresponding amount of interest shown at local levels. The committee believes that both distributors and contractors need each other more than ever now and should endeavor to develop mutual understanding. Otherwise, relations will tend to be strained as equipment becomes more costly and money tighter. New models are developing so fast that obsolescence comes early and trade-ins are much lower than the contractor

Tecon's paving operation on the Kansas Turnpike . . . *(right)* because of an efficient batch plant and dependable Macks, like those shown, the minimum number of haulers were used.

tch trucks speed nsas Turnpike paving

much as 3,000 linear feet of n, 24-foot pavement in a 10- ay . . . averaging 2,600 linear r day—that's quite a record o twinbatch pavers working n with wire fabric laid on the pour of the first paver. To a xtent this efficient paving was the trucks hauling the dry s to the pavers—Mack trucks, arrying four batches in their rtmented dump bodies.

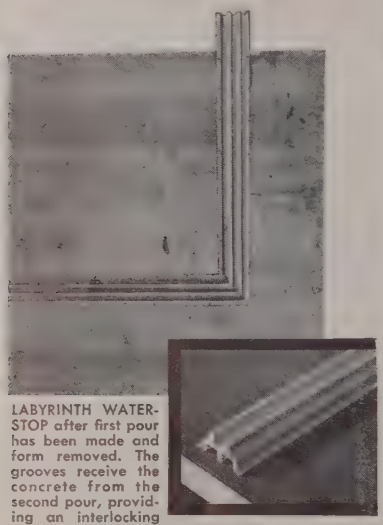
Mr. S. N. Foster, project manager for The Tecon Paving Company of Dallas, Texas, is all for dependable Mack haulers—and for good reason! Tecon's 12 Mack B-42S dumpers can be depended upon for top performance 10 hours a day, week after week . . . assuring an uninterrupted flow of dry mix to the pavers.

Why not discover for yourself, like Tecon, that when you use Macks, you can do more with fewer trucks . . . more efficiently . . . and at less cost. Get the facts from your Mack Dealer or Representative. Mack Trucks, Inc., Los Angeles, Denver, San Francisco, Seattle, Portland, Salt Lake City, Albuquerque.

4429

MACK
first name for
TRUCKS

Waterstop *in place in seconds!*



LABYRINTH WATERSTOP after first pour has been made and form removed. The grooves receive the concrete from the second pour, providing an interlocking joint.

Just a few seconds were needed to nail this LABYRINTH WATERSTOP to the form... just a few seconds and water seepage worries were over before they could ever have a chance to start.

LABYRINTH WATERSTOP forms a waterproof bond between two pours. The corrugated ribs bond firmly with the concrete.

LABYRINTH WATERSTOPS are made of flexible polyvinyl plastic... that has superior weathering qualities, is not affected by temperature changes and chemical activity.

LABYRINTH WATERSTOPS are easy to work with, can be cut to any desired length. "L" and "T" joints can be welded with just a hot knife. Find out now how your costs can be cut... and end your seepage problems.

Distributed by

WATER SEALS, INC.

Chicago 6, Illinois by:

THOMAS CONCRETE ACCESSORY CO.
1219 S. Herbert St.
Los Angeles 23, Calif.

HYDRO PRODUCTS CO.
1350 Old County Road
Belmont, Calif.

CHAS. R. WATTS CO.
4121 Sixth Ave., N.W.
Seattle, Wash.

PLASTI-SPRAY CO.
353 S. State
Orem, Utah

BAKER-THOMAS-WOOLSEY
300 S. Twelfth St.
Phoenix, Ariz.

W. J. BURKE & CO.
2344 N.W. 21st St.
Portland 9, Ore.

anticipated. He then sketched the relationship as it develops between distributor and contractor prior to the sale and during the period of delivery and service.

The relationship which exists between available money and credit was reviewed in some detail by Robert Mann of the C.I.T. Corporation. His essential point was the fact that the cost of money has almost doubled in the past decade creating serious problems for the construction equipment industry.

The manufacturer's point of view was discussed by Henry Hansen, Chicago Pneumatic Tool Co. of San Francisco, outlining the position of the manufacturer as it relates to the functioning of the equipment distributor.

MANUFACTURERS

AT THE DEDICATION of a new Twin Disc Clutch Co. plant at Racine, Wis., recognition was given to *P. H. Batten* (left), chairman of the board, on the 38th anniversary of his founding of the company, now headed by *John H. Batten* (right), president. The first unit of this new plant will provide 92,500 sq. ft. of additional floor space for expanded production of models now being manufactured in the original Racine plant and at Rockford, Ill.

Hyster promotions

Robert C. Shoemaker, supervising engineer of construction machinery at the Hyster Company for twelve years, has been promoted to the position of supervising engineer—patents and product analysis, according to Al Zwald, Hyster's chief engineer. T. Richard Hazel, supervising engineer of the tractor equipment division, has now been assigned the added responsibilities of supervising the construction machinery design section. Additional supervisor appointments are those of Peter Lewis who was named supervisor of industrial truck sales training, and John V. Pearson, who has been appointed to the position of supervisor of tractor equipment advertising and promotion.

District managers appointed

Announcement is made by the Industrial Rubber Division of the Thermoid Company, Trenton, N. J., of the appointment of three new district managers. Oswald J. Sand will head the San Francisco district comprised of Central and Northern California, Oregon, Washington, western Idaho and Nevada. Roy L. Wanamaker was named district manager of the Denver-Salt Lake City area. John W. Minnock was made district manager in charge of the Los Angeles district of the company, manufacturer of conveyor and V-belts, and industrial and oil field hose.

