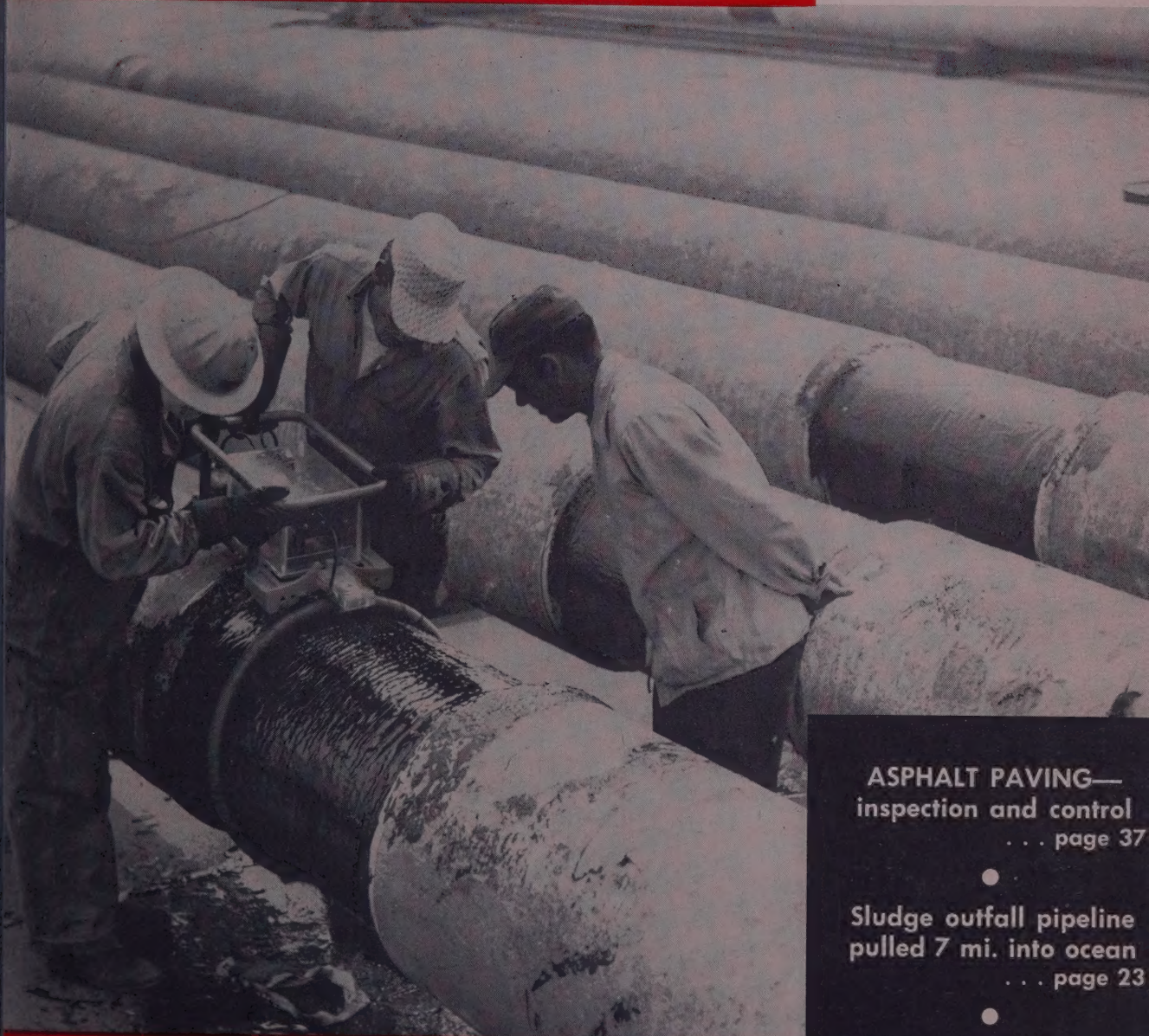


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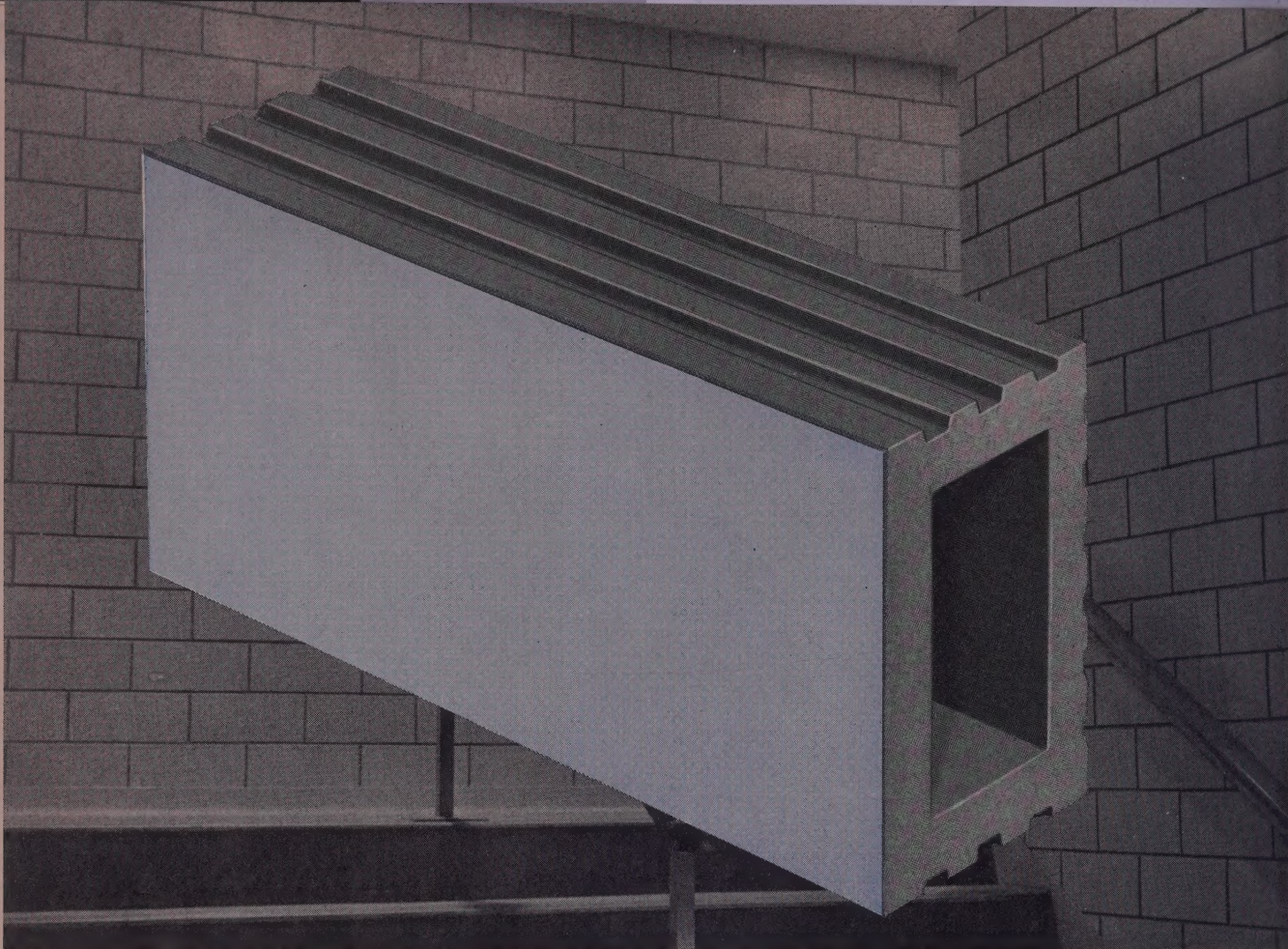
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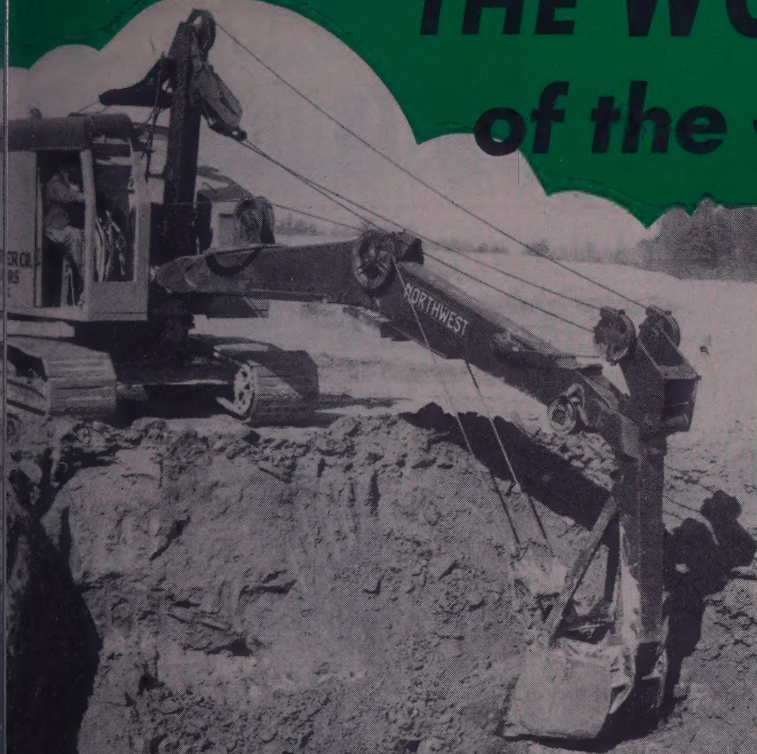
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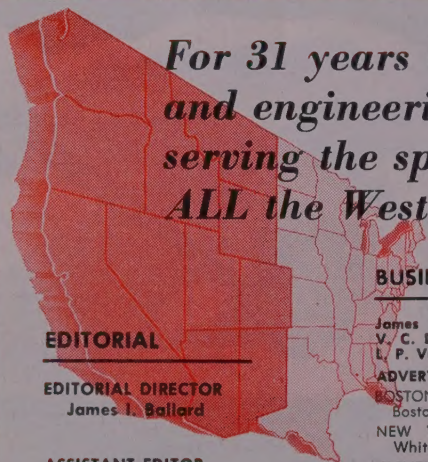
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FRONT COVER

THE STEARS HOLIDAY detector test is shown being performed on the 7½-mile Hyperion Sludge Outfall Project (article begins on page 23). The instrument being used has a 15,000-volt capacity. It checks the coal tar enamel-coated field joint for imperfections. The pipeline is drawing less than one amp. from the cathodic protection system—evidence of a fine coating job.



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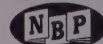
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The West starts a freight-rate fight

EVERYONE in the construction industry of these Western states is indebted to a small group of construction equipment distributors in southern Idaho. Their irritation and indignation over railroad freight charges paid to deliver construction equipment into their territory, and what they did about it, has developed into a national issue under the guidance of the Associated Equipment Distributors. We are pleased to know that other regions of the country stand to gain. It is particularly gratifying that this region stands to benefit most from the work of the original committee from Boise under the chairmanship of H. W. Hurd, vice president, Engineering Sales Service, Inc.

Railroad freight rates have long been noted as antiquated and unrealistic. As an example, among the original facts dug up by the Idaho group was an existing railroad regulation stating that up to six oxen could be included in a mixed carload of "contractor's machinery." In addition to being ancient, the rate structure is so complex and confusing that the average distributor cannot determine whether his freight bills are correct or not. Lastly, the construction industry always seems to get the heavy end of any rate increase. Other industries and groups put up an organized delaying action and get rate increases of from 2 to 5%; the unorganized equipment group has been getting rate increases two or three times as big. This situation with its unfairness, confusion, and high costs finally resulted in the local action that is now taking on a national pattern.

Freight rates on construction equipment have a chain reaction that extends throughout the industry. It is well enough to consider the problem as confined to the manufacturer-distributor level, but it goes much further. The cost of freight from Eastern manufacturing points is passed along to the contractor and from there must be added to bid figures, ultimately affecting engineering estimates and the final cost of the project.

In the present campaign the initial strategy is to have distributors submit their freight bills to a consulting firm of traffic experts selected by AED. This will develop information on tariff inequities and overcharges. With these facts the Interstate Commerce Commission can be approached in the next step toward obtaining fair and realistic tariffs on machinery used in construction.

One simple comparison illustrates the significance of this effort. Since 1946 railroad freight rates have shown an average increase of 98% throughout the country, whereas the ton-mile revenue increased an average of only 41% during the same decade. Obviously, the rate increase was adjusted so that favored shippers gained at the expense of others. Construction equipment has not been favored. An example provided by the current AED study is the fact that the rate increase on power shovel parts since June 1946 has been at least 190%, while the corresponding general increase on manufactured iron and steel articles during the same period has been about 60%.

Confusion prevails and is affecting the construction industry of this Western region. Shipping distances are long and freight is a costly item. The cost to get equipment by rail from the manufacturer to the job site is high, and bid figures feel the effect. Contractors in these Western states, as well as all other purchasers and users of construction equipment, should add their force to this corrective effort, which started with Western men of AED, and help secure relief.

Jim Ballard



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cuts costs on city and suburban pipeline jobs

for UNITED PIPE LINES, Beloit, Wis. *reports Gene Alters, president*

Mr. Alters says: "The results other contractors were reporting in the use of the Austin-Western hydraulic cranes caused us to rent one of these units long enough to prove that we could get the same increased speed in laying pipelines under city and suburban conditions, instead of using conventional side boom equipment. It did not take us long to prove on our own work in difficult locations, especially in or near towns, that with pipe as large as 12 in. there is no comparison between the greater mobility, speed and time saving with this unit over older methods. . . . In July 1956, therefore, we bought our first A-W unit."

Second unit bought, third rented. "A few months later we added a second unit. During the busy season last fall

we rented a third unit for five months from August through December, as they continued to prove themselves decidedly more profitable in laying pipe."

Developed special tools. "We developed special calipers or pipe hooks to handle long lengths of pipe and take every advantage of the precision of hydraulic controls on these cranes. The live boom raises and lowers while it rotates in a full 360° circle. . . . We developed and welded on one of the units a 'bending shoe' at the front bumpers. With chains at either end this powerful hydraulic crane lifted up the ends of a 40 ft. 8 in. pipe and bent it the way we wanted it."

Lays a mile of pipe in 10 hours. "A hurry-up job in Fort Atkinson called for laying 1 mile of 8 in. gas pipe down

a trench beside a city street. We put several crews on the different operations and our two Austin-Western cranes unloaded, strung out and handled the welding operations complete in 10 hours on a Saturday, with minimum inconvenience to traffic and great satisfaction to the city authorities."

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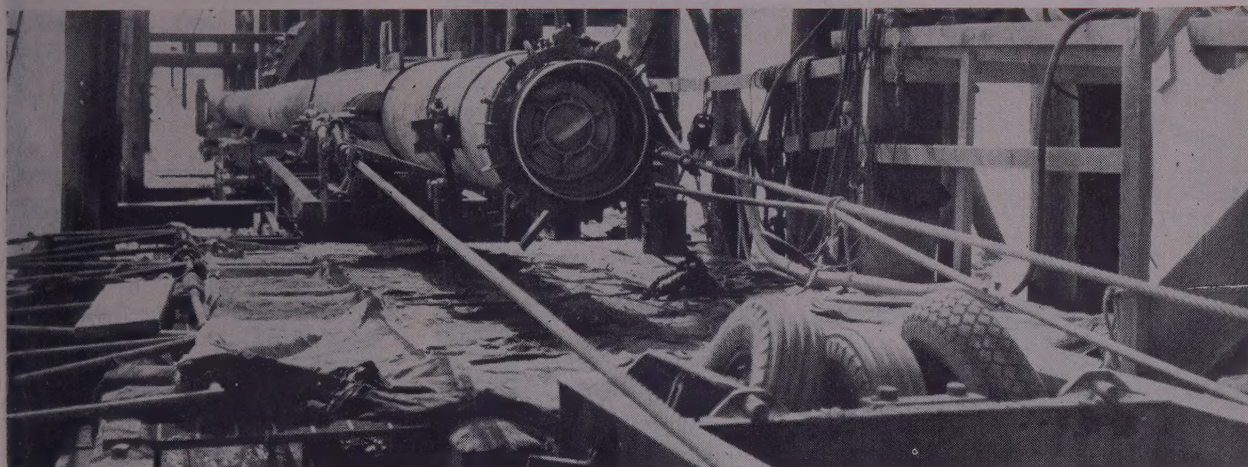
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JULY 1957

WESTERN CONSTRUCTION



THE END of the line, held securely in place by line-up clamps and hold-back cables, waits for the next 600-ft. section to be moved into

position and welded. The 600-ft. sections roll over sets of rubber tires mounted on the launching trestle, as shown in the right foreground.

Outfall pipeline pulled 7 mi. to sea

In a record-breaking performance a 7-mi. long ocean outfall sewer line was pulled into 300 ft. of water in only 7½ days—the fastest, longest and deepest job of its kind. It's part of the \$47,000,000 Hyperion Project of the City of Los Angeles.

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

MODERN CONSTRUCTION methods were combined with advanced engineering techniques in the installation of a seven-mile submarine pipeline in seven and one half days. The project set three new records.

A key feature of the \$47,000,000 Hyperion Sewerage Expansion Program of the City of Los Angeles, the Hyperion Ocean Outfall for Sludge Discharge was recently pulled into place in slightly more than one week. It will permit disposal of digested sludge from the Hyperion Sewage Treatment Plant through a submarine pipeline into Santa Monica Bay at a distance of seven miles from shore and at a depth of 300 ft.

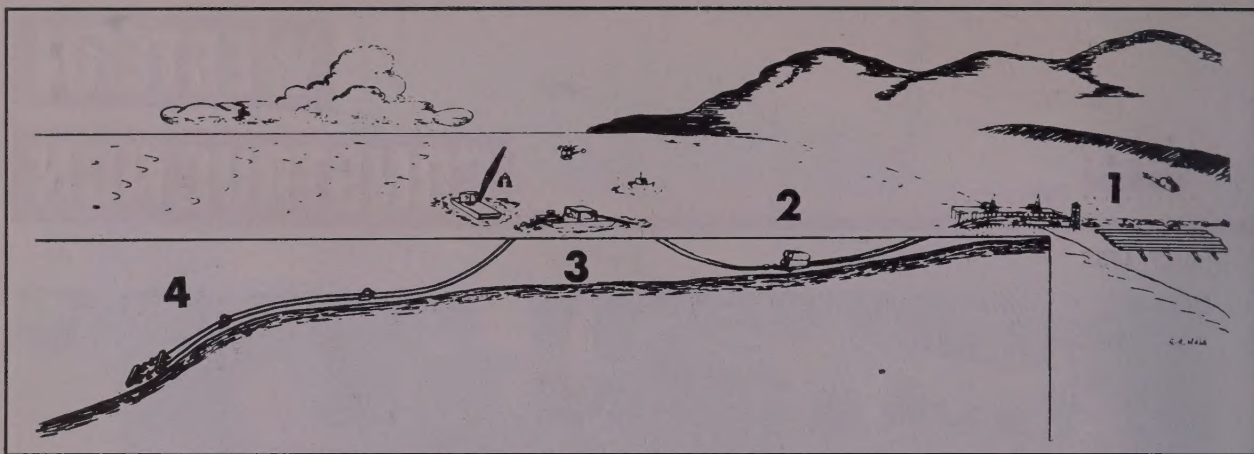
The North Central Outfall feature

of the Hyperion Project has already shattered the progress record for tunneling (WESTERN CONSTRUCTION, March 1957) and now the Sludge Outfall has set three new records. First, its termination depth of 300 ft. makes it the deepest submarine pipeline ever constructed and, secondly, its seven-mile subaqueous length makes it the longest sewer outfall in the world. In addition the contractor by electing to install the line by the pulling method has broken the pulling record of 20,000 ft. set in 1953 at the Straits of Mackinac.

Contractor on the \$2,526,044 project is a joint venture composed of Healy-Tibbitts Construction Co., Submarine Construction Co. and the DeLong Corp. Design for this, as well as the entire Hyperion Expansion Program, has been carried out for the Los Angeles Board of Public Works by Hyperion Engineers, a joint ven-

ture composed of the Los Angeles engineering firms of Holmes & Narver, Inc.; Daniel, Mann, Johnson, and Mendenhall; and Koebig and Koebig.

The pipe is a 22-in. o.d., ⅜-in. wall, steel pipe manufactured in 40-ft. lengths by the expanding process in the Geneva, Utah, mill of the Consolidated-Western Steel Company. In order to secure a high strength pipe which could withstand the severe installation conditions and the high internal pressure (250-ft. head) requirements, the specifications called for A.P.I. 5-LX pipe with a minimum yield strength of 52,000 psi. The actual yield strength observed in tests ranged up to 67,000 psi. For corrosion protection the pipe has a triple wrap coating of Koppers 70-B coal tar enamel reinforced with two layers of fiberglass and a 1⅝-in. outer coat of reinforced gunite. A ½-in. centrifugally spun cement mortar lining protects the interior of the pipe. The coal tar coating was applied by the Pacific Pipeline Corp. and the lining and gunite coating was applied by the United Concrete Pipe Corporation all under sub-contract to the Consolidated-Western Steel Corporation. In addition to the heavy coat-



SKETCH shows main features of construction plan. To the right of the numeral 1 is the hold-back winch, below it the stockpile of 600-ft. pipe sections. To the left of the numeral 1 is the launching trestle, pictured on preceding page. At 2 is the 30-ton pulling sled fastened to the end of the pipeline. Cables lead from sled to the pulling barge, 3, and then to the anchors, 4.



AERIAL VIEW shows 7 mi. of pipe stored on the beach before the pulling operation. Pipes arrived in 40-ft. lengths, were welded into 600-ft. sections. Hyperion treatment plant in background.

ings, corrosion protection is afforded by an impressed-current cathode system. (See cover and page 4.)

Cathodic protection

An important feature of the project is the cathodic protection and testing measures which have been incorporated as insurance against corrosion. These include the conventional rectifier-impressed current type of cathodic protection with Duriron Anodes and a submarine test cable which was connected to the pipe at selected intervals to enable potential readings to be taken. The cable was attached to the pipe at intervals of 20 ft. by means of steel straps. Care had to be exercised to keep the cable away from the top of

the pipe and the submarine trencher which will be riding along the top surface. An unusual provision is the arrangement for applying cathodic protection to the pipe during the construction operations. This was done with the use of zinc sacrificial anodes attached to the temporary trestle. This in combination with the testing system allowed a continuous surveillance of the condition of the pipe coating during installation. Subcontractor for the cathodic protection work is Vanode Company of Pasadena. H. J. Keeling is corrosion consultant to Hyperion Engineers.

Buoyancy control

The contractor elected to install the pipe by the pulling method which

has been successfully used for submarine oil and gas lines. Refinements of this method utilizing the special equipment developed by Sammy Collins, president of the Submarine Construction Co., have been patented under the name of the Collins Friction Transposition Method. General features of the method are shown on the sketch. This method requires control of the buoyancy of the pipe in order to minimize the pulling load required. Ordinarily this is accomplished by attached pontoons at selected intervals along the pipe, but in this instance, the size of the pipe and the coating weight provided allowed a departure from the standard practice. In order to accomplish the desired negative buoyancy of four pounds per foot during pulling, the contractor sealed off the end of the pipe and permitted only air in the pipe during installation. This together with strict weight requirements for the lining and coating operations resulted in a pipeline very easily handled in the water.

Field jointing

At the beach the pipe sections were joined in 600-ft. strings by field welding. Each weld was X-rayed and then a hot coal-tar enamel coating applied. The joint is completed by the field application of the exterior gunite coating. After the pipes were joined in the 600-ft. strings and the exterior field joints completed, the interior joints for the cement mortar lining were completed under a subcontract to Pipe Linings, Inc., who utilized the Centrline Process for this work. Several other methods were attempted for these interior joints but it was found that the Centrline method gave the best results.

In joining the 600-ft. strings during pulling operations, special jointing procedures were utilized in order to minimize the time between pulls. In

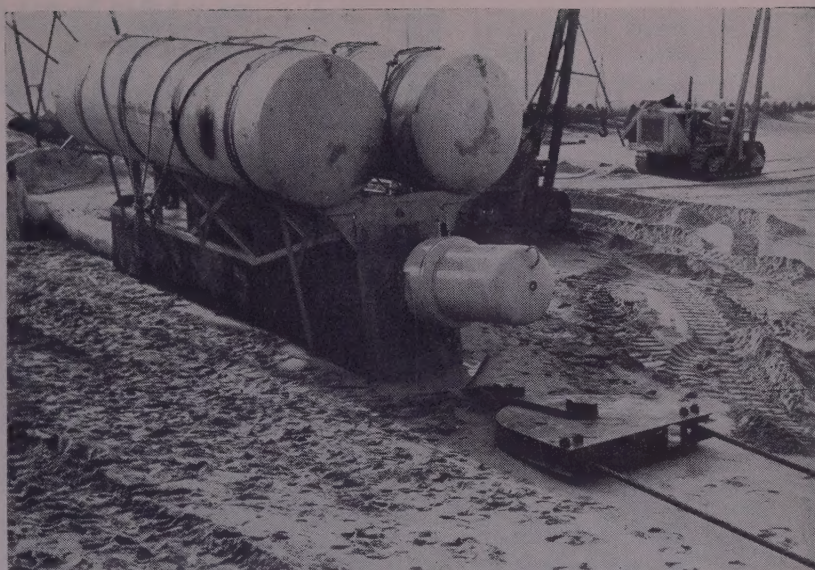
putting the strings together the first operation is to insert a special plastic cylinder into the pipe which is buttered with a plastic adhesive which makes it stick to the inside of the steel pipe and also joins it to the shop-applied cement mortar lining. This is a relatively new method which eliminates necessity of sending a man some 600 ft. in the pipe to hand plaster the joints. Next, pipes are drawn together, line-up clamps attached and weld is made. Some apprehension was felt that the welding operation might damage the interior plastic cylinder, but tests which were conducted have demonstrated conclusively that the heat from the welding has little or no effect on the plastic. The weld is then radiographed and the plates examined in the field laboratory provided by the contractor. Next the coal-tar coating is applied, the reinforcing mesh attached and the gunite exterior coat is applied. A special mix is used for the gunite in order to accelerate the set. A steel sheet is then banded around the gunite and the pipe section is ready to pull.

Installation

A 1,000-ft. pier having two tiers was constructed in order to provide a longer launchway so that 1,200-ft. strings could be pulled in one operation. The lower tier holds the rubber-tired pipe launchers and is so constructed as to provide for a gradual descent of the pipe into the water. The minimum radius maintained in the pipeline is 2,500 ft. which prevented any excessive stresses in the pipe or any cracking in the coating or lining. The top tier is used by side-boom tractors as a means of moving the succeeding strings into position for welding.

The operation began by attaching two 600-ft. strings to the pulling sled and launching this section from the beach. The end of this section was then backed up to the seaward end of the pier and tied to a standing hold-back. Next a 600-ft. string of pipe was rolled onto the launchway and run out and welded onto the pipe at the end of the pier. While this weld was being made, another 600-ft. string was set over and connected. After the completion of the two welds and the lining and coating of the joints the 1,200 ft. of pipe was pulled into the water and the operation repeated until the entire length of pipe had been pulled.

During the pulling operation, a restraining force of 20,000 to 30,000 lb. is held by the holdback winch. This steady tension prevents the pipe from running ahead of the pulling



PULLING SLED weighs 30 tons, is shown just before it entered the ocean. Pulling cables are 2 in. in diameter. End plugs and pontoons are released when sled and pipeline are in final position.

cable and helps to maintain accurate alignment. In this manner, complete and accurate control of the entire pipeline is maintained.

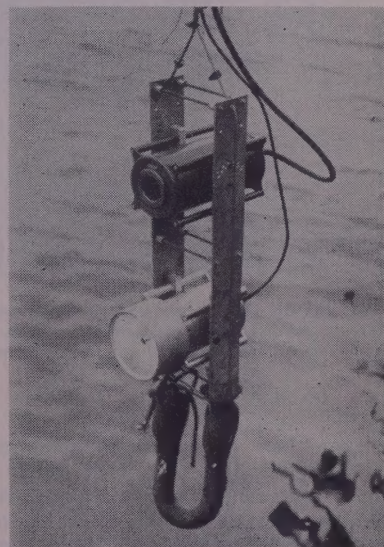
Pulling barge

The pulling barge is a converted LSM on which the pulling and anchor winches are mounted. The main pulling winch is a Seamaster winch designed and built by the Collins Construction Co. to enable pulls of up to 500 tons to be made. The winch is powered by a GMC6-110 diesel engine with a rated 320 hp. and has a torque converter and a torquematic transmission which enables the operator to shift gears under full pulling load. Two-way radios are provided for communications to the shore and in addition the barge is equipped with a helicopter and landing platform for rapid shifting of personnel between the barge and the shore.

During the pulling operation, a recording dynamometer is located on both the pulling cable and the hold-back cable. These instruments record all pulling loads and the restraining holdback load. A limitation 225 tons was placed on the pulling load in order to protect the pipe and an inspector was present at all times to see that this was not exceeded. It was found, however, that due to the low negative buoyancy of the pipe the pulling load did not exceed 150 tons.

As the pipe is pulled into the water, the Seamaster winch will pull against an end anchor weighing 160,000 lb. and having a holding power in excess of the winch capacity.

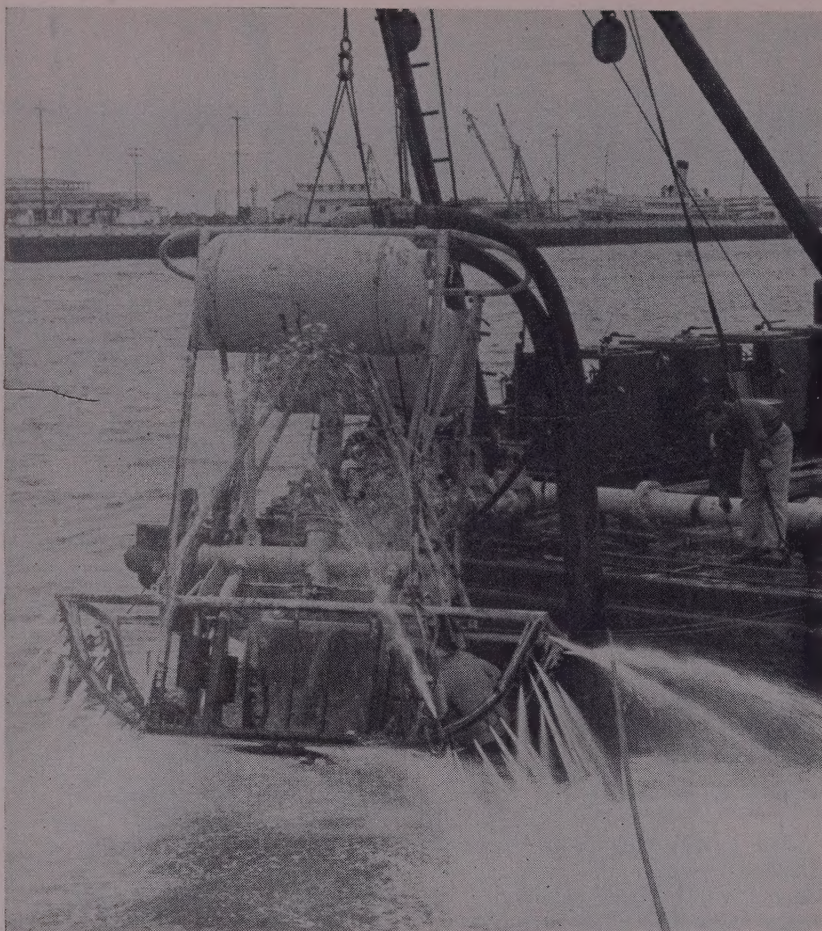
The key to the whole pulling op-



TV is used to inspect terminus of line which is too deep for divers (300 ft.). Set-up shown gives an excellent picture of conditions.

eration is the prior placement of the main and section anchors and the pulling cable. These were placed two days before the pulling commenced and this operation had to be very closely controlled since the alignment of the pulling cable ultimately determined the alignment of the pipe. Survey crews from the City Bureau of Engineering furnished the control for setting the cable and through their careful coordination with the contractor the final pipe was found to be within 5 ft. of the theoretical location.

Some difficulty was encountered in placing the end anchor and a cable was accidentally fouled in it which required considerable maneuvering to



EXCAVATION of a trench into which the pipe will settle is being done with the Collins submarine trencher which uses jets of water to remove material from under the pipe. In the surf zone conventional sheet piling and excavation methods will be used.

clear. Once this main anchor was set, however, the rest of the operation went comparatively rapidly. It required five days to lay the cable in to shore. The pulling operations proceeded smoothly with the time per cycle (from launching of one string to launching of another) averaging about six hours. The longest time was eight hours and the shortest time was four hours. The total pulling time was 7½ days.

Pulling sled

The pulling sled was specifically designed as a multipurpose unit. First, it served as the pulling nose to which the double pulling cables (2-in. diameter) were attached by means of a 5-ft. o.d. sheave, thus transferring the pulling load to the sled and in turn to the pipe. This load transference was accomplished by means of compression in the concrete rather than a direct steel tension tie in order to eliminate the attendant corrosion problems. A very rich mix

was used for the concrete in this sled and the test cylinders showed a strength ranging from 7,000 to 8,000 psi.

During pulling, two 5-ft. diameter by 18-ft. long pontoons are attached to the sled to balance its weight of 60,000 lb. When the pipe is in its final position, the pontoons will be released to the surface and the sled will then act as the pipe end anchor.

Since the pipe must be installed full of air rather than water in order to satisfy the negative buoyancy requirements, an end seal is incorporated with the pulling sled. This seal consists of a plug, pig and keeper plug which are designed to keep the pipe from filling with water during installation and to close the seaward end of the pipe. At the end of the pulling operation, the pipe is filled with water so that the test pressure of 130 psi. can be imposed on the line. The entire assembly is held in place by a single bolt which is pre-calibrated to break under an internal pressure of 150 psi. at which time

the pig will push out the end sealing components which will then float to the surface. Since the 300-ft. depth at the end precluded diver inspection, an underwater television transmitter was lowered near the end sled which was found to be in satisfactory condition. The equipment for this test was furnished by Underwater Surveys of San Diego and gave an excellent picture of the bottom conditions.

Trenching

After the pipe was in place on the bottom, the trenching operations in the nearshore region commenced. The Collins submarine pipeline trenching machine was used to bury the line up to the surf zone. This machine straddles the pipe and undercuts it with a high pressure jet of water thus allowing the pipe to sink to its final grade position. The machine is supplied by three 300-hp. Allis-Chalmers pumps, each powered by a GMC6-110 diesel engine. They are capable of supplying 6,000 gpm. at a pressure of 310 psi. In the surf zone, sheet piling will be driven on either side of the pipe and then the material excavated by conventional means.

At the conclusion of the trenching, the pipe is connected to the shore portion and the line is ready for pigging. The pig was specially designed for the project by the Tod Pazdral Company of Houston, Texas. The most unusual design requirement was that the pig must be buoyant and float to the surface at the conclusion of the run through the pipe.

Personnel

The project has been carried out under the direction of the Los Angeles Board of Public Works, Admiral Cushing Phillips, president. Lyall Pardee is city engineer and W. A. Schneider head of the Bureau of Sanitation.

David L. Narver, Jr., is project manager for Hyperion Engineers with the author as project engineer and Edward W. Walsh as resident engineer. For the City of Los Angeles, W. R. Albritton is in charge of inspection with Hank Holmes as senior inspector. Project manager for the contractor is R. R. Helen with Sammy Collins acting as beachmaster during the pulling operations. Other contractor personnel on the job are Jarvis Gates, assistant to the project manager; Fred Wakefield, general superintendent; J. R. Stapleton, chief engineer; and Jean E. Johnson, marine superintendent.

Salt Lake fill foundation explored with seismology

Extent of salt beds, depth of silt and underlying rock were determined rapidly and provided adequate information for engineering studies. Speed in making survey was essential. Underwater equipment and procedures were unusual features of the seismic tests.

CONSTRUCTION PLANS for the new Southern Pacific railroad causeway across Salt Lake now under construction call for the placement, where possible, of the rock and gravel fill on a competent subsurface salt bed. It was early established by preliminary core drilling that this salt bed is not present at a uniform depth below the lake bottom nor is it present over the full extent of the proposed causeway route.

Engineering studies of the project required that the depth and lateral extent of the subsurface salt bed be more definitely established than shown by preliminary coring so that detailed planning and design could proceed. Further, it was hoped that there might be a shallow bedrock surface beneath the lake bottom muds upon which the fill could be placed. Obviously the exact routing would depend in part on the subsurface salt and/or bedrock conditions established during the preliminary engineering study. As is usual on jobs of this size, a large amount of information was required in the shortest possible time.

Seismology selected

Refraction seismology was decided on as the most practical and economical method of rapidly obtaining this information. Accordingly, seismic traverses were laid out both to the north and to the south of the present trestle crossing. The traverses were so spaced and aligned as to give a network that would effectively cover the area under investigation accurately and rapidly.

As is well known, the refraction seismic method has been successfully used for land exploration problems of a similar nature. Typical applications have been depth to bedrock studies for damsites, bridge abutments, building foundations, road cuts, and in general any type of project where bedrock information is required. Refraction and reflection

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and

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seismic methods are, of course, extensively used by the petroleum industry for mapping subsurface strata. Basically, land and offshore seismic operations are identical. The only major difference between the two is the necessity of devising suitable waterborne means for actually obtaining the data from which the interpretations can be made. These include horizontal control, placing geophones and cable, placing the shot, and protecting the electronic equipment from the effects of salt water.

Basic principle

Refraction seismic exploration both on land and offshore is based on information obtained from the detailed measurement of travel times of an artificially created shock wave through the various near-surface strata. The earth shock waves were generated in this case by placing small 1 to 2-lb. charges of dynamite on the lake bottom. The arrival of this shock wave at the ground surface is detected by small geophones (seismometers) laid out in a line at measured intervals from the origin point of blast.

By carefully measuring to 1/1000 of a second the time taken for the shock energy to travel from the shot point to the various geophones, it is possible to compute the velocity of the energy through the overburden and along refracting high speed layers (bedrock, rock salt) at depth. The velocities so obtained and their relationships to each other make possible the detection and location of subsurface boundaries. The effective-

ness of the method depends on the condition that the seismic velocity is much higher in the buried layer or layers (bedded salt in this case) than the overlying materials (lake bottom muds).

ness of the method depends on the condition that the seismic velocity is much higher in the buried layer or layers (bedded salt in this case) than the overlying materials (lake bottom muds).

The arrival of the shock wave at each measured point or station is detected by means of a geophone. This instrument translates the shock wave energy into tiny electrical pulses. These pulses from each successive geophone are carried back to the recording instrument by means of the geophone cable, consisting of 24 separate insulated wires, two for each geophone. These electrical pulses are then amplified and fed into a 12-channel recording galvanometer. The output of each individual geophone is photographically recorded on a single strip of moving photographic paper simultaneously with timing reference lines. The finished product is a strip of paper, known as a seismogram, containing a photographic record of the instant of the blast and of the arrival of energy from the shot point explosion at each individual geophone.

Operations on shipboard

All operations during this survey were necessarily carried on from

Editor

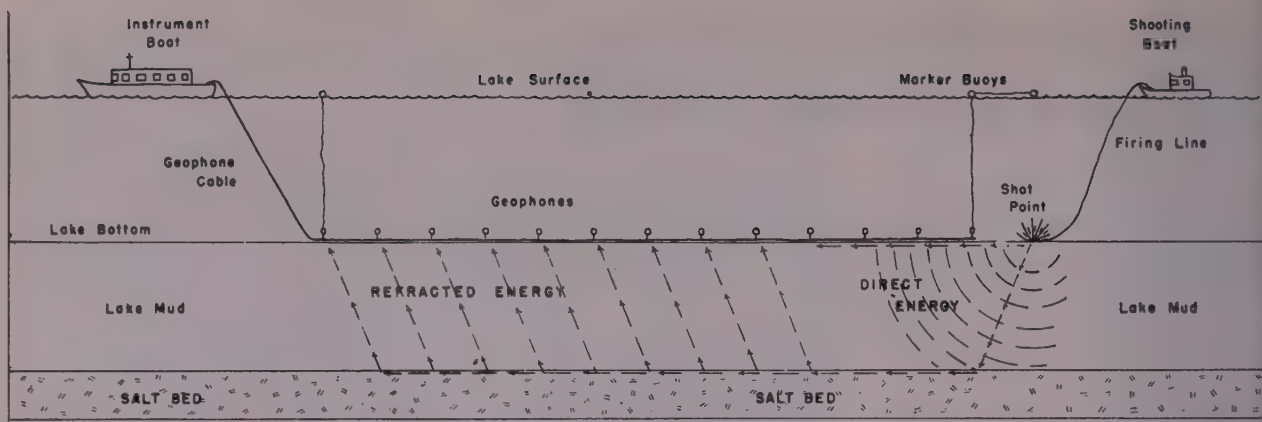


DIAGRAM showing arrangement of shot on lake bottom and location of the recording geophones. This system permitted fast moves along the traverse line with shots at 8 to 10-min. intervals.

shipboard. This resulted in a convenient means of placing the geophones on the bottom of the lake and of moving them to different positions along the traverse lines. The individual geophones were permanently connected at 91-ft. intervals along the geophone cable. Twelve geophones were used making 11 instrument intervals with a total spread length of 1,000 ft. The entire cable system with attached geophones was placed on the bottom along the traverse line and then towed to each successive spread location.

Each geophone was provided with an air filled compartment so that it floated 2 ft. above the lake bottom where the geophone cable rested. These special geophone float assemblies: (1) kept the geophones upright in the water, (2) kept the geophones

in a stable position while the assemblage was pulled along the lake bottom, (3) served as a mechanical filter to reduce outside noise pickup, and (4) provided for efficient transmission of the seismic energy to the geophone.

Floating buoys were attached to each end of the instrument spread so that the accurate position of the cable-geophone assemblage could be observed from the water surface. A second or shooting boat followed the rear end of the cable with the blasting equipment and supplies. The entire cable assemblage and the instrument and shooting boats were all at rest at the time of shooting. The

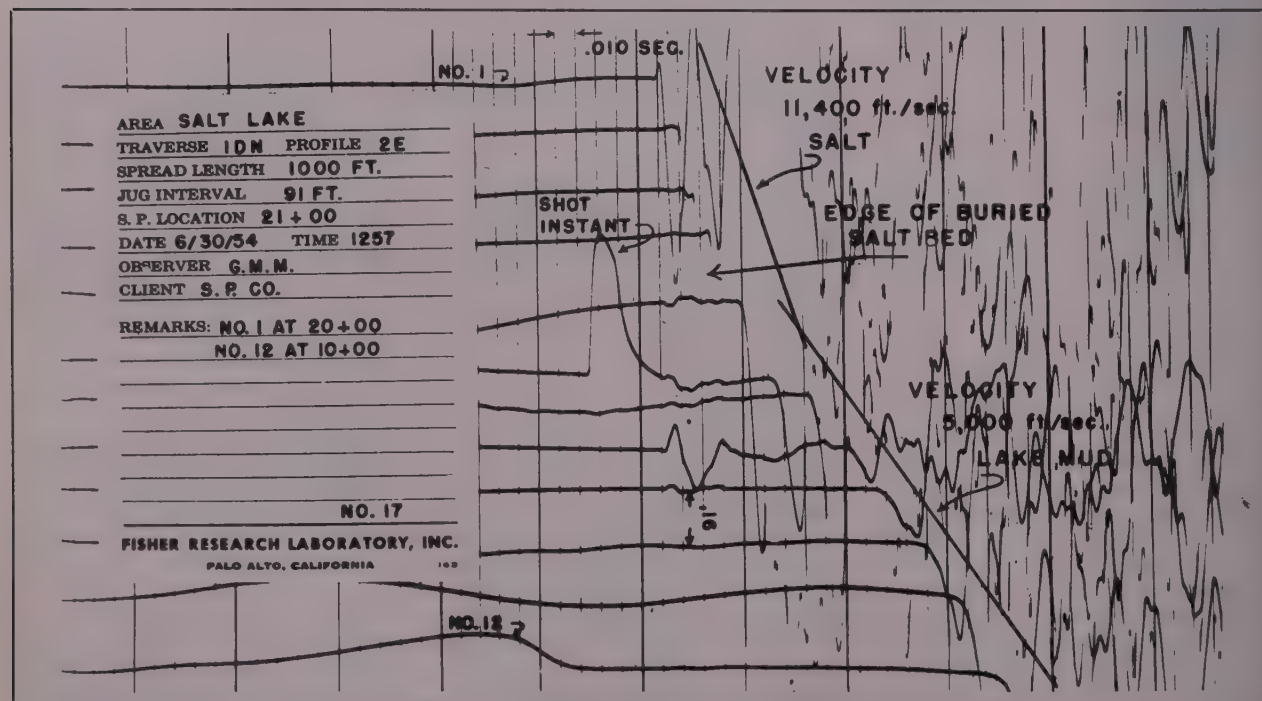
small dynamite charge was placed on the lake bottom and detonated 100 ft. in line from the end or last geophone.

Progress was rapid

Work progress using the field technique described was rapid. Often it was possible to drag the cable into position along the traverse line, place the explosive, detonate the charge, and complete the seismic observations all within a time interval of 8 to 10 min. The problem of providing adequate horizontal control for the project often became difficult due to this rapid rate of progress.

During a sixteen-day work period 128,000 ft. of seismic traverse were completed for an overall average of 8,000 ft. per day. Actually, work progress was much faster than this

TYPICAL RECORD OF SHOT WHICH SHOWS DEFINITE LIMIT OF SALT BED



since many days were completely or partially lost due to lake storms. For example, 42,000 ft. of traverse were completed during one calm, windless day. Frequently the crew would barely be under way for a day's work when winds would come up resulting in waves too high for continued safe operation. Continued winds and rough water made it difficult to line the boats and geophone cable along the established traverses. The frequent winds and rough water also shifted the marker buoys that had been set out to mark the traverse lines resulting in lost time in remarking the traverses. Given calm, windless days, the entire survey could have been completed in four or five days.

The data obtained

The data obtained as results of the seismic work fulfilled the original expectations under which the work was initiated. It proved possible to accurately map the depth and lateral extent of the buried salt bed. Borings completed since this survey have substantiated these results to a remarkable extent.

1. A substantially horizontal layer positively identified as a buried salt bed from core hole information was found over a large part of the area surveyed. The depth to this salt bed was computed from the seismic data recorded for each individual instrument spread. The depth was found to vary between 20 and 40 ft. below the present lake floor with an average depth of 30 to 35 ft. The elevation differences indicate that the salt bed itself probably consists of a zone of overlapping lenses of salt each at slightly different elevations and not one single continuous salt bed. The lateral extent of the salt bed on the east and west ends of the proposed causeway was determined. Detailed cross-sections and a map were prepared to fully show these interpretations.

2. Subsurface materials identified as ordinary lake mud and a transitional zone between salt and mud were also delineated and their respective positions mapped. It was found that the bedded salt, the lake mud, and the transitional materials all possessed distinctive seismic velocities. The transitional zone was found through detailed foundation investigations conducted at a later date to consist of interbedded layers of clay, silt, sand and salt crystals. The seismic velocity found to represent the concealed salt bed varied

from 10,000 to 14,000 ft. per sec. with the great majority of measurements producing a seismic velocity of 12,000 ft. per sec. A seismic velocity of approximately 5,700 ft. per sec. was found to represent the ordinary lake mud. The initial correlation of these two characteristic seismic velocities with definite sub-surface materials was greatly aided by the preliminary core hole data.

Finally a third and equally characteristic velocity of 7,000 to 9,500 ft. with an average value of 8,400 ft. was observed. This velocity was identified as representing a sub-surface strata of intermediate in composition between pure salt and lake mud.

3. It was found that the edge of the concealed salt bed was sharp and distinct along the east end of the proposed causeway route. On the west edge, however, the contact was found to be gradational with the salt passing through a transitional zone to ordinary lake mud.

The eastern edge of the buried salt bed was found to be so sharp and distinct that the seismic records obtained when this contact was crossed proved to be the all too rare textbook example for this type of problem. The information was so clear on the seismogram that the positive location of this edge was available within a few minutes after the shot was detonated. (See illustration.)

The western edge of the buried salt bed was found to be gradational with the salt gradually changing to ordinary lake mud. Material in the transition zone is composed of intermittent stringers and small layers of salt mixed with mud. It was possible to map the limits of this transition zone.

4. No true lake bottom bedrock was found during the course of the survey. In areas not underlain with the buried salt bed, the instrument set-up used indicated that the bedrock bottom was in excess of at least 200 ft. Experimental seismic work conducted after the survey traverse lines were completed showed that the original lake bottom was probably at a depth in excess of at least 350 ft. in the area adjacent to the east end of the present railroad trestle.

Since overall depth penetration by refraction seismology is dependent on the total spread length it would have been possible to continuously expand the distance between the shot point and the geophones until true bedrock penetration was obtained. However, this would have been academic since depths in excess of 200 ft. were beyond the range of

engineering consideration for this problem.

5. Interestingly enough, it was found that a salt surface profile determined from inspection of the pile-driving records for the existing trestle correlated remarkably well with the seismic data.

6. It was not possible to obtain data as to the total thickness of the buried salt bed or the conditions existing below the salt. This is due to the geologic conditions existing at this site plus the nature of the refraction seismic method, this limitation being that in order to obtain effective penetration, the successive geologic layers or strata must show an increasing seismic velocity with depth.

Acknowledgments

This survey was the result of joint effort by Fisher Research Laboratory, Inc., Palo Alto, Calif.; International Engineering Co., Inc., San Francisco, Calif., and the Southern Pacific Company. Fisher Research supplied the refraction seismic instrumentation, technicians, and the interpretation of the seismic results. The Fisher crew was under the direction of George M. MacLeod, geophysicist. Prof. Joshua L. Soske of Stanford University served as special geophysical consultant.

The survey itself was part of a larger engineering study of the Salt Lake crossing undertaken by the International Engineering Co., Inc., for Southern Pacific. James F. Templeton, engineer, was responsible for the overall supervision of the field project.

The Southern Pacific Company furnished living accommodations, boats and boat crews, and the crew to obtain the necessary horizontal control for the survey.

Contract let for dam in British Columbia

A CONTRACT of \$25,000,000 has been awarded by the British Columbia Electric Co., to Northern Construction Co. and J. W. Stewart Ltd. of Vancouver, B. C., for construction of a 190-ft. earthfill dam on Bridge River. This project represents a second stage in the development of power by this company on Bridge River in British Columbia.

The present contract follows up an award of about \$9,000,000 to the same two contractors for a 2½-mi. tunnel which will divert the flow of the river into Seton Lake where the power plant will be installed.



AT THE FACE, and under the jumbo, one of the 200 to 250 holes is drilled to a 15-ft. depth. The round will bring down about 600 yd. of rock. Driving has been from one heading.

DRILLING the 2,778-ft. diversion tunnel through the west wall of the canyon is the current story of construction activity at Glen Canyon Dam being built by the Bureau of Reclamation in northern Arizona. The story behind the story, however, is one of struggle against primitive access roads and isolation. Although located just 16 mi. upstream from Lee's Ferry on U. S. Highway 89, the canyon has been known until recently to only a handful of livestockmen, prospectors and river runners. At the time the contract was let for the diversion tunnel last October the only way into the site was 76 mi. of tortuous road plagued by drifting blow sand and accessible only by jeep.

In six months' time this picture has changed drastically. A modern four-lane highway is now under construction from Kanab, Utah, 63 mi. east to the Utah-Arizona state line. On the east side of the river crews are pushing from Bitter Springs, 13 mi. southeast of the present Navajo Bridge to link the damsite in northern Arizona. Total cost of the 93 mi. of highway is estimated at about \$9,000,000.

Already under contract to Kiewit-Judson Pacific Murphy Co. of Emeryville, Calif., is a \$4,139,277 steel arch bridge across the Colorado River some 850 ft. below the damsite. The construction of the bridge is expected to take two years. A comprehensive review of the Glen Canyon project, its design features and access problems, appeared in **WESTERN CONSTRUCTION**, February 1957, p. 28.

The prime contractor on the west

diversion tunnel is Mountain States Construction Co., Denver, Colo., with a bid of \$2,452,340. Drilling and shooting phase of the operation was subcontracted to Northwood, Inc., Vancouver, B. C., and mucking-out to Theo. Wood, Salt Lake City, Utah.

