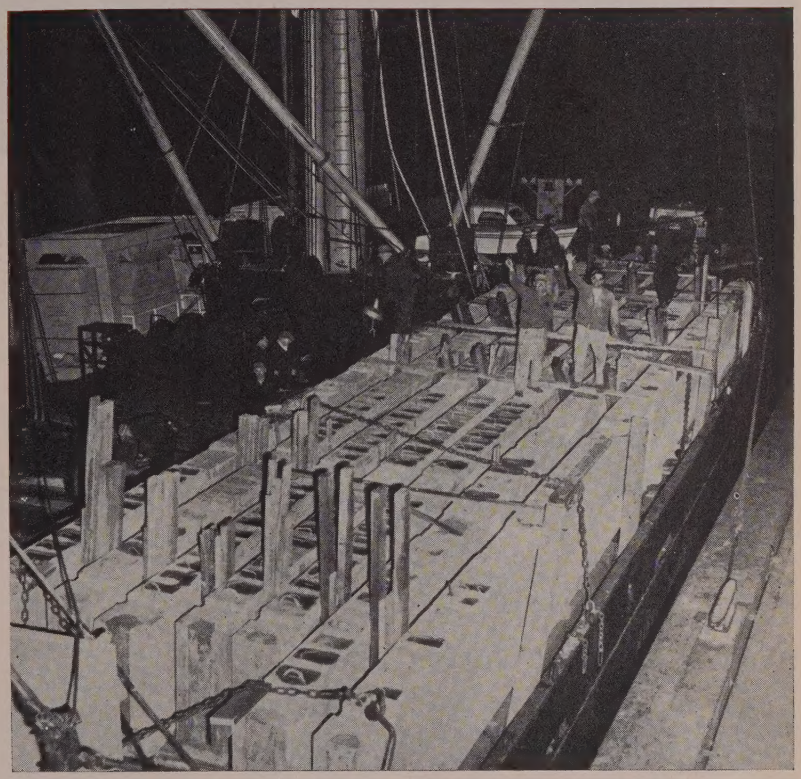
WESTERN CONSTRUCTION

NOVEMBER 1955

Shipping prestressed girders 1,500 miles

Concrete units 70 ft. long weighing 14 tons cast in Oregon for bridge in Alaska — Lightweight aggregate produces 103-lb. concrete.



SECURED ON THE DECK of a freighter bound for Alaska, these girders were picked up and handled 10 times between casting bed and final placement in the bridge.

TRANSPORTING 70-FT. prestressed concrete girders from a casting yard in Portland to the bridge site in Alaska represents a further step in this type of construction development. The procedures, materials, and problems are equally interesting to bridge engineers and contractors. Recently placed in service, the structure is located on the Kenai River Highway between the Seward-Anchorage highway and the Chugach National Forest. Construction of the bridge was carried out under the direction of the Bureau of Public Roads, Division 8 at Portland. Contractor was C. M. R. Constructors, Inc., of Seattle. Originally planned in steel, with a main 190-ft. through truss span, a design revision suggested the alternate of a trestle type structure using 70-ft. rolled beams. A further modification in design introduced the idea of prestressed concrete girders with cast-in-place or precast deck designed to act as the top flange of the prestressed beams for composite action. Use of the 70-ft. spans providing a trestle type structure showed a cost practically the same for steel and prestressed concrete. Final designs were prepared for the prestressed concrete structure and bids indicated that a saving of $100,000 was secured from the original steel truss design.

Specifications permitted the contractor to precast and prestress the girders at any desired location. Such permission, it was assumed, would allow the contractor to produce the finished girders at some city in Alaska where casting facilities were available.

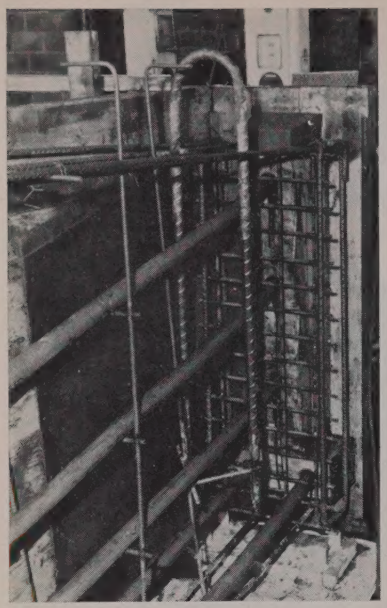
Casting at Portland

However, after studying all of the possibilities the contractor elected to carry out this work in Portland, Ore., at the plant of the Empire Building Materials Co. Although this request was somewhat startling, considering the distance to the bridge site and the transportation problems by ocean going vessel, the Bureau of Public Roads approved the request. One of the advantages to the engineering organization was the fact that supervisory and inspection personnel were available at the location of the casting yard for proper supervision over all concreting procedure including the stressing.

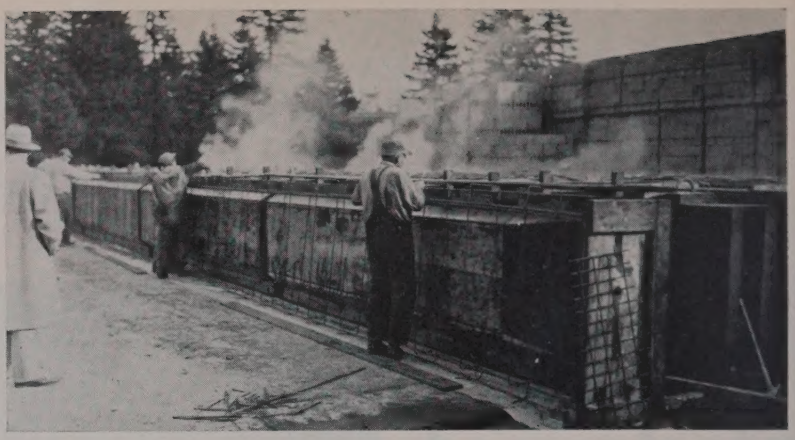
Having elected to carry out the casting of girders almost 1,500 miles from the job site, it was logical to study the possibility of using lightweight aggregate for these members.

Lack of precedent for using this type of material for such a structure resulted in considerable study, although prestressed beams made of lightweight aggregate had been produced in the Portland area for building projects and had proved entirely satisfactory. The lightweight aggregate proposed was of the expanded shale type and tests indicated that requirements of strength and durability could be met. With minor changes in the prestressing it was possible to use the same design section for the girders.

Permission to use the lightweight aggregate carried the following re-



INTERIOR SIDE of the end-block form showing grid for distributing stressing forces, rubber hose to house stressing cables, and lifting eye.



STRIPPED at 24 hr., a 48-hr. period of steam curing followed. The 28-day strength of the lightweight aggregate concrete (103 lb.) averaged 4,780 psi.

quirements: (1) concrete strengths of 4,500 psi., (2) weight of the concrete to be not less than 100 lb. per cubic foot, and (3) a performance test on two of the girders up to the allowable fibre stress.

Following a series of tests the mix selected (1 yd. batch) was as follows:

9 sacks Type II portland cement;

2 cu. ft. natural sand;

20 cu. ft. fine expanded shale aggregate (#4 minus);

8.7 cu. ft. coarse expanded shale aggregate (⅜-in. minus);

50-60 gal. added water (gives 2 to 2½-in. slump).

At 28 days this mix provided strengths well above the 4,500 lb. psi. required in the specifications. Average weight of the resulting concrete was 103 lb. per cubic foot, and average 28-day compressive strength was 4,780 psi.

Normal casting procedure

Casting of the 70-ft. girders represented rather normal procedure, since the work was done in a yard already equipped for extensive precasting operations. Each of the girders contained approximately 10 yd. of concrete and could be poured in about 2 hr. Usually a girder was cast early in the morning and stripped 24 hr. later. Steam curing for a 48-hr. period followed stripping as soon as practical.

Holes in the girders for the prestressing wires were formed by threading a rubber hose of proper size over a ¾-in. reinforcing bar which maintained the hose in its proper position. Bar and hose were pulled out of the concrete about 6 hr. after pouring.

The Freyssinet system of stressing was used by the subcontractor and no difficulties were involved in the stressing of the 16 girders. Only one modification from standard practice was used with the introduction of steel bearing plates 6 in. square x ½ in. in thickness under the anchorages. The use of these bearing plates was required because of the lightweight aggregate used and the possibility of crushing. The stressing of each cable to about 133,000 lb. at the end where the jacks were applied indicates the need for the bearing plate, since the anchorage stress under the cones would have been excessive.

Although the original intention was to stress those cables having the greatest curvature from both ends of the girder, the contractor was permitted to tension all cables from one end.

A lightweight problem

Characteristics of lightweight concrete have not been developed sufficiently to predict accurately the effect of creep and shrinkage. However, it was known that these losses are greater than corresponding loss in concrete produced from customary aggregate. Considering all factors a loss in stress of 36% was assumed and these losses, resulting from nonelastic deformations of the material, combined with the friction loss resulted in the prestressing wires being drawn to 79% of ultimate strength.

The upward camber resulting from this stressing had been estimated to be 1⅝ in. and measurements made on the girders showed values of from 1⅝ to 2 in. Further measurements of camber following the stressing of the girders and before shipment indicated no significant increase. By the time the girders were erected, however, a considerable increase in camber had occurred.

Two of the girders were selected at random for the test required in the permission to use lightweight aggregate. An assumption was necessary in regard to the loss in prestress which had occurred in the 10 days prior to the test. This loss was presumed to be 50% of the ultimate total stress loss and the specified test load was applied by loading pallets of concrete blocks uniformly on the beams. Deflections at mid point were measured at 2⅝ in. for one girder and 2½ in. for the second and these compared to the calculated figure of 2.55 in. Complete unloading was not carried out for almost 2 days following the test and a subsequent measurement indicated that deflections remained at ½ in. and ¼ in. from their original positions. Test results were considered adequate although they did not approach ultimate load capacity.

Principal characteristics of these prestressed girders include: weight of 14 tons with the lightweight aggregate, length of 70 ft., height of 4½ ft., volume 10 cu. yd. of concrete and a prestress of 300 tons per girder.

Diaphragms

Design called for 60 rectangular concrete diaphragms extending transversely between the girders. These were cast in the same yard using the same concrete mix as the girders. Holes for the stressing cables to be inserted on the job were formed by the same type of rubber hose at top and bottom of the diaphragms. These members were cast flat upon the platform using paper to prevent bond. They are 3 ft. high, 6 ft. long, and 6 in. thick. Weight is about 950 lb. and they were steam cured for 24 hr. to permit early handling.

Floor slab units

Specifications provided for either precast or cast-in-place deck slab, and the contractor selected the former option with original intention to cast these units somewhere near the job site from natural aggregate. Subsequently, he decided to cast these slabs in the same yard at Portland using the lightweight concrete. To obtain the required strength of

3,500 psi. at 28 days, the mix was established at 7 sacks per yard with lightweight aggregate at 27 cu. ft. using minus ⅜-in. material and 4 cu. ft. of natural sand. These units involve no prestressing and casting operations were rather standard.

Interior slabs are 14 ft. long, 6 ft. 4 in. wide and 6 in. deep weighing about 4,800 lb. apiece. The units forming the exterior lines of slabs are of the same length but 9 ft. 7 in. wide and weigh 6,700 lb. A casting problem developed from the design which provides for reinforcing steel to extend beyond the edges of the slabs so that it will be embedded in the concrete poured on the job to form the keys.

From casting yard to site

Specifications provided that the girders be handled with lifts which were strictly vertical. The stirrups for handling these 70-ft. members were 66 ft. 6 in. apart which would have required this length of spreader if a single crane was used. The contractor, however, met the specification requirement by using two cranes for every handling operation.

Shipping complications required each girder to be handled about 10 times. These various steps included the original lifting of the member from the casting slab followed by a second lift onto a truck and dolly for a 6-mi. haul to the dock. Here they were stored temporarily and then had to be lifted aboard ship. Loaded on the forward deck, timber cribbing and blocking were used to support and secure the girders. Seven of the members were shipped at one time and the remaining nine followed on a later boat.

Handling in Alaska

Arriving at Seward, Alaska, the first move was unloading and placing on flat cars for a 35-mi. haul. Next they were removed from the railroad cars and placed again on a truck and dolly combination for a final haul of about 25 mi. to the bridge site.

In general the girders arrived at the site after all of this handling in good condition. There was minor spalling and some minor nicks in the top flanges as a result of handling and securing on the various sections of the long trip, but these minor defects were repaired at the site without difficulty.

A more serious problem was the variations in the overall length of these members compared to the design allowance of ½-in. space between girder ends over the piers. Camber in the girders, as a result of the prestressing, had changed the angle of the ends so that they were exceptionally tight at the top and minor chipping was necessary to get them into final position.