Harvey forms new division

Formation of a new division to engineer, fabricate, and erect aluminum structures has been announced by Harvey Machine Co., Inc., Torrance, Calif. Appointed to organize Harvey Aluminum Structures is Dr. J. Morley English, eminent structures authority on leave from the University of California, at Los Angeles.

Leo Ware joins Western Machinery

Leo Ware recently joined the industrial sales division of The Western Machinery Co. at Salt Lake City and will serve the northern Utah territory. Ware has spent a number of years in the engineering departments of several major steel fabricators in the West. L. T. McGuire, branch manager of Western Machinery, said the new appointment was prompted by increasing sales volume of many nationally known lines of equipment.

New facilities

J. T. Hanna, Seattle, West Coast sales representative of Detroit Diesel Engine Division of General Motors Corp., announces the opening of a Western regional office located at 1426 Russ Building, San Francisco 4.

Change of address

Chicago Pneumatic Tool Co.'s Los Angeles District sales offices and service department recently moved into a new location at 6935 E. Bandini Blvd. The larger quarters, more conveniently located, afford greater stock carrying facilities, as well as excellent parking space. H. P. Hansen is district manager here.

Five Northwest reps chosen

New distributorships recently announced by the district office of Diamond Chain Co., Inc., at Menlo Park, Calif., include Mill & Logging Supply Co., Aberdeen, Wash., and the Bearing Sales & Service, Inc., located at Longview, Wash., and at the following Oregon cities: Portland, Roseburg and Eugene.

Seaman-Andwall buys Pulvi-Loader

Seaman-Andwall Corp., manufacturer of Sta-Bilt road building equipment, announces the purchase of the Willimon Mobil-Loader, a multi-purpose unit designed for digging, load

All-wheel-drive traction PLUS!

gs More

mbination of powerful "pry-out" n using breakout pads as a ful- for leverage and a 40° bucket ack *at ground level* gets BIGGER DS with less spillage.

rries More

ed loads are cradled closer and r for greater stability while carry- Exclusive load shock-absorber cushions the load, smooths the and permits faster movement less spillage.

elivers More

e you get MORE to begin with keep MORE while traveling at er speeds . . . with less spillage oth instances . . . the result— *deliver* more yards per load and e loads per hour.

One of the big reasons why the new all-wheel-drive "PAY-LOADER" tractor-shovels can accomplish more *work* and can do more *jobs* is the BONUS tractive effort provided by their power-transfer differentials. This important feature — exclusive with "PAYLOADER" in the tractor-shovel industry — automatically transfers more power to the wheels on the firmest footing. You get traction and action instead of wheel-spinning inaction on sand, mud and snow.

These outstanding machines also have "no-stop" power-shift transmissions, torque-converters, planetary final drives, power-steering, 4-wheel power brakes. Your "PAYLOADER" Distributor is ready to show you *all* the superior features of these three new models. A demonstration will convince you that they are the finest, most productive units, size for size, in tractor-shovel history.

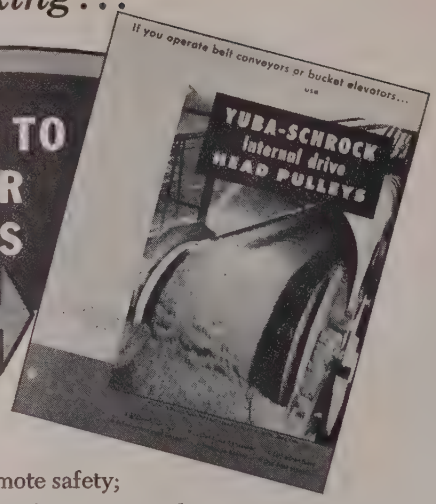
THE FRANK G. HOUGH CO.
707 Sunnyside Ave., Libertyville, Ill.
Send data on "PAYLOADER" Tractor-shovels
- ☐ 4 wheel drive types to 2¼ cu. yd.
- ☐ rear wheel drive types to 1⅕ cu. yd.
- ☐ front wheel drive types to 1 cu. yd.

Name _____
Title _____
Company _____
Street _____
City _____ State _____

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY INTERNATIONAL HARVESTER COMPANY

Yours for the asking...

ANSWERS TO CONVEYOR PROBLEMS



NEW, 4-page catalog tells and shows how Yuba-Schrock internal drive head pulleys save space, cut downtime, promote safety; liberally illustrated with photos of Western applications. Diagrams and charts give dimensions and speeds for sizes from 1 to 125 hp.

See for yourself how "the head pulley with the motor inside" solves conveyor problems. Write for your FREE copy of this Yuba-Schrock folder NOW.

107

YUBA BRIDGES — PROVED DEPENDABILITY 'ROUND THE WORLD

YUBA MANUFACTURING CO.

701 East H Street • Benicia, California

(Advertisement)

Symons Forms Used on Bank of California Bldg. to Assure Smooth Finish on Exposed Concrete

In order to assure smooth finish on exposed concrete, and speed the erection and stripping of forms, Jack & Irvine, San Francisco contractors used Symons Forms with steel cross members for the new branch of the Bank of California, located in downtown Oakland. 7,100 feet of forming is being used on the job. On the 12 foot pours only three walers are required. Symons scaffolding is also being used and it is secured to the forms with standard form hardware.

We would like to help you save on your forming costs. Send us the plans for your next job . . . our engineers will prepare a complete form layout, bill of materials, and make recommendations for the most efficient method of forming.

Symons Forms can be rented with purchase option. Our general catalog available FREE on request.

SYMONS CLAMP & MFG. CO.