Specifications call for 1,818 ft. of unlined tunnel 43 ft. 6 in. in diameter and 950 ft. of unlined tunnel 46 ft. 6 in. in diameter. The tunnel contract, awarded Oct. 2, is to be completed within 400 working days.

The usual drill-shoot-muck sequence of all tunneling is now under way from the upper portal with the work downstream limited to scaling rock on the canyon wall. The cut at the face is approximately 46 ft. in diameter, bounded by a 1:1 side slope which becomes vertical at the portal. An estimated 6,000 cu. yd. of rock were hauled out in making the portal

GLEN CANYON DIVERSION

Giant project starts with tunnel driving around dam site through the canyon wall. Access is major problem with men and equipment lowered by cableway.

using bulldozers and track mounted air drills employing breast and down hole drilling methods in excavation.

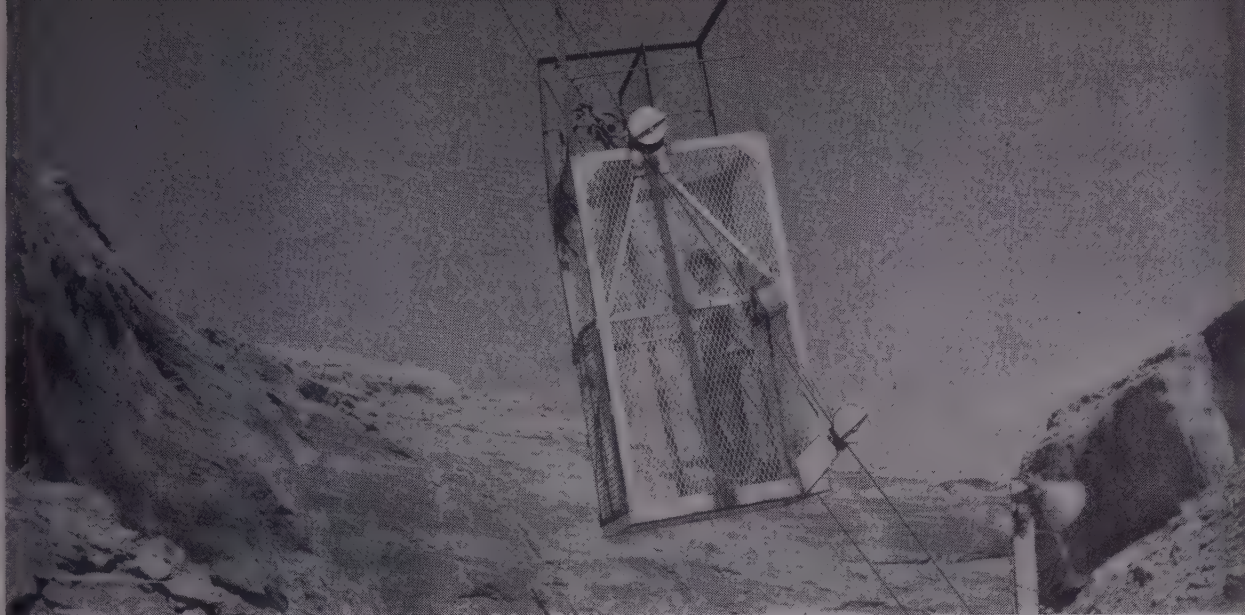
Equipment used for tunnel excavation includes three Euclid 12-yd. dump trucks, a D8 Caterpillar tractor and an Allis-Chalmers front end loader. Gardner-Denver rotary compressors with an output of 900 cfm. handle the drilling operations. Drills include 20 Cleveland H10AL jack leg drills, two Chicago Pneumatic Track Air drills, two Ingersoll-Rand X-71's mounted on a 4-in. column peg, and a number of Thor and Cleveland jack hammers.

The gantry type jumbo moves on its own wheels rather than being mounted on a truck. This rig covers the full face with four decks mounting from two to five drills on each deck. A total of fifteen drills are generally used. From 200 to 250 holes are drilled for the round. Depth of holes is about 15 ft. The shot pulls about 14 ft. of muck or an average of about



PORTAL of the diversion tunnel in the sheer canyon wall shows access difficulty, with muck used to build a working area at the river's edge.

Bur. of Recl. photo



ROLLING DOWN the two guide cables, the man-cage provides access to the diversion tunnel work at the upper portal. The ride is 750 ft. long from rim to river level.

600 cu. yd. A front end loader and trucks move through the jumbo to muck out. The bottom floor of the jumbo folds up (see picture) to permit passage of the mucking and hauling equipment.

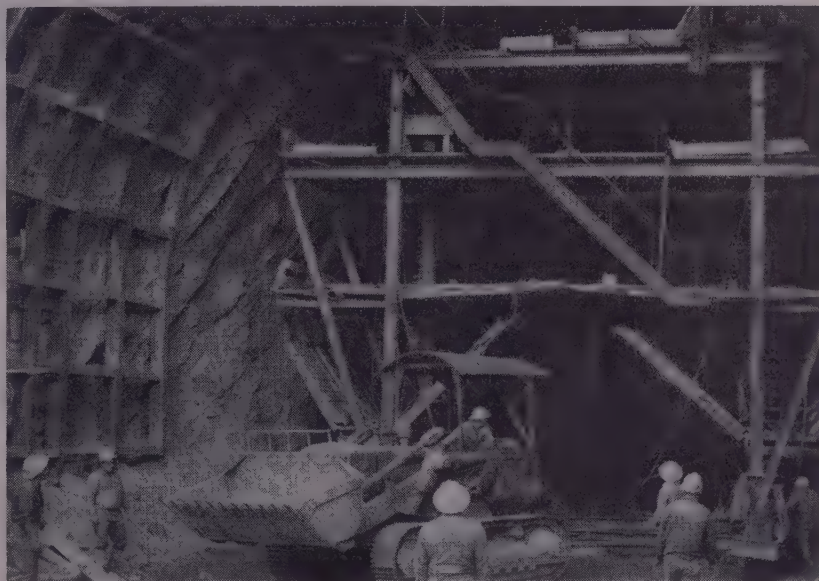
Difficulties encountered in portaling in included some rock falls and ground spalling. About 20 sets of steel ring supports were used in shoring up the rock at the tunnel entrance with roof bolts supporting the tunnel roof along its inner wall.

Depending on the nature of the rock, the drill-shoot-muck sequence produces as high as 16 ft. of tunnel per day, with about 13 ft. considered average. On April 15 the tunnel had swung around the 250-ft. curve and was moving forward in the wall some 500 ft. from the portal entry. Its invert grade was about at water level.

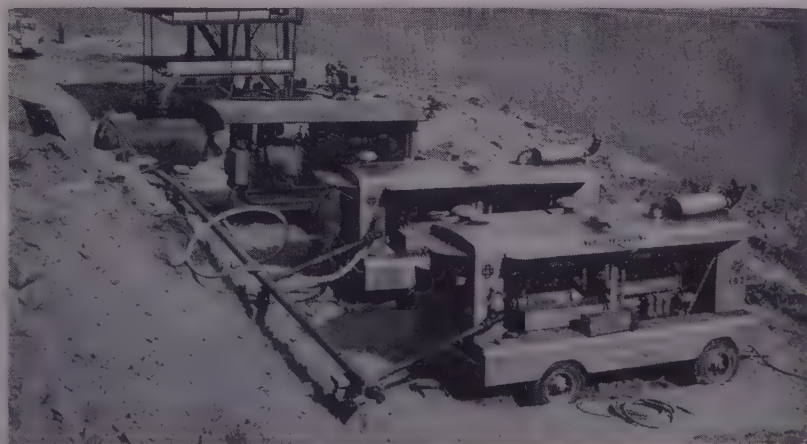
Once into better ground engineers say that the present round of 600 cu. yd. will probably be boosted to 800 yd. with a total of 168,000 cu. yd. of muck to be excavated before the tunnel is complete.

The contract calls for dumping the muck upstream from the dam with the fill used in the construction of a negotiable canyon road. Eventually this road will join the Wahweap, a side canyon of the Colorado River and the route probably will be used to take the heavy equipment out of the canyon.

Scaling operation at the lower portal is being carried out by Mountain States Construction Co., contractor on the job. From 70,000 to 80,000 cu. yd. of rock have been blasted from the canyon wall here with another 55,000 yd. to go. A spokesman for the company reported that the possibility of portaling in from the lower end is now under study although nothing



JUMBO with four drilling levels is being backed in to the face for the next rounds by an Allis-Chalmers front-end loader. Note hinged lower floor to facilitate hauling muck.



BATTERY of Gardner-Denver compressors at the portal supply air for drills on the jumbo. Picture was taken when jumbo (in the background) was being built.

Bur. of Recl. photo



THROUGH the jumbo, with its lowest platform pulled up, comes the 12-yd. Euclid with a load of muck. The jumbo is mounted on rubber tires.
Bur. of Recl. photo



STEEL SUPPORTS were set near the tunnel portal. Drilling is to trim rock back to the line for the rib. Note plates showing installation of rock bolts at upper right.

can be done until the scaling is complete.

Ventilation in the tunnel is supplied by a Joy blower delivering 45,000 cfm. through a 42-in. welded steel line.

A crew of from 60 to 70 are currently employed in the driving of the tunnel. These include 27 to 34 men for scaling, 25 for drilling and from 12 to 14 in mucking. Two shifts are worked with the drill-shoot operation done during the day and mucking at night. Supervisory personnel on the job include Earl M. Cooper, project manager for Mountain States Construction Co.; Olen H. Hamrick, general superintendent, Mountain States, Ernie Moore, superintendent for Northwood, Inc., and Earl A. Edwards, supervisor inspector for the Bureau of Reclamation.

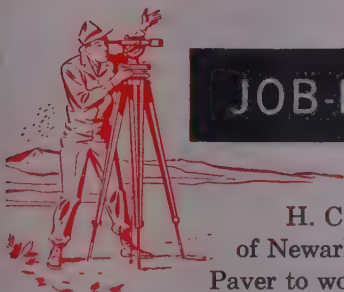
Butler prefabricated steel buildings have been provided by Mountain States for commissary and housing facilities.

Access is an important feature of all work at the damsite. Originally, the only way to the river was by way of the highscaler's rope or through the Wahweap, a narrow side canyon of the Colorado. In November the main cable for a highline was snaked across the river and steel A-frames erected on both rims. Included in the construction of the highline were 1,465 ft. of 2½-in., 450 ft. of 7/8-in. cable and 4,000 ft. of hauling line.



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ASPHALT PAVING

Field inspection, control and workmanship



By **VAUGHN MARKER**

District Engineer
The Asphalt Institute
San Francisco, California

Part one of two

There is a great lack of available information on the problems and duties of the highway paving inspector. In searching for ways to improve this situation **WESTERN CONSTRUCTION** was fortunate to receive the assistance of The Asphalt Institute and, in particular, Vaughn Marker, District Engineer in the San Francisco office. Before joining the Institute he was with the California Division of Highways as a bituminous paving specialist. With this article he makes a valuable contribution to highway construction literature.

EDITOR

THE PRODUCTION and placing of hot-mixed asphaltic concrete mixtures for paving has reached large proportions in this country. More and more use of the material has been made through the years until at present it is used for approximately 80% of the total street and highway paving. The customer for the end product—the pavement—is the motorist who drives over it. His appreciation of the quality of the product he has purchased, however, is limited to his sense of feel and sight. To him a good surface is one that rides smoothly and comfortably and he has little concept of what went into the actual construction of the pavement. This is probably as it should be. He should not have to worry about the phases of construction or the various layers

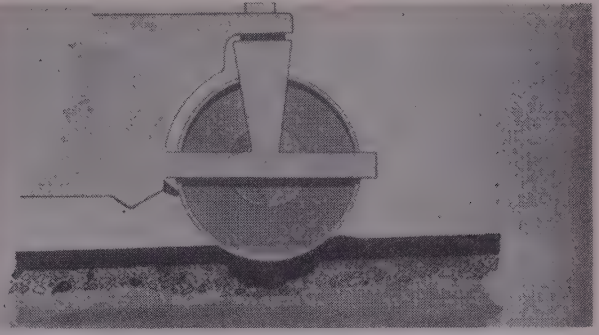
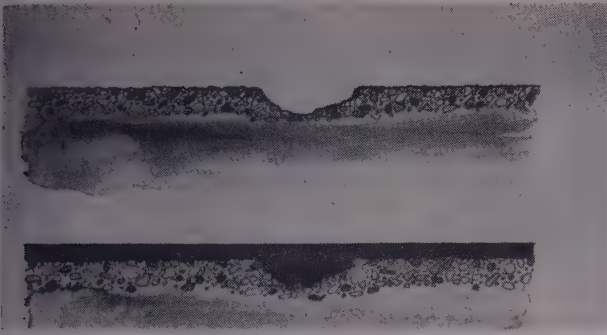
of material that went into the road-bed structure.

In the light of the quality that is demanded by the customer, the importance of the placing phase of asphaltic construction is sometimes overlooked due to emphasis on design and specifications. It goes without saying that the plans and specifications as well as testing play an extremely important part in the construction of any type, but regardless of what is done along these lines, someone still has to build the job according to the requirements. The goal of the best possible paving job is of mutual interest to the contractor and the customer. The role of the customer's representative, the paving inspector, in this light assumes considerable importance.

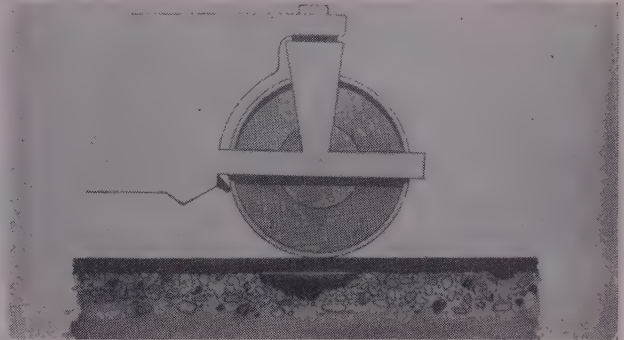
The primary function of the asphalt paving inspector is to see that the end product meets the requirements for the job. In accomplishing this, the inspector's position is to influence and guide the paving operation to produce a road that will meet specifications and give the best possible riding surface to the customer. It is important that the inspector on the street aid the paving operator in solving any problems that may come up, to achieve the highest possible quality. In many instances a change or correction in procedure will improve the quality of the work as well as increase the efficiency with which the contractor is operating. Thus, both are benefited by the same change.

The relationship between the in-

Paving over depressions – a right way and a wrong way



WRONG If the paver is allowed to proceed over depressions and chuck holes the roller will cause differential compaction at the point of greater asphalt thickness. Result: a depression in the finished roadway surface.



RIGHT Chuck holes and depressions should first be filled manually and wheel-rolled by trucks or other equipment. After the paving machine makes its pass the final rolling will create a smooth roadway surface.

spector and the contractor's forces should be cordial at all times. Cooperation with the contractor is essential to obtaining a satisfactory end result. Normally the inspector does not have the authority to tell the contractor how to do anything unless he is specifically requested. His job is to check the equipment, procedures and the end product to see that they meet the specification requirements for the job at hand.

Know the plans and specs

The first thing that the inspector must be fully acquainted with are the plans and specifications for his job. This may sound odd as a beginning statement in describing the duties and functions of the inspector. However, too frequently it has been observed that this man is satisfied merely that the material being placed is "black" and that he pays little regard to what is to be accomplished with that "black" material.

It is not sufficient that he merely sit under the nearest shade tree and observe operations as they progress. He must take an active part in the actual functioning of the paving operation. He should be adequately

equipped with the tools of his job such as notebook, thermometers, string lines, straight edges, etc., necessary to accomplish his mission. He should also have a working knowledge of the construction equipment being used by the contractor.

This means that he should know enough about it to be able to tell on visual inspection whether or not it is in good mechanical condition and properly adjusted. While he is not directly responsible for this phase of the work, he should be aware of conditions in order that he can intelligently perform his job. In connection with this, he should also be familiar with the proper operating techniques for the particular type of equipment he is dealing with.

All of the things that have been mentioned so far can be summed up with one word, *workmanship*. Besides being present to see that the job specifications are properly complied with, the inspector should always be alert to see that good practices are followed by the construction crew. Each little detail of workmanship in itself may be thought of as insignificant. When all the details are added together, however, they assume considerable magnitude. It is the atten-

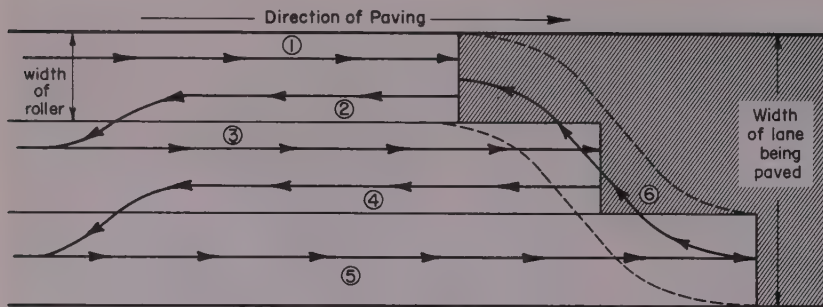
tion to these details that can make the difference between a good job and a superior job.

Subgrade is important

One of the first things the street inspector should do upon arriving on the job is to make certain that the subgrades, or any surface upon which asphaltic paving is being placed, is to as true a grade and cross-section as possible before the paving operations begin. If he finds any excessive irregularities, these should be corrected before placing the first course of asphaltic mixture. Very high spots should be cut down and local depressions should be filled with the most suitable material available and thoroughly compacted.

In the event the surface on which the pavement is to be placed is plagued with a large number of chuck holes which are rather small in size, these chuck holes should be filled and compacted. If the irregularity takes the shape of a long shallow depression, asphaltic material can be placed by a motor grader and rolled with rubber tired equipment before the first course of asphaltic concrete is placed. If there are visible soft spots in the subgrade and/or obvious need

Correct rolling pattern



A PROPER PATTERN of rolling a pavement is shown in the drawing. In this case the roller operates on three lanes, as the pavement is three times wider than the roller. In the top lane the roller advances (1) with the drive wheel forward and returns (2) in the same lane. The roller moves to the next lane as shown at the left. Moving from left to right (3) the roller moves beyond the end of the first compacted lane so that the ridges created by changing direction do not match. The roller returns to the left (4) following exactly the same path as in the previous pass (3). After moving into the lower lane as shown at the left, the roller proceeds from left to right and continues until beyond the ends of the first two compacted lanes. The dotted lines show a path to follow in returning to the upper lane which would smooth out the side and end ridges. An alternate procedure is to give the bottom lane another rolling by returning along (5) from right to left and returning to the top lane at the left.

of drainage correction, this work should also be done prior to the paving operation. The smoothness of the finished surface is dependent to a large degree on the smoothness and firmness of the subgrade on which it is placed.

Collecting the load slips

One of the routine tasks of the street inspector is to collect the weighmaster certificates, better known as load slips, from the truck drivers at the point of delivery and assure himself that the material represented by that load slip is actually incorporated into the work. While this is the main reason for collecting load slips carefully, there are many other things that are accomplished by these little pieces of paper. In summing up the total quantities represented by these slips, the actual production for the day can be checked against plant records.

Further, an accurate record of these load slips minimizes the possibility of a single load being diverted from the job. While frequently done, it is not considered good practice to allow the construction foreman to collect the load slips and periodically hand them to the inspector. It is much wiser on the inspector's part to collect these load slips himself and make proper record of them.

One of the most important uses to which the information on the load slip can be placed is to allow a check of the spread being made. By this is meant the yield of each truck load of material. With the known unit weight of the material, the average thickness to which it is being placed, and the

quantity available in the truck, checking of the spread is a simple computation. This computation assumes greater importance in the placing of binder or leveling courses because these courses should never be placed to a uniform thickness. If laid to a uniform thickness, one of the main purposes of these courses is defeated, namely to level up the surface irregularities in the base on which they are being placed.

In this connection, it is probably more important to check the yield of the asphaltic concrete when it is being placed in a windrow than when it is dumped directly into a paving machine before spreading. When placed in a windrow, it is usually spread by a motor grader and the operator is prone to use up whatever material is in the windrow before him. If a careful check is not made of the quantity of material in the windrow, the inspector will find that the contract quantities for the material he is working with have either been overrun excessively or he has a large quantity left over. Even with a paving machine, occasional checks of the spread should be made. Only by keeping constant track of the material being used can the inspector be assured that he is doing his job well.

Prime coat purpose and problems

The inspector should be certain that the prime coats or tack coats are judiciously applied. The purpose of these applications is to assure a good bond between the asphaltic mixture and the surface on which it is being placed by knitting together loose particles that may be on the surface of

the subgrade. In addition the prime or tack coat covers the individual particles on the surface and thereby prevents these particles from later taking asphalt from the paving mix, or from acting as a layer of ball-bearings and thereby providing a slip plane.

If the prime is applied in excessive amounts, these applications can also cause slip planes to develop through lubrication, or cause subsequent bleeding and instability in the asphaltic surface. In rare special cases it may be advantageous to omit the use of a prime or tack coat entirely. These cases, however, happen infrequently and the conditions for these jobs should be very carefully analyzed before the application is omitted. It is probably safe to say that the best policy is to always use a prime or tack coat. In the case of the tack coat, particularly, special care should be taken to see that excessive amounts are not placed. A tack coat should be placed in extremely small quantities probably only sufficient to speckle the surface on which paving is to be done.

Placing temperature

The temperature at which the asphaltic mixture should be produced is usually governed by the street operation. Under normal conditions the plant inspector can regulate the mix temperature to whatever degree the street inspector finds necessary for proper workability and placing. To this end, there should be close cooperation between the paving inspector and the plant inspector. Communications can be maintained through the medium of notes carried by the truck drivers or by means of two-way radio systems in the contractor's vehicles.

Mix temperature requirements will vary with the type of work being done, time of day, air temperature, type of asphalt being used and other things. By observation, the street inspector can readily tell whether the mix temperature should be increased or decreased to fit his particular job conditions. Usually the asphalt plant can produce the asphaltic mixture at temperatures as low or below that—which the street operation can handle it. Also, the mix can usually be placed at a somewhat lower temperature with a paving machine than with a motor grader or doing hand work. A good rule of thumb to follow is to keep the temperature of the mix as low as possible to allow for proper mixing and coating the aggregate particles in the plant as well as for proper workability and placing on the street.

(Continued on page 40)



This 22-B, the third Bucyrus-Erie recently added to Hamilton and Thoms' equipment inventory, is the prime mover on a bridge erection project near Sheridan, Ore. It is so versatile — mucking out, unloading, driving piles, etc. — that no other material handling equipment is required.

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And the close attention—during manufacture—to the things that mean outstanding quality—that's the

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At Bucyrus-Erie, hammer forging, annealing, heat treating, case hardening, and flame hardening—each process is applied where it contributes most to strength. Because Bucyrus-Erie has facilities for producing both weldments and castings, it can choose whichever is better for each working part.

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ASPHALT PAVING

(Continued from page 38)

Rolling is one of the hidden secrets of successful hot-mix asphalt paving. Discussions and arguments can be started on this subject with as many people as can be interested in talking about it, since there are several schools of thought concerning which is the best procedure. Undoubtedly, under certain conditions each method proposed will probably give satisfactory results. There are two or three fundamental points, however, that should be observed no matter what rolling procedure is employed.

With steel wheel rollers, the operation should always progress with the drive wheel forward in the direction of paving. It is probably more important that this procedure be followed during the breakdown pass or initial rolling of the asphaltic mat, but it is also quite important in later operations. The greatest percentage of compaction that occurs during the construction phase occurs during the breakdown pass. One of the main reasons that the breakdown should be done with drive wheel rather than with the tiller wheel is that there is a more direct vertical load applied by this wheel than the tiller wheel. In addition, the greater proportion of the weight of the roller is on this wheel, therefore, more compaction occurs (see sketch).

Due to the fact that the tiller wheel is a dead wheel and is merely being propelled by the roller itself, the resultant thrust of the roll is somewhere ahead of the vertical. In the case of the drive wheel, there is a rotational force on the wheel which tends to tuck the mix underneath the roll allowing for more vertical compactive effort. It is for this fact that there is less of a tendency for the mix to mush or shove forward under the roller if the drive roll is being used ahead of the tiller wheel. With this operating technique, when the direction of the roller is reversed at the end of a pass, the tiller wheel is on compacted material and its movement in changing directions will do less to displace the asphaltic mix.

Exceptions in rolling

There are one or two exceptions to this rolling technique which occur usually when there are high super elevations being constructed or if the grade on which the pavement is being placed is excessive. The exceptions occur when, due to these high grades, the drive wheel of the roller begins to chatter on the mat causing displace-

ment of the mix and a very rough surface. In these cases, of course, the roller must be turned around to allow the tiller wheel to partially compact the material in order that the drive wheel can then proceed over it.

Another fundamental to be observed in rolling is to start the rolling operation from the low side of the spread and progress toward the high side. The reason for this is that asphaltic mixtures, especially when they are hot, tend to migrate towards the low side of the spread under the action of the roller. If the rolling is started from the high side, this migration is much more pronounced than if the rolling progresses in the opposite direction. In matching lanes, this rolling pattern should be followed after compaction of the fresh mix at the longitudinal joint with 6 to 8 in. of the roller width.

The initial or breakdown pass with the roller should be made as soon as possible to roll the mixture without cracking the mat or having the mix pick up on the roller wheels. If the mix is too hot to roll, transverse cracking or hair checking will be evident. This is caused by the surface of the mixture cooling much more rapidly than the mass below, giving a differential movement under the roller. While this does not seriously affect the structural quality of the mat it is good practice to avoid its occurrence. The final or finish rolling to leave a smooth finished surface should not be started until the mix has cooled off sufficiently so that little or no roller marks are left in the mat.

A good rule to follow is to refrain from rolling until the bare hand can be placed on the mat without excessive discomfort.

Weight of rollers

In general, the lightest roller that should be put on an asphaltic mixture is around 5 tons and this only in the case of mixes that have border line or low stability. Most effective rolling can be done with an 8 to 10-ton roller. In some cases, especially where high stability mixes having large proportions of crushed material are involved, however, it is sometimes wise to use a 10 to 12 or 12 to 15-ton roller for the breakdown pass, with the finish rolling being done with either the heavy roller or a lighter one. In the cases of border line stability mixes, only that roller which can be adequately supported by the mix should be allowed on the mat with no use of very heavy rolling equipment.

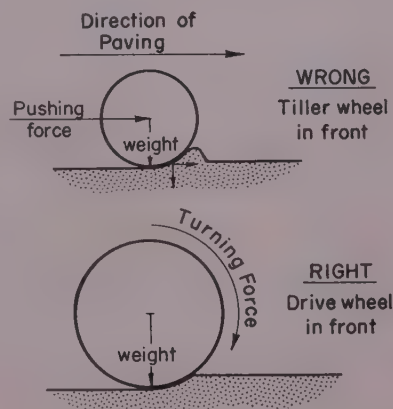
It should be kept in mind that for street and highway construction it is nearly impossible during construction to impart the density to the mat with the rolling equipment that will ultimately be achieved under the action of the vehicular traffic. In the case of streets and highways, the primary purpose in rolling is to set the mix down and to leave a smooth surface rather than to attain ultimate density in the mat.

The exceptions to this, of course, are those cases where traffic is light and weather conditions are cool or the construction work is being done late in the season and little traffic is anticipated after completion. In these cases it must be attempted to achieve the maximum density during the construction phase. In all cases of street and highway rolling, however, the breakdown or initial pass should consist of one coverage with the roller, and the same for the final rolling if all marks can be eliminated with the one coverage.

There has probably been more harm done to asphaltic concrete surfacing by over-rolling than by under-rolling. If, after the initial rolling of the mat there is a tendency for the mix to mush or shove under the rolls, there is probably little or no benefit being realized by the rolling and it is even possible that the compaction and bond that was achieved under the initial compaction is actually being destroyed. This mushing or shoving comes as a result of a borderline stability mix, too light an asphalt, too heavy a roller, too hot a mix or

(Continued on page 84)

ROLLING—direction is important



IF THE INITIAL or breakdown pass of the roller is made with the tiller wheel forward, the resultant of the pushing force and the weight is slightly ahead of vertical, causing material to push up in front of the wheel, as shown in the upper drawing. The correct method is shown in the lower drawing. The greater weight of the drive wheel carries out the compaction while the turning force tends to tuck material under the front of the wheel.

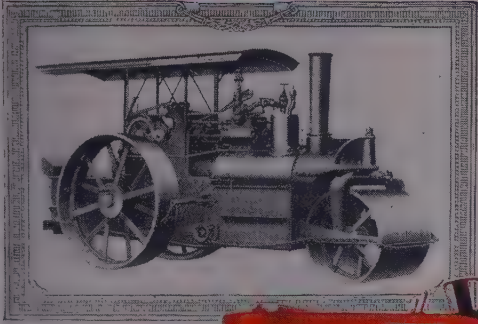
There's been a World of Change



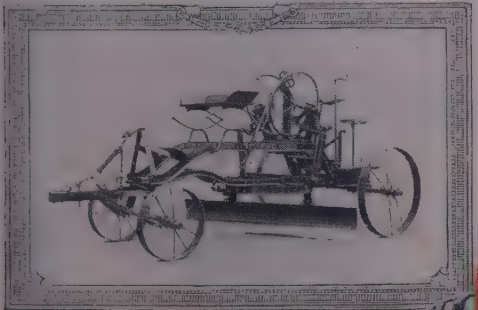
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Prestressed lift-slab for Bay Area

Post-tensioned concrete floor slabs 6 in. thick are lifted into place on steel columns by console-controlled jacks for San Francisco State College classroom building. It's the first prestressed lift-slab structure to be built in the San Francisco Bay Area.

A 70,000-sq. ft. classroom facility, now under construction by Ralph Larsen & Son, San Francisco, for the California Division of Architecture under a \$770,000 contract, will be the first prestressed lift-slab structure in San Francisco. The project is located on the campus of San Francisco State College. Work started in September 1956 and is expected to be completed by this September.

Because of the sloping site the building is designed as a part two-story and part three-story structure. The first floor is located entirely on the lower portion of the site and will be concrete slab on grade. Second floor design calls for prestressed lift-slab over the first floor area with remaining portions concrete slab on

grade. Third floor and roof will be entirely of prestressed lift-slab construction.

Experience gained during the last several years has shown how effectively the modern construction methods of prestressing and lift-slab can be combined. Prestressing increases the strength of the slab, practically removes the possibility of tracking, and greatly reduces the depth of the section and total weight. All of these are factors which reduce the difficulties of the lifting operation. Although the general techniques of prestressing and lift-slab are familiar to most of the construction industry the actual field work is still new enough and complex enough to demand the services of skilled specialists—in this

case the Vagtborg Lift-Slab Corp., using the Youtz-Slick method, and the Prescon Prestressing Corp.

The San Francisco job calls for a total of ten slabs to be lifted. The largest one is 57 x 138 ft., weighing 250 tons. The roof slabs are only 6 in. thick, the floor slabs 7½ in. thick. All the slabs are stressed by post-tensioning, with stressing cables 2 ft. on centers in each direction. Cables are wrapped with heavy Kraft paper and impregnated with oil. There will be no bond between cables and concrete.

The cables running across the narrow dimension of the slab contain ten wires and are stressed from one end. Cables running the long dimension contain eight wires and are stressed from both ends. Each wire is ¼ in. in diameter and furnished by American Wire Corp. Cables are placed in the slab in the form of catenary curves, near the bottom of the slab between columns and near the top over columns in order to resist the negative movement at the supports. Clearance between cables and the surface of the slab is ¾ in. minimum at the top and bottom. There is a total of about 1,150 stressing cables on the job.

Concrete mix has 6½ sacks of cement per cubic yard, and contains aggregate varying in size from 1½ in. to sand. Maximum design strength is 5,800 psi, after 28 days. Permission was given to the contractor to introduce Pozzolith furnished by Master Builders into the mix at the rate of 4 oz. per sack of cement to increase workability.

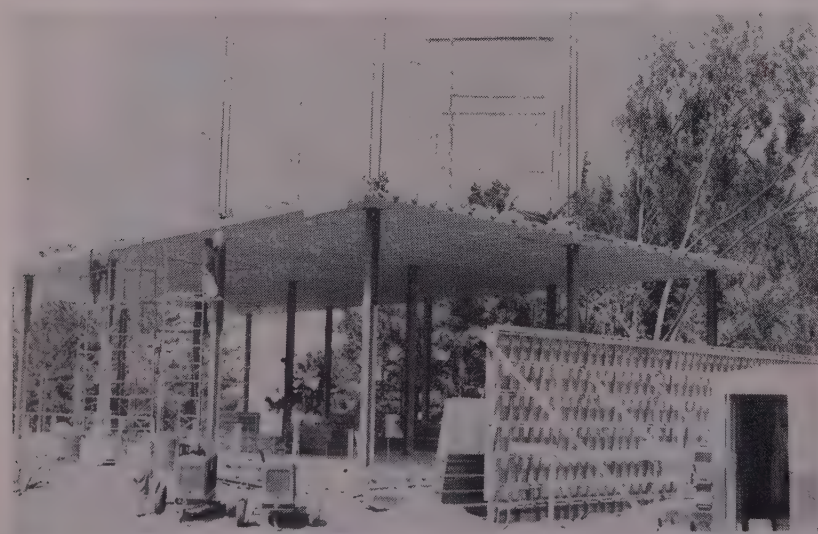
Stressing of the slabs is not started until the concrete reaches 3,500 psi. and lifting is done at 4,000 psi. which normally takes about 11 days after pouring. Concrete is placed with manual buggies and vibrated with internal type vibrators.

Because of the unusual conditions on this job, the Division of Architecture approved the use of Thompson's Water Seal, used as a bond breaker and curing agent. It is sprayed on in two coats after final troweling. The bond breaker is put on after the first coat has penetrated and set. The second coat was usually put on the day following the first coat.

In the Prescon system of post-tensioning the ends of the button-headed wires are threaded through bearing plates at both ends of the line and through stressing washers. If the cable is over 50 ft. long it is usually



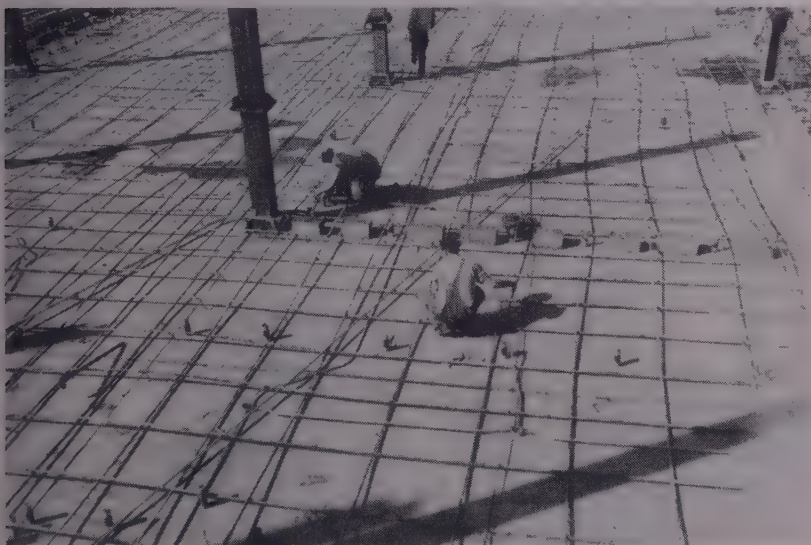
FINISHED STRUCTURE will be ready for occupancy by September of 1957. The building was designed and is supervised during construction by California State Division of Architecture.



FIRST SLAB, only 6 in. thick, has been lifted and is being welded in its final position. This is done by welding small plates to columns under slabs. The largest slab weighs 250 tons.



PRESTRESSING CABLE is rolled into place. After utilities are also in place concrete is poured, cables are stressed, and the slab is raised to correct elevation by jacks on top of columns.



READY FOR CONCRETE on the first of ten slabs to be lifted. Stressing cables are spaced 2 ft. apart in both directions and are wrapped in paper and soaked in oil to avoid bond with concrete.

stressed from both ends. On this job stressing of the cables is being done with two William S. Pine center-hole hydraulic pullers. These jacks are fitted with a gauge which registers the pressure of the hydraulic fluid.

In stressing a slab, every other cable is stressed in both directions first. Then the remaining cables are stressed in order. First a stress of 185,000 psi. is introduced into the cable, (designed maximum is 240,000 psi.) then the stress is reduced to 132,000. Then the stress is increased to 156,000 psi. and set at that point by introducing the correct number of shims between the stressing washer and the bearing plate. This process stress relieves the cables. On the ten-wire cables the bearing plate is $\frac{3}{4}$ in. by 4 x 7 in. For the eight-wire cables the bearing plate is $\frac{3}{4}$ in. by 4 x 6 in.

When stressing a cable from both ends the jack operators keep their movements coordinated simply by calling back and forth. The stress in the cable is measured both by the hydraulic pressure as recorded on the gage and by the elongation of the cable.

Columns for the building are 10 WF60 and 10 WF49. The lifting jacks are positioned at the top of these columns and connected to the slab by hooking the lifting rods which extend downward from the jacks into slots in steel collars cast into the slab around each column. On this project the maximum load on any one jack is about 35 tons, well within the 75-ton capacity of the jacks. All jacks are connected to a central control console. Hydraulic pressure is about 1,500 psi., enough to raise the slab at



STRESSING is done manually with hydraulic jack from one end on short cables, from both ends at once on long cables. Job called for about 1,500 stressing cables.

the rate of about 7 ft. per hour.

The slab must be kept level during raising because there is only $\frac{1}{8}$ -in. clearance between columns and collars in the slabs. When the slab is at the correct elevation four steel plates 1 in. thick by 3 x 7 in. are welded onto the columns under the slab. These plates fix the slab at its final elevation.

Lifting sequence

On one section of the building the roof slab is 33 ft. 9 in. above the floor slab. To lift a slab to this height in one lift would require bracing the columns and welding extensions onto the 24-ft. lifting rods. In order to avoid this extra work the columns were cut at 22 ft. The jacks were then set up on top of the columns and the first slab was lifted to the top and temporarily bolted at that level. Next, the second slab was lifted to the top, under the first slab and temporarily bolted. Finally, the third slab was lifted to the half way mark and permanently welded at its designed position.

Then, the jacks were removed and the upper 12 ft. of the columns were spliced on by welding. Jacks were then re-positioned at the top. Bolts were removed from the upper slab and it was raised to the 33 ft. 9-in. mark at the top of the columns and welded permanently in place. Then the middle slab was raised 2 ft. to its final position and welded off.

William A. Craib is superintendent for general contractor Ralph Larsen & Son. Gary Perry is field superintendent for Prescon Corp. Otto Mass is superintendent for Vagtborg Lift-Slab Corp.

THERE'S A "Euc" SCRAPER MATCHES

3

TYPES

Euclid offers you the most complete line of self-powered scrapers in the industry—and they're all job-proved to give you more work-ability and low cost yardage. No matter what your job may be—from small clean-up or grading work to big yardage projects—there's a size and type that meets your requirements.

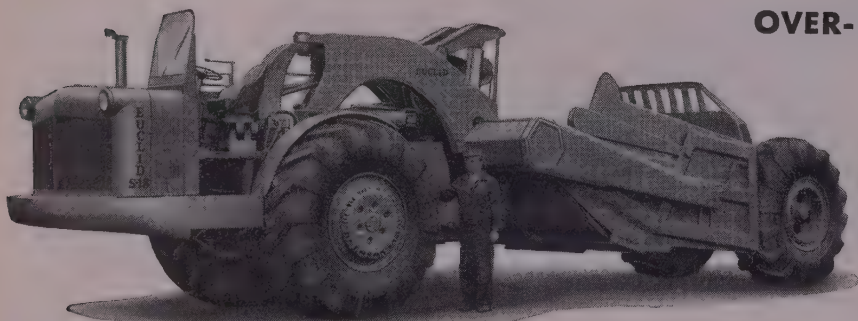
SIX-WHEEL SCRAPERS

These models provide maximum stability for long, high speed hauls. They have capacities of 12, 18 and 24 yds. struck . . . are powered by engines of 200 to 335 h.p. and haul heaped loads of 16, 25 and 32 yds. at speeds up to 30 mph.



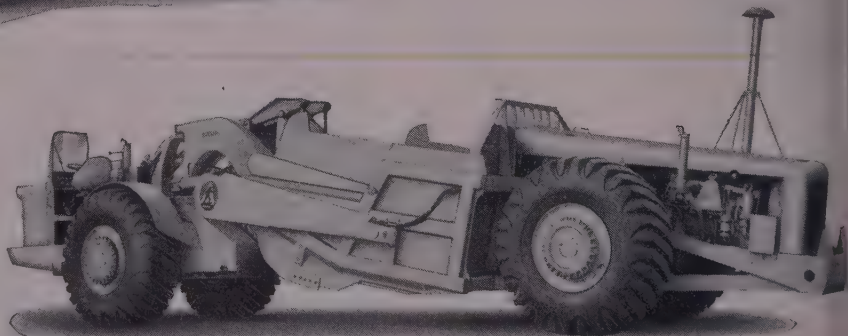
OVER-HUNG ENGINE MODELS

Payload capacities of these "Eucs" are 7, 12 and 18 yds. struck . . . 9, 16 and 25 yds. heaped. Over-hung engine design of tractors provides excellent maneuverability and ease of handling in difficult work . . . engines are 143, 300 and 335 h.p.



TWIN-POWER SCRAPER

With a total of 518 h.p., this Euclid has a struck capacity of 24 yds. . . . 32 yds. heaped. Two engines, each having a separate Torqmatic Drive, enable this "Euc" to work independent of other equipment and move more yards at lowest cost on any scraper job.



Your Euclid dealer can supply performance and cost data on the Euclid Scrapers best suited to your operations. Have him show you why Euclids are your best investment.

EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

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Steep slope requires construction in stages as —

Oregon builds a sidehill highway

Building a highway along a steep slope is tough when there's a highway below which must be kept open. The necessity for stage construction, muddy conditions and a short working season add to the problems.

"I WISH there were more rock on this job," said Don Boots of the Rogers Construction Co., Inc., of Portland, Ore. That sounds like a strange thing for a superintendent to say when the excavation on the job is unclassified, but the project is located in northwest Oregon where the average annual rainfall is around 90 in. per year. That's enough water to keep earthmoving projects impossibly muddy seven months of the year and somewhat less muddy the rest of the time.

With a little more rock and a little less mud Don might be able to add a month or two to the 5-month summer working season and put on another shift as well. As it is, sunshine is essential to keep the material dry, and one shift each day, May to September, is just about the limit.

Difficulties come in bunches

Rain and mud are only two of the problems—there are plenty of others. The new alignment is located 20 to 35 ft. above the existing highway on a talus slope of about 1:1. This means that almost every move sends loose rocks and debris down onto the existing highway, so one of the biggest headaches is safely maintaining traffic.

To minimize interference to traffic the job is being constructed in carefully planned stages. One result of this is that the contractor at all times is working in rather narrow strips which makes efficient use of hauling units difficult. Some crawlers and scrapers have been used but the job so far has been mostly a truck and shovel operation.

There is about 200,000 cu. yd. of rock to be blasted and it's all tricky,



PARTS OF THREE of the "Bugby Loops" can be seen in this photo. The new alignment eliminates the well-known hairpin curves, reduces the curvature by a total of 2,314 deg. in 2½ mi.



AT THE SUMMIT the alignment runs along the edge of a bluff, affording this view of the Lower Columbia River. The project is located 24 mi. east of Astoria on U. S. 30, the Old Oregon Trail.



NEW LANES are now being excavated at the base of the bluff at the top of the talus slope. This phase corresponds to diagram three in the sequence drawing presented on page 52.

Producing 9 hours'



ALL OPERATIONS ARE COMPLETELY INDEPENDENT —

In addition to eliminating shifting time, *Independent-Travel* allows the operator to swing and hoist the load while travelling. Whether to save time or to jockey the boom around obstacles, the operator can swing the boom while his machine is travelling in either direction. This optional feature can be used with any front-end attachment.

MORE USABLE HORSEPOWER — Size for size, Link-Belt Speeder shovel-cranes utilize more of the engines' available horsepower. This bonus pays off in added power at the bucket teeth, greater line pull plus extra power to swing, hoist and travel. Although it gets more usable power and line pull out of the same engines used in other shovel-cranes, a Link-Belt Speeder remains well within the engine manufacturers' recommended operating speeds.



output in 8 hours...

Independent-Swing-and-Travel is available on 11 Link-Belt Speeder models. Eliminates shifting . . . saves 20-30 seconds each machine move

Users of Link-Belt Speeder shovels, hoes, draglines and cranes are setting new high production standards by equipping their machines with *Independent-Swing-and-Travel*. This optional feature eliminates time losses ordinarily occurring when operators shift from swing to travel and from travel to swing. With *Independent-Travel*, shifting is eliminated and the machine can travel and swing simultaneously.

Speed, maneuverability, safety

Owners of machines equipped with *Independent Travel* report that the feature gives them higher percentage of work time spent in actual productive effort. What's more, they say it greatly decreases operator fatigue, keeps end-of-the-shift output at previously impossible high levels. In addition, because all operations are independent of each other (as shown in illustration at left) the machine maneuvers more readily in tight quarters and is able to move away from bank cave-ins in split seconds.

80 extra yards a day

Here's a conservative comparison of what happens when a Link-Belt Speeder 1-yard hoe with *Independent-Travel* is matched against an equal-sized ordinary hoe:

Digging to a depth of 6 feet, with each machine averaging a move every 7 feet, the Link-Belt Speeder with *Independent-Travel* eliminates shifting, producing an extra 80 to 90 yards, digging an added 120 lineal feet of trench per 8-hour shift because it has converted shifting time into work time!

Figured at 35 cents a yard, it earns an increased return of about \$30 per shift or more than \$600 extra each 20-day working month.

Cuts maintenance bills

The design of *Independent-Travel* calls for separate power trains, separate clutches, shafts, gears and bearings for swing and travel. As opposed to ordinary machines — which have but one power train to perform both functions and therefore have these components in almost constant use — the Link-Belt Speeder with *Independent-Travel* separates the functions . . . divides total wear over two power trains. Life of shafts, clutches, gears and bearings is practically doubled.

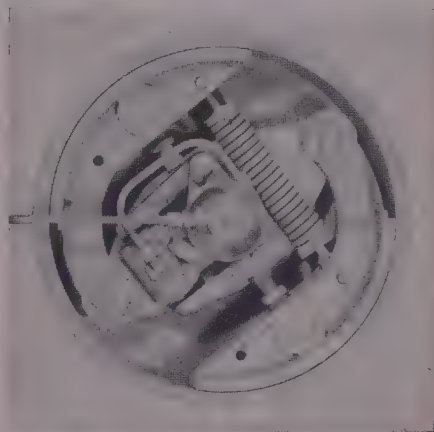
This is but one of many reasons why Link-Belt Speeder machines are completely revising existing standards of high-speed, high-profit shovel-crane operations. Contact your Link-Belt Speeder distributor or write: Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

14,325



SIMULTANEOUS SWING AND TRAVEL

— *Independent-Travel* eliminates shifting from swing to travel, from travel to swing and provides completely independent control. And fingertip-operated Speed-o-Matic — the only true power hydraulic system — makes every shovel-crane movement fast, easy, positive. With a flick of the wrist the operator puts his machine through its paces. There is little, if any, end-of-the-shift letdown.



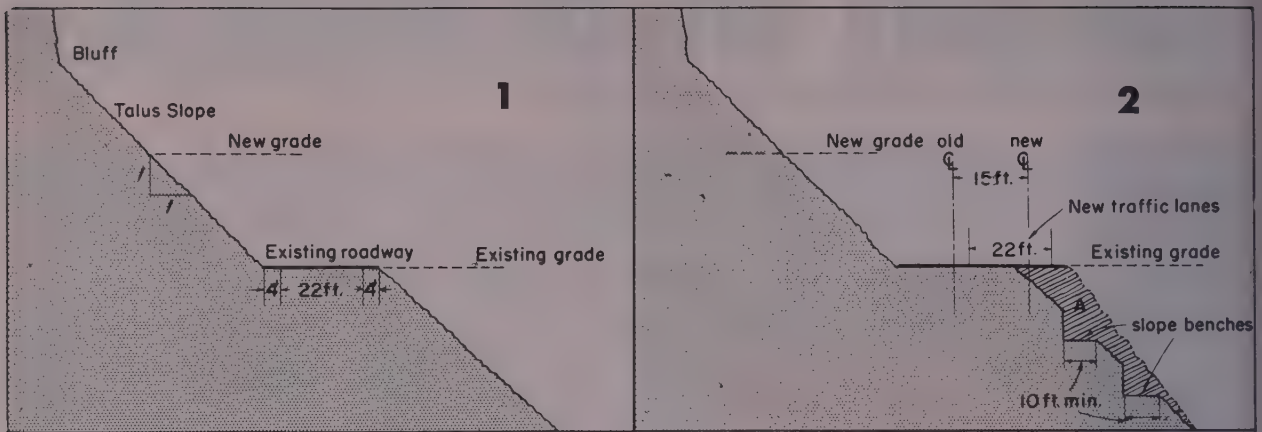
LESS MAINTENANCE — Self-compensating hydraulic piston automatically adjusts the clutches . . . eliminates operator's daily clutch adjustments for heat expansion and normal lining wear. With Speed-o-Matic, hydraulic pressure does the job.

It's time to compare . . . with

LINK-BELT SPEEDER

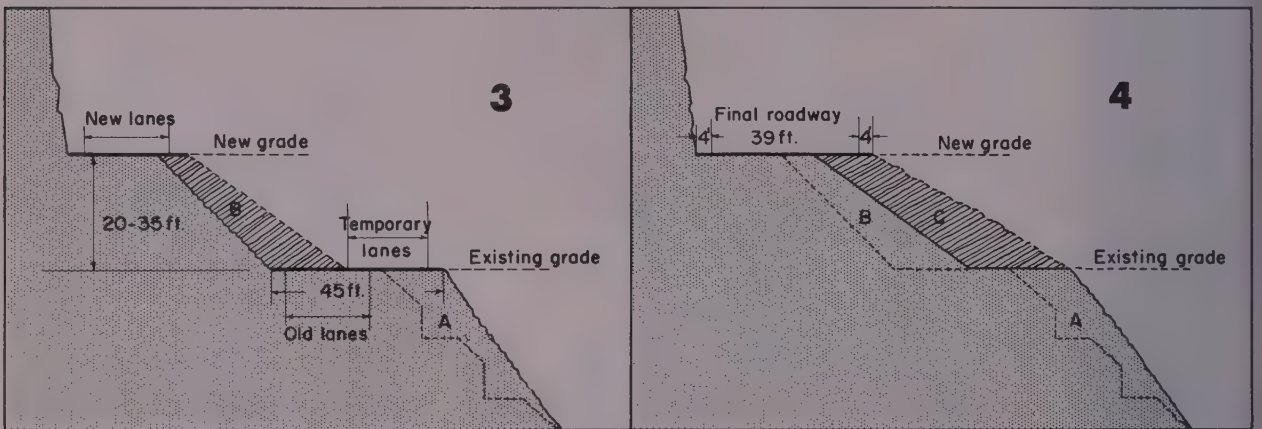
Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

Construction steps on Oregon highway



THE NEW GRADE for most of the job is 20-35 ft. above the existing roadway which must be kept open. First step is to cut slope benches

in the slope below the existing roadway and build up embankment A. Then the traffic lanes are moved 15 ft. to the outside, shown above.



NEXT STEP is to excavate a shelf at the base of the bluff at the new grade and build up embankment B from the existing roadway.

Then the traffic is shifted to the upper lanes while the final embankment C is brought up to the new grade. Only blasting stops traffic.

since it's full of crevices and seams. A wagon drill made by the drilling and shooting subcontractor Gibson and Roberts is an interesting feature of this phase of the operations.

Goodbye to the Bugby Loops

Rogers submitted the low bid of \$997,425 on Aug. 15, 1955. The job is located about 24 mi. east of Astoria on U. S. 30, the Old Oregon Trail overlooking the Lower Columbia River, and is designed to eliminate the so-called Bugby Loops, a series of severe switchbacks. Some of the curves in the present highway have radii of only 50 ft. The new alignment is 2.62 mi. long and will eliminate a total of 2,314 deg. of curvature, almost $6\frac{1}{2}$ full circles. The number of curves will be reduced from 53 to 4.

The contract includes earthwork, drainage and paving. For the 910,000

cu. yd. of excavation and hauling Rogers bid \$455,000, or 50c per cu. yd. The bid on the clearing and grubbing was \$105,000 and for the asphaltic concrete, \$60,000.