Incidentally, this camber in the girders had increased considerably since the prestressing was applied. To observe the future behavior of this camber markers were placed at the curb line and levels will be run over the bridge to note changes in the camber.

VERTICAL LIFTING of the 70-ft. girders was specified and the contractor used two cranes at the site. A temporary fill provided working area for the cranes.

Placing the diaphragms

Cast to exact length the diaphragms provided no space for mortar at the ends where they contact the girders. Design provided for two stressing cables to extend through the diaphragms near top and bottom. These 12-wire cables were threaded through the holes in the diaphragm and beam ends without too much difficulty at the job site.

Also some difficulty was experienced in getting the diaphragms into place where the beams were resting on the substructure. In some cases jacking was resorted to, and the end of the diaphragms did not make full contact from top to bottom with the web of the girder. This difficulty could possibly be traced to inequality in the wooden forms when the girders were poured. Weight and pressure of the wet concrete would always tend to spread any forms wider at the bottom than at the top which would result in the diaphragms being tighter at the bottom.

Diaphragm problems

During the prestressing of the end diaphragms the slight taper of the webs and the resulting uneven contact with the diaphragm ends caused a minor amount of cracking as the top of the diaphragm was put under stress. The damage was considered of a minor character and was repaired in the field by removing the concrete along the cracks and refilling. However, because of this difficulty the diaphragms used at the ends of the other two spans were chipped and ground to fit the individual openings before stress was applied. This corrective procedure eliminated further difficulty.

The Freyssinet system was used also for this prestressing and no trouble was experienced on the job. Because the members were more than 90 days old, the loss in stress was reduced to an assumed 15% and the initial force was set at 72,000 lb. to secure a final stress of 48,000 lb. per cable. An elongation of 1.95 in. was calculated for the 24-ft. stressed cable length.

A job observation resulting from the experience with the diaphragms would indicate that either extreme care must be used in casting these elements or else a joint material should be used between the bearing surfaces with the diaphragms cast to a slightly shorter dimension.

Setting of the deck slabs moved rapidly with an entire span being covered in the best day's work. At the casting plant extreme efforts had

(Continued on page 56)

Weber Aqueduct: 4 mi. uphill and downhill for precast concrete pipe

Slopes up to 70% are taken in stride on this Utah job with one-way traffic for dozers, steps cut in hillside for dragline

PRECAST concrete pipe is laid under many different conditions in the West. One of the most interesting examples at this time is the Weber Aqueduct in Utah. It is basically a 48-in. diameter line that runs a distance of about 4.2 mi. over some very rugged ground. Maximum pressure head will be 400 ft.

The 700 calendar day contract was awarded to Wheelwright Construction Co. of Ogden, Utah, December 30, 1954, for its low bid of $819,610. The project is part of the Bureau of Reclamation's Weber Basin Project and is located near Ogden. Under this development water will be diverted from the Weber River via the Gateway Canal and Gateway Tunnel. Near the downstream portal of the tunnel a bifurcation structure has been constructed in which the flow will be split—part northward through the Weber Aqueduct and part southward through the Davis Aqueduct.

Long siphon

The first leg of this contract is a siphon 5,500 ft. long which will be subjected to a pressure head of 400 ft. All the pipe is under ground with a minimum of 3 ft. of cover. Trenching involved slopes up to 51 per cent on the downhill section and 70 per cent on the uphill section. The system used to excavate involved digging a series of benches into the hillside and then using a dragline working its way uphill. A Lima dragline did most of this work along with D-7 and D-8 Cat dozers. On the steepest slopes the excavation was carried out by using a D-8 dozer pushing down hill and returning to the top by a side road, since the slopes were too steep to come back directly.

Pipe length varies

The pipe is in 8-, 16-, and 24-ft. lengths and is being furnished by United Concrete Pipe Corp. The reinforcing used varies considerably. Welded steel plate from 10 gage to 14 gage is used with concrete lining inside and out for the pipe which will be under a water head of 150 ft. or more. Pipe shell thickness is 5¾ in. for this type. The remaining concrete pipe is made with steel rod reinforcement. Joints are of the rubber ring gasket type with cement mortar applied to both inside and outside of the joint of the cylinder pipe. No mortaring is required for the joints of non-cylinder pipe if specification tolerances are met.

A CAT D4 fine grades a 52% slope before placement of the 48-in. diameter concrete pipe. Benches in the hillside to the left is where crane will be positioned to place pipe.

After the trench has been excavated two types of pipe bedding are possible. On the slope compacted bedding was used and there was usually material available from the excavation itself. Ingersoll-Rand air-operated hand tampers were used to a great extent on this operation. A density of 92 per cent of the dry density determined by the modified Proctor test was required. The other type of bedding could be prepared by consolidation which was a process of using free draining materials, flooding them with water, and then vi-

orating. A relative density of 70 per cent was suitable here.

A Northwest 25 with a 25-ft. boom was used for placing the 8-ft. lengths of pipe, and a Lima crane with a 30-ft. boom was used for the 16- and 24-ft. lengths. From hillside benches on the sloping sections of the line, it was possible for the crane to set about three of the 9 ton-lengths from one location before moving up to the next bench. The grade and line tolerances for setting the pipe were .01 ft.

Turnout and wasteway

The 48-in. pipe line terminates in a vent, turnout, and wasteway structure. The turnout leads to a 42-in. diameter pipe section 0.9 mi. long that will furnish water to irrigation districts and a water treatment plant. The wasteway leads to an equalizing and wasteway reservoir that is also part of Wheelwright's contract. The reservoir was formed by construction of a dam and dike, both of earthfill construction. The dam is 500 ft. long, 40 ft. high, and has a 3:1 reservoir side slope and 2:1 downstream slope. The dike is 275 ft. long, 15 ft. high and has the same side slope as the dam. Both have sand, gravel, and cobble blankets on both slopes over the earth fill. All material except the outer course blankets was obtained from borrow excavation from within the reservoir site. For the reservoir embankments the borrow areas were watered so that when the material was placed within the embankment it already contained the correct amount of moisture. Of the 64,000 cu. yd. excavated, 46,000 cu. yd. went into embankments. The difference is attributed to shrinkage and waste.

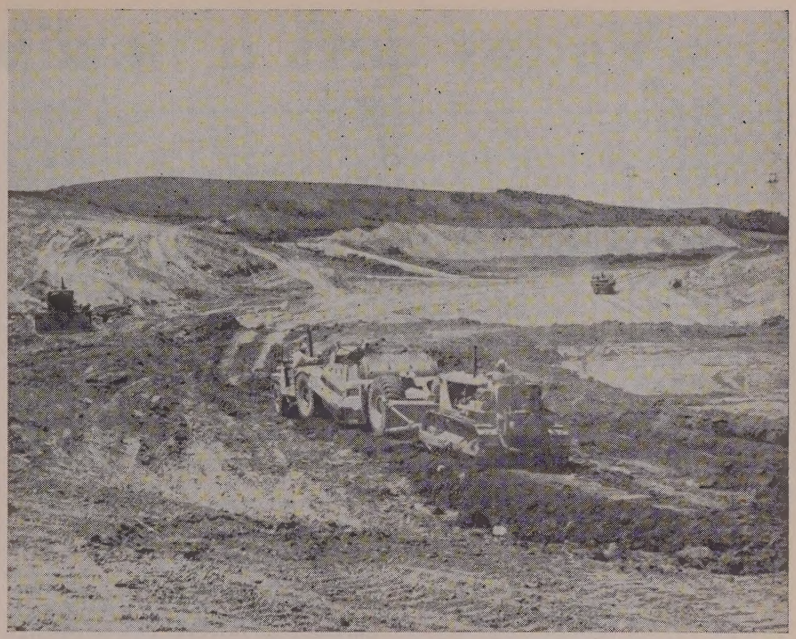
Earthfill in lifts

Wheelwright used two Cat DW-10s for this work with a Cat D-8 for push loading. The earth fill was placed according to the usual method for Bureau of Reclamation projects, that is: 6-in. to 8-in. lifts were compacted at near optimum moisture content by 12 passes of a sheepsfoot roller with the requirement that it have a compacted density as determined by the modified Proctor tests.

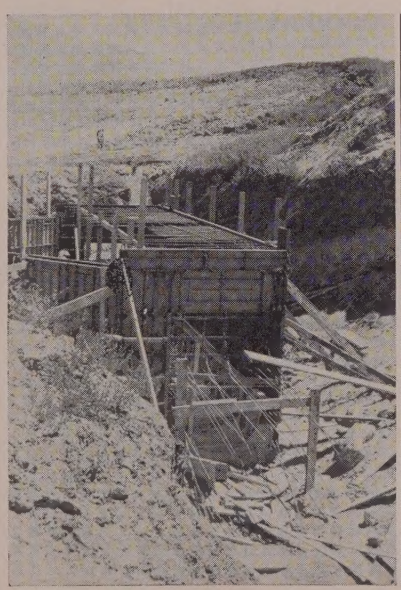
Economy forms used

In Utah there is extensive use of prefabricated concrete formwork panels. On this project the fairly intricate outline of the vent structure was formed by the use of Economy steel forms. Ease of assembly was evident.

A small phase of this project that scored a bull's-eye was the hydraulic jacking in two separate cases of 16-ft. lengths of 48-in. pipe beneath railroad tracks. One of the two was on a 26 per cent slope, yet both came out good for line and grade when completed. This was considered excellent since no preliminary auger borings were put through.



EXCAVATION from the bottom of the equalizing and wasteway area by Cat DW10s with Cat D7 pusher provided material for the dam and embankment. Total of 64,000 cu. yd. was moved.



ECONOMY STEEL FORMS outline a structure that will serve as combination vent, turnout and wasteway. Form assembly went rapidly.

BIFURCATION STRUCTURE at lower end of tunnel splits water. Part goes to Weber Aqueduct, part to Davis Aqueduct.

NEW BOOK ON CONCRETE TECHNOLOGY

THE FIRST of a two-volume work entitled "The Technology of Cement and Concrete" covers the known facts about the materials used in concrete, and examines the concrete-making qualities of these materials. A second volume will cover the effective combinations of these materials and the properties and uses of the resulting concretes. The authors of the two-volume work are Robert F. Blanks, vice president and general manager, Great Western Aggregates, Inc., Denver, Colo., and Henry L. Kennedy, manager, Construction Specialties Division, Dewey and Almy Chemical Co., Cambridge, Mass. Publisher: **John Wiley & Sons, Inc.,** 440 Fourth Ave., New York 16, N. Y. Contains 422 pages with extensive pictures, charts, and tables. Price $11.00.

Las Vegas gets a new water supply

A population increase of 575% since 1940 and steady industrial growth forces Nevada resort city to tap Lake Mead for a supplementary supply

By JAMES M. MONTGOMERY
Consulting Engineer
Pasadena, California

UNPRECEDENTED GROWTH has again forced a Western community to look for new sources of water supply. In Las Vegas, Nev., growth and greatly increased tourist activity, together with industrial expansion have over-taxed existing sources of supply, and during the summer months periods of water shortages have been experienced. To cope with this problem, water from Lake Mead is being brought into the large population centers as a supplemental water supply.

The industrial development of Clark County since 1940 is due primarily to the inexpensive electric power and water supply made possible through the construction of Hoover Dam in the 30s. This industrial growth combined with construction of various United States Government installations, tourist travel, and the trend toward desert living, made attractive by air-conditioning, has brought about tremendous increases in the population. Although electric power from Hoover Dam has been fully contracted for, development of steam generating facilities in the Las Vegas area are now under construction. The El Paso Natural Gas Company has recently brought natural gas into the Las Vegas area.

Population growth

Las Vegas, being on the main route between Los Angeles and Salt Lake City, accommodates practically every automobile traveler between these points. Visitors to Hoover Dam are also accommodated in Las Vegas. Of course, mention should be made of the many people who come to Las Vegas primarily for the night life and gambling activity the area has to offer. It is estimated that 9,217,900 persons are housed annually in Las Vegas with an estimated tourist spending of $102,425,000, exclusive of gambling and drinking which amounts to an additional $61,500,000.

The 1950 population of Las Vegas was 24,624 while that of Clark County was 48,289. As of January 1955, it is estimated that the population of Las Vegas was 46,000 and of Clark County 83,000. This tremendous growth, continually spiraling upward, has indeed taxed the water system of a city whose population was but 8,000 in the year 1940.

Industry in the area is primarily limited to Henderson, where the Basic Magnesium Inc. plant was constructed by the Defense Plant Corporation in 1941-42. This plant has been taken over by five major companies. Water and power facilities for serving the plant are presently operated by Basic Management Inc. (B. M. I.)—a corporation wholly-owned by the companies which have taken over the Basic plant. The water supply system includes facilities for pumping water from Lake Mead. Other industrial developments include the Union Pacific Railroad and warehousing.

Original water supply

Las Vegas Valley has depended in the past upon the large springs which were familiar to early settlers and the Los Angeles and Salt Lake Railroad, which established the community now known as Las Vegas.