634 Williams Street **San Leandro, California**

ing, mixing and leveling dirt and soil. Heretofore manufactured by J. R. Prewitt & Sons and developed by Willimon, the unit will be renamed "Pulvi-Loader" and manufactured in Seaman-Andwall's Milwaukee plant along with their Pulvi-Mixer, Trav-L-Plant, Pulvi-Breaker and other road equipment.

Charles M. Greiner dies

Buffalo-Springfield Roller Co., Springfield, Ohio, announces the death of Charles M. Greiner, 93, former president of the company. He was chairman of the board of directors until his death.

G-E plans Northwest expansion

General Electric Co. reports plans to construct a 14,268-sq. ft. single story office building in northwest Portland, Ore., to house its apparatus sales division. The $275,000 structure will be adjacent to the company's apparatus service shop and warehouse, according to John F. Gogins, user sales manager for the Division's district office in Portland.

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND July 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF WESTERN CONSTRUCTION, PUBLISHED MONTHLY AT LOS ANGELES, CALIFORNIA, FOR OCTOBER 1, 1956.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Arthur F. King, 609 Mission St., San Francisco 5, Calif.

Editor: James I. Ballard, 609 Mission St., San Francisco 5, Calif.

Managing Editor: Robert L. Byrne, 609 Mission St., San Francisco 5, Calif.

Business Manager: Luther P. Vrettos, 609 Mission St., San Francisco 5, Calif.

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M. K. Lyons, 609 Mission St., San Francisco 5, Calif.

M. K. Vogel, 609 Mission St., San Francisco 5, Calif.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

LUTHER P. VRETTOS
(Signature of business manager)

Sworn to and subscribed before me this 20th day of September, 1956.

(Seal) (Signed) RUTH POWELL POOL

(My commission expires Sept. 11, 1958)

for

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Nothing builds 'em like BASALT!

Extreme strength of prestressed Concrete Double Tee (TT) Slab design, coupled with its manufacturing economy and erection speed, produce a top notch building component to streamline building operations.

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A 3 foot overhang was used on the building, here illustrated. Longer cantilevers are also possible with BASALITE Double Tees.

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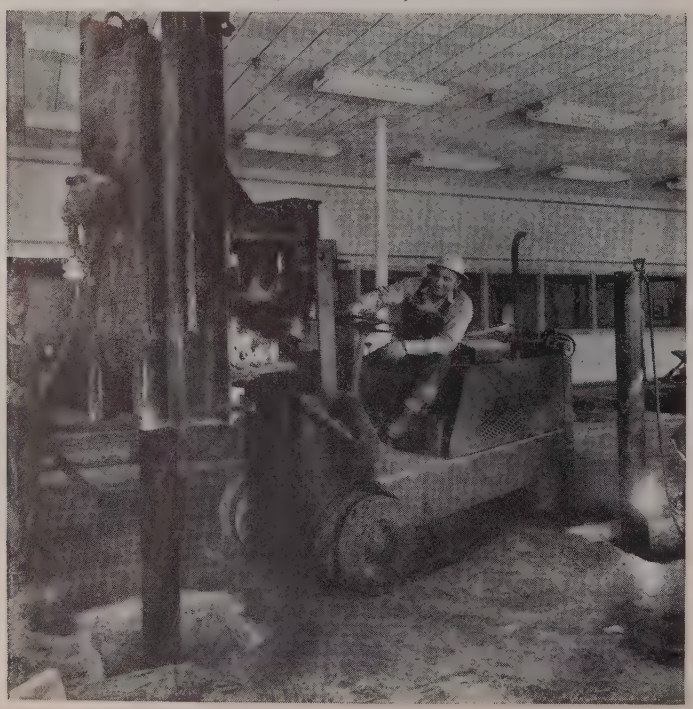
Promotions follow White expansion

White Motor Co. announces the formal opening of a new Pacific Coast parts warehouse located in Los Angeles at White's factory branch. Heading up the new Pacific Coast warehouse is William Kostelecky. Emil Kaminski, former parts manager at Los Angeles, moves to the White home office in Cleveland to take over duties of assistant parts service manager. Taking over Kaminski's former post is R. J. "Bud" Davis of the service sales force at San Francisco. C. L. Murphy, former parts manager at San Francisco, has moved to Denver in the same capacity, replacing Charles Lane who recently accepted a position with White's distributor at Phoenix. Carl Pearson replaces Murphy at the San Francisco Branch.

White Motor advances two in sales

Two promotions have been made on the national sales staff of the White Motor Co. as part of an expansion of truck merchandising activities, P. E. Tobin, vice president—sales, announces. Roy A. Fryer, assistant sales promotion and advertising manager, has been named advertising manager, and David W. Sheehan, assistant to the vice president—sales, has been made sales promotion manager.

(Advertisement)



Unusual pile-driving operation within a warehouse in Tacoma, Washington, necessitated by the sinking of the structure in the fill over soft ground on which it had been built. Because of the low head room, short sections of 6-in. steel piles were welded together as they were driven, and some of the piles were driven to a depth of 60 ft. A fork lift truck was used as mounting for the pile hammer, which was a No. 7 Double-Acting Hammer manufactured by McKiernan-Terry Corporation, 24-A Mercer St., Dover, New Jersey.

ESCO appoints McQuaid

Joe E. McQuaid has been appointed manager of the general sales department, according to recent announcement by Electric Steel Foundry Co., Portland, Ore. A veteran of fourteen years with the company, McQuaid brings to his new position practical experience and thorough knowledge of ESCO's products and organization.

Le Roi appoints lab chief

Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis., has appointed Don Blackmar chief metallurgist. He will be in charge of the new metallurgical and chemical laboratory, a part of the $5,500,000 engineering and research expansion instituted by Le Roi.