Clearing and grubbing began in September 1955 and continued through the rainy season into the summer of 1956. The average work force consisted of about 15 men with two Cat D8s and two Burma jeeps. The jeeps have 6-wheel drive and PTOs with lines front and back. When positioned on the existing highway for yarding logs the jeeps took up much less space than the crawlers. This was important as traffic was allowed to pass through the construction area almost all the time.

Slope too steep for fires

Much of the clearing and yarding had to be done manually by running cables from the machines through

blocks positioned at the top of the area. The slope was also too steep to build fires. Level benches were dozed out by the crawlers in central locations and the material was transported to them for burning.

Flagmen and traffic control

When yarding logs or dozing above the existing highway a careful traffic control was maintained because almost any sort of activity on the steep talus slope sends rocks and debris downhill. The specifications contain almost two pages on flagmen. In Oregon the contractor provides the flagmen and is reimbursed by the State for 57½% of the expense.

The new alignment blocks out about 80% of the old road so early in 1956 the contractor began constructing detours for the traffic totaling about one mile. When these detours were finished heavy excavation



**YOU CAN'T
BARGAIN
WITH SAFETY**

Ski lift operators stress safety when it comes to buying wire rope. Too many lives are at stake. So they buy . . .

A Safe Lift

Even though you don't operate a ski lift, false economy can be costly in your rope purchases, too. For a rope failure can cause personal injury . . . wreck your equipment . . . throw off your entire work schedule . . . and affect employee morale. Yes, a "bargain" wire rope may save you money, yet cost you your peace of mind. Don't take a chance. Buy a rope that's a quality rope—buy Wickwire Rope.



PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

5050

**LOOK FOR THE
YELLOW TRIANGLE**

THE COLORADO FUEL AND IRON CORPORATION—Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
New York • Philadelphia



DRILLING RIG was built by subcontractor Gibson & Roberts. The rubber-tired wheels on each side are connected by a chain drive. Two independent air tuggers control movement.



BLASTING CREW loads holes with sticks of dynamite. Crevices in the diced basalt make loading difficult. So far the material has averaged about $\frac{1}{2}$ lb. of powder per cu. yd.

work started above the old highway without the worry of endangering traffic below. However, there is about 1 mi. of excavation which must be carried out above traffic.

At this writing the earthwork is more than half completed and the contractor is hoping to finish the job before the rains begin in the fall. The completion date, of course, depends largely on the weather.

At present the equipment consists of a Northwest 80D loading four Euclid end-dumps, two Cat D8s, and a Cat No. 12 grader maintaining the muddy haul road. This fleet will be added to as the job dries out.

Drilling and shooting

There are about 200,000 cu. yd. of rock which has to be shot. In May 1957 Gibson and Roberts, Spokane, Wash., were called in on a subcontract basis to carry out the drilling and shooting.

The rocky material is mostly diced basalt. Some of it has to be blasted simply because it is too dangerous to work a shovel or a crawler under the overhanging ledges. It's tricky to load a blasthole in this material because often the hole ends in a large crevice. Often, too, the energy of the blast is

dissipated in the crevices. It fractures fairly easily, though, and requires only about $\frac{1}{2}$ lb. of Atlas dynamite per cu. yd.

Gibson and Roberts is using a wagon drill which they originally designed and built for quarry use. It has four pneumatic tires tied together on each side by a chain drive. A separate air tugger operates the wheels on each side. The operator works one tugger with each hand, maneuvering the rig somewhat in the manner of a crawler tractor. It has a 14-ft. boom which mounts an Ingersoll-Rand hammer. Oiling is taken care of automatically under air pressure. A Gardner-Denver 600 Gyro-Flo compressor is supplying the air.

Stage construction

Because of the unusual sequence of operations required the specifications contain a paragraph entitled: "Contractor to inform himself regarding details and difficulties of the work." The paragraph states that the contractor must contact the resident engineer before submitting the bid to show that he understands the problems involved in traffic control, earth hauling and embankment construction, and that he understands the

stages in which the construction must be carried out.

The first step is to build slope benches below the existing roadway to break up any possible slippage plane. Next, the shoulder is widened by building up an embankment in compacted lifts. Third, a new strip of pavement is laid down on the new shoulder. This permits the two traffic lanes to be moved 15 ft. to the outside. Fourth, a bench wide enough for one lane of traffic is excavated 20 to 35 ft. above the old grade. Another lane is added to this by building up an embankment from the original roadway.

Then these two lanes are surfaced and traffic directed over them. The last step is to add another lane to the upper two by building up an embankment from the temporary roadway below. These steps can be understood easily by glancing at the accompanying drawing. The contractor is now in the process of excavating the first upper lane.

The embankments are built up in 6 to 8-in. lifts. About 130,000 cu. yd. of clayey material has been wasted. No rollers are needed to achieve specified density—95% of maximum at optimum moisture content—as the hauling units alone have been sufficient. However, the specs state that the upper 3 ft. of the embankments shall be compacted by means of a "grid type or perforated metal twin-drum roller similar in type to the 'Hyster Grid Roller'."

The base course under the roadway will be 16 in. thick. The bottom 10 in. will be $2\frac{1}{2}$ in. minus material, the next 4 in. will be $1\frac{1}{2}$ in. minus, and the top 2 in., $\frac{3}{4}$ in. minus. The asphaltic concrete wearing course will be 4 in. thick. The shoulders will be oiled with $1\frac{1}{4}$ -in. asphaltic mat laid down in three passes. The finished roadway will have two 12-ft. lanes with an 11-ft. climbing lane for slow vehicles. Near the summit there will be four lanes.

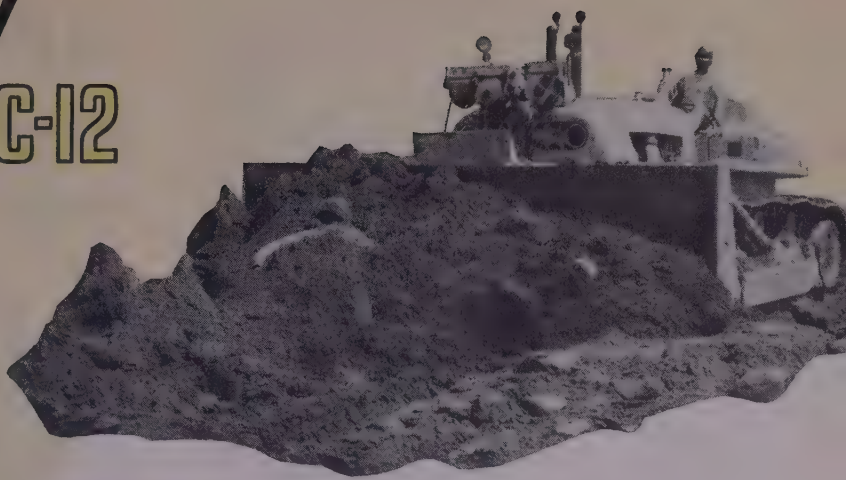
Much of the drainage on the project will be handled with asphaltic-lined open ditches.

Personnel

Don Boots is superintendent for Rogers Construction Co., Inc. Pete Peterson is shovel foreman.

Division engineer in Salem in charge of this job for the Oregon State Highway Department is J. D. Walker, assisted by Raymond Asbury. Resident engineer on the job with offices in Astoria is E. J. Hall, assisted by Nile Hoover.

Here's why Euclid TC-12 Twin-Power Crawlers give you MORE WORK-ABILITY



SPED

The TC-12 has speed—up to 7.8 mph forward or reverse—but that's not all. Pivot turns (one track forward and one reverse at the same time) plus changing of direction and range under full power without loss of momentum save considerable time during the tractor's daily operation.

POWER

Two engines with a total of 436 h.p. (413 net h.p. at drive train) make this Euclid "Twin" the world's most powerful crawler. Being more powerful, the TC-12 offers additional benefits, such as faster work and longer engine life, since the engine often operates at less than full capacity without strain. And, the reserve power permits handling the toughest tractor job.

MANEUVERABILITY

Pivot turns with the TC-12 take less space and time. Changing directions on the go with Torqmatic Drives makes maneuvering into position quicker. Split-half construction gives better traction on uneven ground.

EASY OPERATION

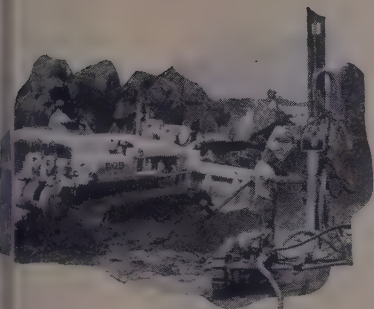
Clutching and shifting are eliminated with the TC-12 "Twin". There's 24-volt push-button starting and instant response to directional levers, range selector and hand throttle levers, all of which are conveniently located to allow complete freedom of the operator's right hand for control of attachments.

DESIGNED FOR EASY SERVICING

Many design features contribute to long life and easy servicing. Location of radiator behind operator reduces damage and improves cooling. Track tensioning and recoil system are automatic. All engine accessories are readily accessible from outside the engine compartment. Rollers can be removed without breaking track. Engines, Torqmatic Drives, and planetary final drives can be removed without disturbing the other components.

**THEY ALL ADD UP to just one thing—
Euclids are your best investment.**

**EUCLID DIVISION,
GENERAL MOTORS CORPORATION, Cleveland, 17, Ohio**



With 436 hp, independent track drive and many other advanced design features, the TC-12 has set completely new standards of performance for big tractor work.

Your Euclid Dealer will be glad to provide specifications and performance data on work similar to yours.



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE





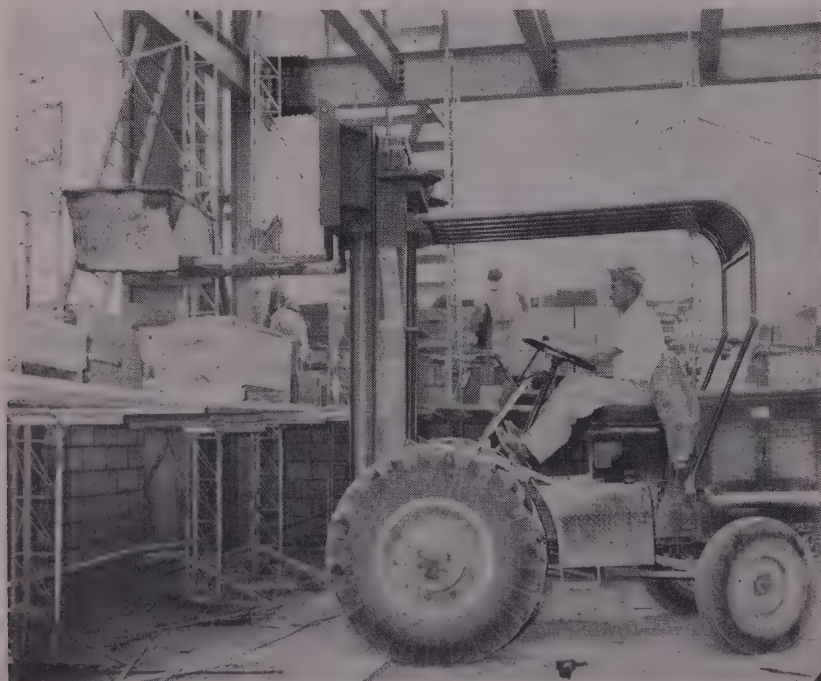
THE SPECIAL quick attachable, guarded platform on the forks permits a man to stand and pass sheeting to men on the roof. In this manner the lift truck driver moves along with the men as they place the roof materials rather than having the men walk dangerously along the roof from the central stocking point if a stationary elevator were used . . . R. E. Howard Co., of Los Angeles, Calif., were the gypsum roofing contractors on this warehouse and office building in El Monte, Calif.

LIFT TRUCKS

New tool invades construction jobs

Well known tool for handling materials in industrial plants, the versatile lift truck has been "discovered" by contractors. Material handling is a common problem on construction jobs and a machine that combines horizontal and vertical movement with maneuverability can be a cost-cutting addition on any job. These action pictures were made available by Champ Corporation, manufacturers of material handling equipment, El Monte, Calif.

LIFTING banded cubes of brick directly to a 16-ft. scaffold is accomplished with ease and requires no additional personnel. The contractor was able to operate to the full extent of the lift height with 15 masons and only 5 tenders including the mixer man and the fork lift driver . . . Art Vanderstek of Phoenix, Ariz., was masonry contractor on construction of this church in Phoenix.



LONG FORKS of 72 in. are able to reach far beyond the center of the scaffold and still let the truck remain a considerable distance from its outer edge. Since this Champ 200 HiLo is designed for lifting capacities well in excess of 4,000 lb. at a 24-in. load center, smaller loads can be extended as much as 7 ft. from the heel of the fork with ease and safety . . . M. Arganbright & Sons of La Crescenta, Calif., were mason contractors on this Douglas jet aircraft building in Long Beach, Calif.



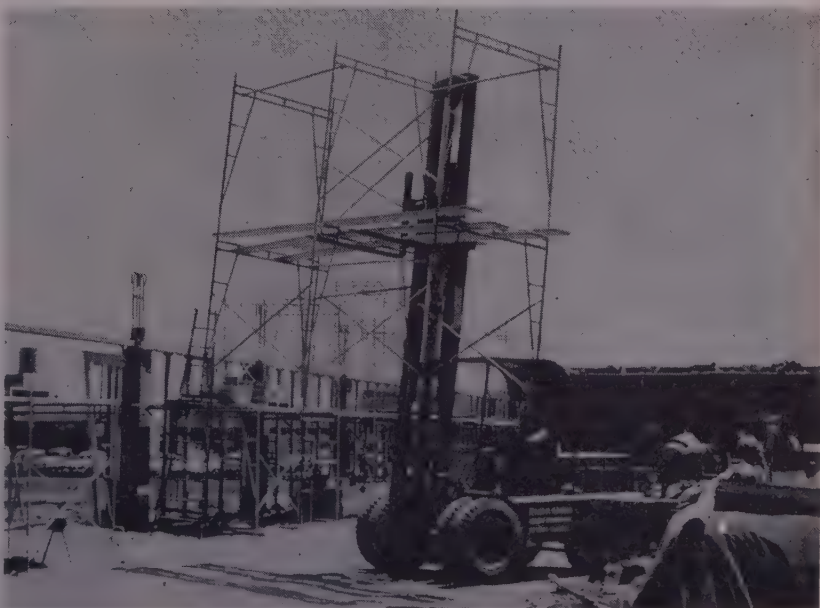
THE OBERG BROS. firm of Los Angeles finds many uses for this lift truck, from the shop mechanic who may use it to place an extra large engine in a piece of construction machinery, to the loading of this construction shed on a truck ready for delivery to a new job. With the special ability of this truck to lift its load ahead of any mast superstructure it is handy in placing and removing forms from bridge structures, etc. Movement of form lumber and other necessary equipment to and from a job site is easily done by one man since he can load the truck with the lift truck and then tow it to his destination and unload it again himself. The ability of this unit to move under its own power at speeds in excess of 40 mph. makes it a very speedy means of materials handling on large construction projects.



TOUGH JOB conditions are overcome by the planetary drive axle on this Model 200. It is one of six owned by this contractor who has provided himself with a unit to contend with each of a number of different working conditions. In this instance one of the more severe rains during the winter had compelled every other subcontractor on the job to limit himself to inside operations. However, this masonry crew was able to operate without shutdown from their outside materials supply points . . . E. A. Wikholm of Inglewood, Calif., was mason contractor on this department store in Covina, Calif.



SCAFFOLD moving without dismantling is another lift truck natural. The contractor built a 150-ft. wall at one end of a terminal building then moved the entire scaffold to the other end of the building. This was done with a lift truck operator and a tender in approximately 3 hr., a job which would normally take considerably more men and many more hours . . . Mason contractor on this job was Ryan M. O'Brien of Burbank, Calif. A similar operation was performed by M. Arganbright & Sons, mason contractors of La Crescenta, Calif., on a housing project of 62 buildings. Scaffolding was erected around the first six buildings and not disassembled until the final building was completed. A single operator and a tender were able to scaffold the next building in line and stock the scaffolding in approximately 4 hr.



How a cost-beating, can "unbind"



A TD-24 starts and gets "ready to run," seconds-fast. Morning, noon, or any other time you shut down the TD-24's diesel engine, you restart in seconds—and save yard-moving, wage-costing minutes! Exclusive International gasoline-conversion diesel starting does it—and the combustion-heated engine is ready to run as a diesel, without "gumming the works" with raw fuel!

TD-24 Cerametallic engine clutch eliminates time loss and upkeep cost of temperature-sensitive, "service-nervous" type clutches! You get the simplicity of long-familiar clutch design. You get the operating ease, temperature-immunity, and power-transfer efficiency of International Cerametallic facings. You get the instant readiness to operate perfectly when cold—plus heat-defiance for clutch-mauling jobs like 'round-the-clock shuttle-dozing.

TD-24 on-the-go shifting is a "double-barreled" cycle-speeder. The exclusive TD-24 two-speed planetary system gives instant, stall-

preventing Hi-Lo shifting without declutching in either the Torque-Converter or Gear-Drive models. And in the Gear-Drive model, you get two-direction "no-stop" shifting with exclusive synchromesh transmission.

TD-24 exclusive Planet Power steering eliminates load-limiting "dead-track drag"—gives full-time "live" profit power on both tracks It's more than total engine hp or weight tha

Announcing 

The exclusive equipment buying plan that value-measures used machinery and its components before you buy!

See VM buys now at your International Construction Equipment Distributor!

cycle-speeding TD-24

your profit squeeze!



Moore and Perry, Laton, California, depend upon three International "75" Payscraper® units and a TD-24 Torque-Converter crawler—to fulfill their 8-mile grade-raising subcontract, on

ounts—watch how "dead-track drag" limits any ing-sized steering-clutch crawler to what it can ande on turns. Then watch how years-proved Planet Power steering gives the TD-24 full-time, oth-track power—to pull or push extra-big loads in the turns or straight ahead, uphill or down!

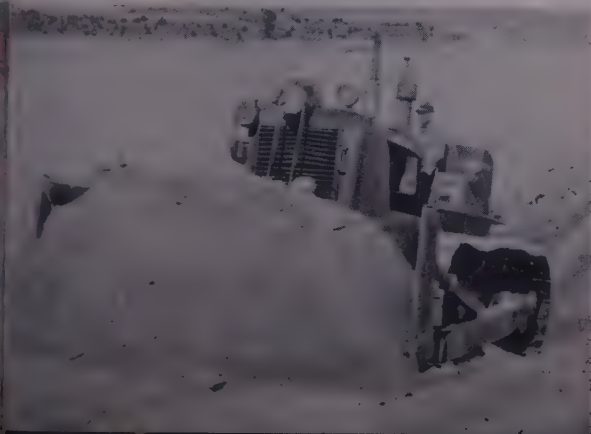
TD-24 control ease puts record daily production at your operator's fingertips. Cool and safe flush-deck design, control-tower vision, and

Central Valley Highway south of Hanford. TD-24 push helps boil-in 20 cu yd heap-loads, in only 42 seconds!

reach-easy fingertip controls all increase operator comfort and performance. Never before has big crawler work-power been so load-responsive—or record work-production so easy to achieve!

Prove positively your profit-margin widens—with geared-and-steered-for-action TD-24 power giving you the success-margin of push or pull! See your International Construction Equipment Distributor for a TD-24 demonstration!

◀ "The TD-24's 2-speed track steering holds you in 'dozing' position with no slide-slip or power loss in turning," states Operator Jack Campbell for Owner J. H. Marshall, Clovis, New Mexico. The Marshall TD-24 is shown dozing tough caliche rock for road surfacing.



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CONSTRUCTION
EQUIPMENT**

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A COMPLETE POWER PACKAGE. Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.



White Alice installation is construction battle

Morrison-Knudsen builds a fantastic Air Force communication outpost at the blustery air crossroads of the Bering Sea. Planning and expediting shipments of materials is key.

ALICE IN WONDERLAND dreamed a fantastic dream and stepped through the looking-glass into a strange magical world of make-believe to entertain generations of wide-eyed children. Our out-of-this-world atomic age has caused scientists to dream some believe-it-or-not, truth-is-stranger-than-fiction fantasies also.

One of these designer's nightmares has materialized into construction reality as the last word in ultra-modern communication systems and these magical installations appropriately have been labeled "White Alice" in Alaska. Alice for their design magic and White for the snowy, deep-freeze Arctic winters that confronted the construction crews when they kicked off the White Alice network spread in August of 1955.

This multimillion dollar Air Defense Communications System utilizes recently developed electronic techniques, modern microwave transmission, and the new UHF tropo-

spheric scatter. This latter bounces its strategic beams off the stratosphere to throw its vital message waves over the horizon in a javelin arc and the sky high ranges of majestic mountains which block ordinary radio and television.

Alaska's radio network will support the radar screen on this outer Arctic outpost of our defense perimeter with circuits linking 33 locations over approximately 3,300 route miles for early warning defense purposes. Where possible some stations will utilize commercial television system while others will use the fantastic over-the-horizon method, working in the ultrahigh frequency band with capability of sending and receiving voice and data signals at the same time. It is possible that this cold war precaution could bring peace-time television to the vast far-flung tundra and mountain wilderness of the Alaska bush.

In 1955 the U. S. Air Force contracted with Federal Electric Co. for

this vital network and the installation of the electronics equipment by Western Electric Co. Due to the vital need for speed the first 22 projects were negotiated cost-plus contracts. Naturally, the hurry-up stampede created construction conflicts and bottlenecks.

The Corps of Engineers, Alaska District, was called into the program to handle eleven of the projects, where the district engineer already had established resident and project engineer offices for other construction. During this past winter the Corps has awarded contracts for six combined Air Craft Warning and White Alice stations, labeled "Stretch-out," extending defense coverage out to the Aleutian Islands.

Morrison-Knudsen Co., Inc., has been in the foreground of the "White Alice" picture since its inception. In 1955 this old Alaska hand, which has specialized in isolated Alaskan installations since World War II, was awarded the building of the 22 negotiated jobs by Federal Electric Co. with Western Electric Co. to install the electronic equipment. Later this construction company won the contract to maintain all the White Alice sites. When the Corps of Engineers projects came up for bids in 1956, M-K was awarded the White Alice facilities at King Salmon, on August 8 for \$469,949.

King Salmon Airport lies 285 air miles from Anchorage across the towering Alaska Range, 14 mi. up the Naknek River from the canning and fishing village of Naknek on Bering



10,000 MILES

PAKISTAN



"We shipped our GMC's 10,000 miles to handle this truck-killing job"

Oman-Farnsworth-Wright report on 114 GMC's working their giant Pakistan construction job

YOU have to have real confidence in a truck to ship it nearly half way round the world for a vital job.

"We knew GMC's were our best bet," says the report. "After all, they've been breezing through Oman Construction Company's biggest projects in the U. S. since 1929. And they've never had to be pampered."

How well have they stood up on the grueling Pakistan job? Though many of them work 24 hours a day — through 7-day weeks — under far

from ideal conditions — they've kept the fast-moving operation right on schedule. "The GMC's have certainly lived up to our expectations," says the organization.

Actually, that's pretty typical of GMC users' reports. You see, every GMC 6-wheeler is designed and built for the toughest job in the construction field. You can collect their money-saving — money-making — benefits right up to 90,000 GCW. See your GMC dealer!

GMC TRUCK & COACH—A General Motors Division



MOVING MILLIONS OF YARDS OF FILL—on a tight, grueling schedule—is no problem with rugged trucks like these GMC W503's at work in Pakistan. There's the power-reserve to pull through *anything* in their new 206-h.p. V8 engines. There's stamina to spare in brawny frames and a 28,000-lb. rear axle. And that's typical of the super-toughness engineered into every GMC construction hauler. The company operates 70 of these 6-wheelers, and 44 other GMC's.



GALE WINDS and sub-zero weather gave erection crews a tough fight. After the lower part of the tower was in place, two cranes were used. One lifted 30-ft. pieces of the antenna and held it in place while the second filled in the supporting structure behind it.

Seas' Bristol Bay where a great percentage of the American housewives' red salmon is caught and canned. This Air Force base is a super-deluxe bush job as the commercial air lines stop here, Pacific Northern, Northern Consolidated, and Reeve Aleutian, on their way to the Bering Sea Islands, carrying the usual summer pay load of tourists eager to record on film the fabulous fur seal horde.

Alaska Steamship Co. runs a ship a month from June until September when Bering Sea is free of ice. Materials for King Salmon construction have to be barged from the roadstead 15 mi. out in the bay, and up the Naknek River 15 mi. This short shipping season handicaps construction and puts a premium on perfect materials take-off to be sure everything from bolts to generators make the boats. Another White Alice complication was that the towers, generator room equipment and sundry

other items were government-furnished.

When M-K was awarded the White Alice contract August 8, 1956, time was running short as materials, both contractor and government-furnished, had to be Seattle dock-side by August 23 to make the last ship for Naknek. William "Brownie" Greetin, buildings manager of M-K's Alaska District, hurried stateside to expedite transportation and delivery of materials to be loaded on this last boat. With luck, red tape cutting, persuasive fast talking, he was able to get 75 tons of very essential materials and equipment delivered and loaded. The majority of the 85 tons of missing items were government-furnished and were flown up by the Air Force-Western Electric combine in December.

Cement was borrowed from another contractor, Macri Construction Co., who had shut down a tank farm contract for the winter. Rein-

forcing steel was borrowed from another King Salmon M-K contract for a Ready Rocket Storage Building, which could not be built until the 1957 summer season due to change order redesigning. Dirt moving equipment from their other King Salmon contracts was on hand.

These were big breaks as the job had to fight time and rough winter weather that was parked up at the polar ice cap, just waiting for the time to pounce down on Alaska and button up the jobs. The beneficial occupancy date for the communications building was December 31 to allow Western Electric to come in and install its electronics equipment on schedule. A tight schedule for Morrison-Knudsen to meet.

The project consisted of a communications building, fuel and utility facilities, two towers with 30-ft. reflector antennas, power line and communications messenger cable from the AC&W site to the White Alice location, access road, and 2,500-bbl. fuel tank. No troop housing was necessary as the operators will live in the nearby quarters of the Aircraft Control and Warning base which was built in 1952.

On August 23 the job kicked off with tundra stripping operations; this was followed by excavating and placing the 4-ft. minimum compacted non-frost-susceptible fill which is needed under all King Salmon structures to prevent heaving. On August 31 the access road fill was initiated. September 4 saw the start of footing forms. The last ship of the season arrived at Naknek September 6 and the first barge of tower structural arrived at King Salmon the following day.

The first footing concrete pour of the communications building was made September 18 with framing following on September 25. The first tower foundation pours were made September 29. Tower steel erection was not far behind as the assembling of the reflector antennas started on the ground October 3, erection of the short stub towers began October 8. On October 9 the line crew started its installation of the primary power line and messenger cable to the White Alice site.

Winter was on its way with working hour lows of 20 on October 12, 5 on October 21, -6 on November 5, -12 on November 14, and -27 on November 16. Still the work, both on the exterior of the communications building and the outside towers went on. December 21 saw the communi-

(Continued on page 84)

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TEMPERED AND
BRINELL TESTED
to exactly the right
degree of abrasion-resistant
hardness and shock-absorbing toughness.

**A SUPERIOR ESCO
CAST 12M CUTTING EDGE
THAT STARTS SHARP, STAYS
SHARP, AND WEARS LONGER**

ArcEdge

**Now Available
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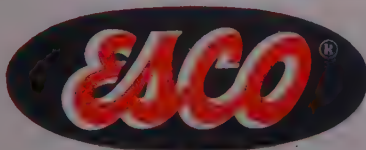
TOUGH. ESCO 12M Scraper and Dozer Cutting Edges last longer under every digging condition. Because of its high-strength, wear-resistance and shock-absorbing toughness, ESCO 12M increases cutting edge life, reduces down-time and keeps your equipment operating far more profitably on every job.

TEMPERED. ESCO Cast 12M Cutting Edges are Oven-Tempered — that's why the same tough "edge-metal" extends all the way through; there is not just a thin shell of hard surface metal that soon wears away. ESCO Cast 12M Scraper Cutting Edges will actually outwear ordinary rolled steel blades 5 to 1, and stop blade breakage.

TESTED. ESCO Cast 12M Cutting Edges are Brinell Tested to assure you exactly the right combination of wear and shock resistance for longer blade life, fewer blade changes and more profit per job.

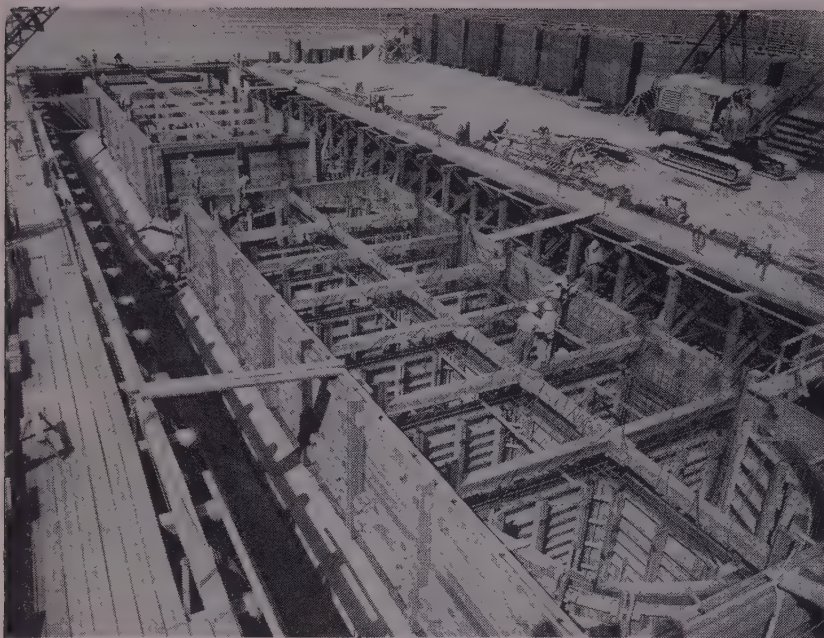
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BUILDING THE PONTOONS takes about 6 weeks each. The forms are supported by posts until they are aligned, at which time the posts are raised by jack screws and removed.

British Columbia builds— Concrete pontoon bridge

LAST NOVEMBER Pacific Bridge Co. of San Francisco in joint venture with General Construction Co., Ltd. of Vancouver, began work on a crossing that will add an important link to the British Columbia highway system—the Kelowna Floating Bridge. With the Pacific Bridge acting as sponsor, the job has been set up under a new administrative structure called Kelowna Bridge Contractors.

Calculated to speed vacationers along their way to the Canadian Rockies, Kelowna Bridge will forge a route equally important to agricultural truckers covering the southern part of the province. It will also offer far faster shipment of oil and minerals from the North.

Crossing Okanagan Lake at a point measuring 2.5 mi. from shore to shore, the Kelowna span will combine pontoon, steel superstructure and lift features. It will connect the towns of Kelowna and Penticton.

Its twelve reinforced concrete pontoons, now being built, will form one continuous section 2,100 ft. long, rigidly connected by heavy bolts and held in place by anchor cables connected to 24 anchors weighing 70 tons each and jetted through 20 ft.

of sand. Ten of the pontoons will be 200 x 50 ft. in plan, and 15 ft. deep, and two will be 50 x 50 ft. and 30 ft. deep. Each pontoon is divided into 56 cells, each four cells forming a watertight compartment, for a final total of 14 compartments.

The pontoons are taking approximately six weeks each to construct, with work being done in two graving docks whose bottoms require drainage 24 hr. a day. A complete well-point system has been installed in the docks for proper drainage. It will also be used to drain the docks after they are flooded to float each pontoon out into position in the lake. The front of the docks consists of a wooden gate, steel trussed and supported by a concrete gate sill and concrete abutments.

Building the pontoons is an impressive part of the total job, which is being coordinated by Emerson Hail, project manager of Kelowna Bridge Contractors. (Picture appears on page 94.) The bottom slab steel of each pontoon is placed followed by the wall steel. The timber forms and the cells are temporarily supported by posts until they are finally aligned, at which time the posts are raised slightly with jack screws and removed.

At least 1,500 tons of heavy equipment for the job was brought to Kelowna and strategically placed near the docks. Included in the bridge building plant are a P & H-1055 crane, and a large Manitowoc crane, several truck cranes and earth-moving equipment. Lake work is being done with a dredge, a pile-driving barge for the piers, several derrick barges and a 350-hp. diesel tow boat. Approximately 3,300 tons of reinforcing steel have been bought for the job. It is being cut and bent at the site as it arrives.

Five sizes of aggregate go into the concrete mix which is being handled through a Noble fully automatic batch plant, and two 2-cu. yd. Smith mixers. The batch plant handles 100 cu. yd. per hour. Bulk cement is being used here for the first time in interior British Columbia.

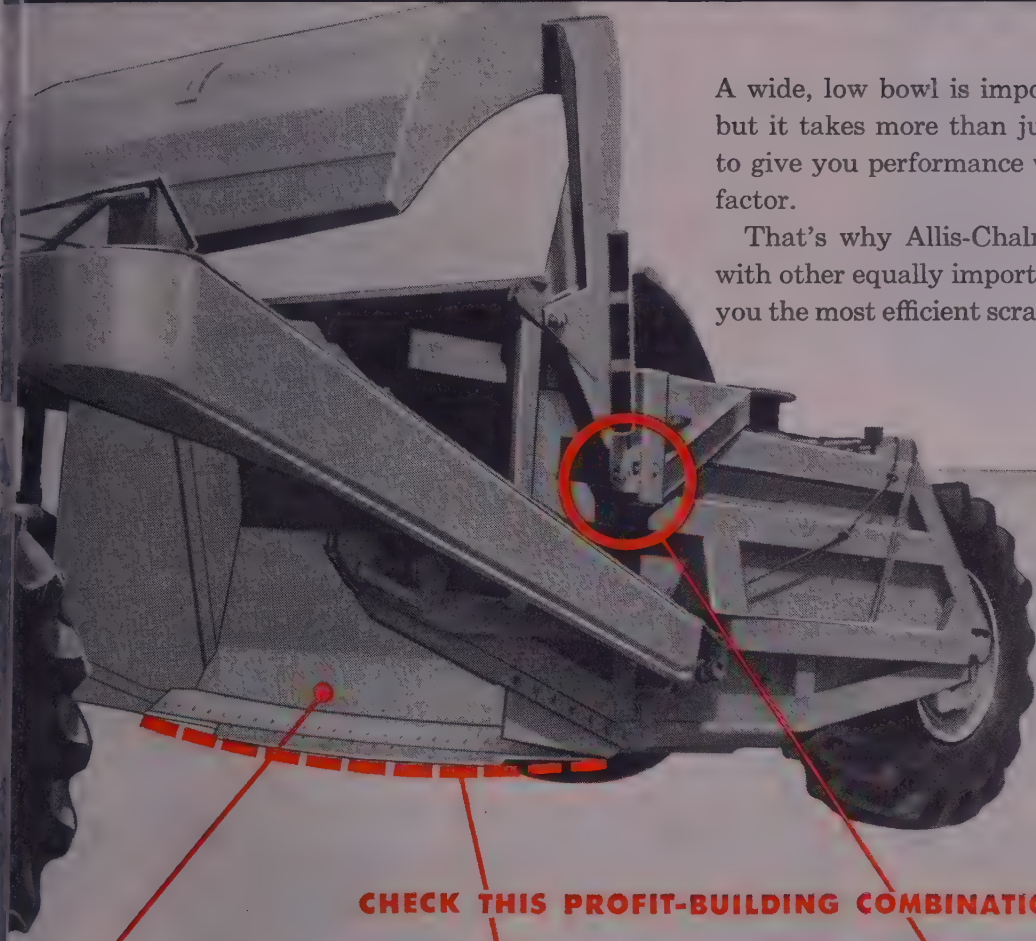
While the major portion of the bridge is made up of twelve pontoon sections, Kelowna Bridge Contractors also have the contract for building the two main piers which serve to support the steel lift span. The lower section of each of these piers consists of a concrete caisson which is extended by means of steel walers and timber cofferdams. The launching section for the piers is being built in the graving docks, floated to the pier sites and progressively sunk to the underwater pile foundations. Piers are of the hollow type and water will be admitted into the inside cells for preloading the piling prior to completion of the piers and setting of structural steel.

A feature of the site that has influenced the job from the beginning is the unstable, liquid lake bottom. Original recommendations called for a rockfill causeway and suspension bridge, but that design proved impossible because of the quality of the soil.

A second major difficulty was the coming of winter just after the job was due to start—a winter with temperatures down to 14 below. But with the first sign of thaw Pacific Bridge stepped up its pace, and got back on schedule. The goal now is to complete pontoons and piers by next fall and to move out for the superstructure contractor.

Tom Coull, Jr., chief engineer, reports that the job is moving along on schedule. Sinking of caissons, anchoring of pontoons and all pile driving is going on under marine superintendent Richard Verbugge. Hubie Smith is master mechanic in charge of maintenance of all equipment. Field work is being directed by Chris Anderson.

The Low-Down on Low-Bowl Scrapers



A wide, low bowl is important in a scraper, but it takes more than just low-bowl design to give you performance with the best profit factor.

That's why Allis-Chalmers combines this with other equally important features to give you the most efficient scrapers available.

CHECK THIS PROFIT-BUILDING COMBINATION:

1.

Low, wide-bowl design for fast, heaped loading.

2.

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IDAHO
Southern Idaho Equipment Co.—Idaho Falls and Twin Falls
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SIZE AND TYPE OF
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IMPROVE ITS OPERA-
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Structural Design Chart—XII

By THOMAS HARAN, Civil Engineer

THE ILLUSTRATED DATA on the opposite page is the last chart of the series on the structural analysis and design requirements of the "ACI Building Code," ACI 318-51. Chart No. 12 is an accumulation of miscellaneous requirements of a general nature, which supplement the previous charts and complete the series.

Under *Pipes in Concrete* a column is shown in section with the stipulation that the embedded pipe shall have a total area less than .04 of the gross area of the column. A section and plan view are shown of a wall, beam, or slab with pipe size and spacing requirements indicated; some of these stipulations are designated as being required only "if pipe is taken as replacing concrete."

Throughout the series of charts a dimension "c" has been used to indicate the thickness of protective concrete covering reinforcing bars at the surface of the various structural members. This dimension "c" is tabled for various conditions of exposure and bar size under the section entitled *A_s Cover*.

Bar Bends (except ties and stirrups) are shown to be restricted by minimum radii in proportion to the minimum thickness of the reinforcing bar. Requirements for the bending of ties and stirrups appear on Charts 7 and 8, already published.

The rest of the chart is on lap splices of reinforcing bars. The clear space between lapped bars is required to be at least one inch, or the diameter of the bar, or 4/3 the maximum size of the coarse aggregate (whichever is the greatest). It should be noted that ACI 318-51 does not specifically require this minimum clear space between lapped bars; however, since the Code states, "Splices shall provide sufficient lap to transfer the stress between bars by bond and shear," the Code's minimum space requirement for parallel bars in beams and girders seems to be applicable also to their splices, as in both cases there must be enough concrete on each side of each bar to mobilize the bond and shear stresses as evenly as possible so as to conform with the "pull-out" tests on which allowable bond stresses are based.

The graph, shown, will be seen to be practically self-explanatory by running through the following example:

Given: $f_c = 4$ ksi.; $f_s = 18$ ksi.; #7 deformed, top bars.

Find: L_s , length of splice.

Procedure: from f_c axis on right run along the 4-ksi. line horizontally to the diagonal line "all deformed top bars," then down vertically to midway in the shaded strip between the curves $f_s = 20$ ksi. and 16 ksi., then horizontally left to find $L_s/D = 16$, from which we get $L_s = 16 \times 7/8 = 14$ inches.

If $f_c = 2.5$ ksi. and $f_s = 20$ ksi., #4 plain top bars require a minimum lap of $26\frac{1}{2}$ inches.

Top bars are, as defined in the Code, "... horizontal bars so placed that more than 12 in. of concrete is cast in the member below the bar."

Readers who have saved the charts may wish to make these addenda:

Chart No. 2 should have the three notes on "Arrangement of Reinforcement," which appear in ACI 318-51 at the top of page 617, added under the graphs at the top of the chart.

Chart No. 8 should have the lap splice of vertical column bars shown in the upper right part of the chart restricted to a minimum of 20D for f_c equal to or greater than 3 ksi. and $26\frac{2}{3}D$ for f_c less than 3 ksi. with deformed bars—with plain bars, lap splices must be twice as long.

Inasmuch as this article concludes the series of structural design charts on the 1951 ACI Code, I should like to comment on the general effect of ACI 318-56 on the charts. Since the time these charts were formulated the American Concrete Institute has made various revisions to ACI 318-51 and adopted them in ACI 318-56. Many of these revisions do not contradict or conflict with the charts of this series, however, there are cases to the contrary. Many of the revisions are of a minor nature while some are quite important, such as the new requirements pertaining to web reinforcement in restrained rectangular beams. This new requirement, incidentally, did not conflict with data appearing on the charts but may be incorporated as an addendum. In general, the revisions may be considered to have made the Code more rigorous by closing some of the "loopholes" rather than correcting errors. Then, too, it should be remembered that the new revisions still must be adopted into local codes before they become part of our building laws. In view of these considerations, I'm still using this series of structural design charts—I hope they are of use to you

A.C.I. MISCELLANEOUS

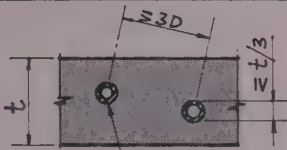
PIPES IN CONCRETE



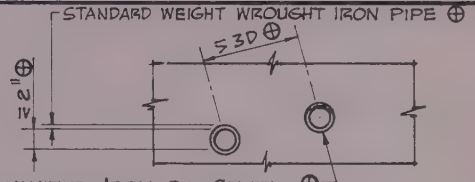
Σ PIPE $A \approx .04 A_g$

COLUMNS

$\oplus$ = IF PIPE IS TAKEN AS REPLACING CONCRETE

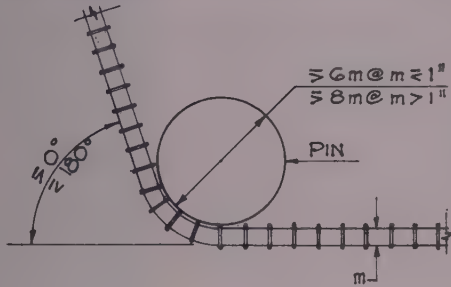


UNCOATED OR GALVANIZED IRON OR STEEL
WALLS, BEAMS & SLABS



STANDARD WEIGHT WROUGHT IRON PIPE $\oplus$

BAR BENDS (EXCEPT TIES & STIRRUPS)



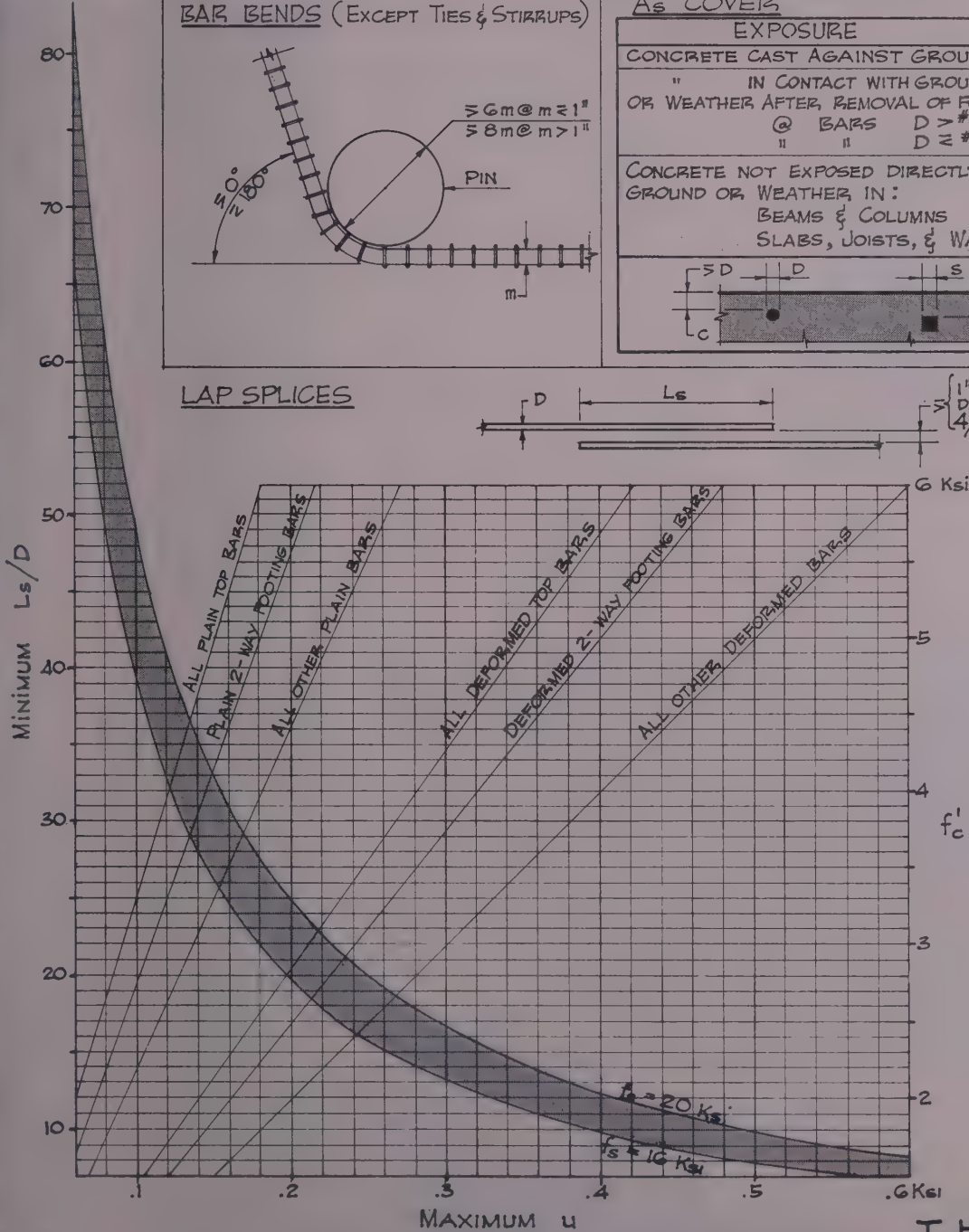
$\leq Gm @ m \leq 1"$
 $\leq 8m @ m > 1"$

As COVER

EXPOSURE	C $\geq$
CONCRETE CAST AGAINST GROUND	3"
" IN CONTACT WITH GROUND OR WEATHER AFTER REMOVAL OF FORMS:	
@ BARS D $> \#5$	2
" " D $\leq \#5$	1 1/2
CONCRETE NOT EXPOSED DIRECTLY TO GROUND OR WEATHER, IN:	
BEAMS & COLUMNS	1 1/2
SLABS, JOISTS, & WALLS	3/4



LAP SPLICES



T. HARAN

8.11.45G

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

THE BIG TASK—Now, in the almost round-the-clock daylight of the North more than a score of big construction projects are being pushed. These range all the way from new harbors in southeastern Alaska to new radar warning stations in the Aleutians. The tempo of construction is reaching its peak. Ships loaded with construction supplies are Alaska-bound. Alaska Railroad trains, some more than a mile long, haul enormous quantities of supplies to the distribution points of Anchorage and Fairbanks. In vast areas where bear and moose roamed unmolested for centuries, survey gangs are camped. More than a hundred surveyors are scattered across Alaska's amazing expanse of wilderness. With rod and chain and transit, with muscle and engineering intellect, they are converting the unknown and uncharted wilderness into the roads, townsites and defense installations of tomorrow. The days are long—but in many ways too short for the gigantic tasks facing Alaska's construction industry this summer of 1957.

THE BIG SUMMER—Summer, 1957, has all the earmarks of being "the big summer" in Alaska construction. The weather, from springtime onward, has never been better. Over the vast stretches of interior Alaska where herds of caribou drift like cloud shadows there has been a welcome succession of sunny days. Except on the high, barren peaks of Alaska's spectacular mountains, the snow is gone. Alaska's mighty rivers, the Yukon and the corkscrewing Kuskokwim have passed their flood stage. The golden days of near-midnight sun are here. Construction men in Alaska have long since rolled up their sleeves, spat on their hands and pushed forward on the tasks that must be completed before the gloom and ice of winter clamp a cold hand on the wheels of northern industry.

ROAD TO THE GOLD RUSH—Another interesting road project, the planning of which is still in its infancy, is the proposed road from Fairbanks to Nome. It will be pushed over countless rivers, through vast oceans of tundra to the colorful gold rush capital on the Bering Sea. This highway, the northernmost sector of the proposed transcontinental U. S. 97, will inch a few miles closer to reality by the end of the 1957 construction season. Construction crews from the Bureau of Public Roads will start where they left off last year—about eight miles out of Livengood, and move westward toward Eureka. At the same

time, a second crew will start at Eureka and work back toward Livengood to speed up spanning the 60 miles between. Even when this is done, Nome is still a couple hundred miles and perhaps five years away. But it's a start.

NEW ROADS TO PARADISE—Roads which will open up a still-untamed wilderness are going ahead in several areas. Most interesting of these is the new Denali highway which, for the first time, will permit travelers to drive into the heart of beautiful McKinley National Park, in the shadow of the continent's highest peak. The government-built Mt. McKinley hotel is being readied for the expected influx of tourists when the road is punched through later this summer.

CONQUERING THE TUNDRA—Perhaps the most spectacular and surely the most vital construction industriousness in Alaska this summer is the activity on roads. In Juneau, the territory's capital, officials of the Bureau of Public Roads have launched a new era of road-building in Alaska. With the aid of Federal funds, a network of new highways and extensions of old ones is beginning to emerge from the hopeful dreams and plans of the long yesterdays.

AIR MAN-HAUL—One thing that seems to make Alaska contractors a breed apart is the way they are able to create time-saving and cost-saving procedures when confronted with jobsite problems. A case in point is the way American Service, Inc., solved the problem of transporting men to and from an inaccessible location. The contracting firm is constructing an instrument landing system at Point McKenzie across the inlet from Anchorage. Instead of setting up a camp in the wilderness—a procedure considered to be quite costly—the contractor decided to shuttle the work crews back and forth via helicopter. From the International Airport at Anchorage to the wilderness jobsite is only eight minutes by helicopter. Two men are hauled at a time. I asked Jack Kline, president of American Service, Inc., how the job haul was working out. "We think it will cut costs," Kline said. "Of course it's too early to evaluate the success of this method at this time." He asked me to contact him again in about two months when his contract is complete. I plan to do this in the belief that other contractors may find in the whirlybirds a means of cutting job costs and expediting construction schedules. Other

Alaska contractors I talked to are watching the new-type transportation operation with interest. So is this correspondent.

EMPLOYMENT SQUABBLE—Alaskan labor unions are, to put it mildly, unhappy with a Fairbanks employment agency which has been advertising extensively in the "Help Wanted" columns of statewide newspapers. The "mail-order" employment firm placed ads in the classified columns hinting that all kinds of workers, skilled and unskilled, are needed now in the Territory. What the employment service is offering is a brief letter from one of the owners of the employment service and an application for employment. When the construction man returns the application, he must inclose a \$1 "service fee" and his written promise to pay 10% of his first month's Alaska wages to the employment service provided the applicant is placed. Both the unions and the Alaska Territorial Employment Service fear that many job-seekers who observe the "Help Wanted" ads in their newspapers would take it at face value and head north without seeking additional factual information. In an effort to curtail the employment agency's statewide operations, the Fairbanks Central Labor Council filed an "objection" with the District Attorney's office in Fairbanks. The "objection" listed what the labor council considered to be 15 violations of Chapter 94, session laws of Alaska, 1953. To counteract the agency's operations, Territorial employment officials have mailed 15,000 copies of a booklet entitled "Alaska Job Facts" for statewide distribution and issued a news release through the press services warning migrating workers that the Alaska job situation is not all rosy.

CONSTRUCTION NEWS NUGGETS

—Construction phase of the 3,000-mi. Distant Early Warning line across the northern rim of the continent is now virtually complete . . . Western Electric's cumulative expenditures in Alaska on both the White Alice and DEW Line projects have totaled nearly \$80,000,000 . . . About 4,200 Alaskans have been employed on the two projects at the peak of the construction period . . . The Anchorage Carpenters Local has protested hiring of construction workers in Seattle for jobs in Alaska. One firm was reported to have brought its entire work crew from Seattle to Alaska for work on an Aleutian job . . . More than a thousand construction men are still "sitting on the bench" in Anchorage waiting for work . . . Several persons in Alaska's construction industry fear that a slash in the nation's defense budget will be felt acutely next year in funds appropriated for Alaskan construction . . . More than \$500,000 in residential and commercial construction is currently under way in the Anchorage area . . . This does not include a \$600,000 bowling alley being constructed in the city of Spenard.