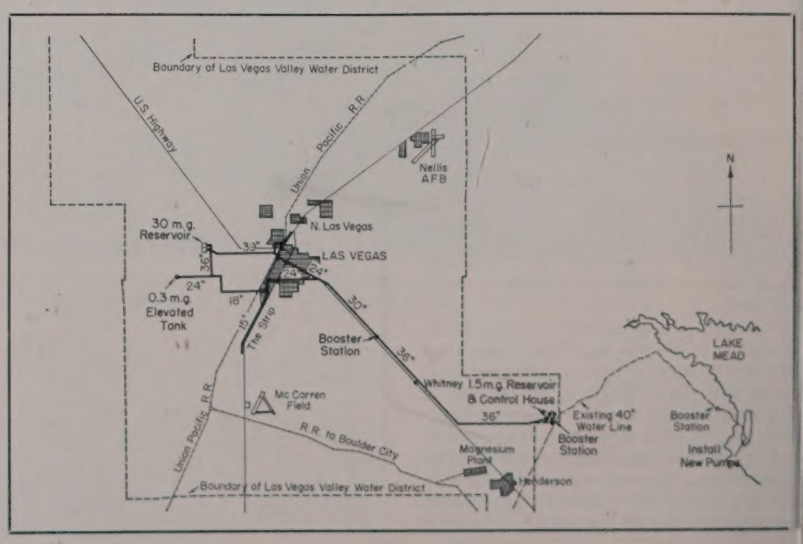
The City of Las Vegas and surrounding territory have depended exclusively upon the underlying artesian basin. This artesian basin with an average annual replenishment of 30,000 to 35,000 ac. ft. is being overdrawn. Estimated withdrawal in 1952 was 45,000 ac. ft. Realizing that the future growth of the entire community is dependent upon an adequate water supply, the voters of the Las Vegas Valley, in 1948, established the Las Vegas Valley Water District.

The function of the Las Vegas Valley Water District, in addition to its operation as a public utility, is to cooperate with the state engineer of Nevada to regulate the usage of water from the underground artesian basin. The district has an area of 196,480 ac. and, with the exception of Henderson, has depended upon the underground basin for its water supply. Henderson is supplied from Lake Mead through the B.M.I. System.

Because of the dual function of the Las Vegas Valley Water District: (1) to regulate the usage of water from the underground basin and (2) to operate as a public utility, it was realized that acquisition of the water system owned by the Las Vegas Land and Water Co., a subsidiary of the Union Pacific, was necessary. The purchase price of this system was included in the $8,700,000 bond issue presented to the voters in 1953. General obligation bonds were voted, although it is the intent of the district to pay all costs, including bond charges, from revenues.

Lake Mead only source

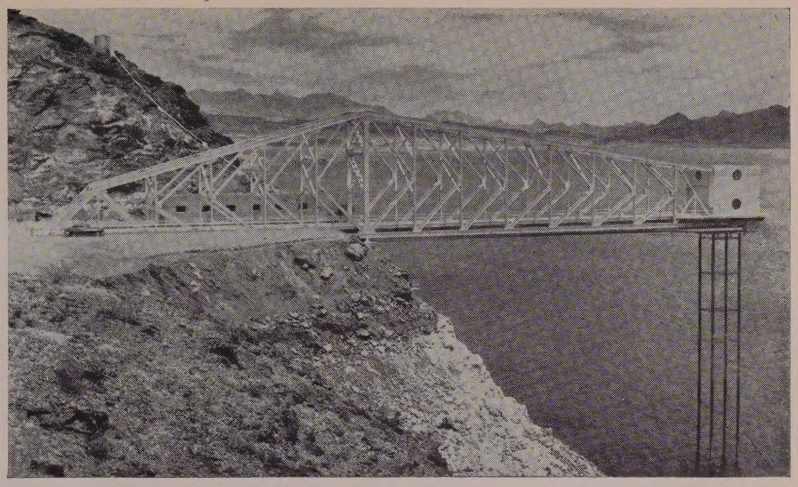
Since the only source of additional water supply is Lake Mead, the Las Vegas Valley Water District was formed to provide expanded service, including additional water supply from Lake Mead. It was soon determined that the cost of bringing water from Lake Mead to Las Vegas was too great for the area's estimated



bonding capacity, after which efforts were made to acquire the water facilities originally built by the Defense Plant Corporation for Basic Magnesium Inc. When these efforts failed, certain capacity rights in the system were finally obtained.

The B.M.I. system consists of intake pumps located at Lake Mead, a booster station and approximately 14 mi. of 40-in. diameter pipeline to a terminal reservoir at Henderson. The design capacity of these facilities is approximately 30 mgd. To increase the capacity of the B.M.I. system and bring the additional supply into Las Vegas, major improvements were recommended and were approved by both the Las Vegas Valley Water District and Basic Management Inc.

Upon completion of these improvements to the existing system, the Las Vegas Valley Water District will have a capacity right in the amount of 13.75 mgd.



CANTILEVER SUSPENDS the intake pumping station over the waters of Lake Mead, with the 182-ft. columns reaching into deep water. Existing pumps are being replaced with larger units for ultimate 50-mgd. capacity.

Features of the improvements

These improvements include five new intake pumps and the construction of a 1.5-mg. reservoir located near Manganese Inc. with a booster pumping station capable of delivering water to Henderson. The facilities for delivering water from the 1.5-mg. reservoir to Las Vegas include a gravity pipeline from a point near Manganese Inc. to a booster pumping station just north of Whitney, a 15-mg. booster pumping station and a force main from the Whitney Pumping Station to Las Vegas. In Las Vegas, the construction of a 30-mg. terminal reservoir and extensive distribution system improvements will insure adequate flows.

The existing pumps at the intake pumping station consist of six seven-stage deep-well turbine pumps with 182-ft. columns suspended into deep water from a steel cantilever structure. Initially, five of these pumps are to be replaced with five larger units. Ultimately, all pumps will be replaced which will provide a capacity of 50 mgd. An existing booster pumping station in the B.M.I. system will not require modification since the construction of a 1.5-mg. reservoir at the Las Vegas diversion point near Manganese Inc., will provide a lower head under which the booster pumps will operate.

The Las Vegas diversion point near Manganese Inc. incorporates in its design a booster pumping station capable of delivering 36.25 mgd. to Henderson. Five units will be installed initially and a sixth unit will be installed when needed. The pumps will be of the submersible type and will take suction from the 1.5-mg. steel reservoir. Provision is also made to supply water to this reservoir by backflow from the District system in Las Vegas for emergency purposes. The Las Vegas pipeline from the 1.5-mg. reservoir to Whitney will be 36-in. and 39-in. diameter mortar lined and coated steel and steel cylinder concrete pipe, terminating at Whitney in a steel standpipe 10 ft. in diameter and 106 ft. high.

At Whitney, the construction of a booster pumping station consisting of four submersible type pumps with provision for two future pumps will deliver water to the 30-mg. Charleston Heights terminal reservoir in Las Vegas. Surge protection is afforded for both the suction and discharge piping.

The Lake Mead transmission main includes approximately 20 mi. of 24 to 39-in. pipe. In Las Vegas, distribution system improvements include about 13 mi. of major transmission pipelines, 8 mi. of water mains 12 in. and smaller, a 500,000-gal. elevated tank and the enlargement of three pumping stations.

The 30-mg. Charleston Heights reservoir is constructed of compacted embankment with a nominal water depth of 20 ft. The side slopes terminate in a concrete wall 8.5 ft. high. The bottom and side slopes of the reservoir are lined with a 3-in. thick asphaltic concrete pavement on a 4-in. gravel base.

William C. Renshaw is chief engineer and general manager of the Las Vegas Valley Water District.

Contractors and suppliers for the Las Vegas project

Construction Contracts

CONTRACT AWARDED TO:	AMOUNT	DESCRIPTION OF WORK
Wells Cargo, Inc.	$ 41,466	North Las Vegas Feeder
Fisher Contracting Co.	599,310	Lake Mead Transmission Main
J. A. Tiberti Const. Co.	68,812	Office Building
Well & Stewart Const. Co. and Industrial Const. Co.	354,737	Charleston Heights Reservoir (30 mg.) exclusive of roof
Lembke, Clough & King	262,300	Charleston Heights Reservoir roof
Fisher Contracting Co.	159,320	Whitney Pumping Station
Hammond Iron Works	53,975	BMI Reservoir No. 2 (1.5 mg.)
Fisher Contracting Co.	259,820	Feeder Mains
George E. Miller Co.	36,085	Distribution Mains
Bovee & Crail Const. Co.	40,834	BMI Booster Pumping Station No. 2
Reynolds Electrical & Engineering Co., Inc.	80,900	Communications Line, 69 kv. Transmission Lines and 5000 kva. Substation
Allen and Failing	117,489	BMI Intake Pumping Station
Hallmark Const. Co.	191,459	Distribution Mains
Bovee & Crail Const. Co.	218,417	Westside Booster Pumping Station
George E. Miller Company	9,751	Temporary Installation of Booster Pumping Units
N. P. Van Valkenburgh Co.	278,090	Distribution Mains

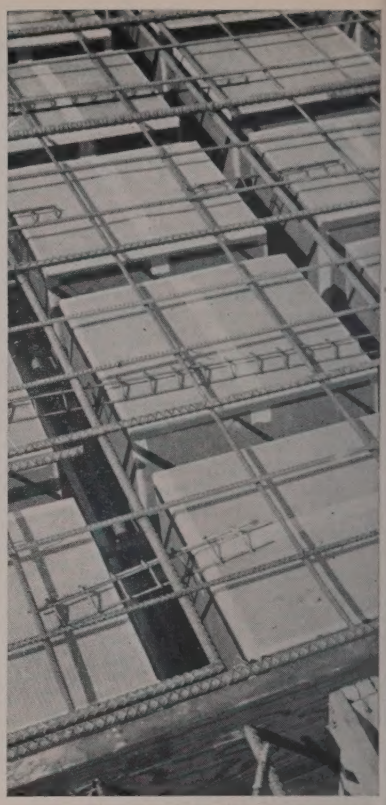
Major Equipment and Materials Contracts

United Concrete Pipe Corp.	$465,450	Pipe for Lake Mead Transmission Main
Southern Pipe and Casing Co.	704,722	Pipe for Lake Mead Transmission Main
Byron Jackson Company	94,400	Pumping Equipment
Republic Supply Co. of Calif.	27,413	Lubricated Plug Valves
The Pelton Water Wheel Co.	20,415	Pump Control Valves
The Pelton Water Wheel Co.	9,478	Surge Suppressors
Allis-Chalmers Mfg. Co.	24,176	Electrical Equipment
Southern Pipe and Casing Co.	121,349	Feeder Mains
American Pipe and Const. Co.	174,323	Feeder Mains
Fairbanks, Morse and Co.	24,412	Pumping Equipment
Industrial Engine Service	32,855	Diesel Engines

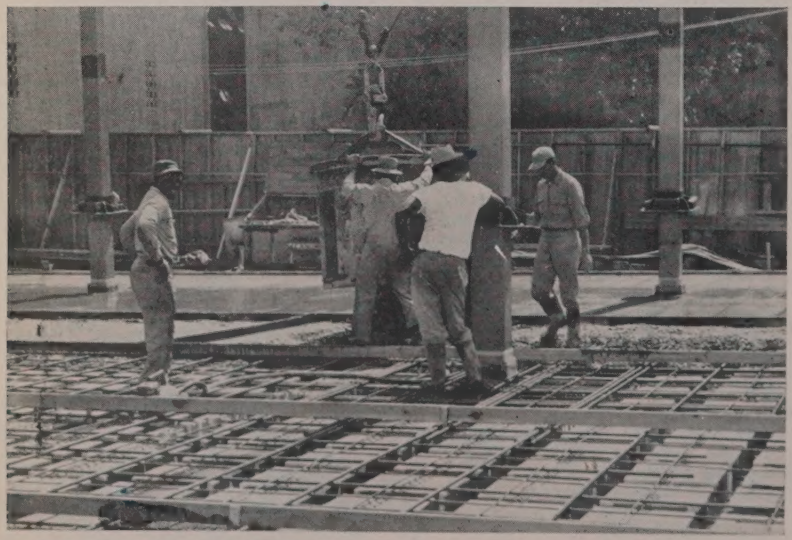
1 WORKMEN INSERT CARDBOARD filler, which gives the boxes the nickname "egg-crates," before stacking the boxes in the background. In the right foreground are the flat boxes before folding, as they are delivered by the manufacturer, Container Corp. of America. The joints of the boxes are sealed with a strong masking tape especially developed for this use by Technical Tape Corp. The surface of the boxes is waxed during manufacture for additional waterproofing. No special skill is required for assembly.