Chain Belt service appointment

John H. Sproule has been appointed service manager of the construction machinery division of the Chain Belt Co., Milwaukee, Wis., according to announcement from W. C. Messinger, sales manager. Prior to this appointment he was a field service supervisor. Jack I. Sullivan is assistant service manager.

Two for research and design

In keeping with plans to expand its product line, Miller Spreader Corp. of Youngstown, Ohio, recently announced the creation of a research and design department. Rober L. Wymer, Jr., was named chief industrial engineer. Jack Foster was promoted to chief design engineer. Wymer was formerly with Republic Stee Corp., Carbon Limestone Co., and the Lone Star Steel Co. Foster has had more than 15 years of practica experience in the asphalt industry both in batch plants and in manufacturing paving equipment. He has been with the Miller organization fo the past nine years.

Koehring lists new district men

H. R. Powers has been named district representative for the Koehrin Company in the Pacific Northwes area, covering four states: Washington, Oregon, Idaho and Montana C. M. Andresen was named South west district representative, coverin the territory of New Mexico, Texas Louisiana, Oklahoma and Mexico Both men will also represent two o Koehring's subsidiary firms: Par sons Company of Newton, Iowa, an Kwik-Mix Company of Port Wash ington, Wis.

Caterpillar acquires Englehart

Acquisition of Englehart Manu facturing Co. of Davenport, Iowa, b Caterpillar Tractor Co. of Peoria, Ill has been announced by H. S. Eber hard, president of Caterpillar, an C. E. Murray, president of Englehar The Davenport company has been major supplier of parts for Cater pillar for the past 13 years, and w

ow be operated as a wholly-owned ubsidiary, with Murray continuing Englehart's chief administrative ficer.

ob Gray joins Superior Scaffold

Robert F. Gray has joined Superior caffold Co., Culver City, Calif., as les manager. Gray is widely known mong dealers in the Western states. He will be interested primarily in deeloping Superior's dealer sales proram.

eneral Talley joins Raymond

The appointment of Brig. Gen. . B. Talley, U. S. Army (ret.), as roject manager of Raymond Conrete Pile Co., New York, is announced. For the past year, General alley was Division Engineer, Mediterranean Division, Corps of Engineers, with headquarters in French Morocco.

ucker adds to engineering staff

Rucker Company, South Gate, alif., announces two appointments o its engineering staff. Malcolm F. liff has joined the firm as a sales enineer for the Los Angeles area, and Duane Shaw has tied up with the enineering staff at the Oakland office s hydraulic design engineer.

alaveras ups Casey

Appointment of James R. Casey as upervisor of contractor salesmen for alaveras Cement Co. is announced by Mel J. London, vice president in charge of marketing. Casey, who will continue to make his headquarters in San Francisco, became a sales representative for Calaveras in 1932. During World War II he was assigned to management duties at the San Andreas plant. More recently he has been sales engineer.

F. H. Denman named sales manager

F. Halsey Denman has been appointed general sales manager of Termite Drills, Inc., Pasadena, Calif., a major supplier of all types of rotary masonry drills and accessories for contractors and the engineering and construction industries.

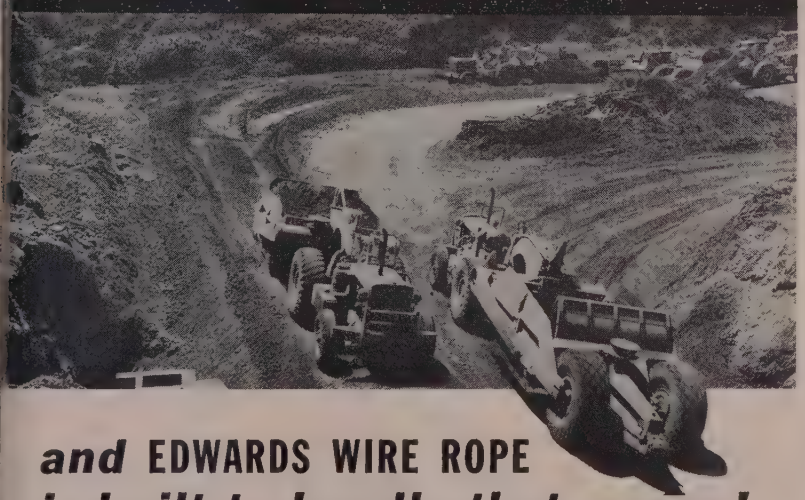
R. M. Ervin moves to Wash., D. C.

Richard M. Ervin, Hyster Company, has been promoted to manager of Hyster's Washington, D. C., office, and district manager of the East Central industrial truck division. He moves to the position held by Robert F. Lange who will become manager of a Hyster plant to open in Brazil. Ervin, originally from Portland, Ore., has been with Hyster for five years.

Construction Machinery Co. news

James W. Maxwell has joined Construction Machinery Co., Waterloo, Iowa, as manager of its newly created research and development department. For the past eight years he has been owner and operator of Maxwell Speciality Co., Cedar Falls, Iowa.

It takes POWER to move a mountain



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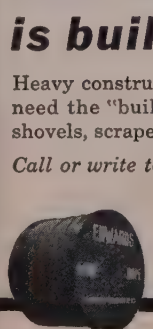

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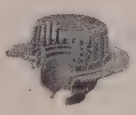
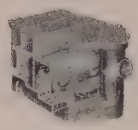
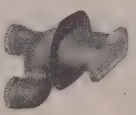


Series No. 4110 Roof Drain



Series GA Oil Interceptor



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Series No. 1480 Shock Absorber

Series No. 0300-R Ramp Drain

Series No. 0100 Track Drain

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UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—Approximately 2 mi. roadwork in Utah

Utah—Salt Lake County—State. A $378,909 contract was awarded to Gibbons & Reed Co. for construction of 2.015 mi. of road and a concrete bridge near Murray, Utah.