California water plan released

THE CALIFORNIA DEPARTMENT of Water Resources has released to Governor Knight Bulletin No. 3, "The California Water Plan." Harvey O. Banks, director of water resources, said it is the first fully comprehensive plan ever developed for all the water resources of an entire state, for all purposes, now and under ultimate conditions of development.

He stressed that the plan is not a construction proposal at this time, and that the physical works listed in the plan merely represent, under today's best engineering judgment, the solution to maldistribution of California's water supplies. "It is a flexible plan, subject to change and modification in light of future technological advances and changing conditions. Before any of the projects listed are built, each must be examined separately as to need, economic justification and financial feasibility." Two bills calling for legislative acceptance of the California Water Plan are pending.

The California Water Plan was evolved after ten years of intensive investigation, review by a board of consultants, and a series of nine public hearings held throughout the state last year. The volume is dedicated to the late A. D. Edmonston, former state engineer and a pioneer in statewide water development planning.

It was authorized by the State Water Resources Act of 1947, and until the reorganization of the department last year the studies were under the direction of the then State Water Resources Board. The plan has been approved by the present State Water Board.

It lists 376 dams and reservoirs, including 270 major structures, conduits, power plants, pumping plants and other works designed not only to transfer surplus waters of the north coast and Sacramento Valley to areas of deficiency to the south, but to solve local problems in all areas practicable. Cost of all the works listed, at today's prices, is estimated at \$11,900,000,000 of which \$9,000,000,000 covers features of the California Aqueduct System.

Bulletin 3 points out the maldistribution of California's water supplies, and water deficiencies in Alameda, Santa Clara, and San Benito counties, in the east, south and west portions of the San Joaquin Valley, in the Antelope Valley, Santa Maria Valley, in Ventura County, San Diego County and in other portions of Southern California.

It points out also the urgent need for

flood control, and the need for reducing the dangerous overdraft on the state's ground water basins which now approach 4,000,000 ac. ft. per year.

It stresses that the job as outlined in the plan calls for the coordinated participation of the Federal government, the state itself, various levels of local government, and private industry.

Changes for airfield specs

FOLLOWING the study of a joint AGC-Corps of Engineers Committee, as a task unit, the Corps of Engineers has announced that a revision will be made in the tolerances for both smoothness and grade in airfield paving. There have been objections to the tight specifications which in the past have allowed only a 1/8-in. deviation in smoothness from a 16-ft. straight edge and the corresponding requirement that the finished grade have only a plus or minus 0.04-ft. variation from the design grade.

The AGC part of the committee met with the Corps of Engineers to discuss the problems encountered in the field in meeting these specifications and to recommend changes which could be regarded by contractors as logical in the light of actual field experience.

Contract for arch dam

A \$2,289,052 Bureau of Reclamation contract for construction of Anchor Dam, a concrete arch structure near Thermopolis, Wyo., has been awarded to Foley Brothers, Inc., St. Paul, Minn. The Foley bid for a concrete dam was nearly \$300,000 less than a bid by the C. F. Lytle Co., Sioux City, Iowa, for an earth dam which would do the same job.



M. H. SLOCUM

M. H. Slocum, long associated with heavy construction in the West, has joined Morrison-Knudsen Co., Inc., Boise, Idaho, as consultant on project planning and construction in the dam and powerplant division.



GORGE DAM: CITY LIGHT BUYS REFRIGERATORS

Seattle City Light has purchased the refrigeration equipment used to create the ice barrier at Gorge High Dam. With the addition of several more units City Light intends to lower the temperature from the present minus 10 F. to minus 40 F. Purchase of the equipment will enable City Light to direct its operation. The ice barrier (dotted line in photo) was described in *Western Construction*, Nov. 1956. The dispute between City Light and the contractor, Merritt-Chapman & Scott and Savin, concerning leakage through the barrier was presented in the April 1957 issue. The 136-ft. long power tunnel (upper right) was recently holed through.

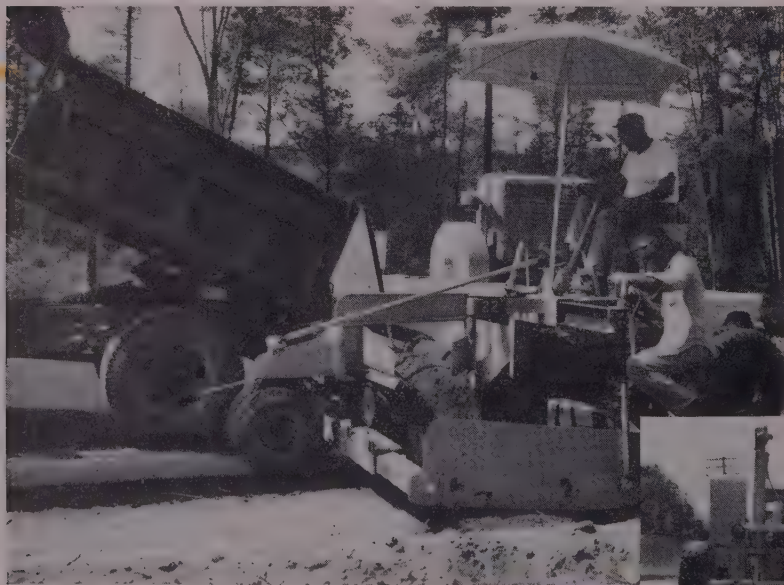
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from Superhighways to Driveways . . .***

Get all the advantages of Blaw-Knox Bituminous Paving Equipment

For any type of bituminous paving operation, the efficient production of Blaw-Knox bituminous paving equipment will keep operating costs at a minimum. Where big yardages are involved for superhighways, airports or turnpikes the combination of Blaw-Knox PF-90 Bituminous Paver Finisher laying asphaltic concrete on base course material laid by a Blaw-Knox Base Paver will assure big profitable production. Where the jobs are smaller and working area confined such as driveways, parking lots, alleys, play areas, or streets, the Blaw-Knox PF-45

Black Top Paver will give you the kind of production that will mean money in the pocket. When shoulder paving or road widening are involved the Blaw-Knox Road Widener and Trench Roller team will reduce hand labor, wasted material, form setting and rolling time.

All units in the line of Bituminous paving equipment are engineered to give maximum versatility. They can be adjusted to work in various widths and handle many types of material or mixes. For complete information see your nearest Blaw-Knox distributor.



Road Widener can be used to spread gravel or pave concrete and asphalt on shoulder paving or road widening jobs. They can be adjusted to work from 18" to 10'.



Trench Roller speeds trench compaction in either narrow or wide trenches. Rolling width and depth can be adjusted while roller is in motion.



Model PF-90 Bituminous Paver Finisher has high capacity features for big job production. No other paver offers its combination of rubber-tired mounting, paving speed, paving width, capacity and high travel speed — features that mean more tons per shift on day-after-day jobs.

Model P-150 Base Paver spreads big tonnages of base course material without segregation. Its oscillating screed knits fine or coarse material into an even compact base course that is true to grade and crown.

Model PF-45 Black Top Paver assures big profits on small to medium black top paving jobs. Its rubber-tired mounting, capacity, high travel speed and maneuverability save time and hand labor when working in confined areas or on scattered jobs.

For complete information of the complete line of Blaw-Knox bituminous equipment send for the following bulletins — for the Model PF-90 Bituminous Paver Finisher, No. 2475; for the Model P-150 Base Paver, No. 2457R; for the Model PF-45 Black Top Paver, No. 2539; for the Road Widener, No. 2458R and for the Trench Roller, No. 2497.



BLAW-KNOX COMPANY
Construction Equipment Division
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Tortuous old mountain highway formed

Honolulu traffic barrier

solved by modern alignment including two tunnels



RECENTLY opened to traffic, the \$3,000,000 Nuuanu Pali tunnel project breaks the serious traffic bottleneck between Honolulu and windward side of Oahu. The air view and sketch (above) prepared before construction started shows the old, two-lane highway and the new four-lane route both approaching the famous Hairpin Turn from the near side of the range. Beyond the turn the "B" section is two-lane road and causeway leading to 500-ft. tunnel. Section "A" includes the two tunnels, the second passing under Pali Lookout. From there the highway leads down to Honolulu at the extreme right. The new highway "B" and "A" will carry outbound traffic, with the old road carrying inbound, until parallel tunnels and structures will eliminate it completely.

Aerial close-up (left) shows the windward portals of the two tunnels, and the old road with its congested, two-way traffic.

Construction views on following page.

Collbran Project starts in western Colorado

INITIATION of construction of the Collbran Project in western Colorado, authorized in 1952, will be the award of a contract for Vega Dam. The 145-ft. earth dam, on Plateau Creek, is the project's principal feature. The development will provide a full water supply for 2,310 ac. and a supplemental irrigation supply for 18,340 ac. Plans also call for two small powerplants with an installed capacity of 13,000 kw. of hydroelectric power. Contract with the Collbran Conservancy District, representing the water users, calls for repayment of \$1,070,000 in 50 equal annual payments, commencing within three years after receiving notice of the availability of water. The law provides that the remainder of the irrigation allocation shall be repaid from surplus power revenues. Total estimated cost of the revised project is \$14,006,000. Of this, \$3,914,000 is allocated to irrigation, \$9,992,000 to power, and \$100,000 to fish and wildlife benefits . . . the later being nonreimbursable.

Cochrane Dam progress

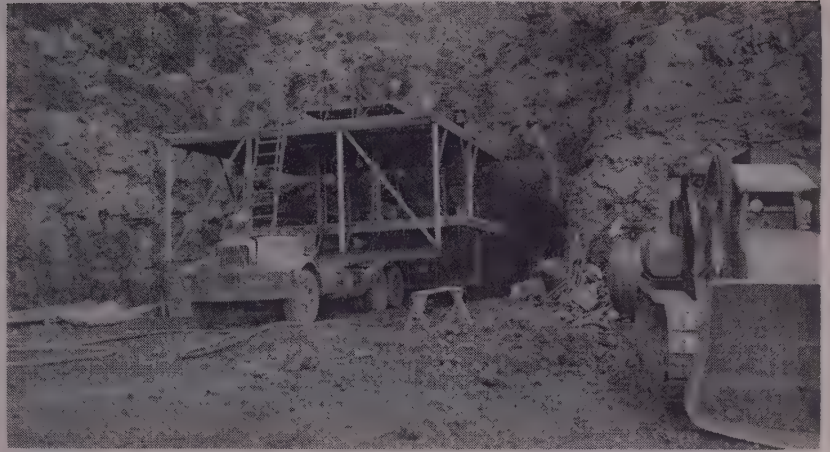
COCHRANE DAM being built by the Montana Power Co. near Great Falls on the Missouri River has passed the 20% mark toward completion. Work on the preparation of aggregate continued throughout the winter, according to H. H. Cochrane, consulting engineer for the company. The dam is being named for him following his long service with the organization. Contract for the \$10,000,000 project is a joint venture by Winston Brothers Co. and Greene Construction Co. It will be a concrete gravity structure 98 ft. high and 869 ft. high at the crest, containing 114,000 cu. yd. of concrete, including the powerhouse.

At the present time towers have been completed for the cableway system across the site and the first concrete was placed last February. When completed the project will add 60,000 kw. to the system of the power company.

Vehicular tube planned

WITH an estimated cost of \$18,000,000 a vehicular tube is being planned to extend under the ship channel from San Pedro to Terminal Island. Enabling legislation, expected to pass the California legislature, would provide that the State Toll Bridge Authority undertake construction and financing with a sale of revenue bonds. If this means of financing is not adequate the legislation provides that supplementary funds can be taken from the Los Angeles County and the City gas tax allocation. The tube would be about 3,000 ft. long and would handle the extensive traffic moving through San Pedro to the Terminal Island Naval and other facilities.

Construction views of Pali Tunnel



JUMBO at portal of the 500-ft. tunnel showing footing drift. The project was carried out under the direction of **Ben E. Nutter**, until recently superintendent of public works of the Territory of Hawaii. **Erwin F. Morrison** is district engineer of the highway department. Contract held by **J. M. Tanaka**, Honolulu.



PUMPCRETE was used to place lining concrete, with this view showing the conveyor loading the pump, concrete being piped to the footing drift.



HOLED THROUGH, the 500-ft. tunnel looked toward Kailua on Windward Oahu. The eight bridges on the project have a total length of 1,815 ft.

Speeds Jobs

It pays to Standardize on GM Detroit Diesel Power

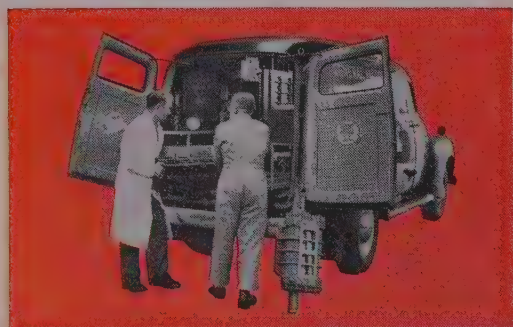
BECAUSE of 2-cycle operation, General Motors Detroit Diesel engines respond immediately to sudden heavy load changes. There's no power lag—no coasting piston strokes to draw in fresh air and discharge exhaust as in 4-cycle engines. With a GM Diesel, you have power for work at *every* downstroke of *every* piston. This instant response to load changes means faster work cycles—more work in less time.

But that's only one of the advantages. All GM Detroit Diesel engines of a single series have the same bore and stroke. This means that in the Series 71, for example, practically all moving parts are the same for any size engine from a 2-cylinder to a 24-cylinder "Quad."

This unique feature of GM Detroit Diesel design permits lower parts inventories—less time out for maintenance. Maximum parts interchangeability is one of the many *plus* values that go with your purchase of GM Detroit Diesel engines.

Standardization of design leads also to lower manufacturing costs, both the assembled engine and repair parts. Not only do you profit by investment in a *smaller* number of repair parts, but you profit *doubly* because the engines and parts cost less.

Another is the prompt, efficient service you can count on from your GM Detroit Diesel Distributor or Dealer—an extra good reason why it always pays to standardize on GM Detroit Diesel power.



First Class Service for America's First Choice Diesel

Many a GM Detroit Diesel owner has been agreeably surprised the first time he utilized our "Unit Exchange" service. Because of the basic standardization of GM Diesel engines, we are able to maintain a "pool" of fully reconditioned "51," "71" and "110" engines ready for replacement in your equipment on quick notice. The engine we install is fully warranted to perform like new. You keep any accessories that are in good working order—and the price you pay for "Unit Exchange" is simply the cost of putting your old engine into the same first-class condition as the one you receive. Want more information? Just give us a call.

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ARIZONA—Phoenix
The Diesel Service Company

CALIFORNIA—Berkeley
West Coast Engine & Equipment Co.
El Monte, Long Beach, Los Angeles
Anderson-O'Brien Co.

COLORADO—Denver
The Colorado Builders' Supply Co.

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

NEVADA—Reno
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TEXAS—El Paso
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Plus Dealers at many other points



It's wetter than we thought

WEATHER conditions over the watered areas of the 11 Western states have resulted in some modification in the precast runoff during summer months. The regular annual forecast was presented in **Western Construction**, May 1957, page 76.

A letter from one of the authors of the precast, Homer J. Stockwell, Snow Survey Supervisor, indicates that temperatures during April and May have been unusually low and total precipitation during these two months has been near maximum record. As a result, all stream flow is expected to be well above normal in Colorado, southern Wyoming and northern New Mexico. Damage from high water is expected in local areas along the Gunnison and Dolores rivers and possibly on the Rio Grande. There will be flooding of low lands on almost all of the Western streams during the peak of the snow melt season, but no material damage is expected outside of the streams just mentioned.

Largest cantilever span

ONE of the world's largest aircraft maintenance hangars is under construction at Metropolitan Oakland International Airport. Designed to accommodate the largest planes in operation today as well as those planned for the foreseeable future, the structure is being built by the Port of Oakland at a cost of \$1,250,000 for lease to Aircraft Engineering and Maintenance Co.

Representatives of O'Neil and Long & Associates, civil engineers on the project, said that the first unit of the structure, to be completed this July, will include the largest free cantilever span in the United States—160 ft. with no intermediate supporting columns. The full structure, to be completed in early 1958, will measure 225 x 600 ft. To gain the necessary weight to stabilize the 160-ft. cantilever, 6,500 cu. yd. of concrete will be required and approximately 750 tons of structural steel will be used in the full project.

Men's fashion department

"HARD HATS" will be in style this summer on construction jobs throughout the Territory of Alaska. A new safety regulation of the Alaska District Corps of Engineers provides that all field, maintenance and operations employees of the district will wear the protective headgear at all times while on duty in construction or operating areas.

In addition, provisions of new construction contracts being signed by the Alaska District in many cases make entire projects required hard hat areas for contractors' employees.

Among the new projects which will be entirely hard hat areas for construction workers will be the \$25,000,000 project

to build six new DEW-Line stations for the Air Force stretching 1,000 mi. along the Aleutian Island chain off Alaska's coast.

The new hard hat regulation is an extension of the previous rule that hard hats would be worn in posted areas where there was danger from falling objects. It is part of a continuous safety campaign of the Alaska District to protect the health and lives of men who work on defense construction.

Work at Snoqualmie Pass

IMPROVEMENT of the Snoqualmie Pass Highway (U. S. 10 on the Interstate System) will be advanced by the award of four contracts totaling about \$2,800,000 by the Washington State Highway Commission. This work is located east of the summit and will provide for two 24-ft. roadways built to Interstate standards.

The four different contracts cover: (1) from Keechelus Inn to Sunset Lodge, awarded to Goodfellow Bros., Inc., on a low bid of \$371,972; (2) from Sunset Lodge to Keechelus Dam, awarded to Max J. Kuney Co., Spokane, on a low bid of \$1,060,150; (3) from Keechelus Dam to Midway, awarded to The Harrison Bros. Co., Tacoma, on a low bid of \$712,107; (4) from Midway to Kachess River, awarded to C. E.



BOEING IS EXPANDING

A Manitowoc 3500 with a 120-ft. boom sets a 47-ton steel section for a new hangar at Boeing Airplane Company's Seattle plant. The Seattle expansion program has been under way for over a year, is nearly finished.

Oneal, Inc., Ellensburg, on a low bid of \$646,796.

These contracts will be financed with state matching money and the Federal funds made available for Interstate System Highways. The smallest contract is scheduled for completion by October of this year, with the other contracts calling for 130 working days after starting.

Because of the large amount of solid rock excavation which will be carried out near the present roadway, the existing highway will be closed from 5 a.m. to 1 p.m. on weekdays until October 11. The highway will be open over weekends and holidays. The resulting inconvenience to traffic has caused the Washington Department of Highways to prepare a pamphlet titled "Snoqualmie Pass—Four Lanes Across The Cascades." This pamphlet will be handed to travelers on this highway and explains in some detail the situation and the need for closing the pass during certain hours. The leaflet points out that this highway is an important link connecting eastern and western Washington carrying about 4,570 vehicles per day, of which 1,420 are trucks.

Utah Power building

THIS FALL the Utah Power & Light Co. will start construction on a \$1,700,000 general office building in Salt Lake City. Occupancy is scheduled for January 1959. Preliminary architectural plans have been completed for the building which will have 60,000 sq. ft. of space on three floors and will be adjacent to the company's Operations Center building. It will be completely air conditioned.

Green Construction Co. low on Hills Creek Dam

WITH a joint bid of \$20,572,366, Green Construction Co., Des Moines, Iowa, and Tecon Corp. of Dallas, Texas, were low for construction of Hills Creek dam and incidental work on the Middle Fork on the Willamette River in Oregon. The project is under the general direction of Col. Jackson Graham, district engineer, Corps of Engineers at Portland who announced that the Government estimate for the project was \$16,770,500. If the low bid had been \$90,760 higher, it would have been automatically rejected as exceeding by more than 25% the Government estimate. Assuming the contract is awarded it will represent the largest job to be put under contract by the Portland District since the first phase of The Dalles Dam in 1953.

Other bidders for the work were Guy F. Atkinson Co., South San Francisco, and Ostrander Construction Co., Portland, at \$21,625,447; Peter Kiewit Sons' Co., Omaha, Neb., at \$23,154,425; Wunderlich Construction Co., and Vinnell Co. of Omaha, Neb., at \$23,209,515; and Morrison-Knudsen Co., Seattle, Wash., at \$24,842,727.

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ASPHALT PAVING

(Continued from page 40)

possibly some combination of these. In some cases, excessive speed of the roller will also contribute to the shoving or mushing.

Good machine and operator

The roller should always be in good operating condition. It should be checked to see that it runs smoothly and reverses without jerking and that the rolls are smooth and unpitted. Many of the older rollers also display evidences of worn bearings in the roll shafts, especially in the tiller wheel. It goes without saying that rollers in unsatisfactory condition should not be allowed on the work.

During the rolling operation, the operator should take care that he does not stop in the same transverse location with each pass that he makes. Likewise he should not bring the roller to a stop or reverse it too suddenly, nor should the roller be allowed to stand in one spot on a newly laid asphaltic concrete for too long a period of time. All these procedures have a tendency to cause differential compaction in the mat and leave indentations that are extremely difficult to remove.

In addition to the rolling with steel wheel rollers, just discussed, the use of pneumatic-tired rollers is frequently beneficial. Rubber-tired rollers are used to obtain the type of compaction or surface finish that vehicular traffic gives an asphaltic surface. In rolling with a pneumatic-tired roller on normal street and highway work, densification is not the primary goal. The greatest importance is in the achieving of a well knit surface that is inherent after vehicular traffic uses an asphaltic surface. In addition, if the compacted surface exhibits transverse heat-checks caused by rolling on a mix too hot with a steel wheel roller, a pneumatic-tired roller will do much to heal these cracks by its kneading action.

Rolling on airfield pavements

In the case of rolling or compaction on airfield pavements, a different set of conditions exist and different rolling techniques should be employed. Unlike streets or highways, once the airfield runway is completed, the greater portion of it will receive very little further compaction. The bulk of the surface on an

airfield rarely, if ever, receives the action of rubber-tired vehicular traffic, whether they be aircraft or motor vehicles. For this reason it is important and necessary that the maximum degree of densification and compaction be achieved during the construction phase of the pavement.

The initial or breakdown pass should be made as soon as possible after the paving machine has laid the mat. This should be done regardless of whether heat checks are rolled into the mix or not. After the breakdown pass it is common procedure with the Corps of Engineers to require pneumatic-tired rolling directly afterwards. The rubber-tired rollers used in this case are usually heavier and with higher tire pressures than those used in highway work. They are used to achieve further densification as well as to heal the heat checks that developed under initial rolling.

The final rolling operation on airfields again is similar to that on highways and is to eliminate any roller marks that may have been created by the previous rolling effort. As in the case of the breakdown pass on airfields, the finish rolling should also probably be done at a little higher temperature than is employed on streets or highways. Regardless of the type of surface being rolled, however, it should be repeated that the rolling should always progress with the drive wheel of the roller forward in the direction of paving.

(Next month Vaughn Marker will conclude his discussion of asphalt paving with a detailed description of what the inspector should know about the operation of graders and pavers. EDITOR)

WHITE ALICE

(Continued from page 62)

cations building completed except for a few minor deficiencies caused by missing government-furnished equipment. On January 9, 1957, a joint inspection was made by representatives of the Air Force, Western Electric Co., the Corps of Engineers and the contractor, and the communications building was turned over for beneficial occupancy so Western Electric could start its electronics installation.

The outside towers were completed February 18 by a rugged structural steel crew who thumbed their dripping noses at the raw weather. The tower erection was handled very efficiently by M-K's crew who were confronted by below zero weather and brawling 50-mi. gales. The lower stub portion of the tower was erected

in place while the 30-ft. reflector antennas, which resembled king size dishpans (see illustrations), were assembled on the ground. Then two cranes ganged up on the erection to assure no blowing down by the wild winds with one crane lifting the mammoth dish into place and staying hooked to it until the fill-in tower erection behind it was completed by the second crane.

It is anticipated that the remaining uncompleted work items, the 2,500-bbl. fuel storage tank, the wave guides, outside grading, will be completed without trouble by the project completion date of July 31, 1957.

Personnel

The White Alice facility at King Salmon was contracted and supervised by the Alaska District, Corps of Engineers, Anchorage, with following key personnel: Col. P. V. Kieffer, Jr., District Engineer; John E. England, Chief of Construction Division; Bill Broadwell and Jim Moore, Projects South; George W. Avery, resident engineer, and Herb C. Brooks, project engineer.

Morrison-Knudsen's key men are George E. Fowler, projects engineer; Fred Swanson, general superintendent; John Austin, project engineer; Ben Ostrom, steel superintendent, and Henry Svaasand, carpenter superintendent.

City Electric Co.'s subcontract is being supervised by A. E. Tegstrom, and Alaska Heating & Plumbing Co. has Carl Littin superintending on their contract.

Washington plans jobs

LEGISLATION passed and signed in Washington provides for spending \$300,000,000 on highways, county roads and city streets. The law also adds 100 mi. of road to the state highway system.

Important projects for the future, for which money was appropriated for engineering studies, include the bridging of Puget Sound, a tunnel through the Cascade Mountains, a bridge across the lower Columbia River at Astoria and preliminary investigation for a highway crossing the northern section of the state.

In another legislative action a \$75,000,000 bond issue was authorized to expedite construction on the proposed freeway extending from Tacoma through Seattle to Everett. By this method of financing it was hoped to cut three years off the construction time for this project.

Low bids and contract awards

ARIZONA

A low bid of \$1,159,757 was submitted by **Wallace & Wallace** of Phoenix for 6½ mi. of grading and surfacing on the Cordes Jct.-Flagstaff Highway in Yavapai County. **W. J. Henson**, contractor of Prescott, submitted a low bid of \$241,967 for grading and surfacing northeast of Cordes Jct. on the Cordes Jct.-Flagstaff Highway in Yavapai County. A low bid of \$543,972 was submitted by **San Xavier Rock & Sand Co.**, Tucson, for grading, surfacing and bridge construction northwest of the city of Tucson in Pima County. **Flickinger Bros. Contracting Co.**, Phoenix, submitted a low bid of \$477,192 for grading and surfacing the Superior-Winkelman Highway northwest of Winkelman in Pinal County. **Fisher Contracting Co.** of Phoenix submitted a low bid of \$659,674 for grading and draining southeast of Sedona on the Cordes Jct.-Flagstaff Highway in Coconino County. **Heiskell Construction Co.** of Phoenix submitted a low bid of \$139,390 for construction of the Gila River bridge and approaches on the Casa Grande-Chandler Highway in Pinal County. **Peter Kiewit Sons' Co.** of Phoenix submitted a low bid of \$205,126 for grading and surfacing Rte. 2, south entrance road in the Grand Canyon National Park in Coconino County. **Fisher Construction Co.** of Phoenix submitted low bid of \$756,579 for 5.4 mi. of grading and surfacing the Mogollon Rim Section of the Tonto and Sitgreaves National Forest in Gila and Coconino counties.

CALIFORNIA

A \$3,594,047 contract was awarded to **Kenneth H. Golden Co., Inc.**, **M. H. Golden Construction Co.**, **E. C. Young**, **Young & Arrieta**, San Diego, for construction of 2.9 mi. of 8-lane freeway on U. S. 80, west of La Mesa Blvd. in La Mesa and Ballantyne Lane in El Cajon, San Diego County. **Fredrickson Bros.** of Emeryville received a \$1,008,121 contract for grading, surfacing and structures on Rte. 12, east Suisun in Solano County. A \$720,587 contract was received by **Arthur Siri, Inc.**, of Santa Rosa for grading and seal coating 6.3 mi. of Rte. 53 between Cache Creek and Rte. 20, and constructing drainage facilities in Lake County. **Stewart & Nuss, Inc.**, of Fresno received a \$449,516 contract for grading and surfacing 2.5 mi. of Rte. 180 in the city of Fresno, Fresno County. **W. F. Maxwell Co.** of Fontana received a \$203,300 contract for construction of 3 bridges and approaches on Rte. 150, north of Santa Paula in Ventura County. **Griffith Co.**, Los Angeles, received two contracts for roadwork in San Diego and Orange counties: \$1,695,513 for grading, surfacing and construction of three bridges on 8-lane freeway in the city and county of San Diego and \$3,161,807 for 3.6 mi. of grading, surfacing and con-

struction of 6-lane divided freeway, Rte. 174, six major structures and pumping plant in Orange County. **R. E. Hazard Construction Co.** and **W. F. Maxwell Co.** of San Diego received a \$947,769 contract for construction of 3 bridges and grading and surfacing 8.4 mi. of U. S. 101, in National City, San Diego County. A \$2,570,432 contract was received by **Cox Bros. Construction Co.** and **J. E. Haddock, Ltd.**, Stanton, for grading, surfacing 2.3 mi. of the San Diego Freeway and to construct one undercrossing and three overcrossings in the city of San Clemente, San Diego and Orange counties. **McCammon-Wunderlich Co.** and **Wunderlich Contracting Co.**, Palo Alto, received a \$1,291,659 contract for 2.2 mi. of divided highway and to construct one bridge and one equestrian undercrossing between Manor Drive at Edgemar and Rte. 5 in San Mateo County. **Harms Bros. & M. Syar & Erickson**, **Phillip & Wiseberg** of Sacramento received a \$4,118,053 contract for grading and surfacing 3.5 mi. of 6-lane divided freeway on U. S. 40 and construction of 7 concrete bridges near Vallejo Wye, Solano County. **Mercer, Frazer Co., Inc. & Mercer**, **Fraser Gas Co.**, Eureka, received a \$659,028 contract for 4.6 mi. of surfacing north of Fernbridge in Humboldt County. **Osborne-Bowie Engineering Contractors** of Crescent City received a \$244,089 contract for construction of two bridges south of Minot Creek and north of High Prairie Creek in Del Norte County. **A. Teichert & Son, Inc.**, Sacramento, received two contracts for roadwork in Butte and Sacramento counties: \$931,422 for grading and surfacing 13.9 mi. on U. S. 50 to provide a 4-lane highway between Brighton and east of Alder Creek in Sacramento County and \$906,383 for 5.4 mi. of grading and surfacing and construction of two bridges north of Hot Springs in Butte County. **Basich Bros. Construction Co.** and **N. L. Basich** of South San Gabriel received two contracts for highway construction in Mono County: \$255,301 for paving 31.3 mi. of State Rte. 40, near the Nevada State Line and \$198,577 for grading and surfacing 4.5 mi. of Rte. 96, between Bridgeport and East Walker River Reservoir. A low bid of \$3,742,547 was submitted by **J. E. Haddock, Ltd.**, Pasadena, for 5 mi. of grading and surfacing and construction of 4 bridges in Camarillo, Ventura County.

COLORADO

Pioneer Construction Co., Pueblo, submitted a low bid of \$816,080 for construction of Santa Fe Overpass and Arkansas River Bridge on S. H. No. 1, in city and county of Pueblo. A low bid of \$325,845 was submitted by **Harrison Construction Co.**, Denver, for 3.5 mi. of grading, surfacing and structures on State Highway 347 in Montrose County. **Peter Kiewit Sons' Co.**, Denver, submitted a low bid of \$230,811 for grading and

structures north of Kersey in Weld County. A low bid of \$207,782 was submitted by **L. J. Hesser** of Greeley for grading, surfacing and structures on 1.5 mi. of State Highway 52 and 85 in Weld County. **Monaghan & Smith Construction Co.** of Derby submitted a low bid of \$263,946 for grading, structures and surfacing on 9.9 mi., between Kim and Andrix on Highway 100 in Las Animas County. **Pendleton Construction Co.** of Longmont submitted a low bid of \$197,352 for grading, structures and surfacing on 3.6 mi. east of Johnstown in Weld County.

IDAHO

Morrison-Knudsen Co. of Boise received a \$205,415 contract for 7.4 mi. of grading and surfacing U. S. Highway 30 between Glens Ferry and King Hill in Elmore County. **Intermountain Co.** of Boise received a \$340,527 contract for rehabilitation of the Hayden Lake Unit of the Rathdrum Prairie Project near Coeur d'Alene. A \$206,200 contract was received by **Frank G. Baulne** of Yardley, Wash., for furnishing gravel, rock and cover coat in stockpiles adjacent to various highways in District 5, Shoshone, Boundary, Kootenai and Benewah counties. **Nelson Gravel Co.**, Boise, received a \$158,943 contract for grading and surfacing 5.7 mi. of U. S. Highway No. 95, Council south in Adams County. **Robert V. Burggraf Co.**, Idaho Falls, submitted a low bid of \$149,330 for 47 mi. of roadways and parking areas at the AEC's National Reactor Testing Station.

MONTANA

S. Birch, Inc., and **S. Birch & Sons** of Great Falls received a \$448,507 contract for 9.9 mi. of grading and gravel surfacing the Lewistown-Roy Highway in Fergus County. **Naranche & Konda** of Butte received a \$428,289 award for 5.2 mi. of grading, gravel surfacing and draining the Gardiner-Livingston Highway in Park County. A \$330,671 contract was received by **Kiely Construction Co.** of Butte for 1.3 mi. of grading, gravel surfacing and draining on the Dillon-Butte Highway in Beaverhead County. **Holland Construction Co.** of Bozeman received a \$247,184 contract for 4.8 mi. of grading and surfacing the Moiese-Charlo-Nine Pipe Highway in Lake County. A \$90,803 contract was received by **Union Construction Co., Inc.**, Missoula, for 2.4 mi. of grading and surfacing the Higgins Ave. Extension, south of Missoula in Missoula County.

NEVADA

Isbell Construction Co. of Reno received a \$643,663 contract for 1.9 mi. of the State Highway System, North City Limits of Carson City in Ormsby County. **Morrison-Knudsen Co.** of Salt Lake City, Utah, received a \$589,948 contract for construction of a portion of the State Highway System in Lander County on U. S. Highway 50. A \$373,937

(Continued on page 90)

BIG YELLOW TEAM KEEPS HOT MIX MOVING AT 150 TONS PER HOUR

Commonwealth Construction Co., Ltd., of Vancouver, B. C., Canada, depends on Caterpillar equipment for its road building jobs. The pictures shown here were taken near Clearwater, B. C., where 11.3 miles of highway were being surfaced with hot mix.

Included in Commonwealth's big yellow team at the mixing plant are a CAT* D318 Engine that drives the blower, a D342 that drives the mixer and a D364 Electric Set that runs the dryer, bucket line, pumps, burners, lights and conveyors. Hourly production is approximately 150 tons of material.

Power for the portable crusher is supplied by another Caterpillar D342 Engine. A D318 powers the 1-yard dragline that loads the hopper, and a Cat D6 Tractor stockpiles the gravel as it comes from the crushing plant, handling about 1,800 tons a day. The seventh Caterpillar machine in the

line-up is a No. 112 Motor Grader, used for scarifying and leveling the road.

Many contractors have found it pays to keep Cat equipment predominant in their spreads. Operators are familiar with Cat-built machines and feel at home with them. Rugged design, good control and ease of maintenance are other qualities which operators like about Cat equipment.

A quarter century of diesel leadership has produced a line of engines that are unbeatable for heavy-duty work. They're built to operate steadily, without fouling, on a wide variety of low-cost fuels, including ordinary No. 2 furnace oil. There are no cylinder ports to clean, and simple, single-orifice fuel injection valves need no cleaning or adjustment. Lubrication schedules are also simplified when all equipment is Caterpillar-built.



Three Cat Diesels power the Standard Steel hot mix plant: A D318, left; D342, center; and a D364 Electric Set, right.



▲ This D342 Engine drives the Pioneer portable crusher. In background, working on the gravel stockpile, is a Caterpillar D6 Tractor.

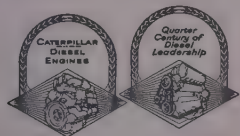
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CATERPILLAR*

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



▲ The Koehring dragline, with 1-yard bucket, is powered by a Cat D318 Engine.



A Caterpillar No. 112 Motor Grader scarifies and grades road surface before asphalt mix is laid.

contract was received by **Silver State Construction Co.**, Fallon, for 9.9 mi. of grading and surfacing north of Mason in Lyon County.

NEW MEXICO

Henry Thygesen & Co. of Albuquerque received a \$184,493 contract for construction of interchange west of Thoreau on U. S. 66 in McKinley County. **Wylie Brothers Contracting Co.**, Albuquerque, received a \$1,417,728 contract for 8 mi. of grading, surfacing and bridge construction on U. S. 66, Santa Rosa-West road in Guadalupe County. A \$1,068,474 contract was received by **Jack Adams** of Santa Fe for 4.5 mi. of grading, surfacing and structures on U. S. Highway 70-80, Lordsburg urban road in Hidalgo County. **Leslie Wheeler** of Albuquerque received a \$271,491 award for 2.9 mi. of grading, surfacing and structures on the Gallup-Shiprock road in McKinley County. A \$147,861 contract was received by **Imperial Paving Co.**, Oklahoma City, Okla., for construction of bridge over Rio Grande at Salem in Dona Ana County.

OREGON

Green Construction Co., Des Moines, Iowa, and **Tecon Corporation** of Dallas, Texas, submitted a low bid of \$20,572,-366 for construction of dam, outlet works, power intake and detour road and bridges at Hills Creek Reservoir on Middle Fork Williamson River. **F. L. Somers**, Medford, received a contract of \$322,600 for construction of two rubble-mound jetties at the mouth of the Chetco River near Brookings. **General Construction Co.** of Portland was awarded a \$1,395,645 contract for repair of the outer end of the North Jetty and construction of pile dikes at Coos Bay. **Cherf Bros., Inc.**, and **Sandkay Contractors, Inc.**, and **S. Birch & Sons Construction Co.** (joint venture) of Ephrata, Wash., submitted a low bid of \$1,636,739 for earthwork, concrete canal lining and structures, Soda Creek Feeder Canal, Talent Div., Oregon Rogue River Basin Project. **Harbert Brothers**, Estacada, received a \$102,606 contract for construction of stone revetment and drift embankment along the right bank of the South Santiam River at Gunderson, north of Lebanon in Linn County. A low bid of \$175,754 was submitted by **J. C. Compton Co.**, McMinnville, for grading and paving the Sunset Highway in Clatsop County. A low bid of \$133,693 was submitted by **Hughes & Dodd Co.** and **Tru-Mix Equip. Co.** of Medford for grading and paving the Crater Lake-Jacksonville Road in Jackson County. **Morse Bros.** of Lebanon submitted a low bid of \$153,299 for grading and paving the Lebanon-Crabtree and Orleans-Lebanon roads in Linn County. A low bid of \$155,215 was submitted by **John Havlik, Jr.**, Scappoose, for grading the Hillsboro-Silverton Highway in Marion and Yamhill counties. **J. M. Steinmuller, Jr.**, Eugene, submitted a bid of \$126,806 for construction of a concrete lined channel for Amazon Creek.

UTAH

A low bid of \$665,957 was submitted by **Industrial Construction Co.**, Las Vegas, Nevada, for grading and surfacing the Utah-Arizona State Line to Mexican Hat in San Juan County. **Wheelwright Construction Co.** of Ogden received a \$291,264 contract for grading, surfacing and bridge construction on 3.6 mi. on State Road No. 162 in Weber County. **L. A. Young Construction Co.** and **Vernal Sand & Gravel Co.**, Richfield, received a \$139,867 contract for 3.6 mi. of grading and surfacing State Road No. 21 in Summit location, Beaver County. **Alexander Construction Co.** of Minneapolis, Minn., submitted a low bid of \$1,517,412 for surfacing and guardrail, access highway, Glen Canyon Unit, Ariz.-Utah, Middle River Div., Colorado River Storage Project. **Fife Construction Co.**, Brigham City, submitted a low bid of \$92,835 for 2.7 mi. of grading and surfacing on Highway 580, in Weber County.

WASHINGTON

C. E. Oneal, Inc., of Ellensburg received a \$646,796 contract for 4.2 mi. of grading and surfacing Midway to Kachess River in Kittitas County. A \$371,-972 contract was received by **Goodfellow Bros.**, Wenatchee, for 1 mi. of grading, surfacing and structures from Keechelus Inn to Sunset Lodge in Kittitas County. **L. W. Vail Co.**, Pasco, received a \$275,-809 contract for grading and surfacing from Hatton Coulee to Lind Coulee in Adams County. A \$289,000 contract was awarded to **Runnels Industries** of Seattle for renovation of the Tacoma Narrows Bridge in Pierce County. **Pacific Sand & Gravel Co.**, Centralia, received a \$294,-480 contract for 3.7 mi. of grading Hwy. No. 12, Claquato to Rainbow Falls in Lewis County. **J. D. Shotwell Co.**, Tacoma, received a \$399,638 contract for 4.5 mi. of grading and surfacing PSH No. 5 from Mary's Corner to Ethel in Lewis County. **Pakar Construction Co.**, Chehalis, received a \$129,359 contract for 1.1 mi. of grading, surfacing and construction of Willapa Bridge and approaches in Pacific County. **Erickson Paving Co.**, Bellevue, received a \$336,-284 contract for grading and surfacing 2.4 mi. from Hyak to Keechelus Inn in Kittitas County. A \$224,458 contract was received by **Woodworth & Co.** of Tacoma for construction on PSH No. 1 in Pierce County. **K. L. Goulter & Son** of Seattle received a \$197,334 contract for 1.2 mi. of grading and surfacing, G. N. Rwy. Undercrossing to Hay Canyon in in Chelan County. **Lockyear & White, Inc.**, of Longview received a \$118,422 contract for bridge construction, Whatcom Creek Bridge in Whatcom County. **Everett McKellar** of Chelan received a \$162,409 contract for bridge construction over Wenatchee River-Cashmere, Chelan County.

WYOMING

Morrison-Knudsen Co., Boise, Idaho, received two contracts for roadwork in

Sweetwater County. A \$661,122 contract for grading, surfacing and structures on 6.4 mi. on the Rock Springs-Rawlin road from Wamsutter west and \$4,121,-149 for grading, surfacing and structures on 11.4 mi. and grading and surfacing on 17.9 mi. all 4-lane divided highway of the Rock Springs-Rawlin road from Wamsutter west. **Max W. Dudley** of Riverton received a \$137,651 contract for the construction of 4 interchange structures on the Rock Springs-Rawlin road from Wamsutter west in Sweetwater County. **Long Construction Co.**, Billings, Mont. received an \$846,181 contract for grading, surfacing and structures on 4-lane divided highway and service roads on the "F" St. section of the Casper Urban System in Natrona County. **Knisely-Moore Co.** of Douglas received two contracts for roadwork in Platte and Laramie counties. An \$861,-389 contract for grading, surfacing and bridge construction at Randall Ave. and miscellaneous work on the Cheyenne Urban Rte. in Cheyenne, Laramie County and \$229,926 for grading, surfacing and construction of one bridge over Dry Wash and miscellaneous work on three miles of the Orin Junction Glendo road in Platte County. **Reac Construction Co.**, Cheyenne, received a \$1,057,999 contract for grading, draining and surfacing 4.1 mi. of streets in Rawlins, Carbon County. **Asbell Bros. Construction Co.** of Riverton received a \$469,981 contract for grading, surfacing and miscellaneous work on 7.4 mi. of the Lovell-Greybull road in Big Horn County. A \$274,664 contract was received by **Riedesel-Lowe Co.**, Cheyenne for construction of two 4-composite W girderspan interchange separation structures, grading of structures and approaches on the Hynds Blvd. Rte. north limit of Cheyenne in Laramie County. **Ellingsford Bros., Inc.**, of Evanston received a \$119,126 contract for the construction of three interchange structure on the Evanston-Ft. Bridger road in Uinta County. A \$476,606 contract was received by **Wilbur Christensen**, Ringsted, Iowa, for grading, surfacing and structures on 7.4 mi. of the Orin Jct. Lusk road in Niobrara County. **Big Horn Construction Co.**, Sheridan, received a \$690,849 award for grading, surfacing of 7.9 mi. of the Kaycee-Midwest road in Natrona County.

ALASKA

Stock & Grove of Anchorage received a \$578,659 contract for grading 5.2 mi. of the Wrangell Highway. **Peter Kiewit Sons' Co.** of Seattle, Wash., received a \$938,303 contract for extension of runway, Galena Air Force Station. **Morrison-Knudsen Co.** of Anchorage submitted a low bid of \$677,913 for construction of Kodiak Naval Air Station access road. **S. S. Mullen** of Seattle, Wash. submitted a low bid of \$169,634 for extensive sealcoating on the Alaska highway. **Green Construction Co.** of Des Moines, Iowa, submitted a low bid of \$103,500 for sealcoating a portion of the Richardson Highway.

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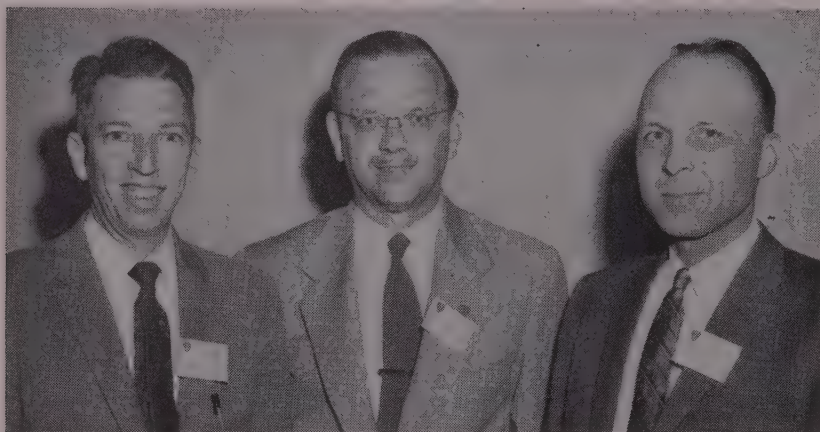
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ENGINEERS

on the move



NEWLY ELECTED officers of Pacific Northwest Council, American Society of Civil Engineers. Left to right: Chairman, **Glenn H. Von Gunten**, assistant chief, engineering division, Walla Walla District, Corps of Engineers; secretary-treasurer, **Harry L. Drake**, design coordinator, also with the Walla Walla District; vice-chairman, **H. A. Cornell**, of Cornell, Howland, Hayes & Merryfield, Corvallis, Ore.

LeRoy W. Mow recently joined the Lockheed Aircraft Corp., Sunnyvale, Calif., as engineer in the Missiles System Division, where he is in the research department doing design and liaison engineering. Mow was formerly a field engineer for Pacific Gas & Electric Co., on powerhouse mechanical installations.

* * *

Ray Dodson, formerly in the district office of Guy F. Atkinson Co. at Long Beach, Calif., is now located at Coyote Dam near Ukiah, Calif., where he is job cost engineer for Atkinson.

* * *

Russell O. Lightcap, an employee of the California Division of Highways, recently transferred from the Construction Department to Bridge Maintenance where he is engaged on highway-bridge design and construction work.

* * *

Frank Leonard and **Richard K. Brimhall** from the Idaho Department of Highways recently spent a week at the Arizona Highway Department studying Arizona's computation programming methods. Arizona was one of the first states to install and use the large Univac 120 now being adopted by the Idaho department. The eight states who have installed the Univac have all sent men to Phoenix to study Arizona's operations.

* * *

The American Water Works Association at its 77th annual conference at Atlantic City in May presented awards to three Westerners. **Willibald A. Kunigk**, retired superintendent and chief engineer of the Water Division of the

city of Tacoma, Wash., was granted honorary membership in the association.

Warren J. Kaufman, professor of sanitary engineering, and **Gerald T. Orlob**, assistant professor of civil engineering at the University of California, Berkeley, received the Resources Division Award. The paper which won for them this award was entitled "Measuring Ground Water Movement with Radioactive and Chemical Tracers."

* * *

Formation of Fryar Construction Co., with offices at 550 So. Fair Oaks Ave., Pasadena, Calif., is announced by the new company's president, **William L. Fryar**. Well known in the Western construction industry, Fryar has represented some of the region's foremost general contractors in high-level capacities over a period of 16 years, among them McNeil Construction Co., M. J. Brock & Sons, Inc., Ford J. Twaits Co., and for the past three years he has been manager of development for the Stanton-Reed Co. Associated with Fryar in the new organization will be **Albert L. Johnson**, vice president and chief estimator, and **James B. Boyle**, secretary-treasurer. The new company will engage in general contracting throughout California.

* * *

Ebasco Services Incorporated has opened a San Francisco office at 120 Montgomery St., according to announcement by **F. C. Gardner**, president of the engineering, construction and business consulting firm. **Harvey K. Breckenridge** who has been with Ebasco since 1954 has been appointed manager. **C. E.**

Pearce, civil engineer, from the New York office has joined the San Francisco staff also, as engineering manager. The new office will be headquarters for a staff of consultants who will serve clients located in this Western region.

* * *

Col. L. L. Haseman, assistant Alaska district engineer, Corps of Engineers Anchorage, recently received a new assignment to Fort Ord, Calif. He has served two years in the Alaska post.

* * *

Dan H. Cadmus is retiring from work in the U. S. Bureau of Public Roads after 34 years service. He has been an engineer on many projects in Oregon and Washington, and at the time of retirement was inspection engineer of Federal-aid work in the Salem office Portland.

* * *

W. A. Bugge, Washington State Highway Director, announces the appointment of **Donald E. Stein** of Yakima as district engineer at Spokane. He succeeds **T. R. Ross**, deceased. **Ray H. Py** has been named the new Yakima district engineer. He was Stein's assistant there.

* * *

John L. Gadd, Jr., formerly district estimating engineer at Salt Lake City for Utah Construction Co., has been made assistant building construction manager for the firm in the San Francisco office.

* * *

Fred Merryfield, professor of sanitary engineering at Oregon State College and partner in the consulting engineering firm of Cornell, Howland, Hayes & Merryfield, was elected president of the American Water Works Association at the 77th annual conference.

New division officers were also chosen for the coming year, among them three men from the West. **E. Jerry Allen**, assistant superintendent of water for Seattle, Wash., is the new chairman of the Distribution Division. One of two new trustees elected for the Management Division this year is **William R. Seege**, general manager and chief engineer of the Marin Municipal Water District at San Rafael, Calif. In the Water Purification Division, **Joseph M. Sanchi**, sanitary engineer for the Los Angeles Department of Water & Power, was elected a trustee.

CALENDAR

- July 29-Aug. 2**—World Conference of Prestressed Concrete, San Francisco, Calif.
- Oct. 7-10**—Federation of Sewage & Industrial Wastes Associations, Statler Hotel, Boston Mass.
- Nov. 13-15**—American Standards Association, annual meeting, Hotel Statler, San Francisco, Calif.
- Nov. 13-15**—Eighth National Conference on Standards, Hotel Statler, San Francisco, Calif.
- Jan. 16, 1958**—Beavers Award Dinner, Biltmore Bowl, Los Angeles, Calif.



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50,000 LB. CAPACITY FRONT AXLE

Kenworth's 803 end-dump is built big all over—from its variable section frame to its all-welded steel body. And, this is especially true of the 50,000 lb. capacity front axle. Completely Kenworth engineered and built, this front axle has an 8" heat-treated, alloy steel, I-beam center section; 3" diameter king pins with nylon bushings, and 6" diameter spindles at inner wheel bearings. Over the roughest terrain, where an ordinary heavy-duty axle would not stand the going, this one has strength to spare. That's typical of all Kenworth's spring-mounted rock and ore movers—every one built for big loads and rough roads. There's one for your job—from the 36-ton Kenworth 803, to the 18-ton 801, the 24-ton 802, the 48-ton 802-B, or the 64-ton 803-B. Ton for ton, each of these rugged rock and ore movers is engineered in every detail for greater strength, lower maintenance, longer life. Now's the time to help yourself to consistently increased profits—learn why . . .

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SUPERVISING the jobs

R. F. Johnson, project manager for Churf Bros. & Sandkay, Inc., is directing construction on three recent awards to this contractor. On Helena Valley Dam, Helena-Great Falls Division of the Missouri River Basin Project in Montana, a \$357,606 earth-fill structure, **Bob Smith** is superintending, with **D. J. Thompson** in the master mechanic spot. On the Rogue River Basin Project in Oregon, where this contractor is executing a \$181,000 contract for earthwork, structures and siphon, Antelope Creek siphon and wasteway, Medford Canal, **L. J. Curtis** is the superintendent, and Thompson is master mechanic. On the third contract which covers earthwork and structures, Main Canal East, Michaud Flats Project, Idaho, **T. W. Barber** is project engineer. Other key men on this \$581,569 project are **C. W. Thomas**, office manager, **C. J. Rogers**, purchasing agent, and again Thompson is acting as master mechanic.