Egg-crates for lift slabs

Made-to-order cardboard boxes sealed with tape are catching on as forms. No special skill is required for rapid placement and removal

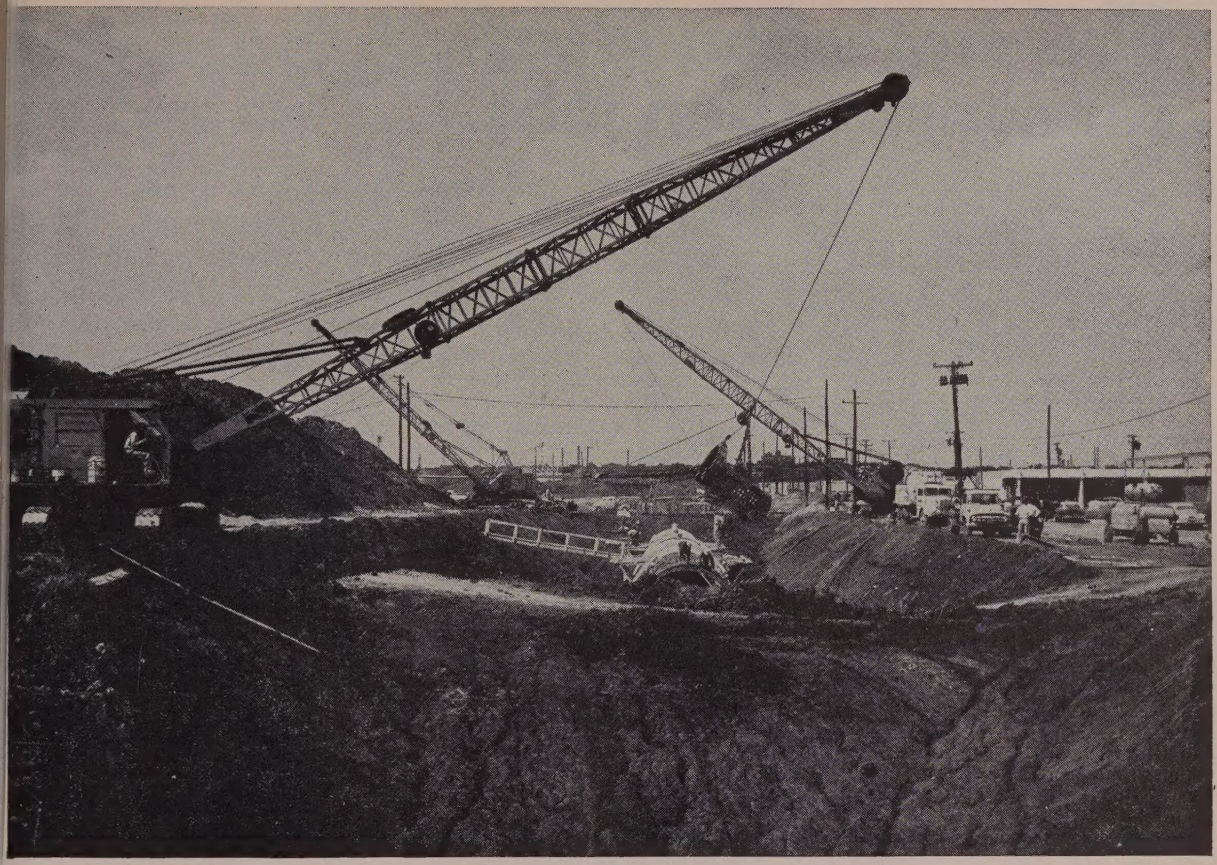


2 BOXES IN PLACE in the casting pad are strong enough to support reinforcing steel, men, and light equipment. Flanges on the boxes of any desired size match up and are sealed with tape to provide desired joist thicknessses. Rain protection should be provided if concrete is not to be poured the same day.



3 CONCRETE IS POURED by a crane and bucket instead of buggies. Boxes are surprisingly sturdy, though, and failures are rare if normal care is taken. After the slab is lifted into place many of the boxes will fall out of their own accord; the rest are easily removed. Two projects are shown on this page, the Union Oil Research lab and the Max Factor building, both in California.

4 THE FINISHED PRODUCT has a waffle-like pattern which is often left exposed. Boxes were omitted near columns to provide extra thickness to take shearing stress.



Kohring 605 Draglines at work on Turtle Creek Pressure Sewer in Dallas area

JOB-ENGINEERED FINANCE PLANS

Giant 22' concrete sewer pipe sections go into place as the Turtle Creek Pressure Sewer Project nears completion. Whittle Contracting Company has this important part of the job of controlling flood waters from the Trinity River.

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Fire protection ideas for construction jobs

D. N. OLIVER, Member
Society of Fire Protection Engineers

FIRE HAZARDS during the course of building construction or alteration generally do not receive adequate attention from contractors. Although reimbursement from insurance may cover some of the loss, the valuable time lost resulting from such fires, the lives that are endangered and the valuable equipment often damaged or destroyed represent losses to a contractor. Furthermore a serious fire during the construction of a building or structure reflects upon the character and the good operational practices of the contractor.

Too many times construction management learns of its responsibility to provide fire protection the hard way. These lessons are costly. Many contractors are aware of the fact that insurance rates are dictated by losses and the fire protection measures which they take to avoid them. Eventually these losses will be paid for by the contractor himself through increases in fire insurance rates on his future jobs.

During recent years fire losses have exceeded $1,000,000,000 per year, and many of these have been sustained in buildings under construction or alteration. To provide a few important illustrations there has been the fire at the General Motors Plant at Livonia, Mich., with its loss of $40,000,000; the fire at the Texas Republic National Bank at Dallas, Texas, with a loss of $500,000; the Anheuser-Busch Co. fire at Newark, N. J., with a loss of $700,000; the Detroit Water Co. fire at a pumping station with a loss of $500,000 and the list could be extended indefinitely.

More hazards during than after

Problems in preventing fires during construction are frequently more numerous and complex than the corresponding problem of fires after the building is completed. Still the necessary facilities for avoiding or stopping these construction fires rarely equal those provided in the finished structure. The problem of controlling fires after they start is particularly serious with the large open areas, undivided by fire walls, which favor the spread of uncontrolled windswept fires through a forest of timber form work while any building is under construction. There are also the usual piles of sawdust, shavings, and rubbish with crews of undisciplined workmen inclined toward the careless tossing of cigarettes. Salamanders for winter heating are too often placed on unprotected wood floors, combined with the dangerous use of non-fireproof shielding curtains. Electric cables of the unshielded type are too frequently strung around construction jobs providing potential fire hazards.

During recent years the careless use of welding equipment has become one of the most serious fire risks during building construction or alteration. Too many times the contractor fails to believe it necessary to provide the protection of fireproof tarpaulins around these welding operations.

After large industrial plants are completed and in operation, it is usual practice to have well-trained fire brigades. Further, it is possible to educate the permanent employees on the hazards of fires in these plants. By comparison, the men on construction projects are assembled for an individual job, are completely unfamiliar with fire hazards or fire fighting and the rush of construction work does not make possible necessary education.

Rules must be enforced

Even though these rules are established and enforced, and even though all types of protection are provided, disastrous fires will continue to occur on construction jobs and facilities must be provided to fight them. For example, fire water lines should be installed early during the construction period and fully equipped hose houses should be available wherever necessary. Risers should follow building erection not more than one floor below and be available for immediate use in case of fire.

Twelve rules to follow

Fire protection can only be adequate if it is preplanned and a definite program established and enforced during construction. To aid in establishing such a program the following fire protection measures are recommended to contractors and construction engineers.

1. Fire extinguishing equipment of proper type and adequate quantity should be installed as soon as construction starts. Water mains and hydrants with properly equipped hose houses are essential. Incidentally the hose fittings should be sure to match those of the local fire department. Access roads to all sections of the project should be provided for the use of outside fire companies, who should be informed about these roads and their locations. Hand extinguishers, in adequate number, should always be located strategically on all parts of the job.

2. Fireproof tarpaulins are a "must" in shielding all welding operations.

3. Temporary heaters should be placed on fireproof bases, or at least the provision made of a metal floor shield, along with fireproof tarpaulins.

4. All electric cables should be of the heavy duty type to resist rough usage on the job without danger of short circuiting. Temporary electric leads should be of the armored or heavy duty cord type.

5. Construction shanties should always be located a safe distance from the new building construction. Safe heating equipment should be used in these shanties.

6. Rubbish should be collected at frequent intervals and "good housekeeping" is a "must" on construction jobs if the fire hazard is to be maintained at a minimum.

7. Employees should be kept constantly aware of the danger from fire hazards. At the foreman level it may be feasible to provide some instruction in the rudiments of fire fighting. Signs and directives in reference to the prevention of fires should be kept posted over the construction area.

8. Watchman service should be provided at night and during all nonworking days from the time construction starts.

9. Place a capable employee in charge of fire protection, and fire prevention. The extent of his duties and responsibilities and his assignments will depend upon the size of the project and the fire hazards involved in the particular type of work.

10. The fire hazards and the requirements for preventing fires should be recognized for each individual job on the project. In the case of a job involving unusual fire hazards, a set of procedures should be outlined for employees to follow and these should be rigidly enforced.

11. The chief of the local fire department should be acquainted with all of the fire protection and fighting facilities provided by the contractor on the job so that the local department can operate efficiently in case of any emergency.

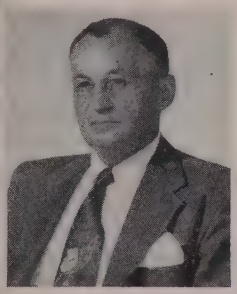
12. All of these arrangements and facilities should be reviewed with the engineers of insurance companies.

An important quotation

In conclusion a quotation is appropriate from the NFPA Quarterly of January 1955: "Reputable contracting firms are interested in future jobs and they know that if their work is not satisfactory, if they have trouble with the fire chief and safety supervisors, the possibility of obtaining additional contracts is greatly reduced."

Welded pipe construction

The change from riveting to welding in penstocks and large pipe has introduced new problems, including two codes for designers, bidders who are not qualified, and contracts that divide shop and field authority with resulting conflicts.



By P. J. BIER
Consulting Engineer
Denver, Colorado

(Formerly in charge of steel pipe and penstock design with the Bureau of Reclamation)

WITH THE INTRODUCTION of welding into pipe and pressure vessel construction the problems in this field have become more complex than during the days when riveting was in general use. Experience we had with riveting just does not fit in with problems of welded construction. While riveting represents a comparatively simple mechanical joining process, easily understood and lending itself readily to visual inspection, welding involves a complicated metallurgical process, the effects of which on a joint or structure are not fully understood as yet.

It is not the object of this brief and informal article to discuss fundamental welding problems but only to point out some of the unsolved questions and the necessity for future research in that field. There is no doubt that much is to be learned by proper collaboration between designer and contractor to produce the safest and most economical pressure vessel or pipe in spite of our limited knowledge in welding and its effect on welded structures.

Two welding codes

There are two welding codes for the guidance of engineers and designers. These are the A.S.M.E. code and the A.P.I.-A.S.M.E. code, both for unfired fusion-welded pressure vessels. Both codes were prepared primarily for enclosed, self-contained pressure vessel construction, but are also used as far as applicable for pressure pipe lines, as there is no specific code available for large steel pipe. As both codes cover an identical field as far as the welding and testing rules are concerned, it is one of the mysteries of engineering, why we need two codes when one would be sufficient to fill the requirements. I was always opposed to this unnecessary duplication and hope that the two code committees will come to realize this waste of effort soon and join hands in an effort to combine the two codes into one.

Such a new code should be made more useful by the inclusion of some specific pressure pipe and penstock problems, and should preferably carry the A.P.I.-A.S.M.E. label to satisfy both the petroleum industry and the mechanical engineers. I hope this suggestion will find wide enough support among engineers and contractors to insure its adoption. With only one all-inclusive code in effect, the present confusion regarding which code to follow will be eliminated, and the problem will be simplified for the engineer, inspector, and the contractor. Considerable time and expense may also be saved by preparing and maintaining one code instead of two as at present.

I had a recent opportunity to review a deficient design of pressure pipe lines. Although the specifications professed to follow the rules of the A.S.M.E. code for unfired pressure vessels, some of the most fundamental code requirements of joint design, design stresses, and joint efficiencies were neglected in the design. In addition a type and quality of steel was used which is not recommended by the code for pressure vessel work. (This type has been used on pressure pipes only when preferred types of steel were not available due to war conditions.) All this combined with inadequate shop inspection and a divided contract under which an inexperienced subcontractor was installing pipe fabricated by two contractors resulted in a construction full of difficulties and disputes which ended in lawsuits. This all could have been avoided by a proper design and specifications based on the code and by consultation with an engineer specialized in such work.

Design and specification problems

Even the best contractor cannot produce a safe and economical pipe if he is forced to follow a faulty design, a design based on a lack of knowledge in welding. The designer may have specified a type of steel not suitable for welding and not recommended by the code for such work, or he may have prescribed a welded joint or welding procedure not approved by any of the welding authorities.