1) Gibbons & Reed Co. $378,909
2) Enoch Smith Sons. 431,881
W. W. Clyde & Co. 439,954

		(1)	(2)
9,500 ton	Bituminous concrete, Type "D"	$ 3.81	$ 4.00
3,000 ton	Bituminous concrete, Type "B"	3.50	4.00
725 ton	Bituminous mat., Type 85-100 penetration	25.00	27.00
25 ton	Bituminous material, Type MC-1 or MC-2	40.00	40.00
95 ton	Bituminous mat., Type RC-1 or RC-2	40.00	40.00
13,000 ton	Gravel, surface, Type "B"	1.43	1.65
700 ton	Bedding material	1.50	2.00
18,000 cu. yd.	Unclassified roadway excavation	1.00	1.50
150 M gal.	Watering	2.50	3.00
25 hr.	Rolling, pneumatic tire or power roller	12.00	10.00
29,200 sq. yd.	Concrete base pavement 7 in. thick	2.58	3.00
23,600 sq. yd.	Concrete pavement 8 in. thick	5.00	4.90
35 cu. yd.	Concrete, Class "AA"	48.00	100.00
35 cu. yd.	Concrete, Class "A"	52.00	100.00
150 lin. ft.	Chain link fence	2.50	5.00
1 ea.	4 ft. walk gate	20.00	25.00
8,600 lb.	Reinforcing steel	.16	.20
6,700 lb.	Structural steel	.24	.30
1,550 cu. yd.	Excavation for structures (unclassified)	1.25	3.00
60 lin. ft.	15 in. reinforced concrete pipe	4.50	4.00
1,521 lin. ft.	18 in. reinforced concrete pipe	5.00	4.00
45 lin. ft.	30 in. reinforced concrete pipe	10.00	8.00
126 lin. ft.	36 in. reinforced concrete pipe	13.00	10.00
292 lin. ft.	24 in. C. M. P.	5.00	5.00
66 ea.	Part circle corr. metal culverts (10 gage)	7.00	5.00
100 sq. yd.	Concrete sidewalk 4 in. thick	4.00	3.60
19,600 lin. ft.	Concrete curb, Type 1-E	1.25	1.50
380 lin. ft.	Removal of existing curb & gutter	1.00	1.00
75 sq. yd.	Removal of existing sidewalk	1.00	1.00
300 sq. yd.	Removal of existing pavement	1.50	2.00
97 ea.	Removal of trees	25.00	50.00
130 ea.	Moving mail boxes	6.00	20.00
59 ea.	Moving light poles	200.00	250.00
150 hr.	Mechanical tamping	5.00	8.00
85 ea.	Reconst. cleanout, manhole & mon. boxes	35.00	50.00
54 lin. ft.	½ in. rigid conduit	.75	1.00
760 lin. ft.	¾ in. rigid conduit	1.00	1.00
40 lin. ft.	1½ in. rigid conduit	1.50	1.50
502 lin. ft.	Installation of 2 in. fibreduct	.75	1.00
9 ea.	6 ft. pressure sensitive detector pads	42.00	200.00
1 ea.	Marker beacon	50.00	100.00
Lump Sum	Furnishing water equipment	750.00	500.00
Lump Sum	Furnishing construction signs	5,760.00	2,000.00
1 CONCRETE BRIDGE 25.25 FT. 0. TO 0. STA. 167+08.5			
150 cu. yd.	Excavation for structures unclassified	5.00	10.00
96 cu. yd.	Concrete, Class "A"	60.00	80.00
16,150 lb.	Reinforcing steel	.13	.20
98 lin. ft.	Steel handrail	11.50	12.00

HIGHWAY—Construction of 7 mi. of state highway in New Mexico

New Mexico—Valencia County—State. A low bid of $668,778 was submitted by O. D. Cowart for 7.303 mi. of highway construction in New Mexico.

(1) O. D Cowart. $668,778
(2) Allison & Haney 694,611
Brown Construction Co. 713,363
Henry Thygesen 729,523