EMERSON HAIL is project manager for Kelowna Bridge Contractors, a joint venture consisting of Pacific Bridge Co. of San Francisco and General Construction Co. Ltd. of Vancouver. A full description of the job appears on page 64.

Robert J. Hansen, superintendent, **Lorenzo B. Anderson**, construction foreman, and **Norman D. McKechnie**, estimator-engineer, are key men on Burgess Construction Co.'s recent award from the Civil Aeronautics Administration for a project at Yakataga in Alaska. The work involves construction of a 500-ft. wood pile bridge, 300 lin. ft. of sheet piling, 2.3-mi. gravel surfaced road, 14,000 ft. of 3-phase primary line, enclosed tramway, and various related buildings, utilities, etc. Costing more than \$1,100,000, the construction got under way in April and Burgess expects to have it finished in September.

* * *

H. M. Roth and **H. E. Roth** of Roth Construction Co. are in over-all charge of a recent award to their company for grading and construction of small drainage structures on the Grass Range-Malta highway in Phillips County, Mont. Foremen are **J. G. Kent** and **J. T. Dugan**. **A. G. Nygaard** is in charge of the office. This \$375,922 job started in May and is expected to finish in September.

* * *

Douglas Hoxsey, superintendent, is in charge of construction on a recent award to Murphy Bros., Inc., for highway relocation work in connection with the Noxon Rapids hydroelectric project in northwestern Montana. Engineer on this \$490,000 job is **W. W. Westermann**. **John Felton** is superintendent of equipment. With mid-September the finishing target, work started in May.

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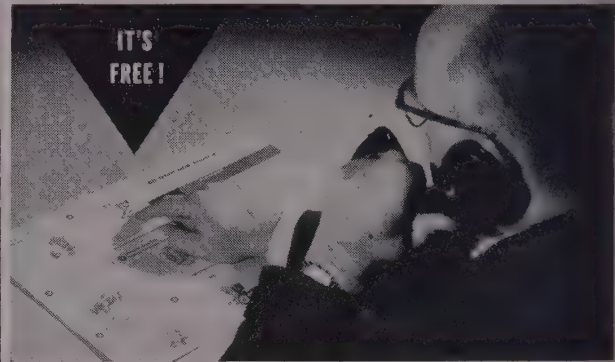
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Barnes Construction Pump Selector can help you avert costly delays—improve job-to-job efficiency—by moving more water faster, "on schedule!"

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Write Department L-77 for details

Ed Surufka (right), superintendent for Charles MacClosky Co., is in charge of a recent job awarded MacClosky for work on the San Bernardino Freeway in West Covina, Los Angeles County, Calif.



Project engineer for the \$497,695 contract which is for grading, surfacing, a prestressed concrete bridge across the freeway, and a concrete bridge across the Los Angeles County flood control channel, is Bob Powell, shown with Surufka. Amos Dixon, Jr., is master mechanic, and Marvin McCoy is concrete foreman. Scheduled for completion this coming December, work has been under way since May.

* * *

W. H. Stecker is acting as project manager for the contracting firm of Stecker & Scott, holder of a \$389,896 contract for grading and surfacing 5.5 mi. and seal-coating portions on Rocky Ridge road east of Roseville, Calif. Superintending the job is Charles F. Bode. Other important personnel on this project are Marty Sheeren, purchasing agent, Louis Kaska, master mechanic, and Ernie Hernandez, foreman. This highway construction started in April and will probably end in October.

* * *

Jack Siegrist is general superintendent, and John Tolvo is job superintendent on grading and highway structures, Limon to Orday in Limon County, Colo., a \$129,789 job on which Siegrist Construction Co. has been working since April, and has now about finished.

* * *

Oscar Murray, clearing superintendent, and Robert VanderBoggh, grading foreman, are key men working for Rogers Construction Co. on a \$718,514 grading and oiling job on The Dalles-California highway in Jefferson County, Ore. John Strom is drilling and shooting foreman, and Homer Paxton is crushing foreman.

* * *

J. H. Becker, vice president in the contracting firm of Strong & Macdonald, Inc., is directing a \$134,686 contract for 2.6 mi. of grading, surfacing plus crushing surfacing material, in the vicinity of Yale, Cowlitz County, Wash. Superintending the work is Arthur Nelson. Strong & Macdonald started this job in May and expect to finish in September.

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"INFERNO" STEAM HOSE specifications include high-temperature tube; multiple-layer, braided steel wire carcass; wear-and-weather-resistant "Synplastic"® cover. Sizes 1/2" to 3", inclusive, in maximum lengths of 50 feet.

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Caterpillar D4 and D2 Tractors, for their size and weight, are as rugged machines as ever wore yellow paint. There are hundreds of jobs they can do just as efficiently as their bigger brothers. And contractors are proving it.

The four tractors shown here are working in localities as far apart as Alaska and Louisiana, and none of them is on an easy job. One owner, John Hannigan, of Philadelphia, puts it this way: "They're tough. I'd never buy anything else. They'll outwork other makes any time and any where. The only repairs I've made on this D4 in three years were adjustments to the main clutch, tracks and steering brakes."

Both the D2 and the D4 are built to handle the tough jobs, right up to their capacity, all day long and month after month. Yet they're small and compact enough to work in cramped quarters—tunnels or narrow city streets. Both are economical to operate, and

maintenance costs are consistently low, because they're *quality* built to stand up under punishment. Their dependable Caterpillar Engines have flywheel capacities of 48 HP for the D2 and 63 HP for the D4.

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NEW ORLEANS

Taking the "blues" out of Basin Street, this Cat D2 Tractor, owned by Boh Brothers Construction Co., New Orleans, La., is helping widen the famous thoroughfare to 44 ft. on each side of a center parkway. Old St. Louis Cemetery shown in background.



TORONTO

Poace Construction Co., of Toronto, Ont., owns this D4 with No. 4A Bulldozer, shown dozing fill into a bend of the Humber River. This is a diversion job, digging a new channel to prevent flooding, and moving the earth into the old river bed.



KETCHIKAN

The D2 helped Manson-Osberg Co. in the construction of a 7 ft. x 8 ft. hydroelectric tunnel through granite rock near Ketchikan, Alaska. Equipped with scrubbers, the tractor worked the whole length of the 4000-ft. tunnel, moving out over 1000 cu. yd. of rock.

PHILADELPHIA

Here the D4, owned by Contractor John Hannigan, rips up old concrete foundations and rough grades for a new driveway and parking area at one of the Penn Fruit Co. supermarkets, in Philadelphia, Pa.





JOY vein type blower used in forcing fresh air into Glen Canyon diversion tunnel under construction in northern Arizona by Mountain States Construction Co. Shown alongside the 75-hp. blower, capable of delivering 45,000 cfm, are (right) **Earl Edwards**, supervisor-inspector for the Bureau of Reclamation, and **Fred Finch**, USBR chief photographer on the project, which is reviewed on page 30.

Ralph "Tuffy" Jones is project manager for Morrison-Knudsen Co., Inc., on 10.9 mi. of grading and surfacing near Hickison Summit in Lander County, Nev. The office is managed by **John Cotner**. This \$589,948 job started in April, and will be finished in November.

* * *

Ben Kelly, Jr., is foreman in charge of construction which got started in April on 10.5 mi. of grading and surfacing, Colorado-New Mexico state line south in Taos County, N. Mex. Other key men for the combination firm of Miller, Smith & O'Hara, Inc., and Harry Trotz Construction Co. are **Gaylord Chapel**, in charge of structures, **David C. Anderson**, office manager, **Millie Richards**, in charge of maintenance, and **Jeff Davalos** general timekeeper. This \$571,266 project is scheduled for completion the first of 1958.

Another award to this joint venture in the amount of \$1,774,095 is for 11.9 mi. of grading, surfacing and structures on the Albuquerque-Algodones road in Sandoval and Bernalillo counties. Here **Fred D. Merritt** is superintending the entire job, while **H. C. Jones** is supervising the bridge and concrete work, and **James K. Alexander** is general timekeeper. As on the above mentioned job, **Dave Anderson** is in charge of the office. This job also started last April, and will finish about June 1958.

* * *

Gail Loop, superintendent for Peter Kiewit Sons' Co., is in charge of a \$165,998 contract for schedules 1 and 2, earthwork, structures and surfacing access road and relocation at Glendo Dam and reservoir in Wyoming. Foremen are **Paul Meeks**, dirt, and **L. A. Cundy**, pipe. Office manager is **John Squier**. Scheduled for completion September 15, the job has been in progress since mid-May.

* * *

E. H. Elwin, project manager, **E. C. Hart**, superintendent, **R. H. Penwarden**, office manager, and **Felix Toner**, engi-

neer, comprise the top men working for Denali-McCray on completion of the Gold Creek flood control channel in Juneau, Alaska. Work entailed in this \$403,929 job covering placement of reinforced concrete lining got started in May and will finish about October. Resident engineer for the Corps of Engineers is **Clifford Fenn**.

* * *

Ben Heirshberg is acting as project manager for the \$3,372,000 recent award to Merco Construction Engineers, Inc., for construction of James Monroe High School at Los Angeles, Calif. Superintending construction of the new school plant is **Robert Pluym**, while **Les Cole** is general foreman, and **Joe Rodriguez** is labor foreman. Expected to be finished in June next year, the construction was started in May.

* * *

Raymond Burns is superintendent, **Walter Reid** is foreman, and **Bill Barnes** is timekeeper for Gardner Construction Co. which is building twin bridges over Sand Creek in El Paso County, Colo. Started in April, this \$192,529 job is now in the finishing stage.

* * *

W. D. Henkel is supervising construction of retaining walls and restoration of roadway on Sign Route 1 south of Monterey, Calif., for **Paul E. Woof**, contractor, who won the award on a \$185,987 bid. Project engineer is **Fred Harvey**. **Jess Whitley** is master mechanic. Job started in May and will probably end in August.

* * *

A. L. Pace is job superintendent for Lester L. Rice & Sons, Inc., contractor doing about 19.4 mi. of surfacing on Highway 299 between Fall River Mills and Nubieber overhead in Shasta and Lassen counties, Calif. Plant superintendent on this \$163,335 job is **Don Fraizer**. July 30 the work is expected to be finished.

Steve Smith is superintendent on a grade and surfacing contract for Fife Construction Co. Located in Lemhi County, Idaho, work consists of 6.4 mi. on the May-Patterson road. Foreman on grade is **Joe Farnsworth**, and on the crusher, **Wendell Fife**. The \$84,551 job is scheduled for July completion.

Another Fife contract for completion in July covers grading, draining, gravel and oiling 2.8 mi. of the Bear River Bridge-Fairview road in Franklin County, Idaho. Superintending this \$55,208 job is **Lee A. Monson**, with **Dick Lower**, concrete foreman, and **Fred Homer**, master mechanic. **Wendell Fife** is acting as crusher foreman here also.

* * *

Harry Claterbos, Jr., **Bud Junger**, and **Ray Senior**, project manager, superintendent and project engineer respectively, are top men on a \$296,772 award to S. S. Mullen, Inc., for construction of a sanitary sewer system at Wrangell, Alaska. Built for Alaska Public Works, the contract involves 4 mi. of mains and side sewers scheduled for completion in July.

* * *

J. W. Cox, superintendent; **Roy Clark**, foreman, and **Jim Silvers**, plant foreman, are **Ralph B. Slaughter Co.**'s key men on a \$114,036 contract for 26.4 mi. of surfacing over existing surfacing at various locations in the Imperial Valley in Southern California. Started June 1, work is expected to be completed in mid-August.



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TRICKS of the TRADES



Oregon's truck-mounted road magnet

OPERATION of the Oregon State Highway Department's truck-mounted electromagnet recently on the Baldock Freeway between Portland and Salem, gathered an average of 2 lb. of scrap metal per mi. on the surface and shoulders of the well-known freeway.

The scrap metal consisted of items ranging from bottle caps, wiper blades, bolts, and screwdrivers to breather-caps, hubcap, a fender skirt, and an automobile drive shaft, the largest item.

Purpose of the magnet is as a safety measure to remove metal scrap from the highway which often causes flat tires and accidents.

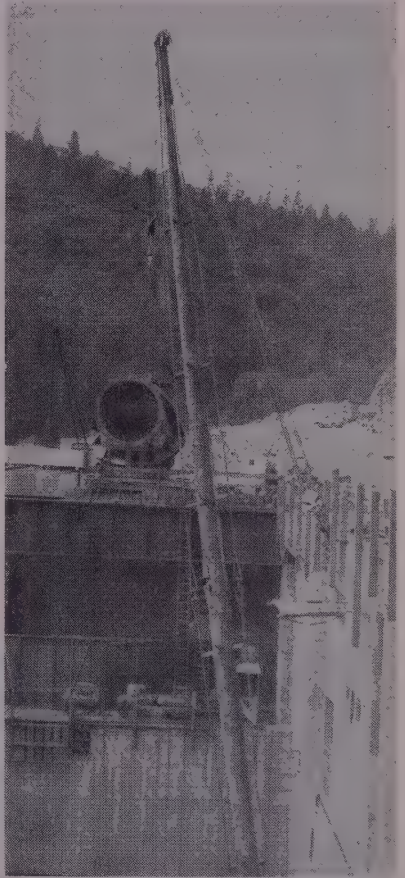
The main highways of the state are cleaned methodically by the road magnet traveling at a speed of eight to ten miles an hour, at least once a year. Six trips were made last year on Highway

US 99 with an average of 1 lb. of scrap for every mile.

Driven by a powerful industrial engine, an electric generator produces 220 volts at 25 amp. which gives the magnet a hefty pull. In one instance, the magnet lifted a loose manhole cover from its place.

In some areas of the state, where hauling scrap metal by truck is prevalent, the average poundage of scrap metal is materially increased. On Highway US 30 between Portland and Scapoose there has been an average of ten pounds of scrap metal per mile picked up by the road magnet per year. The rig was put together in the Highway Department shops, using an army surplus magnet mounted beneath a truck. Height of the magnet is controlled by hydraulic cylinders.

these requirements, it was decided to build one that would meet our needs. Now all we needed were the necessary components. We were able to locate two steel ship masts and our design evolved from these. The masts were 24 in. in diameter at the large end and tapered to 12 in. on the small end. The wall thickness varied from $\frac{3}{4}$ in. on the large end to $\frac{3}{8}$ in. on the small end. Design analysis was made by George Goodall, Consulting Engineer of Sacramento, and by beefing up the $\frac{3}{8}$ -in. wall sections with 40-lb. railroad iron continuously welded along each quadrant, we would have cross section enough to handle the loads. Then by using 1 x 4-in. flat bars with turnbuckles that would develop 80,000-lb. tension, strong backs were designed



Contractor builds derrick to lift 35 tons at 65-ft. radius

By R. G. ALBRECHT

Manager of Construction
Wisner & Becker
Contracting Engineers
Sacramento, California

WITH THE AWARD of Poe Power House by P.G.&E. to Wisner & Becker, we were faced with a rigging problem that was more than a little unusual. We had 18 pieces of turbine and valves that weighed between 36,000 and 70,000 lb. each, and the gantry crane to be in-

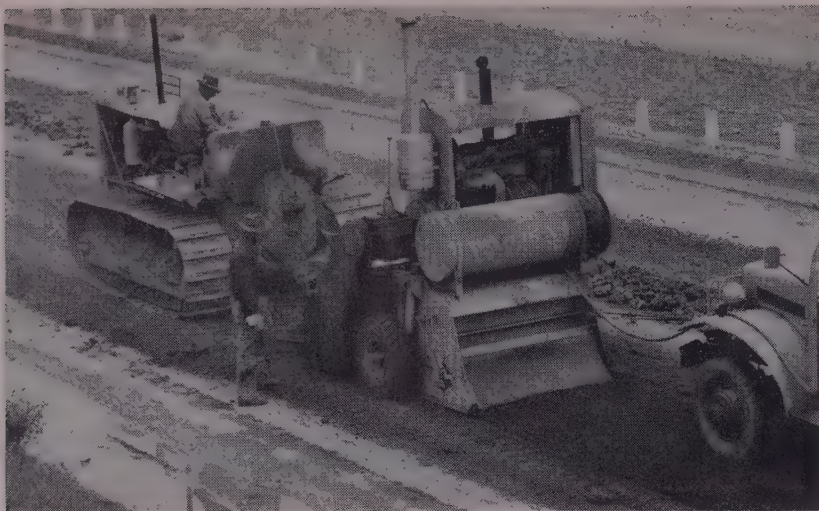
stalled to handle loads of this size was still three months from delivery date.

Our pre-bid planning had been done with a modified bridge crane in mind but use of this soon proved impossible, due to change of job conditions.

We finally decided to build a derrick. To meet our requirements, we needed a boom 120 ft. long that would be capable of picking a load of 35 tons on a 65-ft. radius. Finding a ready-made boom of this capacity proved impossible. As we were unable to find a boom meeting

that would keep the boom straight under these load conditions.

After consultation with P.G.&E. engineers, we were given permission to anchor our topping lift on the powerhouse wall. We were thankful that this 58-ft. free standing wall was 8 ft. thick and capable of sustaining this loading condition. As with any prototype there have been many adjustments and a few major obstacles to overcome before all of the problems were solved. However, as of this date we have made all of our heavy picks and our schedule is holding, so Wisner & Becker feel that this operation, even with all the problems, has been a success.



Preparator speeds highway repair

A NEW MACHINE is being used by Western road contractors for repair and resurfacing of asphalt highways. Shown here at work on U. S. Highway 101 near Agoura, California, the Bros Preparator is pulverizing 250 to 300 cu. yd. of asphalt per hr. The pulverized material will be mixed with a 3½% cement treatment for a base course over which a new

asphalt surface will be laid.

The contract for repair and resurfacing of 2½ mi. of 101 is held by the Griffith Company, of Los Angeles, following a similar maintenance project in North Hollywood where the Preparator also was used on scarified asphalt.

The present contract calls for tearing up the outer lanes for 2½ mi. of the

divided two-lane highway. A new pavement will then be laid over all four lanes. The route is subjected to heavy volume traffic which is the reason for its deterioration since originally paved in 1949.

The method being used by the Griffith Company involves ripping up the outer lanes with a tractor-towed scarifier. The broken chunks are then windrowed by a patrol grader, ready for in-place reduction to base course sizes.

The Preparator, towed by a Cat D8 tractor, passes over the windrows at approximately .7 mph, pulverizing the asphalt into fluffy, uniform materials. Once pulverized, the materials are mixed and blended with a 3½% cement treatment, resulting in a good CTB base.

A water truck towed in tandem by the Preparator is being used to keep dust down as work is done. Water is supplied by a connecting hose to a spraybar mounted on the front of the Bros machine.

In Montana and Wyoming Preparators are being used for in-place reduction of pit and bank-run rock materials for subbase aggregates. The machines reduce oversize rock up to 24 in. in diameter at rates up to 400 cu. yd. per hr. State highway sieve analyses show that the finished products meet acceptable gradation percentages for 2-in. minus aggregate materials.

The Preparator employs 22 free-swinging hammers which rotate at high speeds. Impact from the 48-lb. hammers break rocks along natural lines of cleavage. A vertical adjustment from minus 5 in. to plus 6 in. allows hammer assembly to be adjusted as hammers wear, providing maximum service from them. Special alloy steel used in the hammers also lengthens work life. The Preparator is manufactured by Bros Incorporated, of Minneapolis, formerly the Wm. Bros Boiler & Mfg. Co.

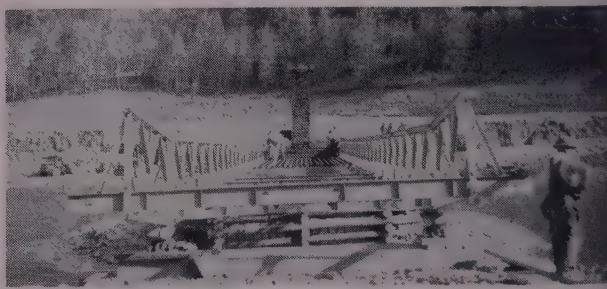
Bailey bridge at Trinity Dam

A BAILEY BRIDGE was used to quickly span the Trinity River in Northern California to enable the \$49,000,000 project to get off to a fast start. The structure is an 80-ft. span, triple-single M2 Bailey with double transoms for loads up to 80 tons. The deck is 12 ft.

6 in. between curbs and 14 ft. 3 in. between trusses. Including ramps the overall length of the bridge is 100 ft. The bridge was supplied by the Bailey Bridge Equipment Co. of San Luis Obispo, Calif., and was built by 5 men in 30 hr., as sequence shots below show.



1½ HOURS: Assembling launching nose on rollers.



14 HOURS: River is spanned as nose rests on far-bank rollers.



20 HOURS: Nose is removed and bridge is seated on bearings.



26 HOURS: Ramps and fills completed. Deck and curbs going in.

ONE-MAN OPERATED

21.5 m.p.h.

KOEHRING CRUISER

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

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

205 Cruiser® safely lifts up to 15 tons (based on 85% rating). Boom lengths range from 25 to 70 feet. Or, when extra reach is needed, you can use 15 to 30-foot jib on 65-foot boom. Converts to ½ to ¾-yard clamshell, dragline, ½-yard shovel, hoe. Get all the facts. Call your Koehring distributor *today*.

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



OPERATING EASE:

20" main-drum clutch, self-adjusting.

Main operating levers on antifriction, self-aligning bearings.

Independent traction optional — on 205 Cruiser or crawlers.

SIMPLE, HEAVY-DUTY DESIGN:

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

Splined shafts, antifriction bearings.

Butt- or pin-connected crane boom.

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

205 WORK CAPACITIES:

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

10-ton lift as a crawler crane.

½ to ¾-yard clamshell, dragline.

½-yard dipper as shovel, hoe.



K695REV R

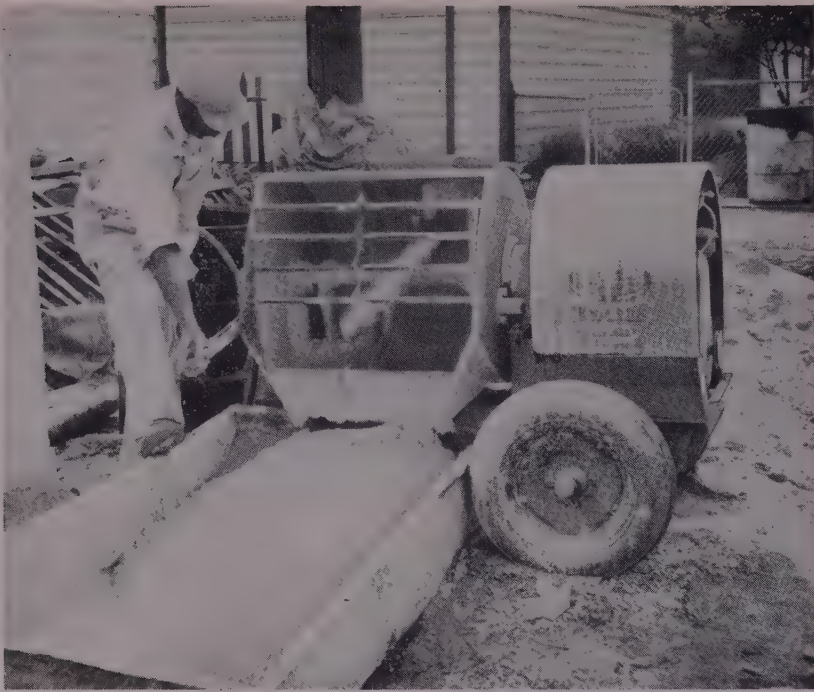


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PACIFIC HOIST & DERRICK CO., Seattle, Washington
COLUMBIA EQUIPMENT CO., Portland, Oregon
HARRON RICKARD & McCONE CO. of Southern California
Los Angeles, California
STANDARD MACHINERY CO. San Francisco, California
KIMBALL EQUIPMENT CO., Salt Lake City, Utah

NEIL B. MCGINNIS CO., Phoenix, Arizona
THE HARRY CORNELIUS CO., Albuquerque, New Mexico
SAN JOAQUIN TRACTOR CO., Bakersfield, California
ENGINEERING SALES SERVICE, INC., Boise, Idaho
WESTERN CONSTRUCTION EQUIP. CO., Billings, Montana
WESTERN CONSTRUCTION EQUIP. CO., Great Falls, Montana
ACTION EQUIPMENT CO., Stockton, California

Put it on wheels

HOW a new batching plant on wheels can reduce plant installation costs on temporary projects is reported by Guy F. Atkinson Co., general contractor. On the two-month concrete schedule during construction of a 3,000-ft. diversion tunnel for the Pacific Power and Light Company's Swift hydroelectric project, a batching plant known as the Noble-Mobile was set up on a roadway within yards of the pouring site and required no concrete footing or field wiring. Aggregates were supplied from an overhead chute fed by a scooploader. The concrete was hauled by transit mix trucks across the river to a pumpcrete machine that filled forms for the gate structure and 80 ft. of lining for the 32-ft. diameter tunnel. Although the plant was capable of 125 yd. per hr., the job schedule called for pours of only 200 to 400 yd. per day. Total concrete for the project was 2,100 yd. Aggregates were hauled from Vancouver, Washington, to the job site on the Lewis River. The Noble-Mobile is manufactured by the Noble Company, 1860 Seventh Street, Oakland 20, California.



Power helps tilt the drum

Easy semi-power tilt takes the muscle strain out of tilting the drum on Kwik-Mix 6-PM plaster-mortar mixer. As operator releases loaded drum, power from the paddle-shaft drive starts the tilting motion. Drum practically tilts itself to discharge. Big grip-latch handle gives easy control of dump in any discharge position. There's full tilt in either direction for quick cleaning.

Clutch controls mixing action

Mixing is controlled by a very simple toggle-lever clutch. It applies or releases tension on the V-belt drive — lets operator engage or disengage paddle-shaft at any time. Saves repeated starting and stopping of mixer engine — takes the heavy drag off the engine for fast, dependable starting.

This Kwik-Mix 6-PM tilter also has: low 41½-in. charging height, bag cutter on safety grill, telescopic axle, non-clog saw-tooth blades, optional

rubber tips, antifriction bearings multiple-sealed and lifetime lubricated. Want more facts on this 6-PM tilter? Contact your local Kwik-Mix distributor, he will be glad to give you more complete information.



Also check into this Kwik-Mix 4-PM mixer. It has: all-welded frame and drum, clutch on V-belt drive, 4 self-cleaning blades, optional rubber tips, bag cutter on hinged safety grill. Ask too about 6-PM non-tilt mixers. The complete Kwik-Mix line also includes — bituminous mixers, and material-handling Moto-Bugs®.

KM747R

AMERICAN MACHINE COMPANY.....	Spokane
PACIFIC HOIST & DERRICK CO.....	Seattle
COLUMBIA EQUIPMENT CO.....	Portland
HARRON RICKARD & McCONE CO. OF SO. CALIF.....	Los Angeles
KIMBALL EQUIPMENT CO.....	Salt Lake City
NEIL B. MCGINNIS CO.....	Phoenix
THE HARRY CORNELIUS CO.....	Albuquerque
SAN JOAQUIN TRACTOR CO.....	Bakersfield
ENGINEERING SALES SERVICE, INC.....	Boise
STANDARD MACHINERY CO.....	San Francisco
WESTERN CONSTRUCTION EQUIP. CO.....	Billings, Great Falls
LEACO CO.....	Hobbs
ACTION EQUIPMENT CO.....	Stockton
PACIFIC BUILDERS SUPPLY CO.....	Portland
ARMSTRONG CASTER CO.....	Denver

Tests prove new fuel cuts smoke, increases power

DEVELOPMENT of a diesel fuel which retards rusting, reduces fuel consumption, cuts smoke and increases long-term engine power by keeping diesel injectors clean has been announced by Standard Oil Company of California.

Results of almost four million miles of road tests show that the fuel maintains clean injector conditions far beyond normal service and reduces piston ring groove deposits in some engines by supplementing the lubricating oil detergency.

The specially treated Chevron diesel fuel and premium grade S.O. automotive diesel fuel also impart anti-rust and detergent qualities that prevent formation of varnish, gums, and rust on operating parts contacted by the fuel.

Field tests were conducted at widely scattered locations to check the performance of the new fuel under a variety of conditions. The Consumer Oil Company of Los Angeles used Detergent-Action diesel fuel in its fleet of tank trucks for 14 months. Results showed that after 60,000 mi. trucks using the new fuel produced only half as much smoke as trucks operating with non-detergent fuels. Injector maintenance costs also were reduced.

Test runs with giant off-highway diesel trucks carrying tremendous loads at the Bagdad Copper Corporation near Prescott, Arizona, brought similar results.

The Detergent-Action diesel fuel is available at no increase in price at Standard bulk plants and truck service stations throughout the West.



KWIK-MIX Dandie® MIXERS
A DIVISION OF KOENIG COMPANY

Heavy-duty leader in the ¾-yard class, Koehring 305 hoe digs 20 feet below grade, cuts up to 40 inches wide over sidecutters, has over 12½-foot clearance height (at beginning of dump) to load trucks. Check its other work capacities listed in table below.

Want more
output?

Check KOEHRING
WORK CAPACITY:

MODEL	SIZE DIPPER	LIFT CAPACITIES	
		(Crawler ratings — 75% of tipping load. Rubber-tired ratings — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-ft. radius
205 ON RUBBER	½-Yd.	30,000 lbs. 14,600 lbs.	at 12-ft. radius at 20-ft. radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs. 40,000 lbs.	at 15-ft. radius at 25-ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

K726R

AMERICAN MACHINE CO., Spokane, Washington
PACIFIC HOIST & DERRICK CO., Seattle, Washington
COLUMBIA EQUIPMENT CO., Portland, Oregon
HARRON, RICKARD & McCONE CO. of Southern California
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NEIL B. MCGINNIS CO., Phoenix, Arizona
THE HARRY CORNELIUS CO., Albuquerque, New Mexico
SAN JOAQUIN TRACTOR CO., Bakersfield, California
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WESTERN CONSTRUCTION EQUIP. CO., Billings, Montana
WESTERN CONSTRUCTION EQUIP. CO., Great Falls, Montana

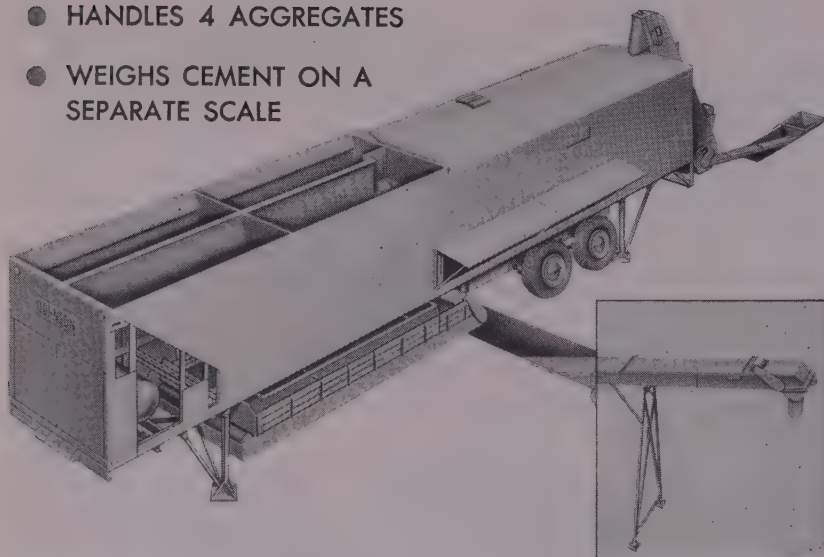


KOEHRING heavy-duty EXCAVATORS

CRANES • DUMPTERS • PAVERS • FINISHERS • CONSTRUCTION MIXERS • MUD JACKS

NEW...automatic batch plant on wheels!

- HANDLES 4 AGGREGATES
- WEIGHS CEMENT ON A SEPARATE SCALE



Porto-Batcher features:

- 4-compartment aggregate bin, 39 cu. yd. heaped capacity — (46 yds. with 12" sideboards)
- 240-bbl. cement compartment
- 700-gal. built-in water tank
- full-automatic, interlocked batch control with repeater
- 4 aggregates are weighed in 2 hoppers — 2 aggregates in each hopper
- 2 aggregate scales have two 2000-lb. weigh-beams each
- cement is weighed in separate, covered hopper, and has 1000-lb. weigh-beam scale.
- enclosed discharge conveyor with 11'6" ground clearance for transit-mix trucks; 8'10" clearance for batch trucks
- 230-bbl. per hour cement elevator with boot hopper, or screw conveyor, undertrack shrouds, or truck hopper
- all wiring factory-installed

New Johnson Porto-Batcher brings you portability and easy assembly in a big-capacity plant. It consists of 3 portable trailer units on wheels: main plant, discharge conveyor, and cement elevator — complete with 5th-wheel-plate, or towing eye, brakes, lights, etc. Maximum overall width is only 8½ feet — height, 12½ feet — length 44½ feet.

You'll also like the production you get with Porto-Batcher. It weighs out 80 to 100 batches an hour, depending on the size of trucks and batch quantities. An interlocked batch control, with repeater, gives automatic push-button operation. Just set the weigh-beams and water-pointer for quantity of each material per batch — set the repeater for number of batches needed — press the starter button, and the plant weighs out the exact number of batches automatically.

It will pay you to get complete facts and figures on this revolutionary new Porto-Batcher. Call your Johnson distributor today.

J748R

CONRAD CREIM COMPANY	Seattle
CRAMER MACHINERY CO.	Portland
WESTERN MACHINERY CO.	Salt Lake City
THE HARRY CORNELIUS CO.	Albuquerque
KING AND EAST MACHINERY CORP.	Denver
ENGINEERING SALES SERVICE, INC.	Boise
COOK BROS. CONST. MACH. CO.	Los Angeles
C. S. JOHNSON CO. STOCKTON BRANCH	Stockton
ANDREWS EQUIPMENT SERVICE, INC.	Spokane
COOK BROS. EQUIPMENT SALES	Phoenix
WESTERN CONSTRUCTION EQUIP. CO.	Billings, Great Falls

Oregon heats paint for highway stripes

UNDER THE DIRECTION of W. O. Widdows, assistant maintenance engineer of the Oregon State Highway Department, the centerline striping crews have completed a year-long test of experimental traffic paint heating equipment which has obtained a 30% increase in painting mileage. Faster drying time — pre-heated paint dries 50% faster than unheated paint — has been the principal factor in the increased mileage. Better penetration is also obtained through the use of pre-heated paint.

With the use of rectangular steel tanks built in the Highway Department's shops pressure to paint guns can be maintained through the use of an air pump. The 3,000-watt electrical elements, somewhat similar to waffle iron grids, heat the paint. The heaters have a capacity of 65 gal. per hr. and deliver the paint to the spray guns at a temperature of 150 to 160 deg.

Desert highway presents problems

A NEW HIGHWAY is being built across the Navajo and Hopi Indian Reservations in northern Arizona by the U. S. Department of Interior's Bureau of Indian Affairs. When it is completed it will not only provide improved transportation for Indian residents on the reservations but also form a direct tourist link from Albuquerque, New Mexico, to the Grand Canyon, cutting driving distance by about 70 mi.

Haumont Contracting Company of Phoenix holds the contract for construction of an 11½-mi. section at the west end of the project, near the town of Tuba City, Ariz.

Specifications on the job call for grading, culverts, subgrade and 24-ft. wide oil mat surfacing. Haumont's total bid price was \$276,721.

As basic equipment, they are using a pair of 25-yd. Tournapull scrapers; two "660" motor graders and four tractors — one as a pusher, one as a ripper and two to pull sheepsfoot rollers.

Material throughout the length of the job is a combination of blow sand and sand rock. To speed handling and provide better packing in the scrapers, areas of tough sand rock are first ripped before loading.

According to Pete Haumont, owner of HCC, his scrapers during a period of 20 consecutive 9-hr. working days each averaged 1,500 cu. yd. per day.

HCC started work on this section March 5, 1957. As work to date has proceeded ahead of schedule, they expect to complete the job somewhat in advance of their contract deadline of September 15.



JOHNSON PORTO-BATCHER®

A SUBSIDIARY OF NOCHTING COMPANY

Welding manual

THE ELEVENTH EDITION of the Procedure Handbook of Arc Welding Design and Practice, recently announced by The Lincoln Electric Company, is a major revision of this well-known arc welding reference book; a major portion of the book has been completely rewritten. All of it has been closely reviewed and brought up-to-date. Over 100,000 copies of the Handbook have been printed.

The book is arranged and written as a reference book covering all phases of arc welding. Its contents range from the early history of arc welding to the intricacies of structural design. The eight sections are divided by subject matter for easy study. Each section has its own table of contents, and there is a complete alphabetical index for the entire book. The eight sections are: history, nomenclature and processes, weldability, mild steel procedures, manufacturing cost data, machine design, structural design, applications and reference data.

The 465-page structural section has been completely rewritten and includes the latest data on welded design, as found in recently-built structures and current research. There is a discussion of the theory and application of the rigid frame and plastic design systems. Details on the design of structural members and joints are included. A group of charts and nomographs simplify design calculations. Applicable codes have been condensed to usable size and are included. This section is actually a book in itself.

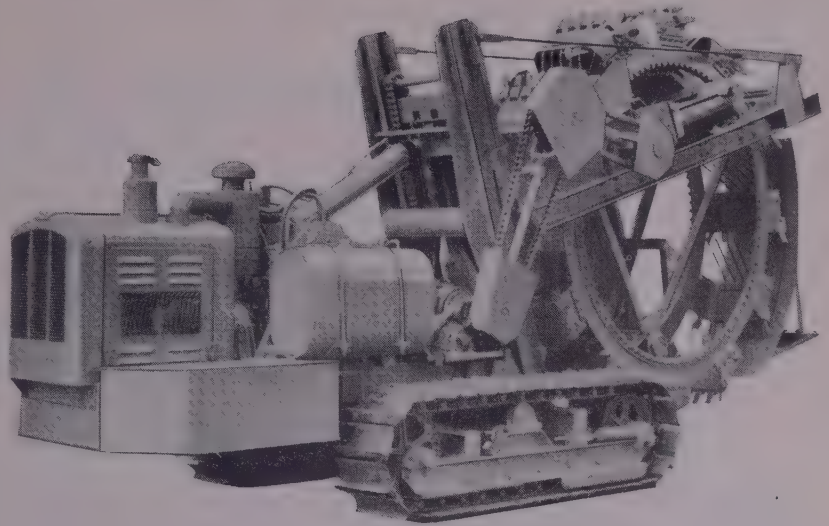
The machine design section presents an entire machine design system which directs the designer from his starting point of "what the machine must do" to a completed design. The system is a logical procedure insuring consideration of all pertinent factors and leading to an economical design which puts the right amount of material in the right places.

The weldability section presents information on how to weld all of the commonly welded metals, including such new materials as zirconium and titanium. The mild steel welding procedure section gives detailed welding procedures for all joints. These procedures are said to be lowest cost consistent with good quality and include the new iron powder manual electrodes, as well as new automatic procedures and the latest information on hardsurfacing, carbon arc work, tool and die welding, pipeline, piping and code welding.

Manufacturing cost data include 28 graphs for estimating the cost of such manufacturing processes as cutting, forming and welding steel. The charts are for use by designers and production men.

The book is only \$3.00 and is a real buy for anyone associated with arc welding. Its 1,300 pages are bound with a gold embossed, simulated leather cover. The publisher is The Lincoln Electric Company, Cleveland, Ohio.

trench widths: 20 TO 32 INCHES



with NEW 170 wide-wheel Trenchliner

- wide wheel frame — cutting widths from 20 to 32"
- maximum digging depth 5'9"
- hydraulically-driven conveyor — belt speeds independent of digging wheel speeds
- 30 digging speeds from 12" to 25 lineal feet per minute
- heavy-duty cast-steel buckets
- double-point "Tap-In" teeth — self-sharpening, reversible
- quick-change gumbo buckets
- retractable bucket-cleaner
- hydraulic wheel-hoist on power-tilt mast
- standard tractor crawlers — 16" grouser-type treads, or 12" flat shoes optional
- choice of gas or diesel power
- all main gears enclosed in oil bath; all main shafts on antifriction bearings

Now, another wheel-type Trenchliner joins the big Parsons line — a new 170, with extra-wide wheel frame. Developed to meet the demand for wide work range in a medium-size machine, it digs up to 32 inches wide, at depths to 5¾ feet. With all this extra capacity, you get smooth, positive wheel control.

Hydraulic power raises and lowers the wheel on vertical mast with fractional-inch accuracy — and tilts the mast for traveling or trailer-loading. New hydraulic control system on conveyor gives belt speeds up to 600 feet per minute — *completely independent of digging wheel speeds*. Belt easily handles maximum yardages from the extra-wide wheel — puts spoil bank well back beyond edge of trench. Better have Parsons distributor demonstrate what this new 170 will do for you!

Other sizes range from a smaller wheel model to "big-inches" and "middle-inches" — also, ladder-types on crawlers, and on rubber.

P749R

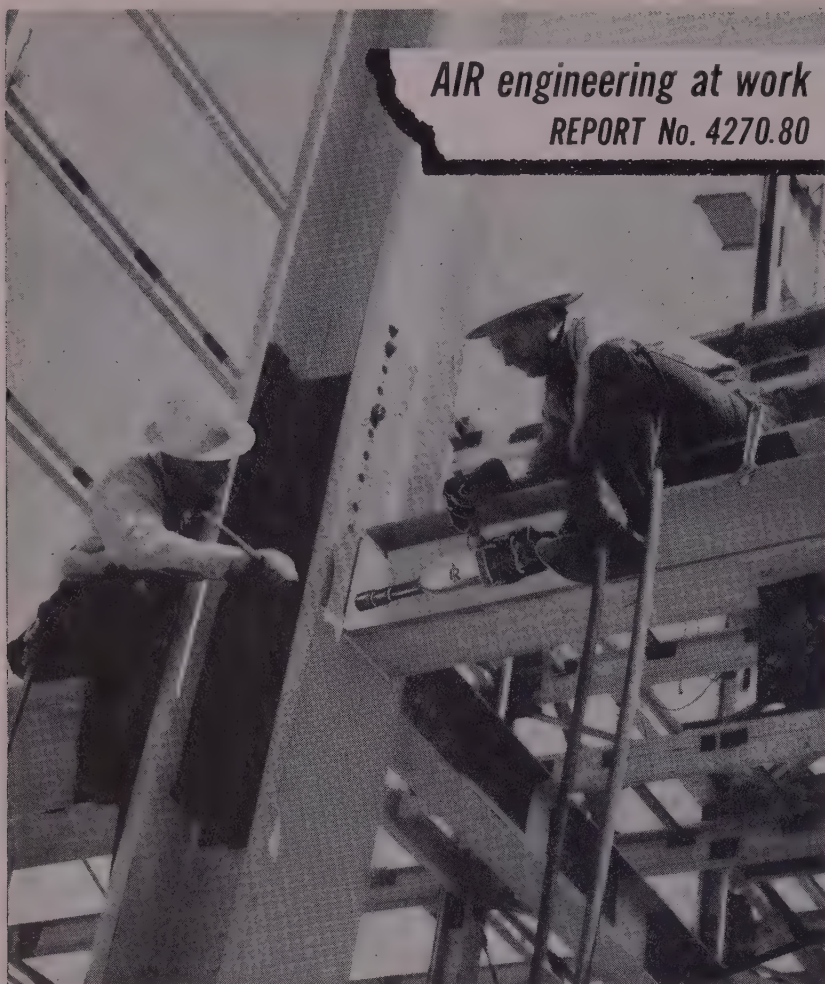
AMERICAN MACHINE COMPANY.....	Spokane
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ENGINEERING SALES SERVICE, INC.....	Boise
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PARSONS TRENCHLINERS®
A DIVISION OF KOENIG COMPANY

AIR engineering at work

REPORT No. 4270.80



1,000 BOLTS A DAY

Two 3-man bolting crews match average production of 24 riveters

Equipped with two new Ingersoll-Rand Torque Control Impacttools, two 3-man crews are running an average of 1000 high tensile steel $\frac{3}{4}$ " bolts per day on a major power plant construction project in the South. On this job the bolt tension produced is in excess of 37,000 lb. These new air powered Impacttools can be set to deliver any torque up to 550 ft. lb., and shut off automatically when the preset torque is reached. The torque setting is checked only once a day, and has required re-setting only once a week—a job which can be done in seconds. Despite hard usage of the two Impacttools, a standby has not yet been put in service.



Call, write or wire Ingersoll-Rand for a demonstration of the new I-R Torque Control Impacttools on your present or upcoming jobs!

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

18-506

Fortier and Biggs join

UNDER the new name of Forstan Constructors, Inc., the firms of Fortier Construction Co. and Stanton Biggs Construction firm of Fresno, Calif., have consolidated. Headquarters for Forstan will be at 2825 Espee Avenue in Fresno.

The former organization was first widely known as a highway transport company serving the construction industry as part of its operations since 1925. From highway hauling, W. J. Fortier organized the Fortier Construction Co., which is a division of the parent organization. This firm is experienced in highway construction, paving, rigging and pipe laying. Stanton Biggs has specialized in trenching work, soil stabilization and building construction. At the present time he is vice president of the Central Chapter of the Engineering & Grading Contractors Association.

Berkeley plans civic center

A LONG RANGE plan for a civic center to cost about \$3,500,000 has been proposed for Berkeley, Calif. Of this program \$2,500,000 is called for "in the near future." The program would be carried out in stages to permit maximum use of existing buildings and to maintain the general plan of the civic center now in its preliminary status.

Naval Hospital to be built in Oakland

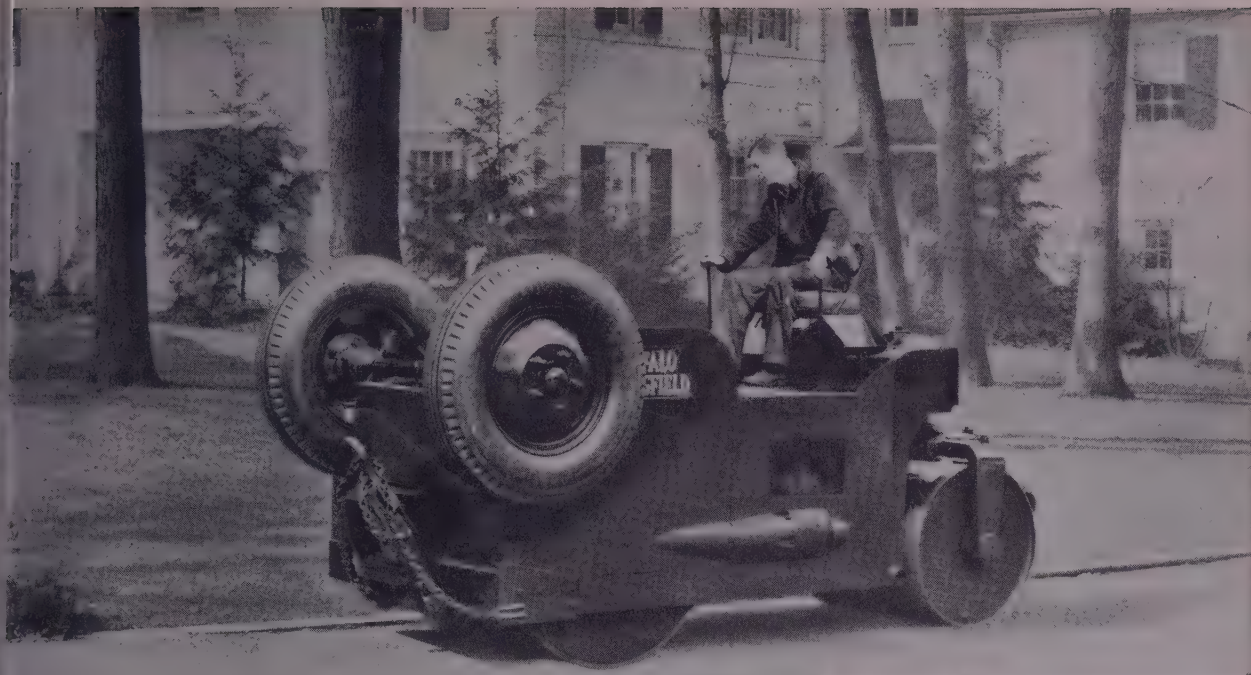
PLANS are being drawn for a \$12,000,000 Naval Hospital on the site of the present Oakland (Calif.) Naval Hospital, according to the Navy Bureau of Medicine. Construction funds for the project will probably be asked for the 1959-60 fiscal year budget.

Stolte is low bidder on disposal plant

WITH A BID of \$1,688,000 Stolte, Inc., was low on six of seven alternates put out by the City of Richmond, Calif., for a sewage disposal plant and program. Stolte also submitted a bid of \$441,323 for construction of the outfall sewer. Bids were not called on the sewer lines which must be built in the city to complete this disposal program. Hilp & Rhodes submitted the low bid of \$766,000 on the alternate which included a screening, grinding and chlorination

Monrovia plans buildings

A \$2,000,000 industrial building program is set for Monrovia, Calif., where four major structures will be constructed by Consolidated Electrodynamics Corp. Architect-engineer on the job is Claude Beelman and Associates of Los Angeles. The general contract will be carried out by Carter Company of the same city.



For heavy-duty rolling **PLUS PORTABILITY...use this BUFFALO-SPRINGFIELD Roller**

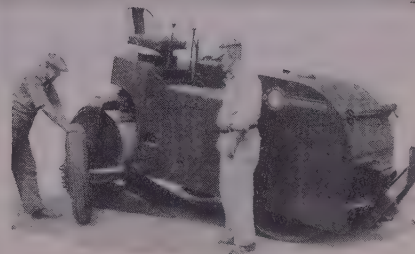
A conventional heavy-duty roller in construction and performance, this 3-5 ton Tandem Roller, when equipped with the Towing Attachment*, is easily transported from job to job. All essential design features of the larger Buffalo-Springfield tandems, *plus portability*, make this particular roller especially popular for handling a large variety of smaller rolling jobs.

Driveways, sidewalks, parking and playground areas, patching and light finishing work are finished fast . . . and the Portable roller is ready for

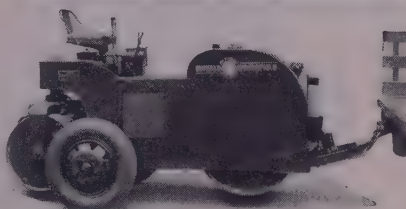
new work at a different location, with minimum time lost.

Rubber tired road wheels are carried out of the way, on a bracket over the drive roll. When the roller is working, there are no tire treads to mar surface materials or produce uneven surface compaction. For heavy-duty roller performance, plus the economy of using *one* roller quickly at scattered locations, get a Buffalo-Springfield *Portable Tandem Roller*.

See your Buffalo-Springfield distributor now, or write for Bulletin S-58-49 for complete details.



The Roller is easily rigged for towing. Inclined wooden blocks are provided for raising guide rolls to slip on road wheels and pin them in place.



Towing hitch is quickly engaged with pintle on towing vehicle. Hand-operated hydraulic jack installed as part of the towing attachment is employed to raise the drive roll off ground.

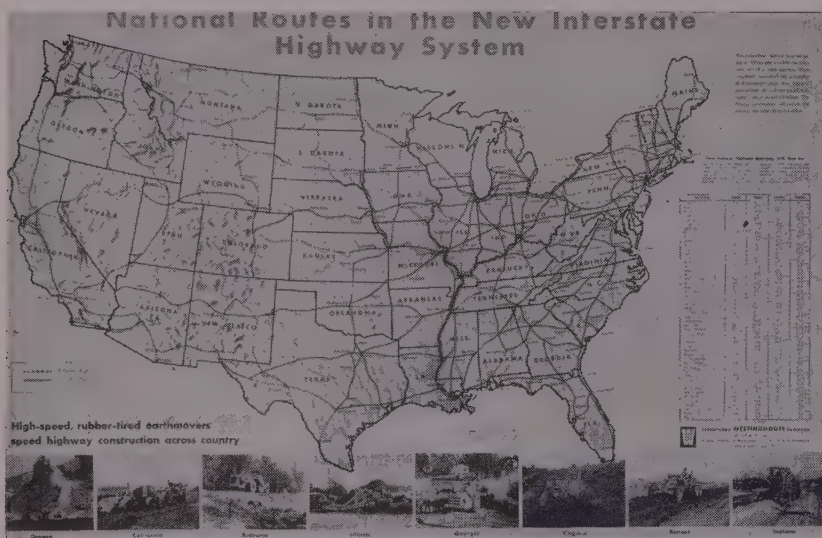
*Towing Attachment is available as optional equipment.