As pointed out by Mr. Bibber, welding engineer, in one of his talks on welding, the first requirement of a successful welded structure is that it must be based on a sound design. The importance of this requirement cannot be over-emphasized. It has been borne out by a number of failures, which upon close examination were traceable to improper design or

specification requirements.

On the other hand a number of well-designed structures have failed because of sub-standard fabrication or welding methods. Most of the deficient designs are no doubt prepared by engineers with only a superficial knowledge of welding and its effect on a structure. It takes men with some specialized knowledge and a background of experience to develop a proper welded design just as it takes men with the necessary experience to design good concrete structures.

Bidders who don't qualify

I have developed a pet peeve against contractors who insist on bidding for steel pipe work although they have neither the required experience, organization, or equipment for such specialized work. If a private concern receives a low bid from such source it is at liberty to reject the bid in favor of a higher one by an experienced contractor. This procedure is not always possible in government work as the rejected bidder is apt to appeal to his congressman or senator and apply political pressure against the agency which attempts to reject his bid. As a consequence some construction work for the government is performed by contractors with insufficient experience in that type of work.

This is not a happy situation and requires extensive inspection service to insure compliance with the specification requirements for quality of material and workmanship. It is one of the reasons why more inspection is necessary on government work than on private construction.

Read the specifications!!

One of the prime requisites for contractors bidding, especially on government work, is to read the specifications sufficiently to be familiar with the requirements. It has happened several times that bidders had to withdraw their bids because they forgot to consider some of the specification requirements which increased their costs. I remember an instance of this type when bids were received for a large pipeline. Of the two bids received one was about two-thirds higher than the other. The low bidder realizing the great difference between the bids assumed he missed something and requested that he be released from his obligation. Such a release on government work can only be granted by the Comptroller General. To our surprise the low bidder was released and as the other bid was considerably in excess of the engineer's estimate the work had to be re-advertised.

There is another point which bidders, on government work especially, should keep in mind. This is the tendency to submit bids including changes from the specification requirements. Such bids do not comply with the specifications and therefore cannot be given consideration. It stands to reason that all bidders are entitled to the same treatment. After a contract has been awarded, however, the contractor is at liberty to suggest changes from the specifications, which may or may not be considered, depending on whether or not they constitute improvements or savings in the contract price.

Pipelines and structures differ

Some contractors seem to think that because they had experience in bridge and other structural steel welding and fabrication they are also qualified to handle pressure vessel and pipe work. There is a great difference between the two types of work. Structural welding is practically limited to fillet welds applied mostly in the flat position, while pressure vessel and pipe welding involves mostly groove or butt welding, in all positions. This calls for a much higher type of welding than the former. Pressure vessel and pipe welding requires welders skilled in this type of welding and qualified in accordance with American Welding Society standards. It would be desirable to apply a similar yardstick to welding contractors to assure satisfactory construction in every respect.

To illustrate the above I want to mention an experience I had on a large penstock job in Wyoming several years ago. A subcontractor was engaged on some field welding and there was a noticeable lack of progress on this work. The equipment used was none too good, neither was the supervision and organization. Consequently the welding was of poor quality as disclosed by X-ray and much of it had to be removed and replaced. I asked the welding superintendent whether the subcontractor had any experience in this type of welding. His reply was that they had experience in structural welding only. When told that there is a great difference between the two types of welding, his reply was that as far as he is concerned welding is welding regardless of the kind of structure it is used on.

Because of this attitude I recommended more and stricter weld inspection, also requested that the company which supplied the welding machine for automatic welding send a representative to the project to examine the machine and instruct the contractor's men in its use. This job was finally completed, about 150 days late, with a penalty of $100 per day, which may be the reason why the contractor ceased to bid on this type of work.

Attitude toward inspectors

Some contractors, especially those who are not too well qualified, seem to have a special dislike for inspectors. They consider them unnecessary busybodies and snoopers interfering with their operations. As already indicated, efficient inspection on pipe work especially when contracted to inexperienced contractors is an essential and necessary part of fabrication and installation work on welded jobs.

This reminds me of a story I was told of a contractor on an irrigation project built many years ago, when inspection apparently was not used as extensively as today. The reinforcement steel was furnished to the contractor in accordance with the design, but he evidently thought that the bars were spaced too close and increased the spacing, saving thereby a considerable amount of steel which the engineer found stacked up near the completed structure during a later visit. Proper inspection would have prevented this arbitrary action on the contractor's part.

Contractors must keep in mind that inspectors represent the purchaser of the material or service and their principal duty is to assist the contractor in compliance with the contract requirements. They have no authority to give orders to the contractor's personnel. Some inspectors may have tried to do that and failed to cooperate with the contractor as they should. It has been necessary in some cases to send engineers out to plants or construction sites to arbitrate between contractor and inspector to prevent interruptions in the work. A harmonious relationship is desirable and is beneficial for the progress of the work.

Divided contract problems

Divided contracts in which one contractor installs pipe fabricated by others have been found to be one of the greatest sources of irritation leading to disputes between contractors, or between contractor and purchaser. As it is not practicable to assemble long pipe lines in the shop and assure a good fit between adjoining sections or shipping lengths, misfits or shortages in length are generally discovered during erection in the field. When fieldwork becomes necessary by the installer to fit the sections together the question comes up who is responsible and pays for this extra work. In some cases this is not so easily determined.

A clear cut specification as to the duties of each contractor is a great help in placing responsibility but is not enough and often reliance must be had on statements of contractors, inspectors, or shippers, which may be misleading. To avoid such difficulties it is desirable to cover both fabrication and installation of pipe lines in one contract whenever possible. This brings out the importance of a good specification which must define clearly the contractor's responsibility in all phases of work. I found out that in divided contracts in particular a specification can never be too clear. In some cases even a word or two or their ommission changed the contractor's responsibility sufficiently to make a difference of many thousands of dollars in the contract.

How to avoid injury to the protective coatings on—

Banded multiple offshore pipelines

THE PROBLEM of how to hold several pipes together securely without injuring the asphaltic concrete covering, or the ½-in. thick joint covering, was very neatly solved for the Monterey Oil Co. This firm recently completed the laying of 8,200 ft. of multiple pipeline from Seal Beach, Calif., to its offshore drilling platform.

Three pipes and telephone cable

The line is composed of an 8-in. pipe and two 3-in. pipes, plus an armored telephone cable, all banded together and laid as a single unit. Sections of the pipe were laid on the beach, banded together and pulled out to sea by a barge to a point where the next section of the line could be welded on. The entire assembly was then buried in a trench in the ocean floor.

Procedure fast and simple

The procedure used is a simple one, easy and fast, and could well be adapted to any installation where more than one pipe is laid at a time. The lines were laid out along the beach, the joints welded, tested, and covered with a raised joint of asphaltic mix. Two smaller lines were then laid on stationary dollies equipped with pneumatic tires. The small strips between and on the pipes were used to separate and cushion the pipes as they were assembled.

BANDING was carried out with standard tools using a 2-in. steel band. Spacing was at about 10-ft. intervals.

READY FOR PULLING, the band is shown with the padding of Panelcraft to protect and cushion the pipe coatings.

Material used

This material, called Panelcraft by its manufacturer, the Envoy Petroleum Co. of Long Beach, Calif., was furnished in pre-cut strips for the operation. Panelcraft is a prefabricated, waterproof sandwich of coated roofing felt and filled asphalt normally used as a waterproof membrane for lining irrigation ditches and reservoirs—coming in panels up to 4 ft. wide, ½ in. thick, and up to 15 ft. long. In the pipe-laying operation, however, the larger panels were cut into smaller strips. These were further cut at the site and were readily trimmed to any desired length.

Banded at 10-ft. spacings

After the two smaller lines were paired on the dollies, the 8-in. line was laid on top. The three lines were then banded together at intervals of about 10 ft. Standard banding tools were used for this, with a 2-in. steel band being used over a strip of Panelcraft to protect the pipe coating. The strips proved to be very flexible and tough, and showed no signs of cutting—even though several of the steel bands were broken in the process of being pulled up.

The large floats attached to the pipeline did not keep it off the ocean floor, but they did provide enough buoyancy to permit the entire 8,200-ft. string to be pulled out to the drilling platform. Storage facilities for the wells on the platform will be on shore.

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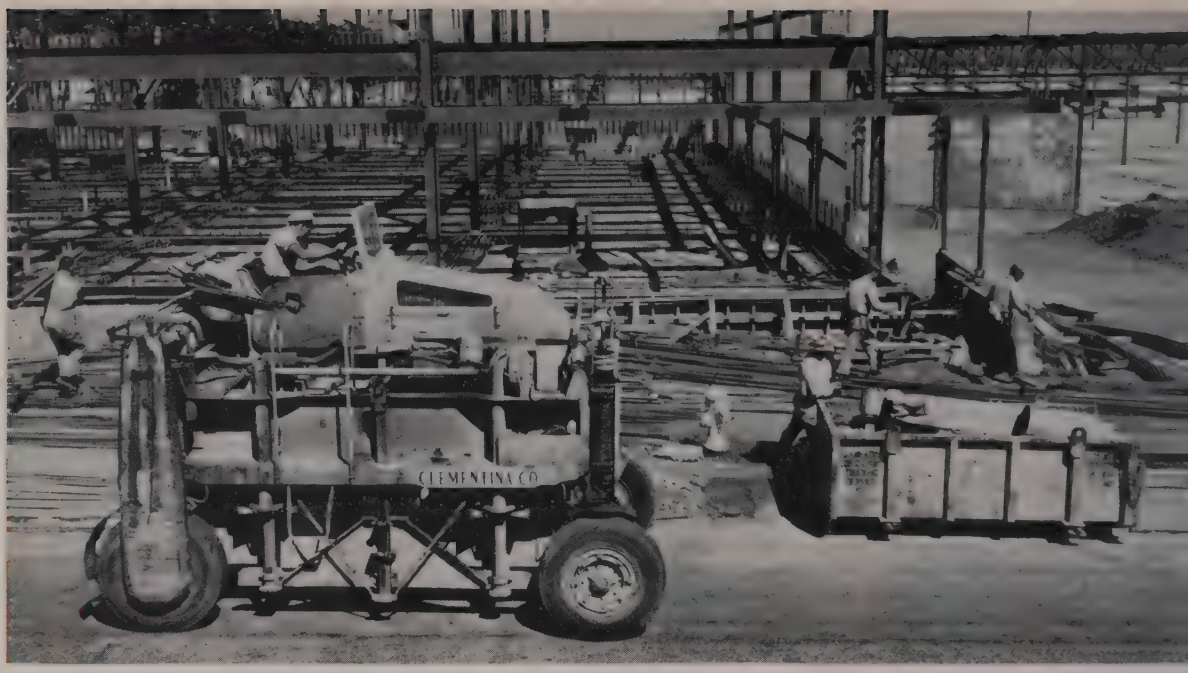
12½-ton	17½-ton Remote control available.	25-ton	30-ton	35-ton



Straddle carrier handling trash containers permits—

Neat housekeeping on building jobs

AN UNUSUAL trash removal service helps building contractors in San Francisco maintain neater, cleaner and therefore safer jobs. This service is available through Clementina, Ltd., and the use of its fleet of straddle carriers which delivers and collects 5-yd. capacity trash containers. As required by the contractor, the empty box is spotted on the job where the foreman directs. Waste materials and trash are dumped in until it is filled. A phone call then brings another empty container, and the straddle carrier picks up the full one and returns it to the Clementina yard.

The process provides a simple and efficient means of keeping building jobs—either new or remodeling—running more smoothly and saves the contractor time and problems of carrying out his own waste disposal plan.

Advantages for contractor

The system has important advantages for the contractor: (1) The building site is cleaner because trash is removed promptly instead of accumulating for several days or weeks; (2) the labor expense of trash handling is almost eliminated; (3) contractors' own trucks are kept at important chores instead of being tied up in trash removal; and (4) double handling of trash is eliminated, instead of being dumped in one spot and later man-handled into a truck, trash is placed immediately in the container.

Contractors who seem especially happy with Clementina's service are those working in crowded downtown areas where restricted space makes the accumulation of waste definitely impractical. In these spots the carriers remove waste at least once a day, sometimes oftener. Clean work sites also make a good impression on "sidewalk superintendents."

Flat rate per hour

Whether a job site is in the heart of the city or far out in a suburban area doesn't affect Clementina's flat charge of $8.50 per hr. with paytime starting when the straddle carrier leaves Clementina's yard, ending when it returns. No charge is made for use of the waste containers. Contractors have no complaint about the cost of the service: some have admitted that, on a per-ton basis, handling trash with their own men and equipment would cost twice as much.