		(1)	(2)
Lump sum	Removal of old structures	$5,700.00	$5,000.00
Lump sum	Removal of obstructions	1.500.00	1,000.00
146 lin. ft.	Removing & rebuilding fence	.15	.20
7 ea.	New posts for rebuilding fence	1.50	2.50
187,438 cu. yd.	Excavation-unclassified	.15	.25
107 cu. yd.	Excavation for structures	4.00	5.10
1,931 cu. yd.	Excavation for pipe culverts	1.50	1.00
302,173 cu. yd.	Ordinary borrow	.17	.21
30,0 5 M gal.	Watering	.10	.50
775 hr.	Rolling (tamping roller)	5.00	8.00
2,025 hr.	Rolling (pneumatic tired)	5.00	4.50
1,535 hr.	Rolling (steel tired)	5.00	6.50
2,655 hr.	Fifty (50) ton roller operation	5.00	11.50
262 hr.	Mechanical tamping	6.00	3.50
33,209 sta. yd.	Station yard overhaul	.04	.01
1,074,782 ¼ mi. yd.	Quarter mile yard haul	.06	.04
883,692 ton mi.	Ton mile haul	.07	.075
312 cu. yd.	Dry riprap Class "A"	10.00	8.00
962 lb.	Wire fabric	.40	.23
148 cu. yd.	Excavation for riprap	2.00	1.15
420 lin. ft.	Steel plate guard fence	4.50	2.90
40,469 lin. ft.	Galvanized barbed wire fence	.17	.25
25 ea.	Gates-standard type	50.00	40.00
224 ea.	Bracing	8.00	11.50
3,661 lin. ft.	Galvanized woven wire farm fence	.30	.35
50 ea.	Right-of-way markers	9.00	8.75
2 ea.	Std. Fed. air project markers, type I.	100.00	40.00
258 ea.	Treated timber warn. posts, refl. (6 in. diam.)	6.00	5.75
60,515 ton	Selected mat. (controlled graduation)	.48	.55
62,275 ton	Crushed stone (2 in. maximum size)	1.03	.85
28,485 ton	Crushed stone (1 in. maximum size)	1.43	1.20
3,830 bbl.	Bituminous material, type MC-1	7.20	7.00
29,065 bbl.	Plant mix surface course	4.00	4.00
8,155 bbl.	Bituminous material, type 85-100	6.20	6.30
1,335 bbl.	Bit. mat., type 85-100 (tack coat)	6.20	7.00
765 bbl.	Bituminous material, type 120-150	8.00	7.85
1,325 ton	Mineral aggregate	4.00	5.25
17.857 cu. yd.	C ass "A" concrete	80.00	58.00
9,129 lb.	Reinforcement for concrete structures	.20	.13
1,948 lin. ft.	Stand. reinf. conc. pipe—24 in. diam.	6.20	5.80
154 lin. ft.	Stand. reinf. conc. pipe—42 in. diam.	15.35	13.25
138 lin. ft.	Stand. reinf. conc. pipe—54 in. diam.	21.20	19.00
12,341 lb.	Structural steel	.40	.35
240 lin. ft.	Galvanized chain link fence	6.00	4.00
1 ea.	Galv. chain link dr. gate (12 ft. wide)	250.00	230.00
1 ea.	Galv. chain link walk gate (6 ft. wide)	150.00	150.00
1 ea.	Concrete headgate—3 way	250.00	130.00
1 ea.	Slide headgate	150.00	100.00
1,318 lin. ft.	Corr. metal culvert pipe—8 in. diam.	3.00	2.40

HIGHWAY—Grading and paving in Arizona

Arizona—Pima County—Bureau of Public Roads. Flickinger Bros. Contracting Co. submitted a low bid of $260,976 for construction of 2.7 mi. of access highway to Grand Central Aircraft Plant in Arizona.

(1) Flickinger Bros. Contracting Co. $260,976
(2) San Xavier Rock & Sand Co. 269,749
L. M. White Construction Co. 273,967
Pioneer Constructors 280,877

			(1)	(2)
4,000	cu. yd.	Unclassified excavation	$ .38	$ .51
36,500	cu. yd.	Unclass. excav. for structures	2.00	2.00
2,700	cu. yd.	Unclass. excav. for borr., case 1.	.38	.40
16,000	sta. yd.	Overhail (1,000 feet free haul)	.01	.04
17,000	cu. yd. mi.	Special overhaul of borrow (1,000 ft. free haul)	.25	.45
3,500	hr.	Rolling existing ground	8.00	10.00
250	lin. ft.	Furrow ditches	.05	.10
800	M gal.	Watering of embankment and subgrade, Items 29 and 41	1.75	2.00
1,420	M gal	Watering of base course, Items 50 and 52A	1.75	1.80
2,300	Lump sum	Prov. & main. wat. plt or plants	1,500.00	1,500.00
As Required	ton	Selected borrow base course	.75	.9
44 000	ton	Crushed gravel or crushed stone base course, Class 2, grading D-1 (revised)	1.10	1.2
18,000	ton	Med. curing cutback asphalt, grade MC-2, for prime coat	43.00	42.00
150	ton	Cover aggregate for Type 3 seal coat, grading A	4.50	5.0
1,150	ton	Rapid curing cutback asphalt, grade RC-4 or RC-5, for seal coat	46.00	45.0
95	sq. yd.	(Class C-1 pavement) road mix surfacing laid, case 1	.07	.0
90,750	ton	(Class C-1 pavement) new road-mix aggregate grading same as item 52A	1.15	1.1
9000	ton	Medium curing cutback asphalt, grade MC-2, MC-3, MC-4 or MC-5, class C-1	43.00	40.0
405	lin. ft.	Raised traffic bars	1.00	3.0
202	cu. yd.	Concrete, class "A"	43.50	40.0
1,050	lb.	Reinforcing steel	.13	.1
138,000	lin. ft.	12-in. CGSM culvert pipe	3.00	2.7
50	lin. ft.	36-in. CGSM culvert pipe	11.00	10.3
180	lin. ft.	22 x 13-in. CGSM cul. pipe—arch	5.00	3.7
140	lin. ft.	29 x 18-in. CGSM cul. pipe—arch	6.50	5.7
320	lin. ft.	50 x 31-in. CGSM cul. pipe—arch	15.00	12.6
184	lin. ft.	48-in. bit. coated CGSM cul. pipe	19.00	15.2
488	lin. ft.	Removing, clear. & stockpiling salvaged culvert pipe	2.50	1.3
40	ea.	Welded steel gratings (spec. type)	100.00	150.0
6	lin. ft.	Concrete curb, 20-in depth	1.90	1.6
3,700	ea.	Right-of-way mon., (type A)	10.00	10.0
20	ea.	Metal culvert markers (type B)	5.00	7.6
10	ea.	Metal guide posts (type B)	6.00	7.6
15	Lump sum	Highway lighting and traffic signal system	28,790.00	30,000.0