BUFFALO-SPRINGFIELD ROLLER CO.
DIVISION OF KOEHRING COMPANY • SPRINGFIELD, OHIO

NEW LITERATURE

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



LeTourneau-Westinghouse issues Highway Program map

A 22 x 34-in. wall map, showing the National Routes in the Interstate Highway System, is being made available free-of-charge by LeTourneau-Westinghouse Co., through its United States distributor organizations. Printed in four colors on heavy paper, the map also in-

cludes a chart which forecasts highway spending by states through the year 1959. Copies of the map may be picked up at local distributor show rooms or secured by written request addressed "Highway Program Map," LeTourneau-Westinghouse Co., Dept. 085, Peoria, Ill.

New catalog on simplicity feeders

Just completed, a new catalog which describes the entire line of Simplicity Vibrating Pan-Type "Os-A-Veyor" and grizzly feeders, has been announced by the manufacturer, Simplicity Engineering Co. Simplicity feeders, described by their manufacturer as aids in automating the handling of bulk materials to elimi-

nate needless operating costs, are built in capacities up to 1,000 tons per hr. The catalog gives specifications and engineering information on 6 different models of Simplicity feeders in a large number of individual machine sizes. The catalog is available by writing to the Simplicity factory at Durand, Michigan. The new catalog is No. 571.

Huber-Warco road equipment

A colorful, 32-page bulletin on its complete line of road machinery is being offered by the Huber-Warco Co. of Marion, Ohio. Bulletin HWC 541 describes in detail each of Huber-Warco's motor graders, tandem rollers, three-wheel rollers and the maintainer. Construction features and performance data are all pictured and explained.

Cat motor graders in action

A new booklet, describing the varied jobs handled by motor graders in action on the job, has recently been released by Caterpillar Tractor Co., Peoria, Ill. "Caterpillar Motor Graders" illustrates the versatility of these units through on-the-job photographs of machines doing bank sloping, road construction, ditching and other operations. A Check list points out the features of Cat Motor Graders, and an outline of attachments available is included. Ask for form D704.

Anchor guard rails

Anchor guard rails of all-steel construction are described in a four-page bulletin issued by Anchor Post Products Inc., 6500 Eastern Ave., Baltimore, Md. This rail is highly resistant to shock or collision as the force of impact is absorbed by the rail as a unit rather than in individual sections. Typical applications are described and illustrated; construction diagrams and specifications provided.

Union Chain Digest

A comprehensive 25-page catalog of products manufactured by Union Chain & Manufacturing Co. is now available. Brief descriptive text along with com-

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**... or any other type of tough
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plete specifications is given for drive and conveying chain, apron conveyors, silent chain, finished steel roller chain, jiffy sprockets, HB drive and bushing chain and flexible couplings. Union Chain representatives are listed on the back cover. Write for Catalog D-4, Sandusky, Ohio.

Paving asphalts and emulsions

A new eight-page, full-color booklet has been issued by the **American Bitumuls & Asphalt Co.**, describing its nationwide production and distribution facilities for all types of paving asphalts and emulsions, plus various types of emulsified asphalts for the construction industry. These include Bitumuls, emulsified asphalts, paving asphalts, liquid

asphalts and industrial asphalts, plus Laykold asphalt specialty products. Available from American Bitumuls & Asphalt Co., 200 Bush St., San Francisco 11, Calif.

Cummer asphalt plants

A 28-page catalog giving full information and specifications on Cummer asphalt plants is now available from the **F. D. Cummer & Son Co.**, 1827 East 18th St., Cleveland 14, Ohio. Units covered include portable, semi-portable and stationary plants. Performance data and component parts are presented in detail. A convenient glossary of terms and list of Cummer equipment and accessories are provided at the back of the catalog.

Felker concrete cutters

Felker Models 257 and 367 heavy-duty, self-propelled concrete cutters are the subject of a six-page brochure published by **Felker Manufacturing Co.**, Torrance, Calif. Features on the new models include a new Felker timing belt spindle drive, Vickers hydraulic power drive and a removable frame section which facilitates rapid belt changes. Close-ups of the unit are provided along with brief descriptive text explaining its outstanding features.

Film catalog

The 18th edition of a catalog describing educational and entertaining motion pictures sponsored and distributed by **United States Steel Corp.** is now available from the company at 525 William Penn Place, Pittsburgh 30, Pa. This edition includes five new films released in 1956. Complete information is given on how to make bookings, how to handle the prints and conditions under which the films are loaned. Two films of particular interest to the construction industry are "Speaking of Wire Rope," a film which illustrates many phases of the manufacture, use and maintenance of wire rope and "The Suspension Bridge," a pictorial record of the construction of two different types of suspension bridges.

New "pocket" guide to concrete and masonry diamond blades

Consolidated Diamond Tool Corp. announces the availability of their colorful, new "pocket" guide for the selection of the proper diamond blade for cutting concrete and masonry materials. Easy to use, the new "pocket" selector makes possible a visual method of choosing a diamond blade according to its efficiency range. For the first time concrete and masonry materials have been arranged according to their relation to diamond blade life, non-abrasive materials being less hard on diamond blades than the porous abrasive materials. The new blade selector, for the contractor, is not only used to select the proper blade for the material he is going to cut, but to readily see the relative efficiency of the blade he has selected. For a free copy of the new "pocket" selector, or more information, write **Consolidated Diamond Tool**, 32 Yonkers Avenue, Yonkers, N. Y.

Fageol industrial engines

Publication of a new four-page catalog, describing Fageol 44 high-output, low-weight industrial engines, is announced by **Fageol Products Division**, **Twin Coach Co.** The new two-color catalog describes and illustrates various models of the Fageol 44 engine, reputed to provide more power per pound than any other engine of comparable horsepower. Profusely illustrated, the catalog contains detail, cutaway and component photos. Dimensional outline drawings, condensed specifications, optional equipment and suggested applications are included. Catalogs are available upon request from Fageol Products Division, **Twin Coach Co.**, 850 W. Main St., Kent, Ohio. Ask for catalog LL-4880.



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St. Paul to Savannah . . . From Paducah to Everywhere . . .**

CONTRACTORS TIE RE-BARS WITH IDEAL

. . . the first and only TWO in one tie wire reel!

Across the nation . . . for greater safety and savings, more and more contractors are "speeding up" their wire tying jobs with IDEAL reels. If your job calls for tying and placing re-bars . . . no matter what the tonnage . . . here's why it will pay you to use IDEAL reels.

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Write or wire for brochure and the name of our distributor in your territory.

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WATCH FOR FIRESTONE WHEN BIG JOBS BEGIN TO MOVE!



Firestone Rock Grips lead all tire choices with tread designs that travel any terrain!

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ROCK GRIP WIDE BASE

ROCK GRIP

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1957, The Firestone
Tire & Rubber Company

Care of diamond blades

A new technical folder, "The Facts of Life on Diamond Blades" has been published by **Cardinal Engineering Corp.**, Philadelphia 27, Pa., for the benefit of those who buy and use diamond blades for cutting masonry materials. The folder offers many practical suggestions for prolonging blade life and reducing costs.

Tusky automatic hoist

Advantages of the Tusky automatic hoist are explained and illustrated in a four-page folder issued by **Tubular Structures Corp. of America**, 2960 Marsh St., Los Angeles 39, Calif. Particular emphasis is put on the automatic operation of the hoist which makes it possible for one man to set it up and take it down in 2½ min. Typical applications are shown and general specifications given.

Informative booklet on stabilized aggregate shoulders

Stabilized aggregate shoulders for heavy-duty highways are discussed in detail in a new 16-page illustrated booklet entitled "Shoulder Stabilization with Calcium Chloride." The data, designed specifically for the highway engineer and contractor, include specifications and established methods for the construction, reconstruction and maintenance of stabilized aggregate shoulders. Write to the **Calcium Chloride Institute**, 909 Ring Bldg., Washington 6, D. C.

Conveyor for concrete

The **Fairfield Engineering Co.**, Marion, Ohio, has released a four-page brochure, No. 157, giving specifications, photos and operating features of their new Faircrete conveyor, designed especially for placing concrete. An automatic belt wiper, self-cleaning foot pulley and triple ball bearing troughing idlers prevent accumulation of concrete on belt and eliminate wear and loss of material.

Explosives—case histories

Construction case histories of drilling, blasting and excavating methods are presented in handy chart form in a six-page bulletin issued by **American Cyanamid Co.**, Explosives Dept., 30 Rockefeller Plaza, New York 20, N. Y. A complete breakdown is given as to geology, excavation, drilling equipment, bit performance, drill pattern, blasting data and explosives ratio on each of 48 jobs. Twelve plan views of blasting patterns are presented on the back of the chart along with a map showing the locations of American Cyanamid magazines and plants in the United States.

Chester products

A series of bulletins and specification sheets are available from **Chester Products Co.**, describing their line of com-

paction equipment. Chester tamping rollers are covered in a four-page illustrated brochure. Models 1760, 4840 and 6060 for standard, heavy-duty and extra-heavy-duty tamping work are pictured and described. Specification sheets are available on the No. 50T4 pneumatic compactor and new power driven models 9W-PD and 13W-PD pneumatic compactors with 9 and 13 wheels respectively. Write to **Chester Products Co.**, Division of Ransohoff, Inc., North Fifth St. at Ford Blvd., Hamilton, Ohio.

Portable hoists

A new 12-page, two-color booklet, No. 3-25, describing Joy single-drum multipurpose portable hoists has been published by the **Joy Manufacturing Co.**, Oliver Bldg., Pittsburgh 22, Pa. The well illustrated booklet carries descriptions and specifications for the Joy line of air, electric and gasoline driven models. Ranging in size from 0.9 to 15 hp., the hoists have lifting capacities from 750 to 5,000 lb. at rope speeds up to 125 rpm. Wire rope capacities range from 200 to 1,500 ft.

Water control with gunite

A four-page bulletin entitled "Water Control with Gunite" has been released by **Gunite Contractors Association**, 714 West Olympic Blvd., Los Angeles 15, Calif. The bulletin shows progress photos in the guniting of typical ditches and channels used for water control. A "right" and "wrong" example of such jobs is also shown.

40% FASTER THAN ANY OTHER DRILL

● The McCarthy Vertical Auger Drill cuts drilling time in earth, clay, compacted sand and gravel, hard pan, shale, sandstone and rock as much as 40%. Rugged construction permits you to drive 2 to 24-inch augers to depths of as much as 125' faster than any other drill. Get the facts on the powerful McCarthy today. See how you can complete shot hole, exploration drilling, foundation holes, dewatering operations, well drilling, highway construction and heavy contract work faster than ever before. The versatile, vertical McCarthy gives you more than any other drill. Write for Bulletin M-100 now. Let us show you how you can turn new profits on your drilling job.



McCarthy Vertical Auger Drill Model 106-24



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THE SALEM TOOL CO.

791 South Ellsworth Ave., Salem, Ohio

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Montana Powder & Equipment Co....123 E. Lawrence St.,
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NEW MEXICO

Contracting Equipment & Supply Co...Broadway, N. E.
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Western Machinery Co., 820 N. 17th Ave., Phoenix, Ariz.

UTAH

Western Machinery Co.....2300 S. Main St.,
Salt Lake City 15, Utah

NEVADA

Sierra Machinery Co. Inc., 307 Morril Ave., Reno, Nev.

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One of the B-80 dumpers operated by Morse Sand & Gravel Company, Inc., of Attleboro, Mass.

two gravel-hauling dumpers supply 20 ready-mix trucks

"Our two Mack dumpers operate nine hours a day supplying gravel for our fleet of 20 ready-mix trucks. Averaging six round trips an hour over our own roads, these Macks have hauled over 350,000 tons in the last six months. Continuous operation of these two dumpers is vital to us. That's why we chose Macks...and they've more than lived up to their reputation. So far, we've had only routine maintenance and service to contend with."

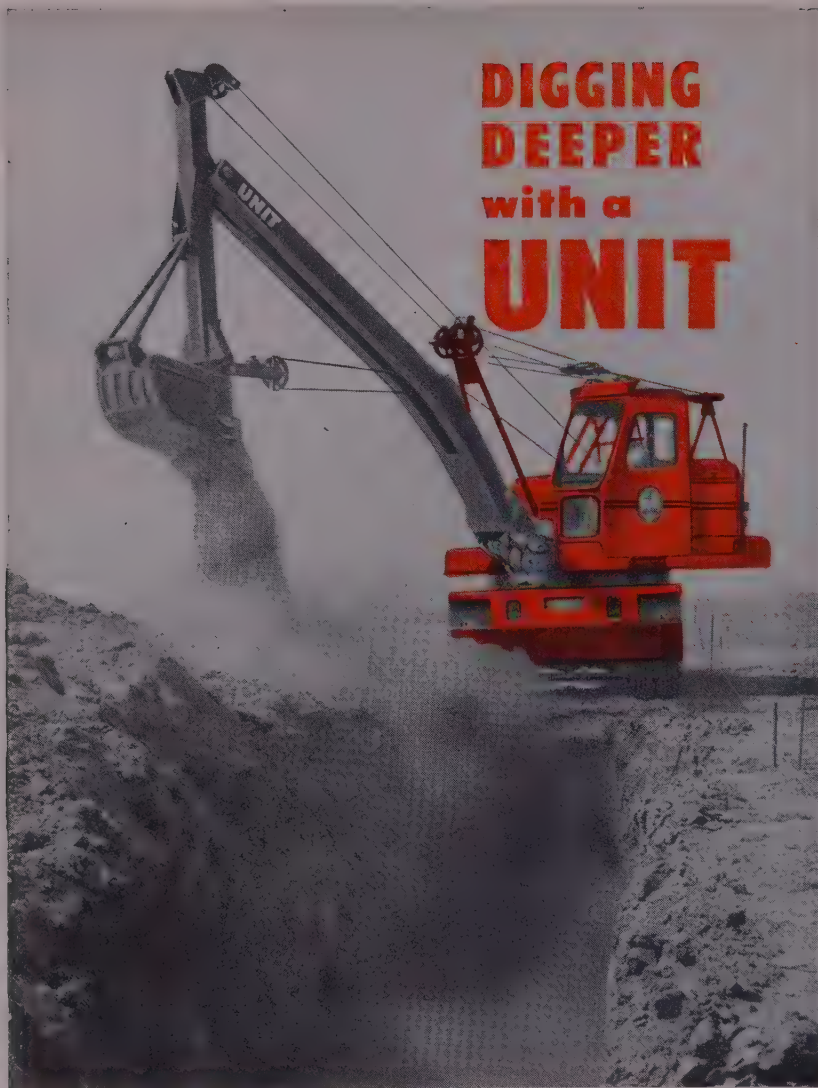
This is the experience of Mr. Alfred H. Morse, president of Morse Sand & Gravel.

Macks are universally acknowledged for their outstanding performance, operating economy and stamina. On-the-job operating reports, like Mr. Morse's, show why.

Want more proof? Let your Mack representative show you the

performance records of other Mack users in your area—operators who found out how much they can profit by using the best. Mack Trucks, Inc., Los Angeles, Denver, San Francisco, Seattle, Portland, Salt Lake City, Albuquerque.

MACK
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TRUCKS



DIGGING DEEPER with a UNIT

You'll Dig More Jobs At More Profit With A UNIT TRENCHOE!

Accurate deep digging of trenches for pipelines, sewers, water connections, footings, basements and culverts is easily and quickly accomplished with a UNIT Trenchoe. The "Goose-neck" boom with its long deep reach assures maximum production. Also saves time trimming vertical sidewalls and corners, and in leveling floor surfaces. Powerful... Compact... Perfectly Balanced. Every UNIT is designed to meet the most rigid demands. Investigate today and earn more pay.

UNIT models are available in $\frac{1}{2}$ or $\frac{3}{4}$ yard Excavators... Cranes up to 20 tons capacity... Crawler or Mobile types... Gasoline or Diesel. Ask for literature.

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



Geared to Produce Maximum Yardage



Hot Rod Asphalt plant

A four-page, illustrated brochure describes in detail the Madsen Hot Rod Asphalt plant in the 3,000-, 4,000- and 5,000-lb. capacity range. Features and advantages of the unit are explained precisely and a full-page view of the unit is clearly labeled for identification of its component parts. **Madsen Works, Baldwin-Lima-Hamilton Corp.**, 14120 East Rosecrans Ave., (P. O. Box 38), La Mirada, Calif.

Denver equipment for quarry, pit and plant

A new 20-page bulletin, issued by **Denver Equipment Co.**, tells about the company's latest machinery for the sand, gravel, and quarry industry, including improved crushing, grinding, screening, classifying, materials-handling and portable machinery. The bulletin outlines Denver Laboratory testing services and shows other equipment supplied by Deco, such as sand scrubbers, thickeners, dryers, samplers, jigs, filters and laboratory machines. For Deco bulletin No G3-B50, write to Denver Equipment Co. 1400 17th, Denver, Colo.

Buffalo-Springfield rollers and compaction equipment

Buffalo-Springfield Roller Co., a division of the Koehring Company, has just released a new illustrated 12-page bulletin, No. S-74-157, covering its entire line of road rollers and compaction equipment. Among those machines described are the KT-7 Portable Tandem, a conventional heavy-duty 3-5 ton, 2-axle roller, standard and heavy-duty 2-axle tandem rollers and 3-axle tandem rollers with "Walking Beam" compaction control, 3-wheel heavy-duty variable weight roller and K-45 Kompactor. Condensed specifications on every unit are included. Copies of the bulletin may be obtained by writing any Buffalo-Springfield distributor or from the company, 1210 Kenton St., Springfield, Ohio.

Allis-Chalmers motor grader

Working advantages of the Allis-Chalmers Model 45 motor grader are covered in a new 16-page illustrated catalog (MS-1148) now available from **Allis-Chalmers Manufacturing Co.**, Construction Machinery Division, P. O. Box 512, Milwaukee 1, Wis. Photographs and sketches illustrate the motor grader's mechanical features and component parts and on-the-job photographs show the unit in action.

Do-it-yourself welder

How to build your own engine driven welder is the subject of a six-page brochure put out by **Lincoln Electric Co.**, 22801 St. Clair Ave., Cleveland 17, Ohio. Complete instructions on how to assemble your own unit are illustrated by diagrams and photographs. Essential parts such as engine, base, coupling, governor, canopy, idling device, radiator, trailers and welding accessories are discussed individually and a list of suggested equipment sources is provided.



When fast mobility counts... depend on LIMA truck-mounted cranes

LIMA truck-mounted cranes guarantee you the equipment mobility you need to reduce profitless trip time between jobs. They give you, too, the *on-the-job* mobility that makes a job go faster for greater profit to you. In addition to mobility, LIMA truck cranes offer you these important benefits:

They are completely versatile . . . as a shovel, crane, dragline, pullshovel.

They are available in 6 x 4, 6 x 6, 8 x 4 and 8 x 6 carriers with capacities up to 60 tons.

LIMA truck cranes are engineered for peak performance under the most rugged conditions . . . without costly maintenance downtime.

Truly, no other machine gives you as much as LIMA. You'll know why when you investigate. Call your nearby LIMA distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Lima, Ohio.

COMPARE! No other machine gives you as much as LIMA!

Big capacity drums and sheaves lengthen cable life by reducing the need for double wrapping and sharp bends in cable.

All gears, smaller parts and shafts which are subject to extreme wear are flame or induction hardened for longer life.

Main machinery is placed well back of center of rotation to eliminate excess counterweight.

Propel and swing gears and power take-off are enclosed in sealed oil bath for dirt elimination and smoother, quieter operation.

Anti-friction bearings, used at all important bearing points, reduce destructive friction, fuel consumption and lubrication requirements.

Travel from job to job at automotive speeds.

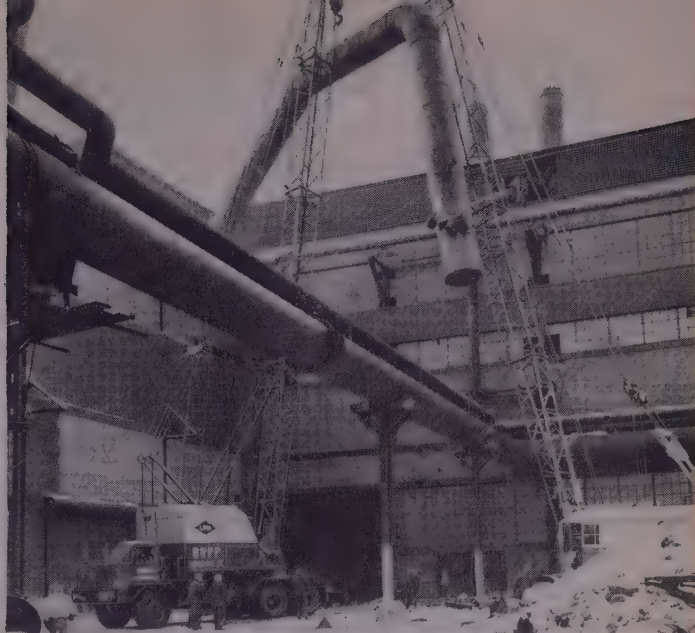
Torque converter (optional) automatically adjusts speed to load requirements—minimizing shock loading, making performance smoother and faster.

Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

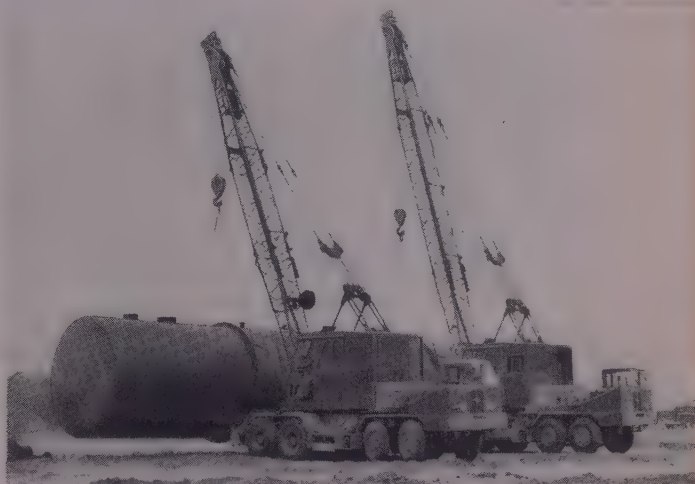
COMPARE and you'll specify LIMA for shovels ($\frac{1}{2}$ to 3 cu. yds.), cranes (to 110 tons) and draglines variable.

DISTRIBUTORS: Our Seattle Office, 1932 First Avenue South, Seattle 4, Washington; Our Irada Office, 14120 E. Rosecrans Ave., La Mirada, California; Feenaghty Machinery Co., 1 E. Belmont Street, Portland 14, Oregon; Feenaghty Machinery Co., 600 Front Street, Idaho; Smith Booth Usher Company, 2001 Santa Fe Avenue, Los Angeles 54, California; Iron Machinery Co., 4412 Trent Avenue, Spokane 10, Washington; Acme Iron Works, 540 1st Avenue, San Antonio, Texas; Shriver Machinery Company, 1756 Grand Avenue, Phoenix, Arizona; N. C. Ribble Co., 1304 North Fourth Street, Albuquerque, New Mexico; Cities Equipment, Inc., 2792 Cypress Street, Oakland 7, California; Bay Cities Equipment, 1178 West San Carlos Street, San Jose, California; McGaraghan Supply Company, 522 1st Avenue, Eureka, California; Evans Engine & Equipment Company, 4300 11th Avenue, West, Seattle, Washington; Helner Equipment & Supply Co., 501 West 7th, South, Salt City, Utah; Hall-Perry Machinery Company, 902 Central Avenue, Billings, Montana; Perry Machinery Company, 1116 15th Street North, Great Falls, Montana; Hall-Perry Machinery Company, 812 East Iron Street, Butte, Montana; Hall-Perry Machinery Company, East Main Street, Missoula, Montana; Reno Equipment Sales Company, 1700 West Street, Nevada; Faris-Moritz Equipment Co., 1554 Wazee Street, Denver, Colorado; Evans Equipment Co., Inc., Post Road, Box 894, Anchorage, Alaska; Shasta Truck & Equipment Sales, 99 Highway, Redding, California.

LIMA SHOVELS • CRANES • DRAGLINES • PULLSHOVELS
BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS



Lima Type 74-T truck crane and a Lima Type 802 crawler-mounted crane, equipped with 100' booms, erecting a gas line at a steel plant.



Two Lima Type 54-T truck cranes, equipped with 40' and 50' booms, setting 31-ton, 50,000 gallon capacity tank.



Lima Type 44-T truck crane, equipped with a 90' boom, placing concrete on a new junior high school building, Dallas, Texas.



NEW EQUIPMENT

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



New track mounted Chicago Pneumatic G-800 Tracdril increases footage at lower cost

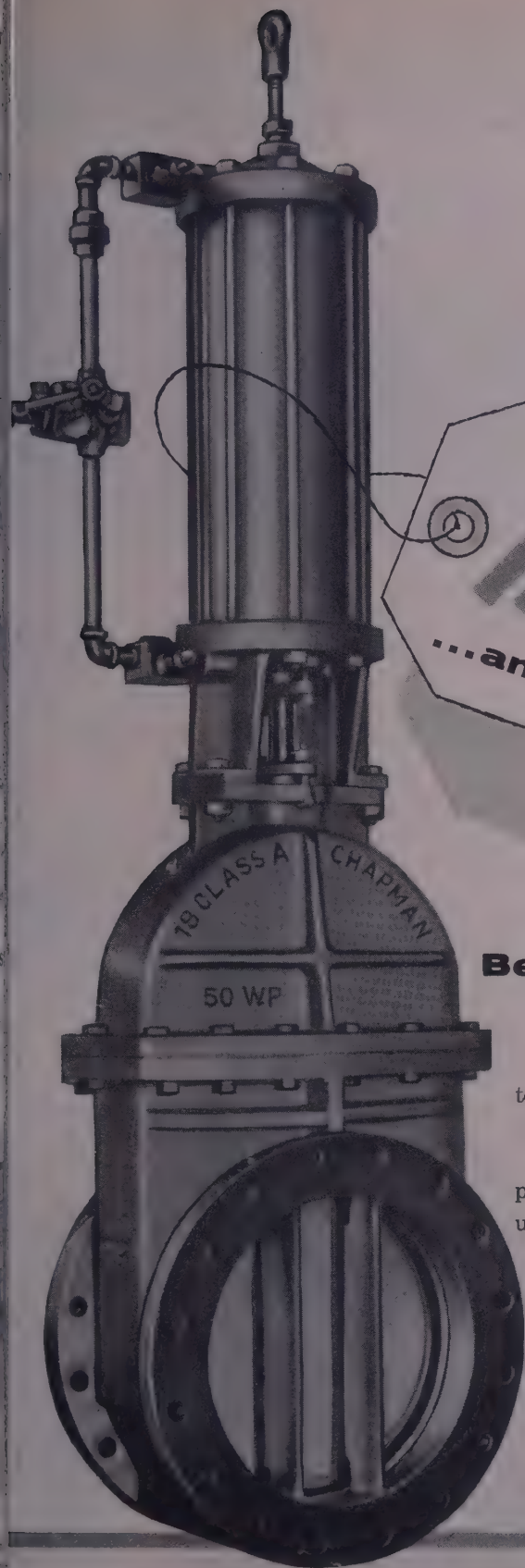
The Chicago Pneumatic G-800 Tracdril is a self-propelled, one-man operated, track-mounted wagon drill. It gives an exceptionally productive performance when mounting a heavy-duty 4-in. drifter and for speedy, soft-formation drilling it can mount a CP-556 Rotauger. Two "Power Vane" reversible tramping motors enable the G-800 to tow its own air compressor around the drilling area. Each track is independently powered by one of the two 6-hp. motors. Spring loaded "dead man" type motor controls give instantaneous forward-back or pivot control, yet insure operator safety by returning to neutral when released. During actual drilling operations, the G-800 is uncoupled from the compressor and, within those limits, moves easily from hole-to-hole. Complicated hose hook-ups are eliminated because the air supply is always close to the operation. Since the tramping motors are never used while the drifter or Rotauger is in use, a 365-cfm. rotary compressor will provide full operating efficiency. However, the G-800 has plenty of reserve tractive power and will tow a 13,000-lb. Chicago Pneumatic 900-cfm. rotary compressor up a 10% grade. The Tracdril has a special "knee action" construction to compensate for ground irregularities. Tracks operate independently within the "knee action" limits and keep the U-arm support for the drill carriage relatively level. This U-arm is hydraulically elevated or lowered and employs dual safety locks to hold the setting. The drill carriage itself may be quickly adjusted for high top-hole or toe-hole drilling and further compensates for ground irregularities. It may also be positioned either crosswise ahead of or between the track treads when running snake holes. Additional features include a simple, positive track-lock that prevents the unit from moving during drilling operations and ground-hugging standard Oliver tracks with low-gravity, high-stability qualities.

Country wide parts service is available on tracks and rubber pads are available. For further information request SP-319 of the Chicago Pneumatic Tool Co., 6 East 44th Street, New York 17, N. Y.



SNOW EQUIPMENT FOR NEXT WINTER

This "V" plow, manufactured by The Gledhill Road Machinery Co. of Galion, Ohio, is for use on trucks with a rated capacity of 4 to 10 tons. It cuts swaths up to 8 ft. 6 in. Nose height is 54 in.; moldboard spread is 11 ft. The plow is easily attached by means of an I-beam push frame. All types of hydraulic controls are available. Wing plows from 10 to 12 ft. are also available with hydraulic controls.



CHAPMAN

Beamed Waterway Gate Valve

Here's the point. On a Chapman Beamed Waterway Gate Valve in the partly opened position, there is six to ten times more contact bearing surface than with any other double disc parallel seat or square bottom gate valve.

They're rugged. They're built for service. For filtration plants, wash water service, or other similar limited throttling use, they'll last for decades with little or no maintenance.

Operation is always smooth. There's little or no leakage. The seats are tight and snug. And they have bronze bearing surfaces on beams and downstream disc for longer life and better performance.

All sizes with any method of operation you need are available. You'll see more about them in our Catalog No. 45. Write for your copy now.

THE CHAPMAN VALVE MANUFACTURING CO.
INDIAN ORCHARD, MASSACHUSETTS

TUSKY HOIST

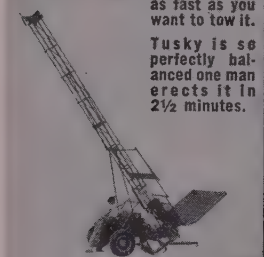
THE FINEST IN HYDRAULIC AND STRUCTURAL ENGINEERING.
Manufactured by Tubular Structures Corp. of America, Los Angeles, California.

finally!
On a large job or a small job

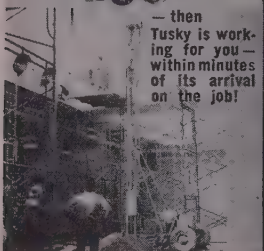
A modern Hoist that meets today's competitive demands for Contractors' requirements with today's higher cost labor.



Tusky is towed to the job — as fast as you want to tow it.



Tusky is so perfectly balanced one man erects it in 2½ minutes.



— then Tusky is working for you — within minutes of its arrival on the job!

AT 100
FEET



AT 60
FEET

AT 20
FEET



TUSKY WILL MAKE YOU MORE MONEY!

MAIL COUPON TO YOUR
NEAREST DISTRIBUTOR
TODAY.

Ferris Equipment Co.
East 3823 Trent Ave.
Spokane, Washington

Laurence Myers & Co.
61 Bluxome St.
San Francisco, Calif.

Waco Scaffold & Equipment Co.
2092 South El Dorado Stockton, Calif.

Universal Equipment Co.
1549 Eastlake Ave.
Seattle 2, Washington

Waco Scaffold & Equipment Co.
2405 E. Jackson
Phoenix, Arizona

Please send me a Tusky Hoist brochure

Name _____
Company _____ Position _____
Street _____
City _____ State _____ WC

Dodge expands 4-wheel drive truck line

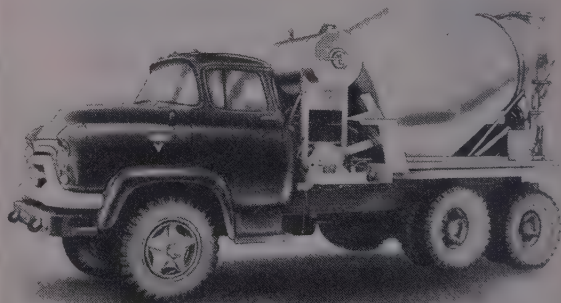
Largest of the expanded line of Dodge 4-wheel-drive trucks is the new W500. Powered by either a 130-hp. 6-cylinder engine or a 197-hp. V-8 engine, the W500 has a maximum gross vehicle weight rating of 18,000 lb. This model is offered with



dual rear wheels for a wide variety of off-the-highway operations. Axle ground clearance is 10 in. The front-mounted power winch has 10,000-lb. pulling and hoisting capacity and comes with 250 ft. of 7/16-in. steel cable. Transmission is 4-speed synchro with 2-speed transfer case. Gross vehicle weight rating of the model is 18,000 lb. For further information on this and other smaller models write to Dodge Truck News Bureau, 2751 East Jefferson St., Detroit 7, Mich.

New CMC model 550 Transcrete truck mixer

Construction Machinery Co. of Waterloo, Iowa, announces the addition of the new Model 550 Transcrete to its line of truck mixers. The new Model 550 has a drum volume of 243 cu. ft.; carries a mixer rating of 5½ yd., and as an agitator is rated to carry 6 to 6½ yd. of concrete. The new Model 550



is available with optional Ford or Chrysler separate engine power and is also offered in the popular truck engine drive. Standard Transcrete features, such as floating drive, swing-out hopper and a favorable center of gravity for load distribution and stability, are retained in the new model. All regular accessories are available. The addition of the new Model 550 to the Transcrete line now gives a choice of five popular sizes and permits the selection of a machine that will mount advantageously on all standard trucks or carriers to give maximum payloads under the various weight restrictions in different areas.

meet challenge program ahead!

action and *profitably* handle these bigger jobs on schedule.

As you equip for the tremendous earthmoving work ahead, carefully study the improved LeTourneau-Westinghouse line that experience built... self-propelled scrapers... anywhere rear-dumps... rubber-tired tractors... heavy-duty graders. Every one of these modern machines offers you special advantages in speed and mobility that will

prove *important* in meeting bigger work areas, higher yardage requirements, shorter time-limits for job-completion, and high wage-levels.

Ask your nearest LeTourneau-Westinghouse Distributor to help you check your present equipment inventory... to recommend a planned program of fleet replacement and additions to best meet *your* needs for tomorrow's expanding, building and highway construction programs.



Tournatractors — 210 hp Model "C" with 23,500 lbs. pull at 2 mph... works and travels on-or-off roads to 17.2 mph forward, 7.2 mph reverse. Push-plate, Dozer blade, Angledozer, Root rake, V-Snow Plow, Snow wing, Winch, Tree Pusher, and Power-Control-Unit also available. Versatile Tournatractor dozes, clears, push-loads, skids, tows, operates electric-control scrapers. With RR coupling at rear, unit becomes SwitchTractor. New 210 hp, off-track SwitchMobile also available for RR switching.

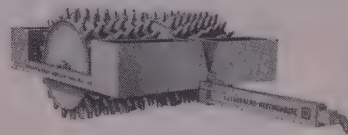
Twin-C Pusher — Giant 420 hp TWIN-C Pusher, with 65,900 lbs. drawbar pull: Loads biggest scrapers easily... has geared kingpin power-steering... travels at 20 mph forward, reverse to 5.8 mph.

Other L-W tools for bigger production



**L-W Model BT
TRACTOR-SCRAPER**

For use with tractors of 150 hp or more. 18 cu. yds. struck, 27 cu. yds. heaped. Low, wide bowl for easy cutting and fast loading in any scraper material.



**L-W Model 120
SHEEP'S FOOT ROLLER**

For use with tractors of 150 hp or more. Two drums, with heavy-duty, dust and water proof bearings; and 120 forged carbon steel feet per drum. Approx. ground pressure, drums loaded with water and boxes loaded with steel ballast, 2400 lbs. per sq. in.

Adams Loaders



TRAVELOADER

Self-propelled, belt-type machine with choice of 55 hp gasoline or 60 hp diesel engine. Picks up and loads snow, and other loose materials into trucks from windrows or stockpiles. Speeds to 26 mph; loads up to 600 yds. per hour.



ELEGRADER

Excavates, elevates dirt up conveyor for casting or loading. Attaches to Adams 440, 550, 610, 660 graders; fits Cat 12.

LeTourneau-Westinghouse also manufactures: Tractor-drawn Scrapers, Power-Control-Units, Rooters, Sheepfoot Rollers, Jib Cranes, and Tournarope (from 1/4" to 1 1/2" dia.).

Tournapull, Tournatractor, Angledozer, Tournarope—Trademark Reg. U.S. Pat. Off. Adams, Rooter, Fullpak, Twin-C, SwitchMobile, SwitchTractor—Trademark G-1267-G-w



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

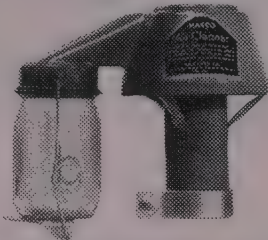
WHERE QUALITY IS A HABIT

TRAP THAT DUST!

HARCO AIR CLEANERS TRAP 90% TO 99% OF DUST PARTICLES... THAT GENERALLY CLOG OIL BATH AIR CLEANERS

Best guide to the amount of dust being pulled into engine air intake system. Air Cleaner serves as a visual guide for oil bath cleaner servicing.

You can pay more, but you can't buy better Pre-Cleaners.



PRE-CLEANERS ARE NECESSARY FOR ALL ENGINES WORKING IN DUST CONDITIONS

HARCO
AIR CLEANER

Also designed for either dash board or under hood installations.

Fits Any Tractor

California, Arizona, Nevada Representative
Franklin B. Lyons, 4 Sequoia Way, Redwood City, Calif. EMerson 6-1248
Dealer Inquiries Invited

See January Directory Issue of this Magazine for Distributors' Names, Addresses

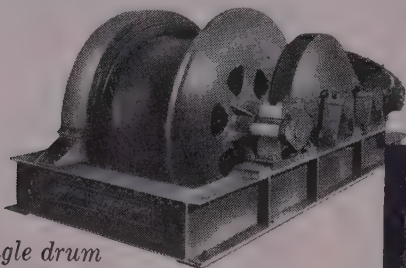
Manufactured by

HARCO MFG. CO.

2051 S. W. 58th Avenue, Portland 1, Oregon

The **HARCO AIR CLEANER** can be serviced in 30 seconds and therefore requires very little of your time.

It will prolong the life of your engine and will cut your repair costs due to dust and grit getting into your engine.



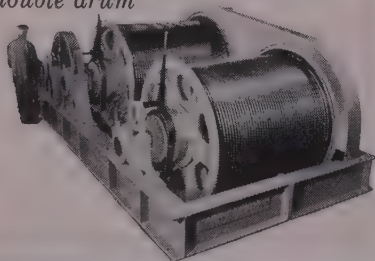
single drum

SPECIAL CARPULLERS

Specify

- load
- speed
- special conditions

double drum



For your Special Carpuller consult Superior-Lidgerwood-Mundy—They Know How.

Write for New 24 page Bulletin C-616

SUPERIOR-LIDGERWOOD-MUNDY CORPORATION

Main Office and Works: SUPERIOR, WISCONSIN, U.S.A.
Pacific Coast Representative: GEORGE E. SWETT & COMPANY
100 Howard Street, San Francisco 5, California

New Smith mixer for low slump concrete

Here's a new truck mixer specifically designed to handle the type of concrete which will be requisite in the road building program. The mixer, which comes in sizes of 4½-, 5½- and 6½-yd., is designed to handle the low slump, large aggregate



type of concrete (1½-in. rock—1-in. slump). Manufactured by The T. L. Smith Co., it features a larger discharge opening for free-flow charging and discharging even with no slump concrete and a shorter, big diameter drum for faster, thorough mixing and better weight distribution. Specification sheets are available from the company at 2835 N. 32nd St., Milwaukee 1, Wis.

New 8-ton lifting capacity for Bantam model

Schield Bantam Co., Waverly, Iowa, has announced 8-ton lifting capacity for its crane carrier-mounted Model T-35. The new Bantam T-35 basic, when mounted on the Bantam heavy-duty "300" crane carrier, will handle a full 8-ton load working at 10-ft. radius, over-end with outriggers. One of the outstanding advantages of this model is its ability to handle bigger lifts at increased working radii with or without outriggers. A major factor in this increased capacity is the extra stability offered by the model "300" carrier with new box-beam frame (shown in insert).



To achieve the new 8-ton rating, the following modifications have been incorporated into the heavy-duty Bantam: new four-part hoist line and hook block; eight-part boom support harness; new open throat box boom top section; 1,250 lb. of additional counterweight; hardened pins and bolts at highly stressed points in the boom and gantry assembly; double hook rollers; heavy "A" frame legs and braces; high gantry; four extra bolts on the trunnion base; and, now standard on all three Bantam models, flame hardened trunion rollers.

Broad, low-pressure tires "float" Tournapull ("C" size shown) over soft going. Deep lugs give ample traction. With self-cleaning tread design, natural running action forces mud and dirt toward edges of tire. This, plus constant tire flexing, keeps tread clean for efficient traction under all conditions.

How to beat bad weather ...tough job conditions

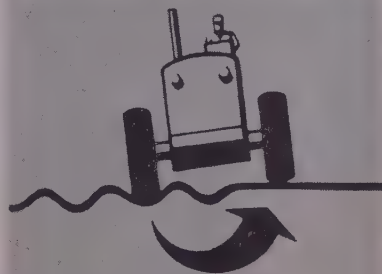
It's no accident that LeTourneau - Westinghouse Tournapull® scrapers haul more dirt — lose less time because of bad footing and other adverse working conditions — than any comparable rubber-tired scraper combination. Sand ... soft cuts and fills ... even wet, muddy going fails to bog-down Tournapull scraper combinations. Here's why:

POWER-TRANSFER DIFFERENTIAL

Major reason for Tournapull's success in moving impressive yardages in all working conditions is its patented, automatic, power-transfer differential. It maintains effective pulling-power on both drive-wheels — regardless of footing. When one wheel begins to spin, differential automatically transfers up to 4 times its tractive effort to drive wheel on firmer

footing. Neither wheel will spin independently until the 4-to-1 ratio is exceeded. ▶

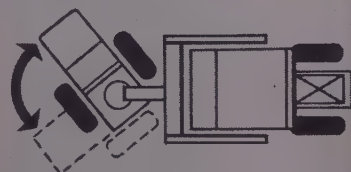
Exclusive L-W differential works continuously — on turns, through mud and slippery footing, over rough, uneven ground. This gives you better traction throughout any haul cycle ... for faster, easier, more profitable dirtmoving.



ELECTRIC KINGPIN POWER-STEER

Where footing is very bad, positive electric kingpin power-steer adds to Tournapull's tractive power. Operator just flicks dashboard steering switch left, right, left, right. This pivots prime-mover from

side-to-side ... "walks" drive-wheels onto solid footing. Kingpin steer also permits operator to make continuous 180° turns in space less than unit's length ... permits working in restricted areas. ▶



BIG, LOW-PRESSURE TIRES

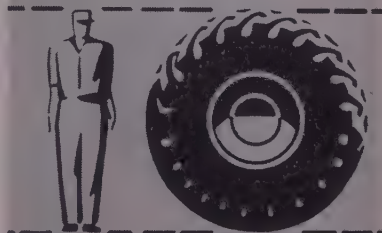
Big, single, low-pressure tires give extra traction to carry Tournapulls through soft going. Tire "floats" ... stays on top of the ground instead of digging in.

In addition, tires provide firm, positive action. Lug height on tire is great enough, and the distance between cleats is wide enough, to permit a big bite. Operation at low-pressures permits more of the tread to grip the ground in soft sand

or mud. Tournapull tires get a good firm grip, but do not dig in. ▶

Get complete facts

For more work days in "shut-down" weather, it will pay you to investigate the popular easy-loading 27-yd. B Fullpak*, 18-yd. C Fullpak, or 9-yd. "D" handyman. Call or write for complete details and owner-verified production figures. No obligation.

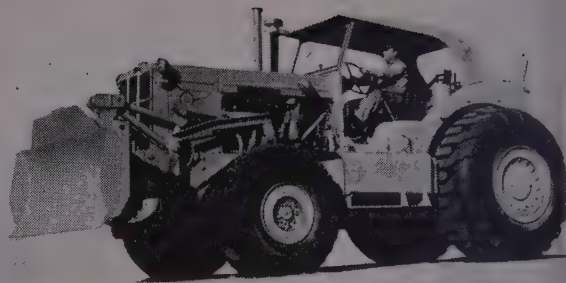


*Trademark P-1464-DC-1

LeTourneau - WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company
WHERE QUALITY IS A HABIT

M-R-S announces large 4-wheel drive tractor

A four-wheel drive version of the 335-hp. M-R-S 200 tractor is now available from the **M-R-S Manufacturing Co.**, Flora, Miss. Designed for hauling over pioneer type terrain, the driving front axle combines a high degree of mobility with the great traction made possible by hydraulic weight transfer for negotiating extremely rough or spongy hauling surfaces. With ample power, a static weight of 45,500 lb. and large, low-pressure tires, the big tractor is capable of providing up to 38,200 lb. available tractive effort. An optional differential ratio is available providing a maximum available tractive effort of 44,100 lb. A semi-automatic transmission is employed, giving the tractor nine forward and two reverse speeds with maximum forward speed of 35.18 mph. The M-R-S 200 four-wheel drive tractor is recommended as a prime mover to self-load scrapers up to 20 cu. yd. struck capacity and for powering scrapers up to 30 cu. yd. struck, 39 cu. yd. heaped capacity when loaded with pusher assistance. Also available



for use with the M-R-S 200 four-wheel drive tractor are 30 cu. yd. struck capacity rear dump rock wagons and 35-cu. yd. struck capacity bottom dump wagons. An adjustable tilt and pitch bulldozer is also available.

New — OWL-LITE* — New

all electronic LONG-LIFE dependable

WARNING NEON FLASHING LIGHTS

Barricade-type Lite Unit: 9 months steady field use life

"SET THEM — FORGET THEM"

- Longer flash (People see it!)
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OWL-LITE PACIFIC

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Rental/Service—Sales

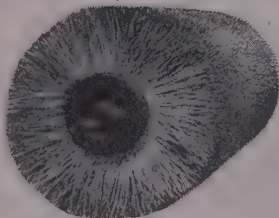
Immediate Sales in Open Territory

*Patents applied for.

MIGHTY-MIDGET: "Back-pack" vacuum drill—100 ft. test holes any angle, anywhere!

M-SCOPE: The best known pipe & cable finder

Fast, expert service on SWEEPER REFILLING!



NEW CORES available for most popular machines. FIBRES & WIRE. All sizes and lengths available from stock.



PACIFIC COAST BRUSH CO.

1507 Santa Fe Ave., Los Angeles 21, Calif.

Ship us your worn street sweeper brooms. We refill cores up to 9' long with any of the standard sizes of Flat Steel Wire, Palmyra Stalks, Split Hickory or African Bass. Gutter brooms refilled. Service is very prompt, even during rush season. Contact your regular equipment dealer or send us his name.

Power shift eliminates clutch on grade

Recently introduced by **Pettibone Mulliken Corp.** is the all new Pettibone Speedmatic Grader Model PM-612. Featured on the new grader are Speedmatic Power Shift which eliminates the clutch and saves time on every machine movement, and Allison Torque Converter Drive for reducing wear and tear of shock loads. A heavy-duty, 145-hp. GM diesel engine supplies power to all four chain driven rear drive



wheels and to a positive differential drive on the two front wheels. Full hydraulic controls, time-saving hydraulic shifting, hydraulic booster steering, and 90-deg. blade control left or right from the cab are all standard equipment and combine to eliminate operator fatigue. Six forward speeds and six reverse give a top operating speed of over 24 mph. Optional three speed creeper gears provide creeping speeds of 1/2 to 1 1/2 mph. For complete information and literature write today to Pettibone Mulliken Corp., 4700 W. Division Street, Chicago 51, Ill.

American Hoist expands crawler and truck crane-excavator line

A new line of low cost crawler and truck-mounted crane and excavators was recently announced by **American Hoist & Derrick Co.**, St. Paul 1, Minn. Included in the new line-up are a 1/2-yd. crawler crane-excavator, two 1/2-yd. truck cranes, a standard 3/4-yd. crawler crane-excavator and a new 22 1/2-ton truck crane. The American 175 Series includes the 175 BC, 1/2-yd. crawler crane excavator; 175 BT, 12 1/2-ton

Can your haul units match these advantages?

Before you buy your next off-road hauling unit, make this test to see you are getting the most for your money. Examine the various makes of haulers in the light of these features — standard on LeTourneau-Westinghouse Rear-Dumps:

Runs anywhere — With big, low-pressure tires, L-W Rear-Dumps easily haul capacity loads over rutted haul-roads, paved highways, city streets... haul cross-country over rough terrain, over rocky pit areas... through mud, sand, and soft fills.

Maneuvers easily — 180° turns — in distance of less than its own length — plus power-steer, quickly positions Rear-Dump under dipper. The normally wasted by conventional haulers jockeying back and forth to spot at shovel or fill is eliminated. Big, square-type body target aids loading.

Dumps fast, clean — Flick of an electric switch actuates hoist-motor. Body lifts quickly to any desired angle, for spreading on the run... for dumping over bank. At full-dump position, bowl is behind rear wheels, so dump is clean, doesn't

"bury" wheels. Streamlined body sheds material readily.

Cuts weather delays — Power-transfer differential automatically applies up to 80% of power to drive-wheel on firmest footing... pulls unit through mud, sand and soft materials which stop ordinary haulers. Front-wheel drive pulls unit off soft fills readily. Pivot-turn, through geared kingpin, "walks" prime-mover out of soft spots.

Provides maximum safety — Multi-disc air brakes have more wheel braking surface than any other type hauler. Low center of gravity, good visibility, power-steer, front-wheel drive, easy electric controls... all contribute to operator's confidence and safety.

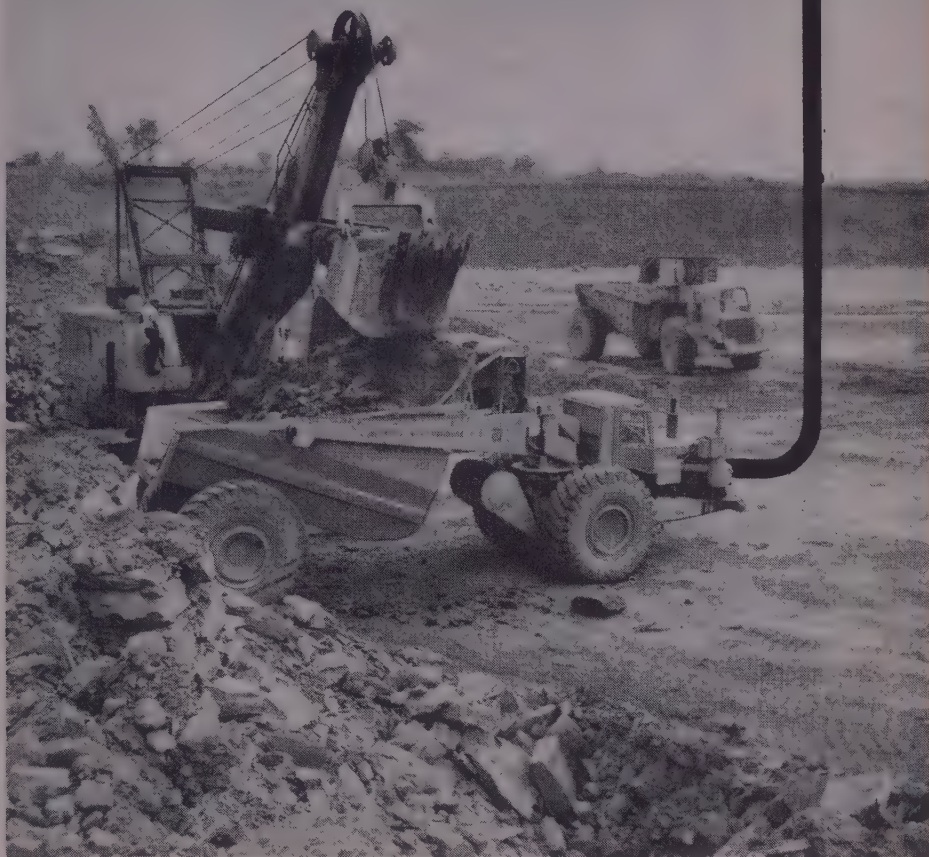
Reduce maintenance — Having no hydraulics or jack-lines, no long

drive-shaft... no frame, sub-frame, springs or tie-rods... these Tournapull® Rear-Dumps are less subject to downtime for maintenance and repairs than any other type hauler. Slant-bottom bowl reduces shock damage when loading large chunks.