Co-owners Al Cleary and Edwin Larkin explain that the reasonable cost of the service is largely due to operating economies gained from a changeover from dump trucks to the straddle carrier-container method. Clementina has seven Ross carriers, each of 30,000-lb. capacity. They do all hauling between the yard and job sites, and have replaced all but two of a sizeable fleet of dump trucks formerly used. Contractors like the carrier system because it's fast; it seldom requires more than five minutes on the job site for a carrier to exchange containers.

Size of containers

The containers are 10½ ft. long, 5 ft. wide and 3 ft. deep and have tailgates to facilitate dumping. The company has 165 of them ready for any service call—125 in San Francisco, the other 40 in Oakland and East Bay communities. The latter area is served by an affiliated company called "Clemco." Back at the yard the carriers deposit full containers under an A-frame and drive off to the next assignment. With the A-frame lift the container is raised onto one of the two dump trucks for removal to a nearby dump.

Besides hauling scrap, Clementina does a sizeable volume in contractor supplies, and uses the straddle carriers to make quick job-site deliveries of almost every item handled—cement, rock, plaster, lumber, blasting sand, bricks, marble, tile, and concrete. Carriers are also rented out with drivers, at $8.50 per hr. Recently the company contracted to move steel girders to the job site of the San Rafael-Richmond Bridge now under construction. Over 250,000 lb. of heavy girders were moved by putting

(Continued on page 45)

ARRIVING at the yard the full container is set down under the A-frame, and the carrier picks up an empty and heads for the next collection job. Clementina makes 40 to 50 runs a day.

a carrier at each end of the load and driving in tandem.

The switch from dump trucks to carriers not only speeded up service for customers but effected important savings for Clementina. In fact, the straddle-carrier container method has helped double the number of customers while slicing cost by 50%. Costs were cut by these factors:

(1) All but two dump trucks were eliminated, saving replacement and maintenance costs. Fewer carriers do more work, since they spend full time transporting, only a few seconds loading and unloading;

(2) Reduction in staff of drivers, those remaining learned operation of carriers in less than one day;

(3) When replacement is necessary, containers cost about $350, compared to $4,000 for trucks;

(4) Elimination of multiple driver and collision insurance premiums;

(5) Lower depreciation;

(6) Lower maintenance costs on carriers (containers require no maintenance).

The last item, lower maintenance, is especially important to Clementina because the success of its operation depends on the speed and flexibility gained through a readily available fleet. Each carrier gets a monthly check-up—as do the two Ross fork trucks, diesel power units, trucks, and automobiles which make up the fleet—in a company-owned repair shop manned by nine mechanics. Periodic check-ups are important in preventing costly mechanical trouble resulting from the rough schedule the machines follow.

FULL CONTAINER has been hoisted, as carrier backs away. Truck is shown moving under container and will take on box in its truck body. Containers are attached by chains to the bed of the truck so that with end gates of box and truck down the load can be dumped without delay.

Equipment rental rates

Rental rates for construction equipment have been compiled again by the Associated Equipment Distributors and are presented in its new 1955 "Green Book." The 80-page book contains the national average rental rates for about 2,000 items of construction machinery. Information comes from the 700 members of AED who answered a comprehensive survey on rental rates during the past 90 days. The book is available at $5.00 per copy from the **Associated Equipment Distributors,** 30 East Cedar St., Chicago.

Form lowering for Utah garage

In order to keep the ground area clear while building a five story building a new technique was tried—pour the top slab first and lower the forms for each successive floor. Here is the contractor's story of a "first" for the construction West.

By GLENN M. CANADAY
Estimator
Jacobsen Construction Co.

ONE OF THE MOST interesting jobs we've seen recently is a parking garage built by Jacobsen Construction Co. for the ZCMI department store in Salt Lake City. Located in a congested part of the shopping area, ZCMI was faced with the problem of providing parking space where apparently there was none. A solution was found by making use of room over a service area in the rear of ZCMI and adjacent stores and effecting entry to the garage by ramping an alley.

The garage has a capacity of 550 cars. It is of the self-parking type, is operated by two men, and has handled as many as 2,400 cars in a day.

The design and unique construction methods employed were an outgrowth of the particular requirements involved. Among these was a traffic problem. The huge ZCMI department store and several adjacent stores received all merchandise from a service area in the rear. This area, which could not be closed to traffic at any time, was the location for the garage.

Ground floor kept clear

The Jacobsen Construction Co's. proposal incorporated precast columns and concrete slab floors cast from the top of the building down. In competition with other types of construction: steel frame, conventional concrete and lift slab concrete the proposed design offered not only lower price and faster completion, but it permitted business as usual during the construction period.

The 115 x 300-ft. garage is actually split lengthwise into two buildings. One half is 4 ft. higher than the other, permitting ramping between levels. Traffic going either up or down moves one way in a counter-clockwise pattern. The structure is supported on 40 precast columns; the first floor is 20 feet above the ground which allows free service movement below.

Construction activity started with demolition of part of the top two floors of a warehouse and the installation of column footings and piers. Footings were 20 in. thick and averaged 9 ft. square. Piers were of varying heights because some of the footings were in basements of adjoining buildings. One footing is under a water reservoir; fuel oil tanks buried inside a building had to be relocated to make room for another. In all, 11 of the 40 footings lie inside of existing buildings.

While footings and piers were going in another crew was busy in the contractor's yard casting the columns. A section of the yard was leveled and paved. Casting beds and eight sets of side forms were constructed. The columns were cast on edge and then cured by covering them with burlap mats and laying weeper hoses along the top. Columns measured 18 x 48 in. to the bottom of the first floor, 10 x 48 in. the remainder of their 52-ft. length and weighed almost 20 tons. The lower 20 ft. contained 20 reinforcing cables and the upper 32 ft. contained 10 cables—all distributed uniformly over the cross section. Each cable consisted of seven ¼-in. high tensile wires. The sheathed cables were tensioned enough to hold them in place while the concrete was being poured and then stressed with jacks to compress the columns after the concrete had reached its 5,000-lb. strength. A criss-cross mat of No. 7 to No. 10 re-bars was left projecting from the column at each floor level; each of these bars was later welded to the slab steel. Bolts were cast into the columns for temporary support of the slab forms.

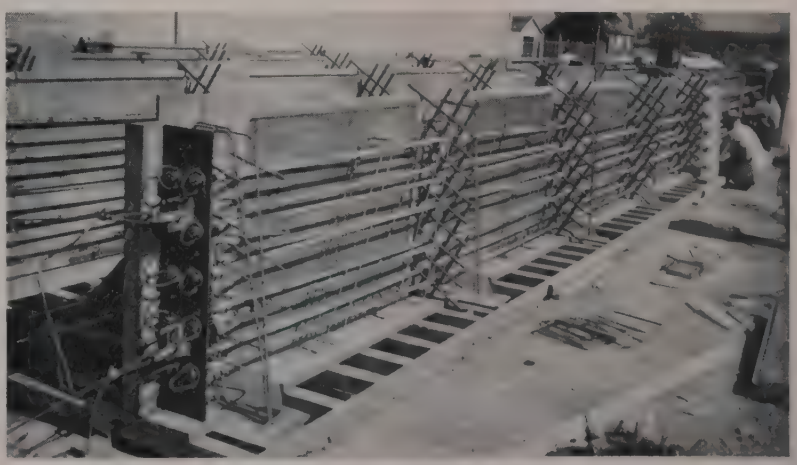
The columns were loaded on trailers, hauled the three miles to the garage site and erected with two 20-ton cranes. The design of the columns allowed them to be loaded and unloaded by a two point pick-up, and lifted for erection from one end. Eleven of the columns had to be threaded through holes in existing buildings to reach the piers below. Timber frames braced with steel cross ties installed below the third floor level stabilized the structure until after the top two floors were poured. After slab forms were lowered to the third floor level these frames were removed.

Lowering the forms

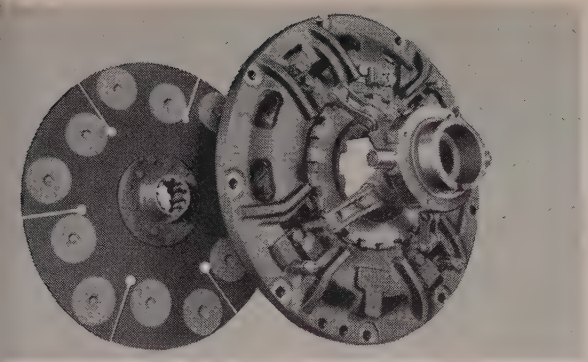
The most unusual feature of this job was the slab forming and the method used in moving these forms. Each floor of the garage was divided into ten forming sections approximately 55 ft. square. A section encompassed four columns. Since columns were spaced 30 ft. on centers, slab sections cantilevered on all sides. Each section was formed and poured independently.

The gargae is divided permanently by a 24-in. sawtooth shaped gap lengthwise through the center. This was covered by a checkered steel plate at the ramps. Twenty-four-inch spaces were left between sections in the opposite direction to allow form sections to by-pass each other and also to serve as shrinkage strips. Sixty days after pouring, reinforcing steel of adjoining sections was welded together, forms slipped underneath and the gap filled with concrete.

(Continued on page 52)



COLUMNS WERE CAST 3 miles from the job site. Though they weighed nearly 20 tons, prestressing allowed them to be loaded by a two point pick-up and lifted for erection by one end. The grid patterns are left protruding to serve as dowels for each floor slab.



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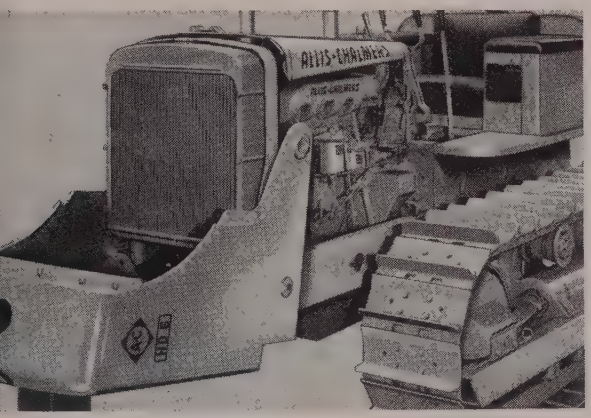

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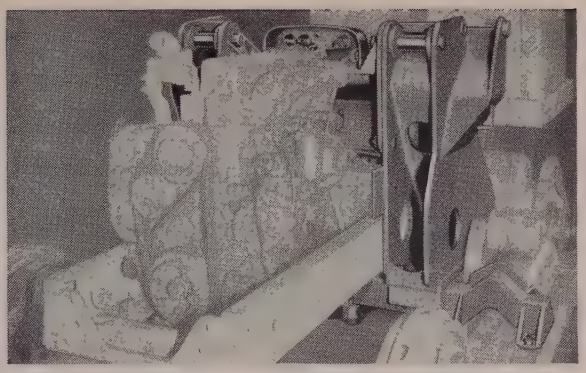

HD-6G TRACTOR SHOVEL FEATURES

Here's the HD-6G shovel frame mounting assembly. The base of the side frame is mounted in the front to the tractor rigid beam, and at the rear to the truck frame. The upper part is bolted to a heavy steel "stabilizer" forming the cowl of the tractor. Together with the HD-6G's new hydraulic system, it provides greater strength, service simplicity and operator visibility. The HD-6G also offers a new two-position bucket, a two-speed reverse, and has extra long track, with six truck wheels on each side.

FEATURES AVAILABLE *ONLY* IN HD-6

. . . no other tractor in this size class has them — all-steel main frame; one-piece steering clutch and final drive housing; double reduction final drives; welded steel truck frames; roller bearing truck wheels, idlers and support rollers; extra-heavy truck wheels and guards available; Tru-Dimension tracks; wrap-around radiator guards; engine-mounted bulldozers; heavy-duty Allis-Chalmers diesel engine with "follow-through" combustion; rubber engine mounting pads; ceramic button master clutch lining; unit construction; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; 24-volt direct electric starting (standard); crankcase guard (standard); bumper and lights (standard).

SIMPLIFIED LUBRICATION

Truck wheels, idlers, support rollers need lubrication only once every 1,000 hours . . . because tapered roller bearings let Positive Seals work effectively to keep out dirt and moisture. No lube points under the tractor . . . no lubrication needed more often than every 75 hours. Go from one to two weeks without needing a grease gun.

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A. H. Cox & Company—Seattle
American Machine Company—Spokane
Mid-State Equipment Company—Wenatchee

WYOMING
Studer Tractor & Equipment Company—Casper

Utah garage

(Continued from page 46)

Form engineering—an all-important phase of this job—was an integral part of the plans. Form sections were constructed of 18-in. WF beams, 15-in. I beams, timber joists and blocking and ¾-in. plywood sheathing. Four of the WF beams supported each forming section; these in turn rested on eight steel brackets bolted to the columns. Each form section made five pours—the number of floors in the building. A greater number of floors would have resulted in even more economical use of forms. Painted lines on the forms simplified the complex steel layout and reduced steel placing costs.