BLAW-KNOX RECTANGULAR BOX SEWER FORMS

save time and cut costs on Proctor Storm Drainage Project built by

SLOVAK BROTHERS

Corpus Christi, Texas

■ Here's another typical example of Blaw-Knox Steel Form Engineering which allowed this Corpus Christi general contractor to average daily pours of 80 feet on 10-ft. wide sewers, and meet all job specifications. The Proctor Storm Drainage Project required 1,710 feet of sewage conduit 10′ wide by 9′ high; 1,722 feet 10′ x 8′; and 2,843 feet 8′ x 7′, for a total length of 6,275 feet. One set of Blaw-Knox special rectangular box type adjustable forms easily handled the three sizes of conduit. The unique feature of the project was the system devised by Blaw-Knox engineers for supporting the conduit roof during pouring and curing. By using four sets of cross beam supports tied together with the outside forms, Slovak Brothers maintained a continuous pouring pace with one set of forms.

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Cut *your* concreting costs by consulting Blaw-Knox in the preliminary planning stage of your next job. Blaw-Knox engineers have undoubtedly solved similar problems and saved money for other contractors, so by taking full advantage of the Blaw-Knox Steel Forms Consultation Service, you are assured of recommendations and proposals for the most efficient concreting methods and the most economical forming equipment. With over 40 years' experience as the original and most prominent manufacturer of Steel Forms, Blaw-Knox specializes in helping you plan for the simplified forming that builds your profits by keeping costs low. Write for details today.

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50th Anniversary BLAW-KNOX 1906-1956

BLAW-KNOX STEEL FORMS CONSULTATION SERVICE

BRIDGES—Construction of two girder bridges in California

California—Mendocino County—State, Peter Kiewit Sons' Co. was awarded a $981,730 contract for construction of two welded plate girder bridges at two locations and about 0.7 mi. of roadway to be graded.

(1) Peter Kiewit Sons' Co. ..... $ 981,730
(2) Nomellini Construction Co. 1,159,765

		(1)	(2)
16 ac.	Clearing & grubbing	$ 900.00	$ 1,210.00
Lump sum	Dev. wat. sup. & furn. wat. equip.	11,000.00	24,200.00
3,300 M gal.	Applying water	2.00	1.65
190,000 cu. yd.	Roadway excav.	.84	1.00
1,600 cu. yd.	Structure excav. (Type A)	10.00	79.00
4,100 cu. yd.	Structure excav.	5.50	19.00
2,350 cu. yd.	Structure backfill	5.25	4.80
450 cu. yd.	Ditch & channel excav.	2.80	2.75
100,000sta. yd.	Overhaul	.01	.06
505 cu. yd.	Class "A" conc. (footing blocks)	35.00	36.00
27 cu. yd.	Class "A" conc. (structures)	105.00	110.00
3,610 cu. yd.	Class "A" conc. (bridges)	345,000.00	306,850.00
1,814 lin. ft.	Conc. railing	7.50	7.75
850 lin. ft.	Rubber waterstops	2.00	2.50
1,300 lb.	Bar reinf. steel	.15	.15
513,000 lb.	Bar reinf. steel (bridges)	67,000.00	77,000.00
2,220 lin. ft.	Furn. steel piling	6.00	3.84
86 ea.	Driving steel piles	200.00	152.50
9 ea.	Steel pile splices	35.00	33.60
1,025,000 lb.	Structural steel	202,500.00	200,000.00
	Cleaning & painting structural steel	16,000.00	17,000.00
182 lin. ft.	18 in. C.M.P. (16 ga.)	4.25	5.50
270 lin. ft.	24 in. C.M.P. (14 ga.)	6.45	7.70
80 lin. ft.	Furn. 30 in. asb. bonded paved invert C.M.P. (12 ga.)	11.00	16.50
80 lin. ft.	Jacking 30 in. asb. bonded paved invert C.M.P.	75.00	33.00
1 ea.	18 in. x 12 in. C.M.P. reducer	50.00	66.00
1 ea.	24 in. x 18 in. C.M.P. reducer	65.00	82.50
286 lin. ft.	84 in. field assem. plate cul. (35-13)	60.00	82.50
250 lin. ft.	8 in. perf. metal pipe underdrains	2.00	2.75
2,150 cu. yd.	Filter material	4.00	4.40
1 ea.	Entrance taper for 8 in. metal pipe	40.00	55.00
40 lin. ft.	8 in. C.M.P. downdrains	3.00	2.50
140 lin. ft.	12 in. C.M.P. downdrains	3.70	4.10
100 lin. ft.	18 in. C.M.P. downdrains	4.80	5.50
1 ea.	8 in. downdrain slip joint	35.00	55.00
1 ea.	12 in. downdrain slip joint	50.00	65.00
1 ea.	18 in. downdrain slip joint	100.00	80.00
Lump sum	Finishing roadway	2,500.00	600.00
1 ea.	Redwood cover for drop inlet	25.00	12.00

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Plan or Frozen Formula

WATER SUPPLY is our most valued resource in the West. Planning for its orderly development and use is sound common sense. *But,* planning an intelligent guide, and creating a frozen formula are two different things. The present situation in California is an example for the entire West to observe and take as a possible object lesson. The principle is the same whether planning is at the state, inter-state, or Federal level.

Years of study have been spent by the state agency in charge of California water resources. Runoff of rivers has been measured and analyzed; demands for water have been evaluated and projected into the future. These years of careful and fruitful engineering work have finally evolved "The Plan." However, having been completed, it appears that the plan has taken a permanent set.