Add to all these advantages, the versatility of Tournapull's prime-mover — which can be converted to operate these matching trail units: scraper, bottom-dump, flat-bed, logging arch, or crane. Any of these interchangeable work-units cost about 25% of your original machine investment. You benefit 100%.

Check all the "plus earning advantages" Tournapull Rear-Dumps have to offer YOU! Ask for complete details on the size that fits your needs: 11-ton "D", 22-ton "C", or big 35-ton "B", each a profit-maker.

R-1056-DC-1



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A Subsidiary of Westinghouse Air Brake Company

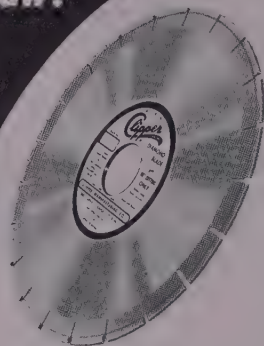
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**SAW CONCRETE & ASPHALT
FASTER WITH THE ALL-NEW**

Clipper
SAILS RIGHT THRU
SELF-PROPELLED

36 H.P. CONCRETE SAW
Over 32 Outstanding
Features Found on No
Other Concrete Saw!

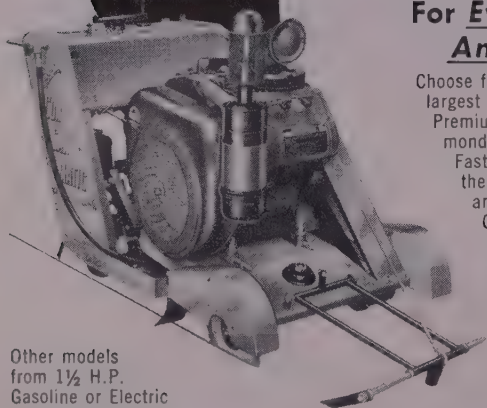
Here is
Engineering
Leadership
by Men Who
Know the
Concrete
Sawing
Industry



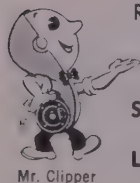
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For Every Saw
Any Job!**

Choose from the world's
largest selection of
Premium Quality Dia-
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Fastest Cutting at
the Lowest Cost on
any job. Let your
Clipper Factory
Trained Repre-
sentative help
you select the
right Saw and
Blades for
your job!

**Call him
Collect
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Priced from \$395



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Offices in Principal Cities Coast to Coast
FACTORIES IN ENGLAND, FRANCE, GERMANY, ITALY

½-cu. yd. truck mounted crane, and 195 BT, 15-ton truck mounted crane. The American 275 Series includes the 275 B ¾-cu. yd. crawler crane-excavator, and the 275 BT, 22½-cu. yd. truck crane. Both the Model 175 BT and 195 BT meet highway



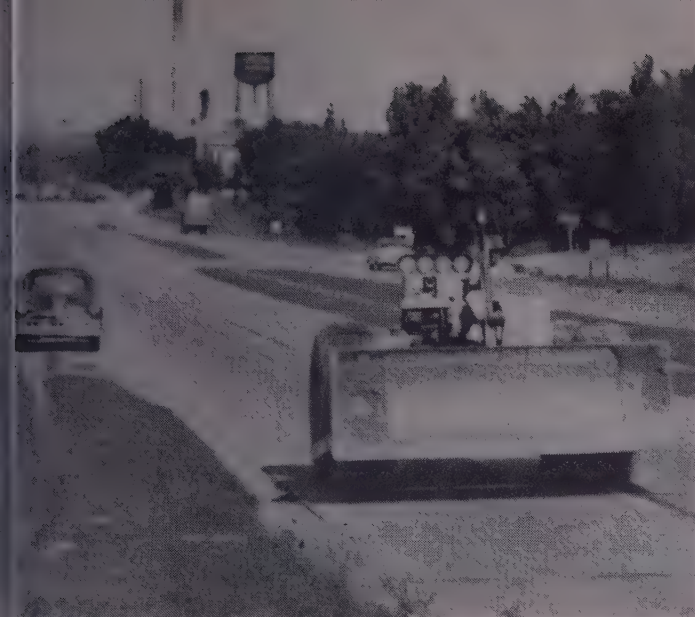
and street restrictions in most states without any stripping. Special features such as power counterweight lowering and removable outriggers enable operators of the Model 275 B truck crane to handle minimum stripping in a matter of minutes. Each of the five new models works with interchangeable front-ends including crane, clamshell, dragline, concrete bucket, shovel, backhoe, pile driver and magnet.

Shawnee truck-mounted heavy-duty backhoe

In order to provide a digging unit which would possess great over-the-road mobility and yet have ability to operate in rough terrain, the Shawnee Manufacturing Co. has made available a truck mounted digging unit. The truck is a heavy-duty, four-wheel drive. The trucks are renovated standard models with a power take-off at the transmission for driving the hydraulic system of the backhoe. Standard mountings



the truck frame is adaptable to either the Shawnee "Chief" or the Shawnee "Warrior" backhoes. The "Chief" digs approximately 15 ft. deep and the "Warrior" approximately 12 ft. deep. Both backhoes are designed on the "Push-pull" principle, with hydraulic cylinders synchronously but in reverse directions on either side of the axis pin. The design provides extra hydraulic force with little or no strain on the axis pin. Also, both models operate in three 120-deg. quadrants which are changeable easily by the operator without leaving his position at the controls. Additional information may be secured from the Shawnee Manufacturing Co., 194 North Topeka Avenue, Topeka, Kan.



At a moment's notice...

"RUNS" to job
under own power

In less than 4 minutes, speedy Tournatractor® travels a mile under its own power to your next job. This mobile machine drives anywhere — rubber-tired speeds — via highway, or cross-country. Big, low-pressure tires do not damage pavement, curbs, sidewalks or RR tracks. You need no planking to cross blacktop. Moving into any new project, you save time, bother, and expense of shipping by rail, or; b) of locating a low-bed trailer... moving in extra men and extra transport equipment... loading, blocking, unblocking and unloading.

Not only does 210 hp Tournatractor get to your jobs faster... it also finishes them sooner. Four speeds forward to 17 mph and two reverse to 7 mph help you complete most tractor assignments in as little as half the time that it takes the average crawler-tractor.

**Figure for yourself
what these advantages mean
in savings to you:**

1. Greater speed on the job; completes each assignment faster.
2. Roadability; cuts moving costs, and non-pay hours of moving time.

3. Fast one-man moves; makes it easy to keep Tournatractor profitably busy at all times, lets you fill in with small jobs between big ones with no idle-time losses.

4. Rubber-tired tractor's long range drive-yourself mobility and versatility; lets you move with the seasons, keep busy the year-around.

Tournatractor has proved itself in every climate, under all sorts of weather conditions. It can save YOU time and money. Write or phone for more information on this versatile, high-speed tractor-on-rubber.

CT-1333-DC-1

A major western railroad uses their rubber-tired Tournatractor for fast emergency sliding service. Rig follows tracks... over ties... thru tunnels... or travels by highway. Big, low-pressure tires do not damage track, ties, switches, or trip block signals.

Tournatractor often goes where other tractors would bog down. Full-sealed wheels, flywheel-mounted generator and electric motors are not affected by water or dust... nor heat or cold. Lubricants do not wash out because oil and grease fittings are water tight.

Owners send Tournatractor job-to-job with confidence. They know its easy-to-handle electric-power controls, and big 4-wheel air brakes, enable Tournatractor to maneuver easily in tight quarters, without interference to traffic. Tractor often tows own fuel and supply trailer.



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
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WHERE QUALITY IS A HABIT



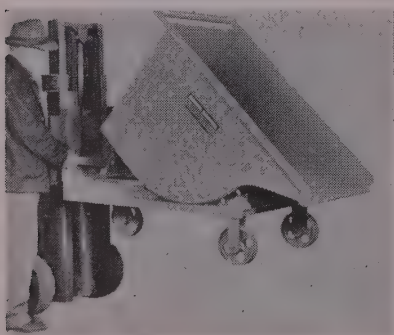
Rig detects uneven spots on forms and pavement slabs

An easy-rolling straight edge for rapid detection of high or low places on forms and pavement slabs has been developed by the **Viking Manufacturing Co.** of Manhattan, Kansas. The Viking "Hi-Lo Detector" dye marks slab areas not within specification. The Hi-Lo is lightweight, consisting of a 10-ft. aluminum beam which rolls on precision ball-bearing,

aluminum rubber-tired wheels. A center wheel measures up and down variations of the surface. These variations are magnified 20 times on a large scale graduated in $\frac{1}{8}$ -in. readings. The Hi-Lo is guided by a bar handle. It has a steerable front wheel. The dye marker is controlled with the left handle grip, permitting an inspector to cover and mark a slab at an easy walking pace. For additional information write to the company.

Self-dumping hopper for narrow aisle work

A new self-dumping hopper only 30 in. wide, designed for handling bulk materials in confined areas, is now available from **Roura Iron Works, Inc.**, 1401 Woodland Ave., Detroit, Mich. The hop-



per will pass through ordinary doors with ease, and has a capacity of 10 cu. ft. Mounted on three casters, the hopper can be pushed manually or transported by fork truck. The self-dumping action is triggered when the operator releases a locking handle on the rear of the hopper. It rolls forward to dump its contents, then returns to an upright position and automatically locks itself in place. It can be dumped with equal ease while carried by a fork truck or while on the ground.

Yale's all-new lift truck line has 15,000 to 20,000-lb. capacity

The **Yale & Towne Manufacturing Co.** has announced the development of an all new line of 15,000 to 20,000-lb.

capacity gasoline powered, pneumatic tire lift trucks. Outstanding among the many new features in the Yale G-3 line are the channel construction which provides 300% more visibility for the operator, the achievement of load stability heretofore impossible to obtain in this capacity industrial lift truck equipment and the fastest possible cyclic rate of operation within the limits of safety. The line is being introduced in 15,000, 16,500, 18,000 and 20,000-lb. capacity models powered with gasoline or LP-gas and utilizing either a straight, fric-



tion clutch transmission or Fluid Coupling transmission. For complete information, write to **Yale & Towne Manufacturing Co.**, 11000 Roosevelt Blvd., Philadelphia 15, Pa.

Crawler track roller bearing

A roller bearing package to fit most crawler-type tractor rollers has been proven and will go into production immediately. This package of parts to fit

HEADQUARTERS FOR THE NEW LORAIN

**ANDREWS
EQUIPMENT SERVICE**
Spokane, Wash.

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

COAST EQUIPMENT CO.
San Francisco 3, California

A. H. COX & COMPANY
Seattle 4 and Tacoma, Wash.

GENERAL EQUIPMENT CO.
Reno, Nevada

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

MCCOY COMPANY
Denver 17, Durango, Grand Junction,
Pueblo and Sterling, Colo.

MOUNTAIN TRACTOR CO.
Missoula and Kalispell, Mont.

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

NEW MEXICO EQUIP. CO.
Albuquerque, New Mexico

LEE REDMAN EQUIP. CO.
Phoenix, Arizona

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

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

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

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

**YUKON EQUIPMENT
INCORPORATED (for Alaska)**
Seattle, Wash., Fairbanks and Anchorage, Alaska

**SHOVELS • CRANES
CLAMSHELLS • DRAGLINES
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70,000 words about 35-ton LORAIN Moto-Cranes

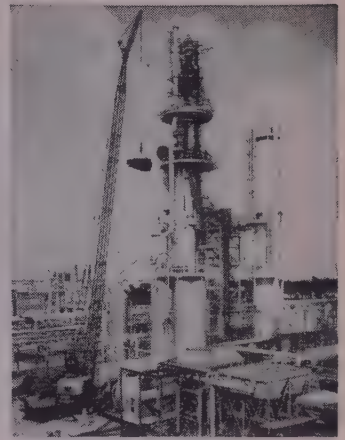
(READING TIME 2 MINUTES)



VIRGINIA
Handling precast beams



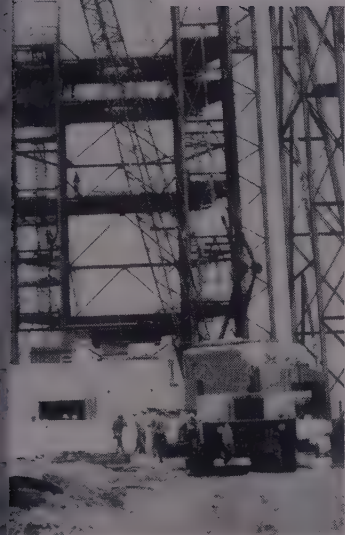
NEW YORK
Pile driving



TEXAS
Building refinery

COLORADO
Erecting transmission towers

MINNESOTA
Stack erection



CALIFORNIA
Erecting rocket test stand



OHIO
Steel erection



If a picture is worth 10,000 words, then here are volumes of testimony that Lorain 35-ton Moto-Cranes are on the job from coast to coast. These are only a few of the scores of Lorain MC-530W's working profitably for Lorain owners. The reasons are many. "Shear-Ball" mounting—Square-tubular-chord boom—2-lever, "Joy-Stick" air controls—and 8x4, 6x6, or 6x4 carriers are some of them.

Here is a 35-ton rubber-tire crane that is not just on the drawing board, but has had over a year of field operation to prove its worth. It will pay you to check it.

Your Thew-Lorain Distributor can give you all of the facts—and show you an "MC-530W" at work. There's one near you, on-the-job, making money for its owner.

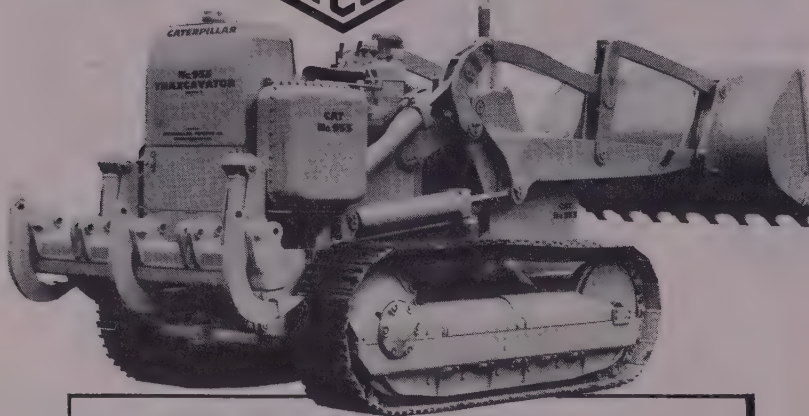


THE THEW SHOVEL CO.
Lorain, Ohio

THEW LORAIN®

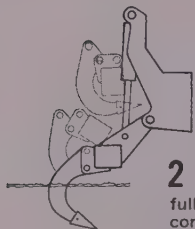
Boost Loader Profits 3 WAYS

WITH RIPPERS

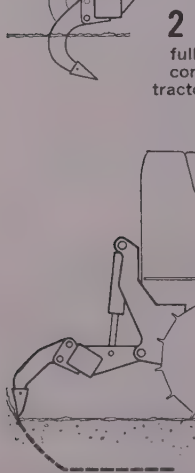


1. Get bigger payloads, faster
2. Handle jobs you never could before
3. Save loader wear and tear

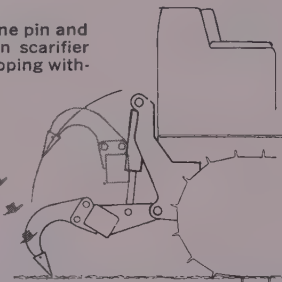
Only ATECO Offers All These Profit Making Features:



1 HINGE-AWAY SHANKS . . . Pull one pin and shanks automatically retract when scarifier is lifted, yet are instantly ready for ripping without replacing the pin!



2 INSTANT PENETRATION . . . Exclusive hinge action "knives" the points to full working depth instantly, even in corners . . . and even without forward tractor motion!

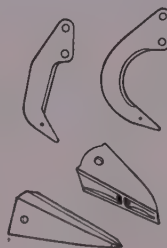


3 BANK AND FLOOR RIPPING . . .

With straight forged shank, your ATECO ripper rips the bank as well as the floor. Ideal for finishing work, preparing radius corners for swimming pools, terraces, etc.

4 CHOICE OF SHANKS AND POINTS TO FIT YOUR JOB . . . Curved shank is ideal for lifting and breaking pavement, hardpan, etc. Straight shank (optional) is designed for slitting, bank and floor trimming . . . excellent penetration for tough work.

Easy-penetrating dagger point is reversible for extra life; new "Holo-ground" point (in standard and heavy duty types) is self-sharpening, and extra-rugged for the tough-to-"impossible" jobs.



ATECO Profit-Builders RIPPERS are available now for Caterpillar TRAXCAVATOR Models 933, 955 and 977. Write today for literature, prices.

 **American TRACTOR EQUIPMENT Corporation** Designers and Manufacturers Since 1920

9131 SAN LEANDRO BOULEVARD • OAKLAND 3, CALIFORNIA

standard roller shells with no alteration consists of binders, oversize shaft, bearings, seals and guards. The cost on a mileage or hourly basis has proven very low as compared to present bearings and bushings. The oversize shaft has an increase of 50% in resisting bending and is therefore suitable to the heaviest rock jobs. Because of close fits maintained in bearings, grease sealing is no problem and 30-day greasing is sufficient. This package is available through **R. F. Stallman**, 4800 Reinhardt Drive, Oakland 18, Calif.

New loader discharges front or rear

The Merton Two-Way loader, manufactured by **Seaboard Equipment Co.**, is a diesel-powered hydraulic loading shovel, self-powered up to 13½ mph.



which can discharge its bucket at the front or over the rear. Discharge at both front and rear is fully controlled, and the height of the discharge can be varied from ground level to 9 ft. in front and from 4 ft. 10 in. to 9 ft. at the rear. A ¾-cu. yd. bucket and a 24-sec. operating cycle give the Merton Two-Way Loader an output of approximately 100 cu. yd. per hour. Spillage is almost eliminated because the design and action of the bucket tilt arms maintain the bucket in a horizontal position throughout the course of its travel. For fuller details and specifications write to **Seaboard Equipment Co., Inc.**, 7 Hanover St., New York 5, N. Y.

New diesel pile hammers

A new diesel pile hammer, now being manufactured by the **McKieran Terry Corp.**, Dover, N. J., is completely self contained, requiring neither boilers nor air compressors. The diesel hammer is presently manufactured in two sizes. The DE-30 has a 3,000-lb. ram that delivers 45 to 55 strokes per min. with an average energy per blow of 18,000 ft. lb. It offers most economical driving with 1- to 3-ton piles at bearings from 40 to 90 tons. The DE-20 has a 2,000-lb. ram that delivers 45 to 55 strokes per min. with an average energy per blow of 12,000 ft. lb. It offers most economical driving with ½- to 2-ton piles at bearings from 25 to 60 tons. Production will soon be started on a DE-40 with a 4,000-lb. ram.



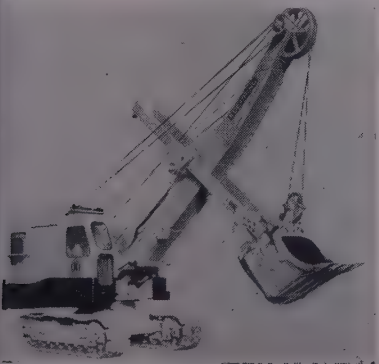
Machine grinds tree stumps

A practical solution to the ever-present problem of tree stump removal has been presented by the **Exeter Company**, O. Box 511, Bloomfield, N. J., with the introduction of their Stump Hewer. This new machine is designed to solve both the problems of stump removal and stump disposal by quickly grinding the tree stump down to as much as 14 in. below ground level. The depression can be covered with earth and the wood chips or shavings produced by the cut-

ting action easily disposed of or used as mulch in the surrounding grass areas. Designed for fast, one-man operation, wheelbarrow type handles guide the cutting head into the stump and can be swung through an 8-ft. radius without moving the trailer. The head is adjustable to cut from 12 in. above to 14 in. below grade. The generator develops 2,500 watts and can be used to power other electric tools or function as an emergency lighting unit.

New Koehring excavator makes 2-cu. yd. dipper

Newest addition to the Koehring line of excavators is the crawler-mounted 805 which can be used as a crane, 2 to 3-cu. yd. dragline, up to a 3½-cu. yd. clamshell or a 2-cu. yd. shovel. Equipped with friction type steering brakes that are spring set and air power released, it is possible for the 805 to turn within its own length when one crawler is completely locked. Main clutches have a



mechanical power booster, cam action and automatic adjustment for heat expansion; permit operator to "feel" load being handled. Bucket on the 805 shovel is crowded into cut by a heavy roller chain. A high A-frame, power raised or lowered, is standard equipment on all cranes using 75-ft. booms or longer. Six turntable and six hook rollers assure operating stability and evenly distribute the 805's weight under any digging or lifting strain. Complete specifications on the 805 can be obtained by writing to **Koehring Division of Koehring Company**, 3026 W. Concordia, Milwaukee 16, Wis.

Cable dump trailer

Recently introduced by Hobbs Trailers is their new Hobbs Schonrock cable dump trailer. Cable-dump principle of the unit consists of a winch working with a cable and sheave assembly that pulls the rear wheels toward the truck, thus raising the trailer on lifting arms into dumping position. The unit may also be worked in reverse, with trailer brakes set and truck backing up, so that the load may be dumped into hopper, or other specified location. **Hobbs Trailers**, 609 North Main, Fort Worth, Tex.

Brake material works two ways

Non-compressible asbestos materials molded with a network of cabled asbestos yarn make up the new Gatke waffle block brake materials for use in brake blocks, clutch discs and frictions. During application the asbestos yarn continuously scours the opposing surface with non-abrasive action that prevents glazing and formation of heat film. By eliminating the film without abrasion this waffle type block retains frictional efficiency without shortening the wear life of opposing surfaces and permits more rapid dissipation of frictional heat checking of brake drums and other opposing surfaces. **Gatke Corporation**, 228 N. LaSalle St., Chicago 1, Ill.

Truck-mounted crane is fully hydraulic

Versa-Lift model 400 crane mounts on any truck, from 1½ tons up, uses only 22 in. of space between cab and bed and leaves ample bed-room for hauling large capacity loads. Using this "self-loader," the truck operator alone can handle all loading and unloading. It lifts from 3,500 lb. (with standard 16-ft. boom) to

Homelite Now Has Full Line of Carryable Construction Equipment



Self-Priming Centrifugal Pumps . . . Carry these lightweight, dependable pumps anywhere. Non-clogging design . . . 28 foot suction lift . . . capacities up to 15,000 g.p.h. . . sizes from 1½" to 3". Diaphragm pump also available.



Builder's Hammer . . . Gouge, drill or chisel in any type of material — faster, easier, and at lower cost — with a Bosch (Germany) Builder's Hammer. Automatic rotary impact action for drilling. Either 110 volt AC-DC or high-cycle motor. Powerful, high-cycle rock drill also available. Both tools may be powered by a Homelite carryable generator.



Carryable Gasoline Engine-Driven Generators . . . Lightweight Homelite generators can be carried and used anywhere to provide high-cycle and 115 volt power for your electric vibrators, tools and floodlights. Complete range of sizes up to 5,000 watts . . . all standard voltages.

HOMELITE
a division of Textron Inc.
PORT CHESTER, NEW YORK



digs more trenches in more places at less cost—and **fits more jobs!**

THIS CLEVELAND 92—a compact maneuverable "Baby Digger"—is doing a neat job of digging from driveway to driveway in a tree lawn that's really *narrow*. The operator sets in and lifts out the digging wheel with speed and safety because the 92 gives him full job visibility and fast accurate boom hoist control. Synchronized wheel and conveyor speeds permit precision placement of spoil. No damage to curb, sidewalk or driveways either, thanks to the 92's perfect balance on long, smooth, non-clog crawlers—a real public relations asset.

The Cleveland 92 "Baby Digger"

- Digs all soils
- Digs to 5' deep
- Digs in any weather
- Power-shift conveyor
- Only 54" wide over crawlers
- Reversible discharge
- Digs 10" to 20" wide
- Portable, at legal limit speeds

THE CLEVELAND TRENCHER CO.

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO



7,000 lb. (with 8-ft. boom), lifts and loads in a full 360-deg. circle, and lowers the load as much as 16 ft. below ground level (with standard cable). Minimum load clearance is about 6 ft. The Versa-Lift is completely hydraulic, with every movement powered by direct PTO driven hydraulic pump. **Teale and Company**, Box 308, Omaha 32, Neb.

Liquid LP gas burner

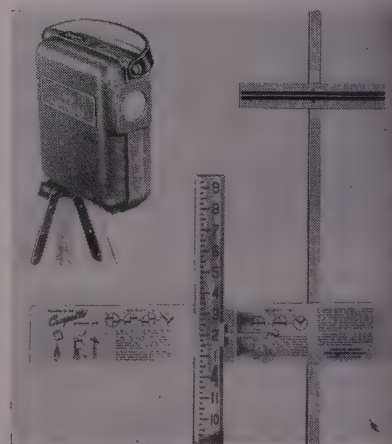
This new Wemco Model TK-2 burner is designed for use with tar kettles, asphalt trucks and any other applications where an abundance of quick, clean heat is required. It operates on liquid LP gas



and will deliver over 500,000 btu. per hr. continuously. It can also be operated on vapor LP gas, and is obtainable also as a unit with fully automatic controls. **Wemco Products**, 1031 E. Ten Mile Rd., Royal Oak, Mich.

New target adopted for Compact Automatic level

A new target has been designed for the Cowley Compact Automatic level by **Engis Equipment Co.**, 431 S. Dearborn St., Chicago 5, Ill. The target is now made of a hard fiber board that resists



splitting or warping and is finished in a design of black and yellow which laboratory and field tests have proved to be of greatest accuracy and visibility in both close and distant leveling. Easy and accurate positioning on the staff is effected by means of a slip proof, rust proof clamp. Another important feature is that

A black and white photograph of a construction worker on a steel beam. The worker is shirtless, wearing dark trousers and a tool belt, and is positioned on a horizontal steel beam, leaning against a vertical one. The background shows a complex network of steel beams forming a structural framework.

BUT SUPPOSE THE STEEL HADN'T BEEN DELIVERED ON TIME?

There have to be reasons why so many western builders specify structural shapes from Kaiser Steel. One of them is *dependable service*. Kaiser Steel's nearby location and proven operating performance assure delivery as promised . . . plus on-the-spot attention from skilled personnel. Kaiser Steel's fully integrated facilities (unique on the West Coast) permit careful control of quality from mine to market. And Kaiser Steel offers the widest choice of structural shapes produced in the West. When you stop to think . . . isn't this a mighty strong case for *your* building with shapes from Kaiser Steel?



built to serve the growing West

For specifications write: KAISER STEEL CORPORATION

Los Angeles • Oakland • Seattle • Portland • Phoenix • Denver • Tulsa • New York

excavating granite overburden /

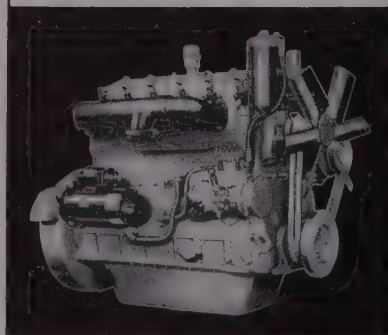


2¼ yard MICHIGAN gets fast maneuverability with WAUKESHA Diesel

● Looks too tough for a rubber-tired tractor shovel. But, Waukesha-powered with a 135-DKB Diesel, this 2¼ yard Michigan 175-A is excavating granite overburden in development work at the Crystal fluorspar mine, near Darby, Montana, at 6900 ft. elevation. 500 tons per 7-hr. day! Good going, but it takes power and lots of it—the smooth, speedy, flexible power of a Waukesha Diesel. This same 175-A Michigan loads fluorspar ore, too, “hopping” from one 12-ft. bench to another... to blend the grade of ore which varies at different bench levels. 400 blended tons per 7-hr. day takes speed and mobility.

339

135-DKB Diesel—4¼-in. bore x 5-in. stroke; 426 cu. in. displacement, with counter-balanced crankshaft. **Get Bulletin 1573.**



WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

NEW YORK

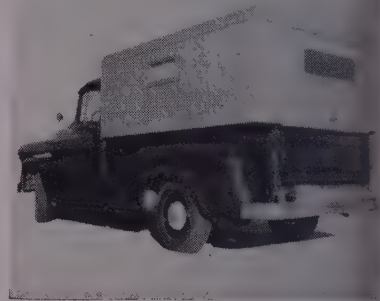
TULSA

LOS ANGELES

the leveling instructions are permanently screen painted on the back of the target so as to be immediately accessible as a reminder or guide to even the most inexperienced operator.

Enclosed cabin for pickup truck

A new kind of cabin has been developed for pickup trucks which affords the protection of a closed truck when needed or the larger capacity of an open pickup when odd-shaped loads are carried. Called the Compac, the new cabin weighs only 150 lb. and is held on securely by four



bolts. Two men can put it on a pickup or take it off in less than 10 min. Made of aircraft-type aluminum, the Compac can be completely disassembled for economical shipping. It measures 90 in. long x 76 in. wide x 16 in. high when crated and can be assembled completely from the crate in less than an hour, using only a screwdriver and wrench. The Compac is made by the Supreme Metal Products Co., 11926 Woodruff Ave., Downey, Calif.

Worm gear diaphragm pumps

Lightweight diaphragm pumps of new design were introduced recently by Rice Pump & Machine Co. of Belgium, Wis. Speed reduction from engine to pump is accomplished in one step by means of a worm gear drive, thus eliminating intermediate speed reducers on engines and motors. This makes for lighter weight, compactness and more efficient transmission of power. Other features include suction accumulators and improved valve design and control of interior velocities to prevent clogging under adverse conditions.

Drott “4-in-1” attachment now available on Payloader line

The Frank G. Hough Co. has just announced that the entire line of four-wheel-drive Payloader tractor shovels will now offer Drott “Four-in-One” buckets as optional equipment. In the rubber-tired front-end loader field, it will be an exclusive offering on the Payloader line. This multi-purpose attachment can be used as a shovel, as a clamshell, a scraper, or as a bulldozer. Additional information may be obtained from the Drott Manufacturing Corp., 3121 South 27th St., Milwaukee, Wis., or by writing to The Frank G. Hough Co., 707 Seventh St., Libertyville, Ill.



Basic Hydrocrane Design Builds Profits From MANY Angles

The basic advantages you get from the all-hydraulic Hydrocrane design eliminates hundreds of parts necessary in ordinary cranes . . . gives you a compact, lightweight machine that costs less to operate and maintain.

The Hydrocrane offers big capacity and unusual stability along with compactness, because strain and stresses of the working crane and its loads are supported by outriggers. These four steel legs extend, set and level the machine hydraulically.

With outriggers to carry the load, the Hydrocrane mounts on a conventional truck giving you the advantages of mobility, convenient corner-station servicing and standard-truck repair parts. In addition, you can save right at the start by buying a suitable, inexpensive

used truck on which to mount your Hydrocrane.

Unmatched precision control lets you handle loads precisely; telescoping boom reaches out for extra jobs; working boom hoist changes boom angles while swinging . . . at the flick of a lever; and a selection of hydraulically operated attachments are money-making improvements over rope-reeved clamshells, grapples, hoes.

The Hydrocrane's basic design gives you a multi-job speedster that handles jobs ordinary cranes can't touch. Start earning extra returns on your truck-crane investment now. Get the complete profit story on the 5-ton H-3 or the 10-ton H-5. Bucyrus-Erie Company, South Milwaukee, Wis.

181H57

SEE YOUR BUCYRUS-ERIE HYDROCRANE DISTRIBUTOR FOR COMPLETE DETAILS

The Border Machinery Company El Paso, Texas; Carlsbad, New Mexico
Clyde Equipment Company Portland, Ore.; Seattle, Wash.
The Colorado Builders' Supply Company Denver, Colorado, Casper, Wyoming
Crook Company Los Angeles & Bakersfield, California
Great Northern Tool & Supply Company Billings, Montana

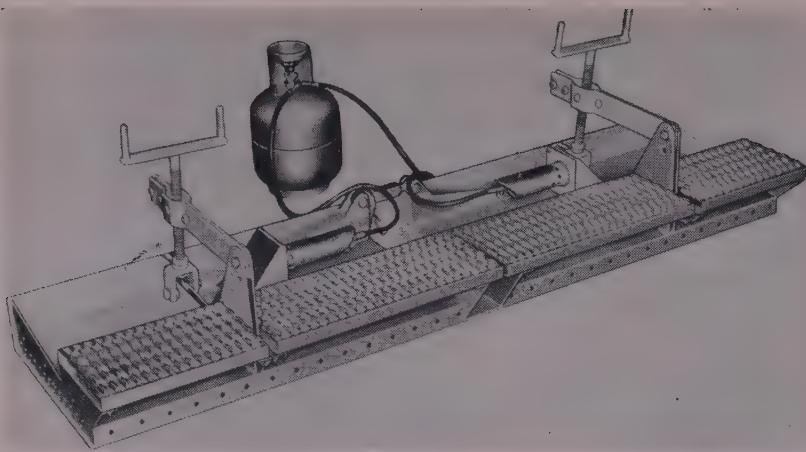
R. L. Harrison Company, Inc. Albuquerque, New Mexico
Lang Construction Equipment Co. Salt Lake City, Utah
Northern Commercial Company
(For Alaska & Yukon Territory) Seattle, Washington
West Coast Engine & Equipment Company Berkeley, California
Westmont Tractor Company Missoula & Kalispell, Montana
Road Machinery Company Phoenix, Arizona



HYDROCRANES

HYDROHOES

H-4



Miller introduces heated-screed

Now contractors can get an earlier start on chilly mornings in spring and fall with Miller Spreader Corp.'s recently introduced heated-screed for use with the Miller Towed Asphalt Paver. The new screed has all of the features of the standard Miller screed—floating, planing action and crown adjustment up to 2 in., plus heating instantly to 250 deg. F. The addition of heat insures a better match on joints—rapid initial heating permits heat shut-off between truck loads without lost time and fuel. Propane eliminates dangerous oil spillage on asphalt and does away with pulling action on fine top or thin patching.

Indirect fire insures uniform heat throughout screed and extension plates. For further information write to Miller Spreader Corp., 4020 Simon Rd., Youngstown, Ohio.

Flexible hose assemblies for field replacements

When fluid-carrying lines have to be replaced in the field, it takes only a few minutes to assemble a new line and install it with Aeroquip bulk hose and fittings. The hose, suitable for air, water, lube, oil, hydraulic, and fuel applications is manufactured in low, medium and high pressure types, along with a low pressure "socketless" fitting that

can be assembled merely by cutting the hose to length and pushing on the fitting. Only simple hand tools are required. For further information, write for Bulletin 182, Aeroquip Corporation, Jackson, Mich.

Fiberglass canopy for crawler tractors

Spun glass canopies for crawler tractors are being marketed by Allen Industrial Products, Inc., P. O. Box 75, Battle Creek, Mich. These tops have a mat of fiberglass sandwiched between two layers of spun glass cloth, all bonded together with Polyester Resin. They are strong, weather resistant, cool and quiet. The light weight of top permits it to be mounted on standard fenders. It is supported on four pipe legs inserted in rubber cushioned sockets. Curtains with Vinyl Plastic lights are offered as optional equipment.

Ready-mixed joint sealer

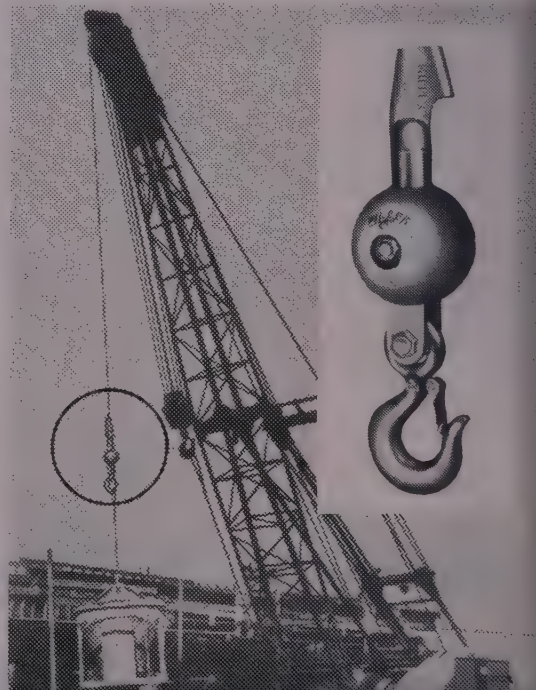
A new cold applied ready-mixed joint sealer for formed or sawed joints in concrete slab is now available from The Philip Carey Mfg. Co., Lockland, Ohio. Careylastic Cold Seal, a one component compound, is a homogeneous blend of asphalt, rubber, plasticizers, inert fillers and suitable solvents. When installed, it films over and becomes a tough, elastic sealer strip that is firmly adhered to both sides of the joint and prevents moisture from penetrating into or below the joint.



Maximum SAFETY plus SAVINGS

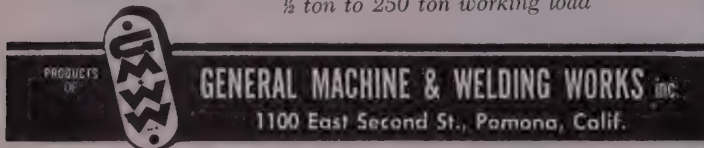
1. Matched set of angular contact bearings.
2. Practically friction free.
3. Seal keeps grease in, foreign matter out.
4. Faster hoisting due to non-spinning loads.
5. Faster load placement due to easy load turning.
6. Faster rigging due to elimination of cranky wire rope performance.
7. Elimination of twists and kinks means longer wire rope life.
8. Safer load placements due to non-spinning loads.

21 standard types available from
½ ton to 250 ton working load

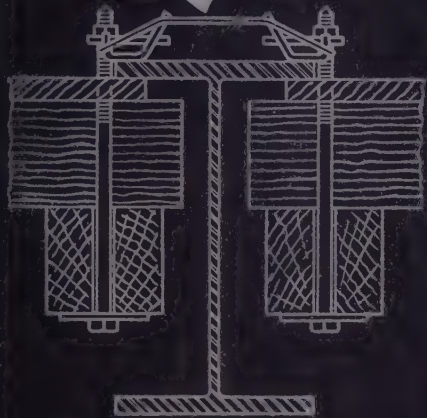


MILLER SWIVELLING HEADACHE BALL

Swivel properly located to absorb twisting effect of wire rope and eliminates spinning loads. Available in four types: Clevis, Eye, Wedge and Thimble. 65-450 pounds; 5-30 Ton Capacity.



Faster Adjustment from TOP of Deck



TOTAL SAFE LOAD ON BOTH COIL BOLTS
IS 10,000 LBS. OR 5,000 LBS. PER BOLT

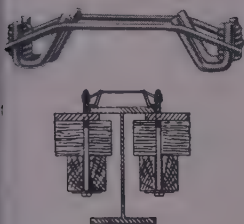
.. WHEN HANGING FORMS WITH **SUPERIOR PLATE HANGER FRAMES**



With Superior Plate Hanger Frames the installation and necessary adjustment to bring the deck forms tight against the flange are from *above* the deck. Coil Bolts are passed through and secured from above with coil nuts. Bolts are easily removed without binding because, (1) nuts are square and will not turn; (2) embedment of the bolts in the concrete is at a minimum since the plate is only $\frac{1}{2}$ " above the flange.

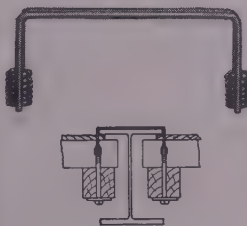
FOUR OTHER SUPERIOR WAYS TO HANG FORMS FROM STEEL BEAMS AND GIRDERS ON BRIDGE SUPERSTRUCTURES

STANDARD COIL HANGER FRAME



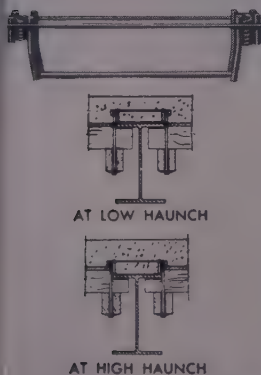
When hanging forms where specifications do not permit any hanger wire to be exposed after stripping, use Superior *Standard* Hanger Frames. Detail at left shows their use with double ledgers, $\frac{1}{2}$ " coil bolts, and flat washers. Total safe load on both bolts for Type 10M is 10,000 lbs., or 5,000 lbs. per bolt. For Type 6M, total safe load on both bolts is 6,000 lbs., or 3,000 lbs. per bolt.

COIL BEAM SADDLE



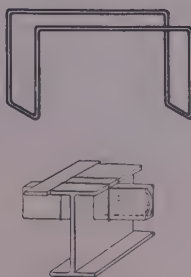
On jobs where hanger wires may be cut after stripping the forms, use Superior Coil Beam Saddles. The Coil Bolts allow for any variation in lumber and flange thickness and tightening the bolts pulls the forms tightly against the flanges. Forms are easily stripped. Safe load is 6,000 lbs. per saddle, or 3,000 lbs. for each $\frac{1}{2}$ " Coil Bolt. Coil Beam Saddles are also furnished for $\frac{3}{4}$ " and 1" bolts.

SPECIAL HANGER FRAME



The design of certain bridge superstructures allows for the permanent deflection of the beams or girders due to the pre-calculated dead load. This deflection is compensated by a concrete haunch of varying depth on the upper flange. Superior *Special* Coil Hanger Frames were developed to meet this field condition, at the same time avoiding any exposed hanger wire. The extent to which the $\frac{1}{2}$ " coil Bolts are threaded into the coils allows for these varying haunch depths from maximum to zero. (See detail). Total safe load per frame is 10,000 lbs., or 5,000 lbs. per $\frac{1}{2}$ " bolt.

WIRE BEAM SADDLE



Wire Beam Saddles are used to hang centering joists from structural steel beams when the beams are not fireproofed with concrete. On non-fireproofed structures the load is determined by the allowable spacing of centering joists rather than the capacity of the hanger. Available in three gauges and sizes as required. Will carry safely, total loads of 2,500 lbs. to 6,000 lbs. Layouts and estimates will be sent upon receipt of plans or quantities. No obligation.

WORKING PARTS (Bolts and washers) are returnable. Layouts and estimates for Superior Hangers are available without obligation.

SUPERIOR CONCRETE ACCESSORIES, INC.

9301 King St., Franklin Park, Ill. (A Suburb of Chicago)

New York Office

1775 Broadway, New York 19, N. Y.

Pacific Coast Plant

2100 Williams St., San Leandro, Calif.



How to get better slabs... faster, cheaper

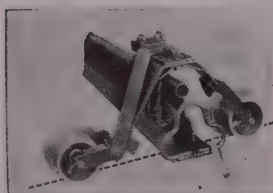
"... the Master goes faster than the mixers."

"Our Master Screed is a one-man-gang. It does everything at once, faster than we've done it before. We've upped our schedules and really cut our costs."

General contractors and road builders say that, because *in one time over*, the Master Vibrating and Finishing Screed strikes off, vibrates and compacts—from top to bottom—even the lowest slump concrete, making a denser, stronger slab than any other way we know of.

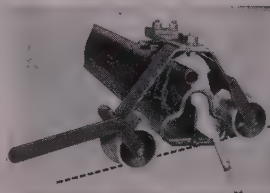
It eliminates honeycomb and form work on bridge decks, molds the concrete in crowns, arcs or flat for roadways and *cuts 'way down on finishing time for any slab*. This cost-cutting, top-quality screed is inexpensive and economical to operate. Available with arc or flat. See your Master distributor today for complete information.

Retractable Wheels Standard Equipment On Vibratory Screed



Screed in operating position. When lever is up, screed rests on work surface, ready to go. Gives high speed strike-off, compaction, and finish.

Lever down, screed beam up, ready to roll easily for another pass. Special retractable lightweight flange wheels increase mobility, step-up operating speed.



MASTER

MASTER VIBRATOR COMPANY

1752 Stanley Ave., Dayton 1, Ohio

DISTRIBUTORS

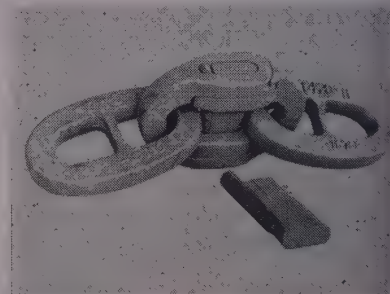
ANDREWS EQUIPMENT COMPANY.....Spokane, Washington
ANDREWS MACHINERY OF WASHINGTON, INC.....Seattle, Washington
NEW MEXICO EQUIPMENT COMPANY.....Albuquerque, New Mexico
OREGON RENTAL & EQUIPMENT SALES CO.....Portland, Oregon
POWER EQUIPMENT COMPANY.....Denver, Colorado
SHRIVER MACHINERY COMPANY.....Phoenix, Arizona
SIERRA MACHINERY COMPANY.....Reno, Nevada
WEST COAST MASTER, INC.....Los Angeles, California
WORTHAM MACHINERY COMPANY.....Casper, Cheyenne, Newcastle,
Riverton, Rock Springs and Sheridan, Wyoming
THE SAWTOOTH COMPANY.....Boise, Idaho

New type foundation pile

A new type of foundation pile proved by field tests to have exceptional strength characteristics, especially during driving, has been introduced by **L. B. Foster Co.**, P. O. Box 1647, Pittsburgh 30, Pa. The pile, called Foster Rail Pile, is made from three steel rail sections welded together at base edges to form, in cross section, a hollow equilateral triangle with rail heads extending outward at 120 deg. This design takes advantage of the high tensile, yield and compressive strengths of rail steel. The shape gives the pile a generally symmetrical section so that its section modulus is approximately the same around any axis. Thus the rail pile effectively resists forces from any direction.

Kensington repair link for hoist and drag chains

A new, easy-to-install "missing link" for repairing hoist and drag chains has been developed by **Kensington Steel**, Division of Poor & Company, 505 Kensington Ave., Chicago 28, Ill. The Kensington link is notable because of its



simplicity and the ease with which it can be assembled. It consists of two identical half links and a combination key and wedge. The half links are inserted through the ends of the chain to be joined; then when the wedge is driven into place, it automatically bends the key and thus locks the link together. No welding, burning, or riveting is needed. Available in sizes from 1 to 3 in., Kensington repair links will fit all standard cast manganese drag and hoist chains.

Full floating screed on paving boxes

A new line of paving boxes has been developed which embody a full floating screed. This new equipment, known as the Cmetco Rola Paver, leaves no wheel or shoe marks to be raked out. Added compaction is developed by the load bearing upon the full floating screed. Four modifications are presently available, one of which is an exclusive high speed trench paver adjustable in any increment down to one foot. The other paving boxes are in 8 and 9-ft. spread widths with side gates for controlling volume of joint material. Insert plates provide intermediate widths. Paving thickness is adjustable from a half inch to eight inches. Complete details can be secured from **Creative Metals Corp.**, 1290 Powell St., Emeryville, Calif.

*The long and
the short of*
**BETTER
WATER SERVICE**
IN Pueblo, Colo.

PDM

WATER STORAGE TANKS

750,000 gallons capacity. Tank diameter 62 ft.
Head range 35 ft. Height to bottom 120 ft.



1,500,000 gallons capacity. Tank diameter 88
ft. Head range 35 ft. Height to bottom 70 ft.

Balancing the water service requirements of the City of Pueblo, Colorado, these strategically-located Pittsburgh-Des Moines Radial Cone Elevated Steel Tanks provide, with a 50-ft differential in tower heights, uniform water pressures

over a large service area. Dependable supply is coupled with low head-range in this large-capacity tank type. Ask for our latest Catalog covering the complete range of PDM Elevated Steel Tanks.



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Plants at PITTSBURGH, DES MOINES, SANTA CLARA, FRESNO, and CADIZ, SPAIN

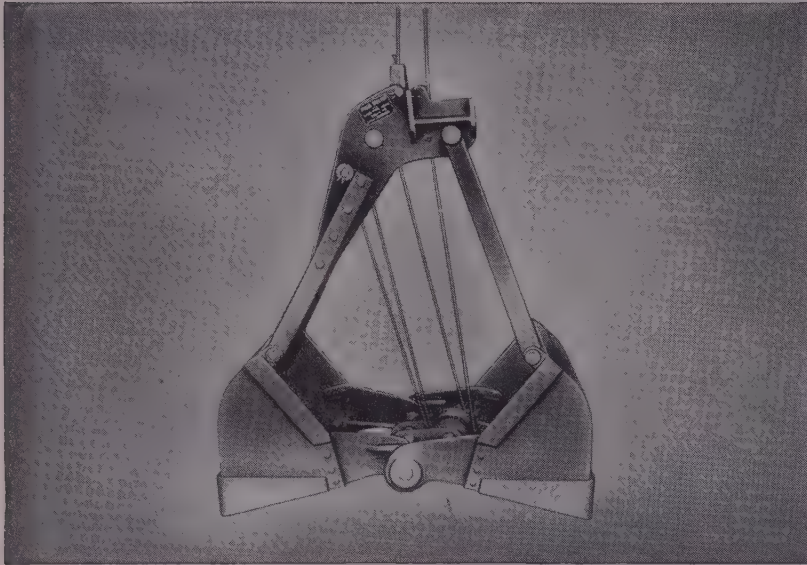
Sales Offices at:

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CHICAGO (3) 1224 First National Bank Bldg.
EL MONTE, CAL.....P. O. Box 2068
DENVER (2)

DES MOINES (8).....921 Tuttle Street
DALLAS (1).....1225 Praetorian Building
SEATTLE.....528 Lane Street
SANTA CLARA, CAL. 627 Alvise Road
909 17th Street

ATTENTION . . . Lightweight Crane Owners

ERIE'S NEW 3/8 YD. CLAMSHELL GIVES YOU ALL THE FEATURES OF REGULAR 2-LINE MODELS



Quick Way, Schield Bantam, Sargent, Dixie, Little Giant, Mitey-Mite, unit crane and other light weight crane owners—ERIE's new 3/8 yd. bucket is built to help you get the most pay load out of your equipment.

Rigid, one-piece, welded head; thick, strong corner bars; over-size bearings; massive hinges and low silhouette—all the features that make ERIE buckets standard for the world—scaled to fit your requirements. You'll be agreeably surprised at the job this new bucket does. We who developed it were surprised and we expected a lot.

Once you try ERIE's new 3/8 yd. clamshell, we're sure you'll agree with us—it's the hardest digging, longest wearing and easiest handling bucket you ever rigged to a light weight crane.

Heat Treated teeth on all ERIE buckets are guaranteed for the life of the bucket against breaking. A new set if they break.

These features make ERIE the bucket experienced operators prefer:

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Treated steel teeth and high carbon steel lips bite up full payloads even in clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low headroom for fast work in tight quarters; low center of gravity for easy positioning.



For catalogs, write Dept. WC 77

ERIE STRAYER CO.

3777 GEIST ROAD • ERIE, PENNSYLVANIA

Makers of Light, Standard and Wide Rehandlers, General Purpose, Heavy Duty, Extra Heavy Duty, Electric and Mechanical Clamshells.

Fast hammer action on wire rope cutter

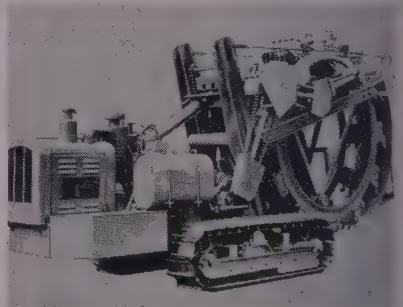
Fast hammer action of the Morse-Starrett wire rope cutter assures a clean cut, leaving the cable end free of frayed or jagged wire, safe and ready for threading or splicing. The patented, precision engineered blade and dies are made of new steels and designed to retain the original roundness of the wire rope. Three models ranging from light duty to extra heavy duty are available. Morse-Starrett Products Co., 1204 49th Ave., Oakland 1, Calif.