Actual lowering of the forms was accomplished with eight hand-operated winches per section—two at each column. Small knock-out portions of the forms were removed around each column to allow form sections to pass the reinforcing steel projecting from the column at each floor level. The ⅝-in. winch cables were slipped through sleeves left in the slab haunch and secured to the WF beams below. Cables were brought into tension, the brackets removed, and the form sections lowered to previously set brackets at the next lower level. Actual lowering time was 15 to 20 minutes.

Although design strength of the slabs was 4,000 lb., a 2,500-lb. strength (acquired in five days) was considered adequate for moving forms. A schedule was worked out for pouring two slabs a day—ten a week. This daily schedule of 6,000 sq. ft. necessitated dividing the preparation crew into two eight-hour shifts. Work procedure on these two shifts was as follows:

1. Install receiving brackets.
2. Remove support brackets.
3. Remove knock-out forms.
4. Lower forms.
5. Replace knock-out forms.
6. Clean and treat forms.
7. Place reinforcing steel and weld to column steel.
8. Place guard sleeves at outside edges of slab.
9. Place winch sleeves and anchor bolts for bumpers.
10. Replace edge forms where steel projects at inside edges of slab.
11. Install electrical conduit and boxes.
12. Place screeds.

Concrete was mixed at the jobsite and pumped in place with a Rex Pumpcrete S-160. A crew of 16 men working on a 10-hr. shift mixed concrete, handled pipe, placed and finished the 160 cu. yd. of concrete required to pour two sections. Hunt's process applied with a Hudson sprayer cured the slabs.

Guards installed around the perimeter and at the center of the building provide safety for both automobiles and pedestrians. Sleeves were placed in slab edges and full length bars threaded through from the top after all slabs were poured. Welded collars held the guard bars in place.

PRECAST COLUMNS, 40 in all, in place with first part of form framework at the top floor. The timber frames at middle of the columns stiffen the structure until top two floors are poured.

FORM LOWERING is under way. The top three slabs have set up and the forms are being positioned for the fourth pour. Two hand-operated winches at each column handle the lowering.

First time in United States

Tilt-up and lift-slab methods of concrete construction have come into widespread use in recent years, but this is the first time form lowering is known to have been used in the United States. A principal advantage is that it allows irregular design on the bottom of the slab together with forming economy. Forms on this garage were complex with haunches around columns, abrupt changes in slab levels at ramps and a sawtooth pattern at the edges. Other advantages are: repeat use of forms, forms become a jig for reinforcing steel, weather protection—roof goes on first. All of this adds up to a fast and economical method of constructing multi-story concrete buildings.

Construction was scheduled on the basis of one 8-hr. work shift five days a week except for the slab pouring sequence. Once the forms were erected at the fifth floor level, the pouring and stripping of the five floors required only one and one-half months. The complete building construction required six months.

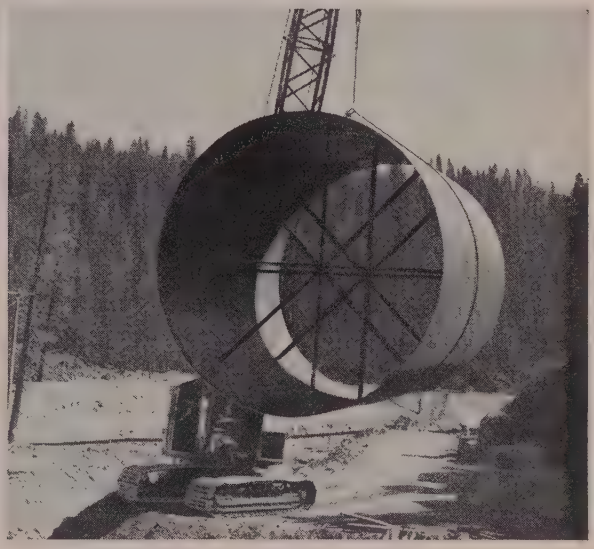
Working conditions were far from ideal. The parking garage is located in the most congested section of the city; the work area had to be kept open to truck traffic at all times, and demolition and repair work on adjacent buildings complicated and slowed construction.

In charge of design was Larry Farrant, designer and vice-president of Farspan Corp. of Salt Lake City (Farspan Corp. has patents pending on the form lowering system). Bowen, Rule and Bowen of Los Angeles, Calif. were consulting engineers. Jacobsen Construction Co. of Salt Lake City held the $564,000 general contract.

The Engineer's Field Report

CASE HISTORY
LUBRICANT RPM Multi-Service Gear Lub.
FIRM Rothschild, Raffin & Weirick San Francisco, Calif.

"No trace of wear" in gear boxes or rear ends after 4½ years of heavy construction work!



WORKING AT CHERRY VALLEY DAM in California's High Sierra, RR&W operates a wide variety of heavy equipment in handling all concrete requirements. For complete protection on this job and to prevent costly maintenance, the firm uses RPM Multi-Service Gear Lubricant in all rear ends and gear boxes. Heard Bonner, Master Mechanic, reports "my Chevrolet pickup has 96,000 miles on it and it's never been worked on. We haven't lost a rear end or a gear in in almost five years of tough work. Every rear end we've ever inspected has been completely clean without a trace of wear."

The 163 h.p. Scoopmobile (above left) loads aggregates at batch plant. The Northwest crane (right) with a Murphy diesel engine, lifts and positions 8-ton, 15'4" OD tunnel liner sections. Other RR&W equipment using RPM Multi-Service Gear Lubricant includes four ready-mix trucks, three dump trucks, a 3/4-yard Un[illegible] crane, and three bulldozers.

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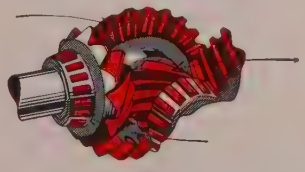
Why RPM Multi-Service Gear Lubricant prevents wear in severe conditions

Contains a special compound that reacts chemically with metal to form a protective lubricating coating...resists rubbing action of hypoid gear teeth.



Withstands extreme temperatures and pressures...highly oxidation resistant. Keeps gears and bearings cool.

Inhibitors resist rusting, stop foaming in cases. Lubricates integral bearings and other parts. Will not separate.

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Officers of WASHO for 1956 (l. to r.): H. D. MILLS, state highway engineer of Nevada; EARLE V. MILLER, state highway engineer of Idaho, and WILLIAM E. WILLEY, state highway engineer of Arizona, are members of the Executive Committee. J. R. BROMLEY, superintendent and chief engineer of Wyoming, is president; D. C. GREER, state highway engineer of Texas, is vice president, and H. B. GLAIYSER, secretary of the Oregon Highway Commission, is secretary-treasurer of WASHO. The 1956 Conference will be held in Phoenix.

WASHO holds record conference

Meeting for the 34th year, Western Association of State Highway Officials recommends a plan for a 15-year Federal highway program at gathering in Wyoming.

SETTING A NEW HIGH in attendance and interest in its technical sessions, the 34th Annual Conference of the Western Association of State Highway Officials concluded its September meeting with an important resolution calling for a 15-year expanded federal highway construction program. The conference was held at Jackson Lake Lodge, September 16-18, and the Wyoming State Highway Department, under the direction of J. R. Bromley, was the host organization. A full report on the findings of the WASHO test road studies was scheduled for the program, but the results were not available for release at that time.

Officers for the coming year are: President, J. R. Bromley, Superintendent and Chief Engineer, Wyoming State Highway Department; Vice President, D. C. Greer, State Highway Engineer, Texas; Secretary-Treasurer, H. B. Glaisyer, Secretary, Oregon State Highway Commission. Members of the Executive Committee are H. D. Mills, State Highway Engineer, Nevada; Earle V. Miller, State Highway Engineer, Idaho, and William E. Willey, State Highway Engineer, Arizona. The 1956 conference has been tentatively scheduled for Phoenix, Ariz., during the month of April with the Arizona State Highway Department acting as host.

The "Dr. L. I. Hewes Award" for 1955 went to J. Al Head, Assistant Traffic Engineer, Oregon State Highway Department, for his "outstanding work in traffic engineering, especially the analysis of urban highway problems and long range planning in this field." This year, for the first time, all of the official nominees recommended by state highway de-

(Continued on page 56)

L. I. HEWES AWARD

Official nominees sponsored by state highway departments of the West for consideration of the Executive Committee of WASHO in selecting the 1955 winner of the Dr. L. I. Hewes Award were:

Paul J. Chadwick, project supervisor, Arizona State Highway Department.

Guy G. Harvey, supervising engineer, Washington Department of Highways.

J. Al Head, assistant traffic engineer, Oregon State Highway Department.

John A. Kennedy, traffic and safety director, New Mexico State Highway Department.

Robert C. O'Connell, traffic engineer, Wyoming State Highway Department.

Resolution on a Federal highway program

Outstanding resolution passed at the 1955 WASHO Conference was one providing for a 15-year Federal program. The resolution follows:

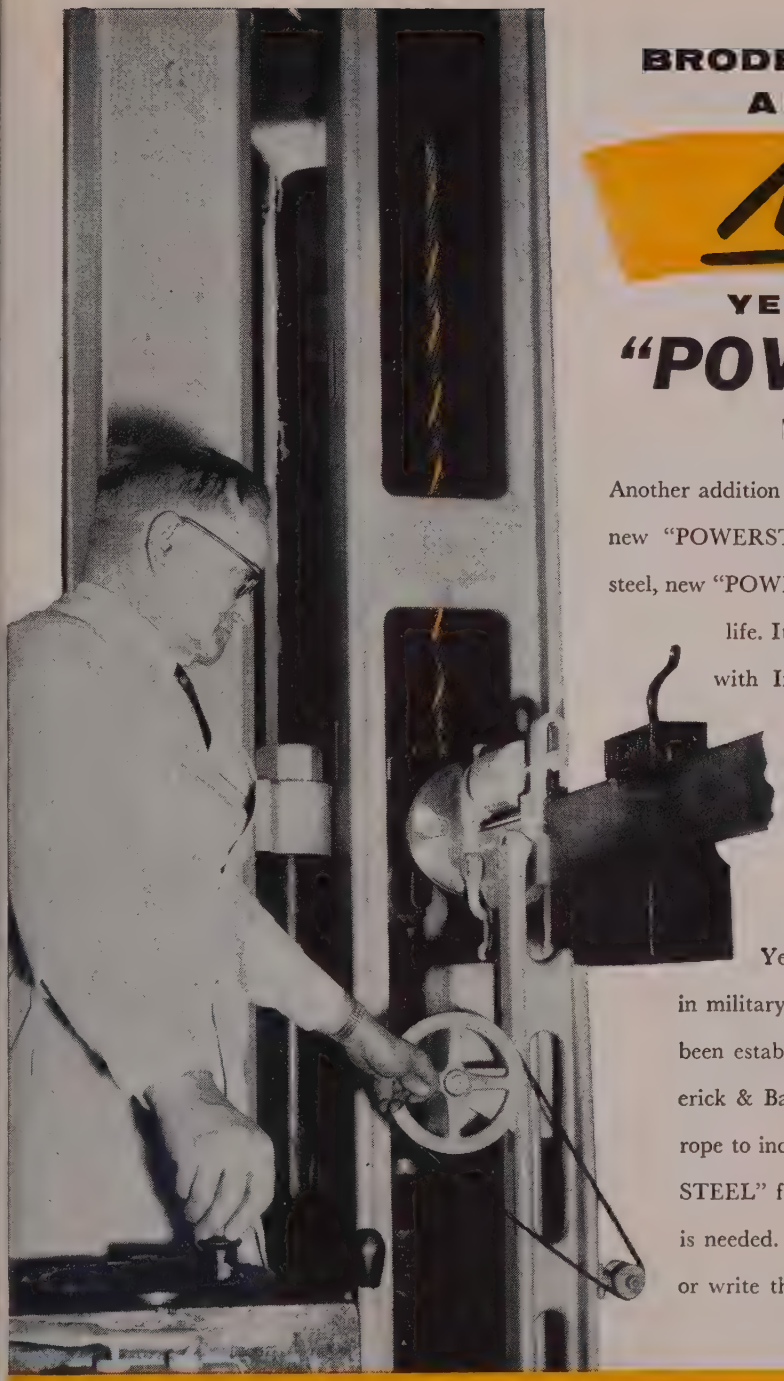
That the Federal government provide at least 90% of the cost of the Interstate System, now estimated to cost about $25 billion, the funds to be apportioned to the several states on the basis of need.

That the Federal government provide not less than $900 million per year for the other federal-aid highway systems, which funds are to be apportioned to the several states in the same relative amounts and on the same matching requirements as provided in the 1954 road act.

Presently the total of the Federal excise taxes on road users is approximately $2,600 million per year and the Association recommends that each year not less than one-half of this tax be authorized for roads.