The more time spent developing any plan the more it becomes a fixation in the minds of the planners. In the early stages it may have elements of flexibility, but with prolonged re-study the ruts begin to appear. Soon there is only right or wrong. The plan has jelled. Then if some official stamp is placed on it, the planners become judge and jury over attempts at deviation.

It is quite understandable that planners who spend years gathering data and predicting needs tend to view their work as verging on untouchable. This could be particularly true of engineers making careers of such research. From a broad vision they have seen the details unfold until each small unit seems to emerge as a keystone. It would be ideal if all the parts could be fitted into such a precise pattern, and in orderly sequence. But no plan can expect to evolve into ideal fulfillment. Imagine a water development plan made twenty-five years ago meeting the needs of a state or the West today. When any plan, like the California state program, includes a concluding phrase, ". . . fulfillment of this project will be carried out by generations yet unborn" the futility of exact planning becomes obvious.

Tomorrow, and the next year the growth and needs of a state may dictate a project that cannot possibly be fitted into the orderly program. Or, what may have appeared to be an important need for water will gradually fade out of consideration. Then the plan must be altered and adjusted, although its final objectives can remain as a guide. Revision of a water development program is as vital as flexible strategy is essential in a military campaign.

Needs must be met as they appear. The words spoken years ago by that pioneer in water development ring with refreshing prophecy. William Mulholland once said, in paraphrase, "Unless water is available ahead of need, there will be no need."

The result of meeting demand rather than following the plan may appear slightly haphazard, and the final cost may be higher. That is the price we pay for growth. And the requirements for growth must prevail over the plan. Re-study of any plan by the original planners must be frequent. In addition, qualified, independent experts must be appointed to provide a fresh approach to the assembled data. They must apply a rigorous appraisal to detect undesirable trends toward having fluid ideas becoming congealed dogma.

California, and every state of the West, must be alert against having a frozen water-development plan. Western growth is too dynamic.

Jim Ballard

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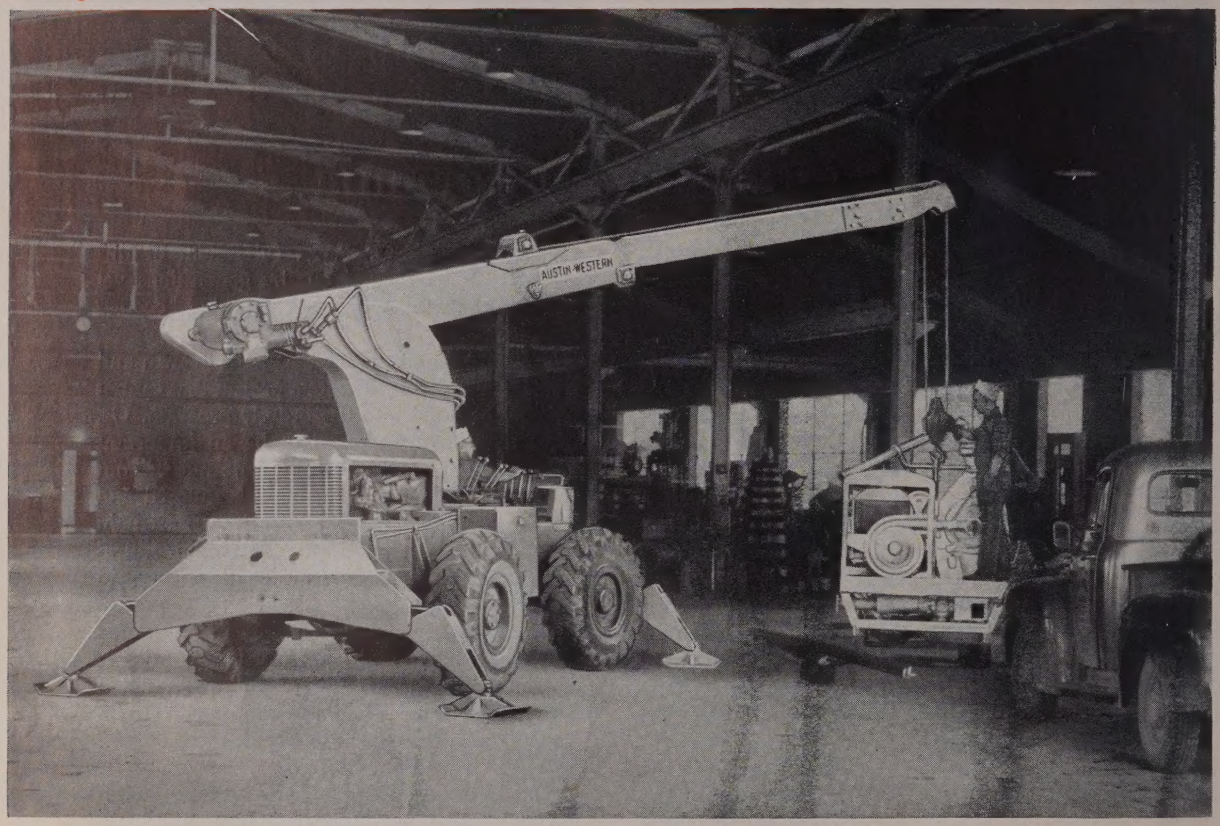
a great Contractor Tool says John G. Yerington



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"Our Austin-Western hydraulic crane has the mobility that enables it to go practically anywhere and be of service in dozens of different ways. Its large 14.00x20 tires and their good grip on the ground make it possible to go through sand or wet or loose soil where many other kinds of equipment would have trouble. Four hydraulic stabilizers allow a wide boom swing."

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