Efficient hot oil heater

A simplified control system on the Childers circulating hot oil heater means less maintenance and more production. Circular radiating fins provide additional radiating surfaces and guide the oil through the heater, thus eliminating the possibility of dead spots and resultant oil deterioration. An exclusive down draft firing principle gives quicker heat more efficiently. Childers Manufacturing Co., Inc., P. O. Box 6185, Station B, Albuquerque, N. Mex.

New wheel-type trenchliner

A big capacity trenchliner, the Parsons 170, has been added to its line of wheel-type trenching machines by The Parsons Co. of Newton, Iowa, a division of Koehring Co. A new feature on the 170 is a hy-

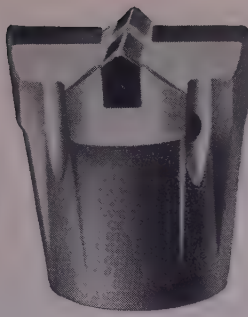


draulically driven conveyor that provides belt speeds up to 600 ft. per minute, yet works completely independent of the wheel speeds. As a result, it is possible to place spoil at a convenient distance from the trench wall when wheel speeds are slowed due to tough digging conditions. The 170 will produce from 12 in. to 25 ft. of trench per minute in a range of 30 digging speeds. Maximum digging depth is 5 ft. 9 in. A selection of 7 cutting widths are available, extending from 20 to 32 in., in 2 in. increments.

New 3/4-cu. yd. trenchhoe dipper

Renner Manufacturing Co., Box 125, Butler, Wis., has recently introduced a new 3/4-cu. yd. cast weld trenchhoe dipper to fill the need for 30-in. wide trenching operations. The trenchhoe dipper has a new lip design and a one-piece heat treated alloy bottom casting which assures long life and good wearability in the toughest digging. The sloping-back construction eliminates heeling, and assures maximum dumping speed. The new trenchhoe dipper will fit any make machine.

CARSET JACKBITS



are **PRECISION MADE**

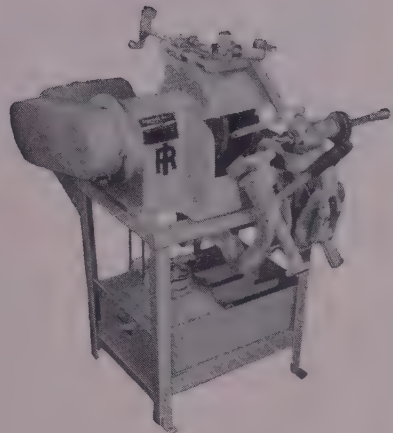
for **HIGHEST PERFORMANCE**

Maintain That Performance

by resharpening with

the NEW JC-3 JACKBIT GRINDER

- ▲ Grinds cutting faces to precisely correct profile for maximum drilling efficiency.
- ▲ Grinds bit gage to proper clearance.
- ▲ Eliminates waste of over-grinding.
- ▲ Greatly multiplies operator output.
- ▲ Available with electric, air or gasoline engine drive.



JC-3 Electric Drive Grinder

TO MAINTAIN the unequalled drilling speed of a NEW Ingersoll-Rand Carset Jackbit—and get maximum feet of hole from each bit—resharpening should be done to close tolerances and without unnecessary waste of the cutting material.

All of these requirements are met to excellent advantage with the new JC-3 Jackbit grinder—far more quickly, easily and accurately than by hand grinding methods. Ask your I-R representative for complete information on this time-saving, cost-saving machine. Or send for a copy of Bulletin 4187.



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COMPRESSORS • TURBO-BLOWERS • ROCK DRILLS
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GAS AND DIESEL ENGINES

15-518

News of DISTRIBUTORS



FINISHING TOUCHES were recently applied to the new quarters of Shepherd Machinery Co. in Los Angeles. A modern plant both in appearance and operation, the service facilities are especially unusual, the shops being open-air, horseshoe type design, with individual hoists in each working area. As an allied line, Shepherd has taken on Southwest Welding & Manufacturing Co., and has worked with Southwest in adapting their water wagons for usage with Caterpillar DW21 tractors, this in addition to a complete line of rollers, compactors, and rippers.

New distributorships for Jay Co.

Eight new distributors were recently appointed to represent the Jay Company in the West, according to announcement by West Coast Manager Herbert L. DuToit. They are: Foulger Equipment Co., Salt Lake City, Utah; Rix Company, San Francisco; Western Traction Co., San Francisco; Construction Machinery Co., San Diego, Calif.; Farris Mortis Co., Denver, Colo.; Moss Equipment Co., Casper, Wyo.; Wortham Machinery Co., Cheyenne, Wyo.; and Myers Company, El Paso, Texas.

Two new Worthington outlets

Two newly named distributors representing the Worthington Corporation are announced. Representing truck mixers and big mixers in the Southern California area is Ziegler Trailer & Machinery, Inc., 7400 Laurel Canyon Blvd., No. Hollywood. Junction Bit & Tool Co., 2422 E. Washington St., Phoenix, Ariz., will distribute Worthington compressors, air tools, building mixers, and contractors pumps throughout the state of Arizona.

Newly appointed distributors

According to announcement by Ken Simpson, district representative at Redondo Beach, Calif., for The Heltzel Steel Form & Iron Co. and The Flexible Road Joint Machine Co. of Warren, Ohio, the following are newly appointed distributors for the products of both firms: Colorado—Contractors Equipment Co., headed by "Ding" Gibson, Denver; Southern Idaho—Starline Equipment Co., Peter H. Cohn, president, Boise; Utah—Atlas Equipment Co., W. W. Kershaw, president, and J. M. Walker, manager, Salt Lake City.

Halton Tractor appoints two to sales

Byrle H. Hunter has been appointed manager of Halton Tractor Co.'s Salem (Ore.) store, and Gordon R. Peters has been added to the Salem sales staff as territory manager, according to announcement by E. H. Halton, Sr., president of Halton Tractor Co., Portland, the Caterpillar dealer in northwest Oregon and southwest Washington.

Hunter has an extensive background of Caterpillar experience dating back to 1925 when he was with Western Loggers Machinery Co. He has held various positions of responsibility with Interstate Tractor, and from 1953 to 1957 was president of Hunter-Gard Motors in Hillsboro, Ore. Peters has had 12½ years of Caterpillar experience, seven years as territory manager in Eugene and 5½ years in the service department.

Lang forms separate corporation

Lang Construction Equipment Co., which has operated as a division of The Lang Company, Inc., Salt Lake City, Utah, recently became a separate and independent corporation. This new corporation will continue the construction equipment phase of the business, acting as distributor for many leading lines, including among others the following: Construction Equipment Division of International Harvester Co., Bucyrus-Erie Co., The Frank G. Hough Co., Galion Iron Works & Mfg. Co., Barber-Greene Co., Gardner-Denver Co., Drott Manufacturing Corp. Frank E. Scheffner continues as president and general manager of The Lang Company, Inc., while H. A. Christiansen has been named president and general manager of Lang Construction Equipment Co., with J. Robert Lang, executive vice president and assistant manager.

Juneau equipment sales addition

Truman Sage, general manager of the Machinery Division of the Northern Commercial Co., announces the addition of Howard C. Robinson to the personnel of the Juneau branch, Alaska. A resident of Juneau for the past four years, Robinson is a former general contractor at both Anchorage and Juneau. Elwyn Pym is Juneau branch manager, and Robinson will handle heavy machinery sales.

New Gradall distributors

As part of the rapid expansion of its sales organization the Gradall Division of The Warner & Swasey Co., Cleveland, Ohio, announces the appointment of three new distributors as widely scattered as Albuquerque, N. Mex., Vancouver, B. C., and Honolulu.

Construction Equipment & Supply Co. of Albuquerque, with John W. Schoen as president, is the new Gradall distributor for New Mexico. In Vancouver, Construction Equipment Co. Ltd., which now handles the Gradall line in Alberta and Saskatchewan provinces, takes on the new territory of British Columbia and the Yukon. In Hawaii, Gradall will be represented by U.S.I. International, Division of U. S. Industries, Inc., Honolulu. K. O. Asper is manager of this firm.

Wheeler-Kershaw ownership change

J. K. Wheeler, long-time distributor of heavy construction and industrial equipment in the Intermountain area, announces his purchase of the entire stock interests of Walter W. Kershaw in the Wheeler-Kershaw Co. and the Rental Equipment Co. The name of the Wheeler-Kershaw Co. is being changed to The Wheeler Machinery Co.

The well established policies of the firm will continue, with the same organization intact. They will concentrate all



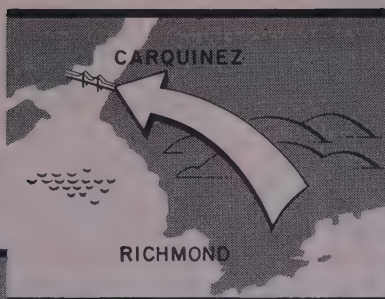
J. K.
Wheeler

their efforts on the distribution of products of the Caterpillar Tractor Co. and associated lines. Wheeler feels these lines give plenty of activity for his large and capable organization which makes its headquarters in Salt Lake City. Besides President Wheeler, who is also general manager, other top men in the organization are Wayne J. Roth, general sales manager, and Alvin J. Carlson, used equipment manager.

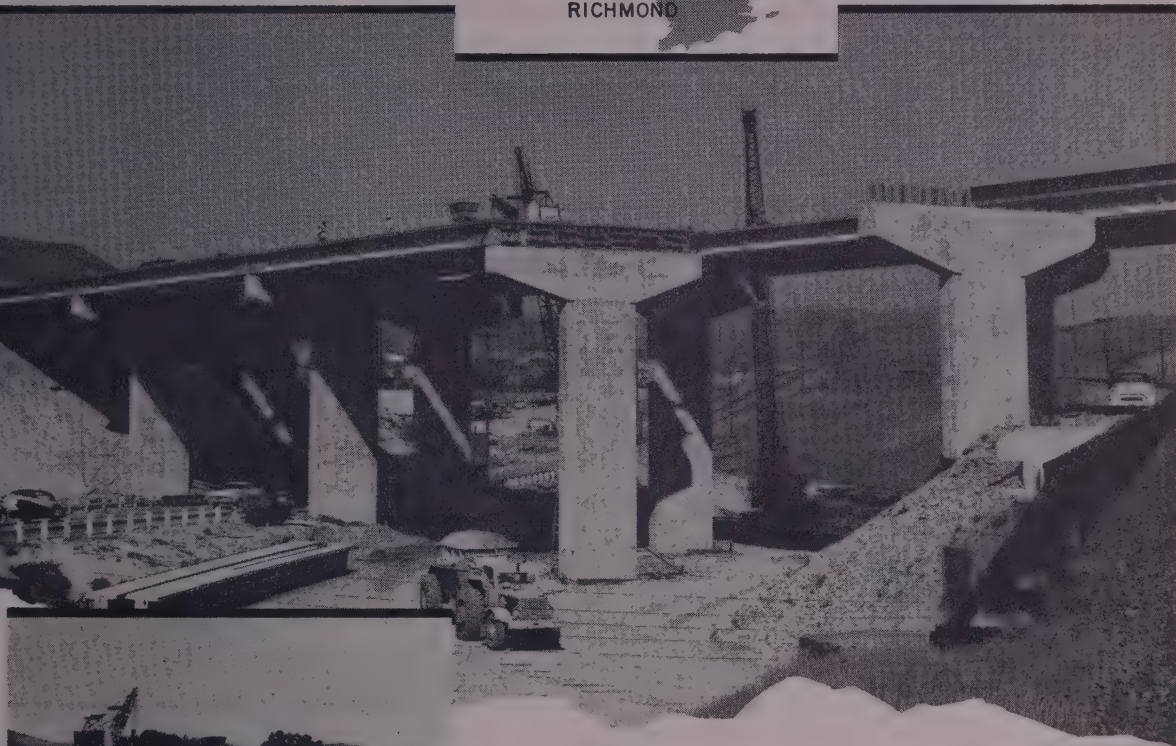
Kirk Hamann joins Manitou Co.

Kirk Hamann has joined the Manitou Equipment Co. of Portland, Ore., as sales representative, according to announcement by Arthur T. Church, president. Hamann will handle sales of

UP and OVER with **BASALT**



This overcrossing is a vital link in the new U.S. Highway 40 construction project. Girders were made in steel forms, under factory conditions and stockpiled at BASALT's plant prior to scheduled delivery.



PRECAST, PRESTRESSED GIRDERS

Another section in California's 7.9 mile Carquinez Freeway Project fits smoothly into place — right on schedule with 136 BASALT precast, prestressed "T" girders doing the job. Each girder weighs approximately 36 tons and is 3'-10" deep x 4'-2" wide x 79'-3" span.

Keeping to the timetable is tremendously important to these contractors, and they looked to BASALT for top-strength structural components when and where they needed them.

Our engineering and sales staff is available to discuss precast, prestressed construction with you. Write or phone...

Hercules Separation and Overcrossing, two miles north of Pinole, California on new portion of U.S. Highway 40.

DESIGN — Division of Highways,
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GENERAL CONTRACTORS —
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Foster offers the fastest service on all types of pipe for foundation piling—Spiralweld, Electricweld, Seamless and Lapweld—in all diameters and wall thicknesses.

Depend on "on-time" delivery of all material required for even the biggest jobs from L. B. Foster Co. Write for catalogs.

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cranes, shovels and draglines in both Manitou and Unit. He was formerly with Interstate Tractor & Equipment Co. and Halton Tractor Co., with seven years of heavy equipment experience.

Prime-Mover announces distributor

The Prime-Mover Co., Muscatine, Iowa, announces the appointment of C. P. Concrete Equipment Co. as distributor for the northern half of California. Offices and service facilities are maintained at 1100 Sixth Ave. in Oakland. Prime-Mover manufactures powered carts and a fork-lift for handling concrete, masonry materials and building supplies.

G-K named LeT-WesCo distributor

G-K Machinery Co., Boise, Idaho, has been appointed distributor for the complete line of LeT-WesCo and Adams products in southern Idaho and eastern Oregon, according to announcement by LeTourneau-Westinghouse Co., Peoria, Ill. The newly organized distributorship is headed by Leland Knudsen, president, and L. W. Gurr, secretary. Both men have long been identified with the earthmoving industry, and in particular LeT-WesCo and Adams products, since they are also officers in the firm's Salt Lake City distributorship, Rocky Mountain Machinery Co. Members of the staff who also bring broad experience to the firm include H. L. McIntosh and Asael Knud-

sen, salesman; Donn Miller, parts manager and co-manager of the service department along with C. E. Swinney.

Other leading accounts handled in addition to the above include Worthington Corp., Universal Engineering Corp., Pettibone Mulliken Corp., and J. I. Case Co.

Interstate Tractor adds sales rep

Wayne M. Moltke has joined the sales staff of Interstate Tractor & Equipment Co., Portland, Ore., as resident territory manager for eastern Oregon, with headquarters at Pendleton. Moltke is no newcomer to the area nor to heavy equip-



Wayne M. Moltke

ment, having worked in the region for 12 years, part of the time as road construction superintendent. For the past four years, Moltke has handled shovel and other heavy equipment sales. He will represent Interstate Tractor & Equipment Co. as distributor for Thew-Lorain power shovels and moto-cranes, Euclid earthmoving machinery, and Chicago-Pneumatic air compressors and tools.

Williams Bucket names two

Two new distributor appointments on the West Coast are announced by the Williams Bucket Division of The Wellman Engineering Co., Cleveland, Ohio. Interstate Tractor & Equipment Co., Portland, Ore., with branch at Eugene, has been named exclusive distributor for Williams contractors buckets in Oregon and the Washington counties of Wahkiakum, Cowlitz, Clarke, Skamania, and Klickitat. Warner-Bancroft Equipment Co., El Monte, Calif., has been appointed exclusive distributor for southern California and the Nevada counties of Nye, Lincoln, Esmeralda, and Clark.

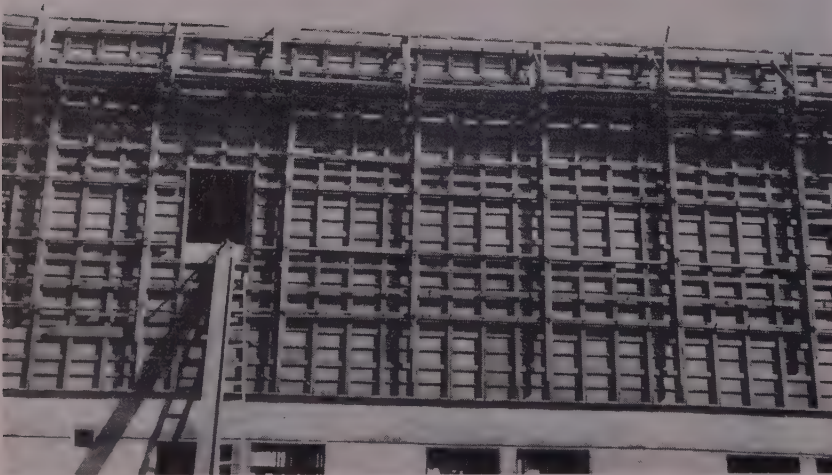
The Williams Bucket Division engineers and manufactures a full line of clamshell and dragline buckets in contractors' sizes, wood grapples and stone grabs.

New Davey distributorships

Appointment of Larson Equipment Co. as a full-line Davey distributor is announced by J. T. Myers, vice president, Davey Compressor Co., Kent, Ohio. Larson's headquarters are at 2421 East 57th St., Los Angeles, Calif. Myers also announced the appointment of Superior Equipment Co., 2402 South Nineteenth Ave., Phoenix, Ariz., as distributor in the Phoenix and Tucson areas.

These distributors will handle sales and service on the Davey line of portable and industrial compressors, "Auto-Air" truck-mounted compressors, air tools and accessories.

(Advertisement)



Symons Forms Cut Costs on Marine Firemen's Memorial Bldg.

Symons Forms provided for Barrett Construction Co., San Francisco, California, an efficient and accurate method of forming for the Marine Firemen's Memorial Building.

Symons Forms are not confined to a single type of application. They can be used on any type of general construction job and on any height wall. Frequent tests prove that no other method of forming can do a more efficient job. The main reason for this efficiency is the simple forming system which consists of only 3 basic pieces . . . connecting bolt, 2-way form tie and tightening wedge.

Symons representatives and engineers can help you with any forming problem and will train your men to do a fast and excellent job. Symons Forms can be rented with purchase option. Write or phone for more information. Symons Clamp & Mfg. Co., 634 Williams Street, San Leandro, California. Phone: LOckhaven 9-9159.

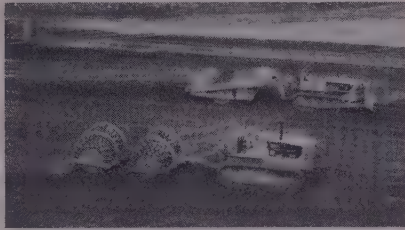
"10,000,000 cu. yds. of earth compaction is keeping our *Southwest* compaction spread busy at Casitas Dam,"

reports
WINSTON BROS.
Nationwide Contractors

The U.S. Bureau of Reclamation Project at Casitas Dam in Ventura County, California will form a 250,000 acre feet reservoir four miles long, two miles wide, and 250 feet deep. The earthfill dam structure itself will be 285 feet high, 2000 feet across, and 1800 feet wide at the base. Part of the \$27,500,000 Ventura River Water Reclamation Program, contract for Casitas Dam is \$8,576,000, with completion scheduled for 1960.

More than 10,000,000 cubic yards of material will be used in the dam project—most of it from borrow sites above and below the structure. Clay, silt, sand, and gravel will be spread and compacted in five different zones on the job. Lifts are specified variously at 6 to 12 inches, dependent on the zone involved and the materials applied.

To meet U. S. Bureau of Reclamation compaction specifications, Winston Bros. brought to the job a spread of Southwest compaction equipment consisting of a tandem 5'x5' double-drum Sheepsfoot Roller, pulled by a Cat D9 Tractor, a single 5' x 5' Southwest double-drum Sheepsfoot Roller, pulled



by a Cat D8 Tractor, a new Southwest multiple-drum Sheepsfoot Roller, pulled by a Cat D8 Tractor, and two Southwest Sprinkler Tanks—one 5000 gallon and one 6000 gallon capacity—both integrally mounted to Cat DW21 Tractors. This compaction equipment spread will be supplemented as the job progresses so that the contractors will compact as much as 30 to 40 thousand cubic yards of material per day at peak operation.

In Zone #1 on the job — a critical area — earth fill is spread 9 inches deep and compacted to 6 inches. Compaction is achieved with an average of only 12 passes by the Southwest Sheepsfoot Rollers. Bureau of Reclamation engineers report the compaction is topping 96 and has hit as high as 106.

Perhaps one of the most interesting factors on the job, to earthmoving men generally, is the use of the high-speed Southwest 5000 and 6000 gallon Sprinkler Tanks integrally mounted on Cat DW21 Tractors. They operate not only to assist in compaction on the dam structure, but to maintain the heavily traveled, two-way, 2-3 mile haul roads as well. The two big sprinkler tanks meet the requirements of a job which demands a tremendous amount of water to meet compaction specifications,



and a time factor which demands that haul roads stay in top shape. The large capacity of the tanks and the high speed of the rigs themselves enable the operators to apply more water in fewer trips at substantial savings in time, Winston Bros. reports. The wide swath of both the front and rear sprinkler bars (45 feet and 55 feet, respectively) combine the ultimate in efficiency with speed. The Cat DW21 Tractors are perfectly matched with the tanks, making an agile team that moves well under almost any conditions. In-the-seat, finger-tip controls greatly facilitate operation of the sprinklers, and the big rubber tires afford the flotation necessary for working on soft fills.

Winston Bros. personnel also report they are pleased with the new multiple-drum Southwest Sheepsfoot Roller. It is proving more versatile than the standard double-drum type, does a better job of compaction on uneven terrain, and requires less drawbar pull with consequent higher operating speeds, particularly on turns.

**COMPACTION IS BEST
WHEN YOU USE
SOUTHWEST**

Call or Write for information.



Pneumatic Compaction Rollers • Sheepsfoot Rollers • Rippers • Sprinkler Tanks

Southwest PRODUCTS ARE SOLD AND SERVICED BY YOUR CATERPILLAR® DEALER

CONSTRUCTION MACHINERY DIVISION
Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA

MANUFACTURERS

Bucyrus-Erie top level appointment

Bucyrus-Erie Co., South Milwaukee, Wis., announces appointment of Henry M. Jameson as general manager of its drill division, with headquarters at Richmond, Ind. James joined Bucyrus-Erie as tractor equipment sales manager in 1937.

Dow appointed Leschen gen. sales mgr.

Gordon N. Dow has been appointed general sales manager of Leschen Wire Rope Division, H. K. Porter Co., Inc., New York, N. Y. Dow has been successively territory salesman in the Detroit area and sales manager of the Chicago district for Leschen. He will make his headquarters at Leschen's main office in St. Louis, Mo.

Gar Wood promotes Ross Miller

Appointment of Ross Miller as sales manager for Gar Wood-St. Paul dump truck bodies and hoists has been announced by Milton G. Peck, Gar Wood Industries' vice president and director of sales, from company headquarters in Wayne, Mich.

V. L. Greedy joins Pipe Linings

Appointment of V. L. Greedy to the position of sales manager for Pipe Linings, Inc., was recently announced by Robert C. Sargent, executive vice president of the company. Greedy joins the Pipe Linings organization after a successful record as Southern California district sales manager for American Pipe & Construction Co.

Parsons Company appoints Western rep

The Parsons Co., Newton, Iowa, a division of Koehring Co., Milwaukee, Wis., recently announced the appointment of Russell J. Dye as new district sales representative for the Western area.

Ottawa Steel appoints Jellesma

Appointment of Frank A. Jellesma as regional manager of the Northwest Territory has been announced by Edwin L. Johnson, general manager of Ottawa Steel Division of L. A. Young Spring & Wire Corp. The division manufactures roadbuilding, materials handling, and industrial construction machinery. Jellesma's headquarters will be in Spokane, Wash., and his territory will consist of Washington, Oregon, Idaho, Montana, Wyoming, northern Utah, and the western provinces of Canada.

Marion elects four new officers

Four new officers of Marion Power Shovel Co., Marion, Ohio, a division of Universal Marion Corp., are announced. Robert Campello, formerly general sales manager, and Martin R. Tuttle, previously general works manager, were elected vice presidents. William R. LeMasters was promoted to secretary-treasurer, and David Reich was elected assistant to the president. Marion manufactures a complete line of excavating equipment up to 75-cu. yd. capacity.

International Harvester Co. celebrates—

Fifty years of truck manufacturing

Increased use and demand for motor trucks from 1907 to 1957 means expanded production, specialization.

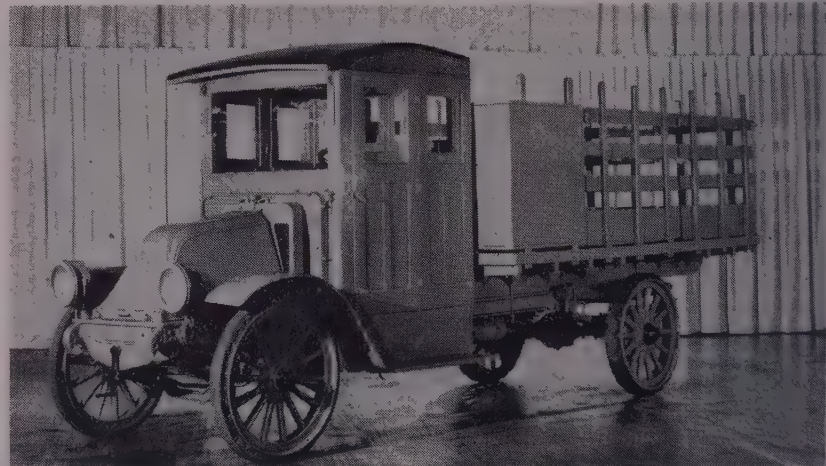
In February of this year, International Harvester Co. will have completed 50 years in the motor truck industry. It was in 1907 that the company manufactured its first high-wheeled, two-cylinder "Auto Wagon." Today, International Harvester produces the world's most complete line of motor trucks, from pickup models of 4,200-lb. gross vehicle weight to off-highway haulers rated at 96,000 gvwt.

The first International motor trucks were built by "production teams" of two or three men at the company's McCormick Works in Chicago. In October of that year, the operation was transferred

to the Akron, Ohio, Works. First year's production was 73 Auto Wagons, a little more than 7% of the total U. S. production of 1,000 motor trucks in 1907.

The years 1907 to 1916 saw a steady increase in the production of trucks and in their size and weight. It was the U. S. Army's use of trucks in World War I that gave the trucking industry its first big boost. A great number of military vehicles were manufactured but relatively few had been shipped overseas at the close of the war. It was the sale of leftover, surplus units that spearheaded national adoption of trucks.

With the ever-increasing demand for motor trucks in the 1920's, International Harvester converted its Springfield plant to motor trucks in 1921. Soon after opening its re-vamped Springfield plant, the company started manufacture of heavy-duty models in a newly constructed plant



FIRST low-wheeled International trucks were produced in 1915, offered greater speed and load capacity. This 1917 model 1½-ton truck had radiator behind engine.



TRUCK-type V-8 engines were offered for heavy-duty International trucks in 1956, in 206-, 226- and 257-hp. ratings. New engines were laboratory and road tested.

Fort Wayne, Ind. To this day, the Fort Wayne Works is the world's largest single plant devoted exclusively to the manufacture of heavy-duty motor trucks.

The "modern" era in International truck history, following the 30's when the "C" and "D" lines were produced, was entered in 1940 when the company introduced its K-line. Production that year reached 86,626 trucks.

In 1944, the Motor Truck Division of International Harvester Co. was formed to handle the growing volume of International truck engineering, production, and sales activities. In 1946 the company began production of heavy-duty "Western-type" models in Emeryville, Calif. Ranging up to 90,000 gvw., these models were designed to cope with the distances and mountainous terrain of the Western states and rugged off-highway hauling jobs.

In 1949, 1952, and 1955 the company introduced the L-line, R-line, and S-line and the V-line in 1956. With the introduction of each line, specialization was carried to greater extents. Throughout its manufacturing history, the company has placed emphasis on designing a vehicle for a specific job. International trucks are "job built" to meet specific hauling requirements.

Today, International Harvester ranks as the world's fourth largest manufacturer in the automotive field. It ranks third in the nation in volume of truck sales and leads the industry in production of heavy-duty, six-wheel and multi-stop trucks.



CHARLES F. SWEENEY, district sales representative for Link-Belt Speeder Corp. of Cedar Rapids, Iowa. Making his headquarters in Denver, Colo., Sweeney's territory embraces the states of Colorado, Montana, and Wyoming, as well as Nebraska and the Dakotas.

Le Roi names Dondero to new post

Louis E. Dondero has been named manager of the West Allis plant of the Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis. He succeeds Hugh M. Little. For the past seventeen months Dondero has been manager of Le Roi's Cleveland rock drill plant.

Jacque Jones new Huber-Warco prexy

Jacque Jones has been elected president of Huber-Warco Company, Marion, Ohio. His advancement from the post of executive vice president fills a

vacancy occasioned by the retirement of Don A. Howard after 33 years of service as a company officer. He continues as a member of the board. Jones has served as executive vice president since the former Huber Manufacturing Co. and the former W. A. Riddell Corp. were combined more than two years ago.

Ed Anderson heads Jaeger sales

C. E. "Ed" Anderson has been named sales manager of The Jaeger Machine Co.'s Paving Equipment Division. Anderson will headquarter in Columbus, Ohio, and will spend much time in the field with the Jaeger line of concrete spreaders, finishers, aggregate spreaders and other equipment used in road and airport paving.

H. B. Jacobsen made sales manager

Appointment of Henry B. Jacobsen as sales manager for Forest Fiber Products Co., Forest Grove, Ore., manufacturer of Forest Hardboards, is announced by F. M. Hughes, general manager.

New sales development manager

John L. Hupman has been appointed manager of sales development for non-automotive products of L. A. Young Spring & Wire Corp., Detroit, Mich. Hupman will coordinate a sales expansion program for L. A. Young divisions which produce materials handling, road-building and other equipment sold under the Layco trade name.



Scoopmobile model LD 5P loading shot rock at Bowman Sand & Gravel Company, Albany, Oregon. Capacity of loader is 1½ cubic yards.

**100%
Breakout
Bucket
Action...
even in
shot rock**

Loading shot rock is a job to test the stuff of any loader. But with 100% breakout bucket action this Scoopmobile makes it look easy.

The bucket clears a path the full width of the wheels to eliminate deflection on the tires. Four-wheel planetary drive gives power to spare. Full visibility, power steering, power shift forward and reverse transmission, and 4-wheel power brakes lighten the work of the operator. It's even easy for him to get in and out of the cab!

To learn how Scoopmobile will tame your tough loading jobs, see your nearest Scoopmobile dealer, or write us for information. You'll hear from us promptly.



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MANUFACTURERS**

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PORTLAND 20, OREGON

UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—Grading in Oregon

Oregon—Douglas County—State. A \$1,049,843 contract was let to Kuckenberg Construction Co. for grading work in Douglas County, Ore.

(1) Kuckenberg Construction Co.	\$1,049,843
(2) Roy L. Houck Sons.	1,138,307
Earl L. McNutt Co.	1,154,825
G. D. Dennis & Sons.	1,174,712

	(1)	(2)
All spec.	Clearing and grubbing.	\$84,100.00 \$156,000.00
2,800 cu. yd.	Drainage excavation, unclassified	2.00 3.50
3,600 cu. yd.	Spec. ditch excav., unclassified	3.00 .50
360,000 cu. yd.	Gen. excav., loc. "A" unclassified	.40 .38
541,000 cu. yd.	Gen. excav., loc. "B" unclassified	1.00 1.00
2,500 cu. yd.	Channel chg. excav., solid rock	3.00 5.00
3,109,000 yd. sta.	Short overhaul	.01 .01
300,000 cu. yd. st.	Long overhaul	.25 .40
18,000 cu. yd.	Excavating and placing topsoil	1.50 .50
All spec.	Finishing roadbed and slopes	
4,300 lin. ft.	Rounding cutbanks	.15 .15
800 lin. ft.	12 in. concrete pipe	2.15 2.30
2,500 lin. ft.	18 in. concrete pipe	3.80 3.60
600 lin. ft.	24 in. concrete pipe	6.00 4.95
180 lin. ft.	36 in. concrete pipe	10.00 9.00
500 lin. ft.	60 in. corrugated metal pipe	25.00 30.00
900 lin. ft.	8 in. sewer pipe	8 1.50
10 only	18 in. metal end sections coated	35.00 40.00
4 only	24 in. metal end sections coated	60.00 50.00
1 only	18 in. metal tide gates	100.00 90.00
2 only	Concrete catch basins	100.00 75.00
160 cu. yd.	Class "A" concrete	65.00 60.00
25,000 lb.	Metal reinforcement	.15 .14
2,100 rod	Type 2 fence	5.50 5.00
10,000 cu. yd.	Coarse crushed material in base	2.50 2.35
2,200 cu. yd.	¾ in. — 0 material in base	3.25 3.00
400 M gal.	Sprinkling	3.00 2.50
1,150 cu. yd.	Furnishing and placing aggregates	5.00 4.75
80 ton	120-150 asphalt	50.00 48.00
34 ton	RS-1 asphalt	52.00 50.00
All spec.	Detour structure	19,000.00 20,000.00

HIGHWAY—Bituminous surfacing and concrete bridge in Utah

Utah—Duchesne County—State. A \$711,901 contract was awarded L. A. Young Construction Co. and Vernal Sand & Gravel Co. for 8.47 mi. of bituminous surfacing and construction of one concrete bridge on U.S. 40.

(1) L. A. Young Construction Co. and Vernal Sand & Gravel Co.	\$711,901
(2) Tiago Construction Co.	763,367
Jack B. Parson Construction Co.	797,389
W. W. Clyde & Co.	806,187

		(1)	(2)
42,800 ton	Plant mix bit. surface, Type "A"	\$ 2.55	\$ 3.30
2,347 ton	Bit. material, Type 100-120 penetra.	34.00	34.00
475 ton	Bit. material, Type MC-1 or MC-2	37.00	42.00
91 ton	Bit. material, Type RC-1 or RC-2	38.70	45.00
31,700 ton	Gravel surface, Type "B"	.90	1.16
174,400 ton	Gravel base course	.80	.86
185,800 cu. yd.	Unclassified roadway excavation	.28	.23
150,000 cu. yd.	Imported borrow	.24	.24
1,106,000 sta. yd.	Class "A" overhaul	.01	.01
74,800 yd. mi.	Class "B" overhaul	.12	.12
10,000 M gal.	Watering	1.00	1.50
2,700 hr.	Rolling, tamping roller	6.00	9.00
500 hr.	Rolling, pneu. tire or power roller	8.00	9.00
700 lin. ft.	6 in. C.M. pipe bit. prot. Type "A"	2.00	2.00
760 lin. ft.	15 in. spec. alkali resist. pipe Type "A"		
	if C.M. pipe is used	2.00	5.00
818 lin. ft.	18 in. spec. alkali resist. pipe Type "A"		
	if C.M. pipe is used	5.00	5.50
190 lin. ft.	18 in. close riveted C.M. pipe spec. alk. resist. Type "A"		
	if C.M. pipe is used	9.00	9.50
1,680 lin. ft.	24 in. spec. alkali resist. pipe Type "A"		
	if C.M. pipe is used	8.00	8.50
858 lin. ft.	30 in. spec. alkali resist. pipe Type "A"		
	if C.M. pipe is used	10.00	10.25
166 lin. ft.	36 in. spec. alkali resist. pipe Type "A"		
	if C.M. pipe is used	17.00	16.00
170 lin. ft.	42 in. spec. alkali resist. pipe Type "A"		
	if C.M. pipe is used	20.00	19.00
96 lin. ft.	60 in. spec. alkali resist. pipe Type "A"		
	if C.M. pipe is used	35.00	40.00
20 lin. ft.	C.M. pipe arches 22 in. x 13 in.—spec. alkali resist. Type "A"	7.00	6.00
120 lin. ft.	C.M. pipe arches 29 in. x 18 in.—spec. alkali resist. Type "A"	9.00	9.00
74 lin. ft.	C.M. pipe arches 36 in. x 22 in.—spec. alkali resist. Type "A"	12.00	11.00
6,950 lin. ft.	8 in. C.M. pipe perforated bituminous protected, protection Type "A"	2.00	2.50
180 lin. ft.	48 in. close riveted C.M. pipe—spec. alkali resist Type "A" (10 gage)	33.00	35.00
250 lin. ft.	72 in. close riveted C.M. pipe—spec. alkali resist. Type "A" (8 gage)	56.00	63.00

240 cu. yd.	Concrete, Class "A"	70.00	80.00
56 cu. yd.	Concrete, Class "AA"	90.00	100.00
41,600 lb.	Reinforcing steel	.15	.14
10,700 lb.	Structural steel	.30	.43
4,500 cu. yd.	Excavation for structures, unclass.	1.00	2.00
1,200 cu. yd.	Small ditch excavation	1.00	.60
1,700 cu. yd.	Granular backfill	5.00	5.00
82 ea.	Guide posts	10.00	7.00
3,252 lin. ft.	Deep beam highway guard rail (conc. posts)	3.50	3.20
50 ea.	Right-of-way markers	10.00	10.00
230 hr.	Mechanical tamping	7.00	7.00
Lump sum	Clearing and grubbing	13,100.00	7,000.00
2,500 lin. ft.	Surface ditches	.20	.20
20,500 lin. ft.	Right-of-way fence, Type "B"	.40	.35
1 ea.	Rem. of existin struct. (sta. 180-47)	2,000.00	1,000.00
5 ea.	14 ft. gates	40.00	40.00
5 ea.	16 ft. gates	50.00	50.00
2 ea.	F.A.P. markers	50.00	50.00
Lump sum	Furnishing water equipment	2,000.00	1,000.00
Lump sum	Furnishing construction signs	4,000.00	1,000.00
400 cu. yd.	(1) CONCRETE BRIDGE 28.02 FT. 0. TO		
269 cu. yd.	Excavation for structures, unclassified	2.00	2.00
59,000 lb.	Concrete, Class "A"	65.00	55.00
1 ea.	Reinforcing steel	.15	.14
	Removal of existing structure	2,000.00	600.00

HIGHWAY—Grading and seal coat in California

California—Tehama County—State. Jesse H. Harrison was awarded a \$613,779 contract for 5.7 mi. of grading and applying seal coat to untreated base.

(1) Jesse H. Harrison	\$613,779
(2) J. H. Trisdale, Inc.	654,182
H. Earl Parker, Inc.	663,145
Fredrickson & Watson Construction Co.	680,955
John Delphia	709,979

	(1)	(2)
67 ac.	Clearing and grubbing	\$ 500.00 \$ 800.00
	Dev. water sup. & furn. wat. equip.	34,200.00 33,000.00
8,000 M gal.	Applying water	.10 1.50
437,600 cu. yd.	Roadway excavation	.48 .55
5,130 cu. yd.	Structure excavation	2.50 4.00
3,300 cu. yd.	Structure backfill	3.00 4.50
3,780 cu. yd.	Ditch & channel excav. (Type "A")	2.50 .90
14,000 cu. yd.	Ditch & channel excav. (Type "B")	.75 .80
4,043,000 sta. yd.	Overhaul	.005 .005
5,900 cu. yd.	Selected rock slope protection	1.50 1.50
15 stat.	Scarifying and reshaping roadbed	25.00 100.00
38,700 ton	Untreated base	1.80 1.55
112 ton	Liquid asphalt, SC-2 (prime coat)	50.00 45.00
500 ton	Sand cover (prime coat)	5.00 4.00
1,200 ton	Pav. asph., gr. 200-300 (med. sl. ct.)	50.00 45.00
139 cu. yd.	Screenings (medium seal coat)	6.00 6.50
13,600 lb.	Class "A" concrete (structures)	135.00 78.00
3 ea.	Bar reinforcing steel	.20 .20
102 ea.	Frames and grates	150.00 160.00
45 ea.	Right-of-way monuments	10.00 8.50
420 cu. yd.	Survey monuments	35.00 20.00
2,080 lin. ft.	Light stone riprap	13.50 4.00
176 ea.	Metal plate guard railing	5.50 5.00
1 mi.	Guide posts and markers	7.00 6.50
1 ea.	New property fence	2,500.00 650.00
2 ea.	14 ft. property fence gate	75.00 65.00
68 lin. ft.	16 ft. property fence gates	90.00 65.00
1,818 lin. ft.	8 in. C.M.P. (16 gage)	2.75 2.00
2,300 lin. ft.	18 in. C.M.P. (16 gage)	3.76 4.50
546 lin. ft.	24 in. C.M.P. (14 gage)	6.03 5.75
230 lin. ft.	30 in. C.M.P. (14 gage)	7.68 7.75
122 lin. ft.	42 in. C.M.P. (12 gage)	14.45 15.00
25 ea.	54 in. C.M.P. (8 gage)	35.00 28.00
18 ea.	60 in. C.M.P. (10 gage)	33.50 34.50
5 ea.	Flared end sect. for 18 in. met. pipe	35.00 34.00
2 ea.	Flared end sect. for 24 in. met. pipe	55.00 45.00
208 lin. ft.	Flared end sect. for 30 in. met. pipe	93.00 85.00
142 lin. ft.	Flared end sect. for 42 in. met. pipe	195.00 185.00
142 lin. ft.	96 in. field assem. pl. cul. (512-110)	58.22 60.00
130 lin. ft.	96 in. field assem. pl. cul. (512-18)	59.67 60.00
52 lin. ft.	96 in. field assem. pl. cul. (510-18)	62.59 60.00
74 lin. ft.	96 in. field assem. pl. cul. (510-15)	64.29 62.00
6,636 lin. ft.	96 in. field assem. pl. cul. (57-15)	73.24 68.00
950 cu. yd.	8 in. F.M.P. underdrains	2.50 2.00
28 ea.	Filter material	6.00 8.00
262 lin. ft.	Entrance tapers	49.00 44.00
14 ea.	8 in. C.M.P. downdrains	3.00 2.25
15 ea.	Downdrain slip joints	30.00 27.50
	Downdrain pipe anchors	25.00 25.00
	Finishing roadway	6,000.00 3,500.00
95 sq. ft.	Met. bin-type ret. wall (Type "A")	5.00 8.00
134 sq. ft.	Met. bin-type ret. wall (Type "B")	6.00 9.00
175 sq. ft.	Met. bin-type ret. wall (Type "C")	7.00 9.00
430 sq. ft.	Met. bin-type ret. wall (Type "D")	8.00 9.00
1 ea.	Cattle guard	450.00 1,650.00

TORQMATIC delivers brute power at the blade



A SCRAPER has to take big deep bites, swallow up to 25 yards of earth and walk away. That takes power!

The converter section of the TORQMATIC DRIVE alone multiplies engine torque up to 350%.

TORQMATIC is a matched converter-transmission team with four speeds forward, two speeds reverse. A flick of the wrist, and your operator can shift to the right gear at full power without losing the "push." It puts an end to lugged or stalled engines because your engine is always working at its top-rated output.

TORQMATIC in a scraper means a big increase in tire life, and far better handling for the operator.

Take a tip from 55 manufacturers of 122 different kinds of road-building and construction equipment. Get the Allison TORQMATIC story.

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TORQMATIC DRIVES

HIGHWAY—Bituminous surfacing in Utah

Utah—Kane County—State. W. W. Clyde & Co. was awarded a \$1,091,369 contract for 18.65 mi. of 2½-in. road mixed bituminous surfacing east of Johnson Junction.

(1) W. W. Clyde & Co.	\$1,091,369
(2) Morrison-Knudsen Co., Inc.	1,138,911
Wells-Stewart Construction Co., Inc.	1,185,483
Strong Co.	1,259,622

	(1)	(2)
2,625 ton Bituminous material, Type MC-3	\$ 42.00	\$ 47.50
581 ton Bituminous mat., Type MC-1 or MC-2	42.50	47.50
382 ton Bituminous material, Type RC-4	46.05	48.00
882 gal. Bituminous additive	2.25	2.20
18,972 mi. Scarifying and mixing	1,200.00	1,200.00
4,400 ton Cover material Type "A"	4.40	4.00
4,400 ton Cover material Type "A" in stockpile	2.00	3.00
146,600 ton Gravel surface Type "B"	1.51	1.40
78,600 ton Gravel base course	1.26	1.30
139,500 cu. yd. Selected material base course	.78	.86
452,000 cu. yd. Unclassified "roadway" excavation	.28	.35
735,000 sta. yd. Class "A" overhaul	.01	.02
10,000 yd. mi. Class "B" overhaul	.20	.20
12,000 M gal. Watering	3.00	3.00
4,000 hr. Rolling, tamping roller	10.00	10.00
1,500 hr. Rolling, pneumatic tire or power roller	8.00	8.00
160 lin. ft. 18 in. spec. alka. resist. pipe—Type "A" if C.M. pipe is used	5.20	5.00
7,462 lin. ft. 24 in. spec. alka. resist pipe—Type "A" if C.M. pipe is used	8.10	8.00
1,170 lin. ft. 30 in. spec. alka. resist pipe—Type "A" if C.M. pipe is used	10.00	10.00
760 lin. ft. 36 in. spec. alka. resist pipe—Type "A" if C.M. pipe is used	15.70	16.00
210 lin. ft. 42 in. spec. alka. resist pipe—Type "A" if C.M. pipe is used	18.60	22.00
206 lin. ft. 48 in. spec. alka. resist. pipe—Type "A" if C.M. pipe is used	21.30	25.00
266 lin. ft. 72 in. spec. alka. resist (paved invert) pipe—Type "A" if C.M. pipe is used	48.40	52.00
84 lin. ft. 72 in. spec. alka. resist 8-gage paved invert pipe—Type "A" if C.M. pipe is used	55.50	58.00
1,670 lin. ft. C.M. pipe arches 29 in. x 18 in. spec. alkali resist. pipe Type "A"	8.65	9.00
360 lin. ft. C.M. pipe arches 36 in. x 22 in. spec. alkali resist. pipe Type "A"	10.50	11.00
368 lin. ft. C.M. pipe arches 43 in. x 27 in. spec. alkali resist. pipe Type "A"	16.65	17.00
82 lin. ft. 84 in. struct. plate pipe 10-gage paint and asphalt coating	70.40	71.00
122 cu. yd. Concrete Class "A"	90.00	86.00
15,400 lb. Reinforcing steel	.16	.18
13,250 lb. Structural steel	.25	.26
0.250 M fbm. Lumber (treated)	500.00	250.00

3,400 cu. yd. Excavation for structures "unclassified"	2.00	1.00
1,400 cu. yd. Small ditch excavation	1.00	.50
600 hr. Mechanical tamping	6.00	4.00
832 lin. ft. Deep beam hiwy. grd. rail (conc. posts)	3.75	3.60
380 ea. Guide posts	7.00	7.00
200 ea. Right-of-way marker	7.00	7.00
69,300 lin. ft. Right-of-way fence Type "B"	.35	.33
15 ea. 16 ft. gates	50.00	60.00
5,000 lin. ft. Surface ditches	.08	.20
200 ac. Clearing and grubbing	70.00	50.00
Lump sum Furnishing water equipment	12,000.00	12,000.00
Lump sum Furnishing construction signs	1,000.00	1,500.00

HIGHWAY—Grading and crushed stone surfacing in Washington

Washington—Cowlitz County—State. A \$143,941 contract was let to Guy J. Norris for 2.2 mi. of grading and crushed stone surfacing in Cowlitz County, Wash.

(1) Guy J. Norris	\$143,941
(2) Smith Bros., Inc.	146,473
Archie Radakovich	154,994
Strong & MacDonald, Inc.	156,522

	(1)	(2)
12 ac. Clearing	\$450.00	\$700.00
12 ac. Grubbing	450.00	750.00
22,830 cu. yd. Common excavation incl. haul of 600 ft.	.50	.45
2,100 cu. yd. Solid rock excavation incl. haul of 600 ft.	.50	1.75
255 cu. yd. Common trench excavation incl. haul of 600 ft.	1.50	3.00
380 unit Overhaul	.40	.80
1,250 cu. yd. Stripping borrow and surfacing pit incl. haul	.20	.60
900 cu. yd. Structure excavation	3.50	3.00
200 hr. Smooth wheeled power roller	6.50	8.00
200 hr. Pneumatic tired roller	6.50	9.00
240 hr. Mechanical tamper	5.00	5.00
116 sta. Finishing roadway	15.00	14.00
100 M gal. Water	3.00	3.00
195 cu. yd. Gravel backfill for foundations	6.00	7.50
18,560 ton Ballast	2.20	1.75
4,030 ton Crushed stone surfacing base course	2.20	1.90
4,330 ton Crushed stone surfacing top course	2.20	2.00
74 cu. yd. Concrete Class "A"	64.00	70.00
13,350 lb. Steel reinforcing bars	.15	.17
159 lin. ft. Plain concrete culvert pipe 12 in. diameter	2.75	3.00
978 lin. ft. Std. reinforced conc. culv. pipe 18 in. diameter	4.00	4.50
60 lin. ft. Galvanized iron water pipe ½ in. diameter	1.00	2.00
2,400 ton Crushed stone surfacing base course in stockpl.	1.60	1.65
6,500 ton Crushed stone surfacing top course in stockpl.	1.60	1.65
15,700 ton Crushed cover stone in stockpile	1.60	1.70



*At loose ends about where
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**Pin it down in the
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Just open the Yellow Pages to your product heading. Like *filters*, for instance. There you'll find Brand Names listed alphabetically—each with the local distributors who sell them. That's all there is to it... takes just seconds.

You'll find it fast in the...



Pacific Telephone

Product specialist appointed

Appointment of Wendell V. Richards as a product specialist in the Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich., is announced. Richards has 20 years' experience in the construction and heavy earthmoving fields. Prior to his Clark connection he was with R. G. LeTourneau, Inc., and LeTourneau-Westinghouse Co. in sales and market research.

New pump company

Crown Manufacturing Co., Box 545, Waterloo, Iowa, is a new company producing a complete line of self-priming centrifugal, diaphragm, electric-powered and high-pressure pumps, ranging in sizes 1 to 10 in. All pumps are designed to give maximum gpm. performance. Complete details on distributor and dealer information can be obtained from the company.

Blackhawk appoints Western manager

Arthur J. Comerford has been appointed Western regional manager for the distributor sales division of Blackhawk Mfg. Co., Milwaukee, Wis. Comerford's territory includes Oregon, Washington, Montana, Wyoming, Idaho, Utah, Nevada, California, Arizona, New Mexico, Colorado, parts of South Dakota, Texas, Nebraska, and western Canada.

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ECONOMY
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AMBURSEN DAM CO INC
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TRANSITS: 20 second, precision heavy-duty instruments with case and extension tripod.
\$395.00 F.O.B.

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Boise, Idaho

Information and/or list
furnished on request.

**VERNON BROTHERS
COMPANY**
BOX 1787
(Telephone 3-3694)
BOISE, IDAHO

FOR SALE

PIONEER CRUSHING & SCREENING PLANT

PIONEER Model 46VE semi-electric crushing and screening plant, SN46VE-150. New in December, 1954.

COMPLETE INCLUDING: 1036 jaw crusher, 4022 rolls, 4 x 123 1/2 deck inclined screen, 50' x 30" swivel feed conveyor with pneumatic tired transports, 50' x 30" delivery conveyor with pneumatic tired transports, 30" x 18' sand conveyor, General Motors 100KW electric set driven by GMC 6110 engine to drive the accessories. No engine for the jaw and rolls, but we have a used UD24 that could be put in with this.

This machine has worked only a little more than two seasons and is in excellent condition. It is now in operation and can be seen near Grand Junction, Colo.

Also bargain price on complete 100 ton per hour stationary crushing, washing, screening plant with only 400 hours work.

For complete information, write, wire, or phone collect.

H. W. MOORE EQUIPMENT COMPANY

5990 Colorado Blvd.

Denver, Colo.

Phone ATlas 8-0771

POSITION WANTED

FIELD SUPERINTENDENT POSITION DESIRED. Twenty-five years' experience in all types of construction work. Applicant is 45 years old and has held foreman and project superintendent posts, including several overseas contracts. References supplied upon request. **Western Construction**, Box 5-A, 609 Mission St., San Francisco.

EMPLOYMENT

Manufacturer of new T-Head form clamp wants representative salesman. Must be acquainted with heavy concrete construction. For details write:

LUDERJAK COMPANY
566 E. Main St., El Cajon, California

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