That the Federal excise tax be increased by adding 1c per gallon to the Federal motor fuel taxes, all of which shall be authorized for road construction.

That the balance of the funds necessary to provide the annual amounts required for the Federal share of building the Federal-aid Highway System be secured by deficit financing supported by the proposed increase in Federal motor fuel taxes.



BRODERICK & BASCOM ANNOUNCES

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Another addition to the famous Yellow Strand family — the new "POWERSTEEL!" Made of higher carbon content steel, new "POWERSTEEL" is 15% stronger, assures longer life. It withstands shock, resists wear. Preformed, with Independent Wire Rope Core, "POWERSTEEL" is a heavy-duty, crush-resistant rope, designed for long service.

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1330 W. Fulton St., Chicago 7, Ill.
2441 Hunter St., Los Angeles 21, Calif.
9350 Market St. Road, Houston 15, Texas

Alaska bridge

(Continued from page 27)

been made for accuracy in these slabs which was an important aid in field erection. However, since the placing of the slab required the meshing of the hooked steel, accurate alignment, proper placing of the slab to receive the railing post as well as joint widths, a considerable amount of shifting and juggling was necessary for final location.

A temporary fill in the river permitted the contractor to use a crane for handling most of these slab units without bringing this load onto the structure. Where this was not possible, a ½-yd. truck-mounted crane was permitted on the ungrouted bridge deck although timbers were required to be placed and blocked so that the load would be carried directly to the two inside girders.

The following step in construction was the casting of the 12-in. strip of concrete over each girder anchoring the slabs together and embedding all of the projecting steel. Before pouring this concrete the joints between slabs and girders were troweled with mortar. This permitted the concrete to fill in and provide bearing wherever there were inequalities between the slab and the top surface of the girder.

The amount of rehandling required in moving the deck slab units from the casting yard to the job site caused some damage although nothing which weakened the slabs structurally. The projecting hooked steel made such convenient handles for lifting that they were used frequently and as a result in some cases resulted in spalling of the concrete.

Personnel

The preliminary design was made in Division 8 of the Bureau of Public Roads at Portland, under the direction of R. B. McMinn, division bridge engineer, who also supervised revisions in the plans to adapt the design to lightweight concrete. Detailed plans were made in Division 7 (Raymond Archibald, division engineer) under the direction of H. R. Angwin, chief of the Bridge Design Section for Divisions 7, 8, and 9. F. E. Andrews is division engineer for the Bureau of Public Roads, Portland, and C. F. Wyller is district engineer for the Bureau of Public Roads, with headquarters at Juneau, Alaska.

Precasting and prestressing operations as well as bridge superstructure erection were supervised by D. M. Goodall for the Bureau, and R. M. Prechaw was resident engineer on the project. Technical data and photos for this article including the front cover were supplied by Goodall.

Charles M. Rhoda is president of C. M. R. Constructors, Inc. David Stewart was general superintendent on the project.

WASHO Conference is a record

(Continued from page 54)

partments for consideration in the final selection by the Executive Committee of WASHO received suitable certificates indicating their outstanding work and accomplishments. The Award is presented annually by WASHO, having been initiated and sponsored by **Western Construction**, the publication providing the financial award of $500.

General

Delegates from all of the state highway organizations comprising the WASHO membership (11 Western states and Texas) as well as representatives from all of the federal agencies concerned with highway activities answered the roll call of President Bromley at the opening session. An important feature of the first assembly was the appearance of E. Keith Thomson, United States Congressman from Wyoming, who reviewed in some detail the various bills for an expanded federal highway program that were offered and considered during the last session of Congress.

Another important presentation at the opening session was a paper by R. H. Baldock, state highway engineer of Oregon and a past president of both WASHO and AASHO. He also discussed plans for an expanded federal highway program considering the particular needs of the Western states. The conclusion of his paper offered specific recommendations for a compromise program and the official resolution passed at the final session of the conference contained many of the ideas presented by Baldock.

The American Association of State Highway Officials was represented at the conference by John E. Wiley, assistant executive secretary, who presented a report on current affairs in Washington affecting highway organizations in this region. Formerly associated with the Wyoming State Highway Department, Wiley was able to present the picture of national highway affairs with a Western touch.

An important feature of the program was the plan to have a final report on the WASHO test road presented by Fred Burggraf of the Highway Research Board in Washington, D. C. Progress reports had been made at previous WASHO conferences and the final report was to reveal the actual facts from the extensive tests on the bituminous test road. Delegates were particularly disappointed when Mr. Burggraf stated that the report had been prepared and was in the hands of the printer, but its findings could not be released until they had been presented officially to the sponsoring agencies for the test road. He did review the important features of the tests and particularly some of the unusual equipment which was developed for measuring results.

Following the precedent established over several years, the major part of the WASHO conference program consisted of small group meetings covering such divisions of the broad highway engineering field as administration, construction, contractor-engineer relations, location and design, maintenance, materials, radio, and right-of-way. This procedure makes it possible for delegates and others to attend sessions where the discussion is confined to subjects of direct interest. Usually three or four short papers have been prepared for presentation.

Contractor-engineer relations

A paper of special interest to contractors, dealing with contractor-engineer relations was presented by Wendell McNeal, district manager, Peter Kiewit Sons' Co., Idaho Falls and is summarized as follows:

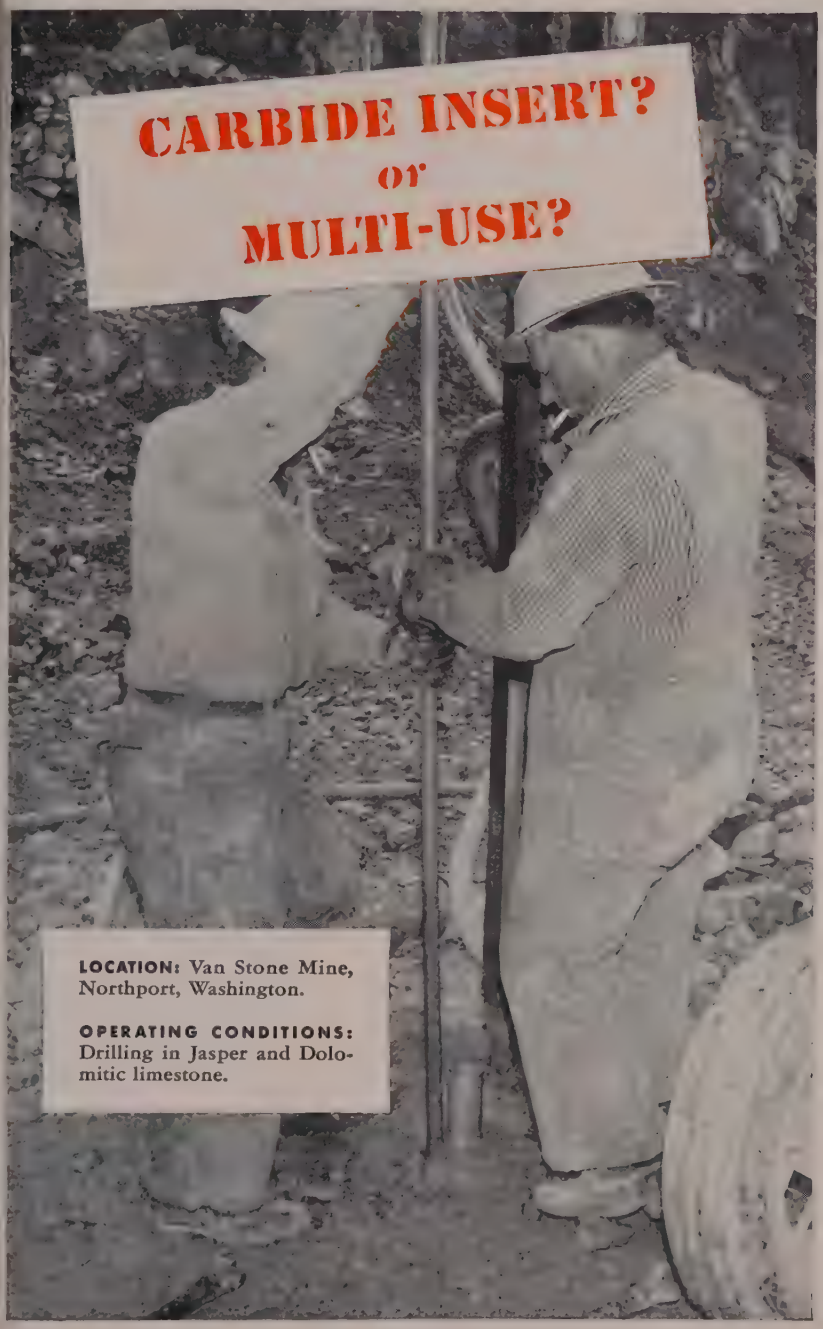
It is far more important to explore the causes of good contractor-public engineer relations in this day of super-highways, freeways, and difficult drainage and grade separation structures than ever before. It becomes more and more important for the contractor and engineer to work together as a team to build the project within the contract.

The successful contractor-engineer relationship resolves itself to one essential point—trust. Trust in one another. The contractor should trust the engineer in respect to his layout, inspection, and payment of work. He must feel the engineer is qualified and knows his business.

In turn, the engineer should have trust in the contractor, his ability to staff the work with competent supervision, skilled workers and ample equipment. He must realize that the contractor risks his assets in the intangible costs and unforeseen hazards that accompany each project and therefore is anxious to complete the project under the specifications in the shortest possible time. Poor work planning and improper equipment is the number one failure on the part of the contractor, causing jobs to "run from crisis to crisis."

We sometimes find an engineer who tries to run the entire job by designing the method and equipment and sometimes even by naming the men to be used for the various operations. But genuine interest on the part of public engineers in the contractor's production and the establishment of realistic progress, equipment, and manpower schedules by contractors would make possible the construction of better highways at least possible cost.

Why Isbell uses TIMKEN® carbide insert bits in drilling Jasper and Dolomitic limestone



IN drilling operations at the Van Stone Mine, Northport, Washington, Isbell Construction Company found it more effective to use Timken® carbide insert bits to drill hard Jasper and Dolomitic limestone.

In such extremely hard, abrasive ground, where a steel bit will not drill out a full increment of drill steel, Timken carbide insert bits speed the operation. Because of their large cross-section of carbide, they allow the most reconditionings per bit, and maintain their original gauge longer. They're most economical for constant-gauge holes, small-diameter holes, and extremely deep holes.

But Timken carbide insert bits may not be the best solution to *all* your drilling problems.

In ordinary ground, for instance, Timken multi-use bits are most economical. With correct and controlled reconditioning, they give the lowest cost per foot of hole when full increments of steel can be drilled.

Both types of Timken rock bits are made from Timken fine alloy steel, made in electric furnaces. No other rock bit manufacturer takes the extra quality control step of making his own steel.

Many different Timken carbide insert and multi-use bits are interchangeable in the same thread series, so drillers can change bit types quickly and easily as the ground changes—right on the job. And, because of the special shoulder union developed by the Timken Company, the threads on both multi-use and carbide insert bits are protected against damage due to drilling impact.

Our rock bit engineering specialists can help you select the right bit for your particular needs. They possess more than twenty years of on-the-job drilling experience. Take advantage of this extra service. Call or write the Timken Rock Bit Engineering Service, The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

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Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

REPORTS from the COURTS

By HOWARD S. BURNSIDE, Attorney and Registered Engineer

Engineer's authority to change is limited

The City of Los Angeles entered into a contract with the plaintiff for improvement work at the International Airport. Runways were to be extended to and across an existing road into a new area. The road was to be removed. The City planned to close this road during the course of the work to allow the plaintiffs to remove it and connect with runway extensions constructed on the other side.

During the course of work the City ordered a deletion of the work of removing the road and constructing runways across that area. This was done because the State Division of Highways refused consent to connect a new road to existent highways. Traffic was to be diverted to the new road to make the job site available. However several months later the new road became available and the City let a contract to another contractor for performance of the work deleted from plaintiff's contract.

The plaintiff was unhappy with this course of events and sued the City for damages for breach of contract. The City contended that it acted under the terms of the contract which provided:

(1) "The engineer . . . shall have the right to make such changes . . . as may be considered necessary or desirable to complete fully and acceptably the proposed construction in a satisfactory manner provided such alterations do not change the total cost of the project . . . by more than twenty-five (25) percent . . ."

(2) "The engineer may . . . order omitted from the work any item other than major items found unnecessary to the project . . ."

The work omitted was about twenty (20) percent of the job. The deletion order eliminated a section that left a gap between the work done by plaintiff and the existing runways. This gap was "closed" under the subsequent contract with another contractor.

Upon a trial the plaintiff was awarded $38,421 in damages on this breach and the City appealed from the judgment. The Appellate Court held the contention of the City to be fallacious and in a carefully written opinion tells why.

"The (City's) right to order changes in the plans . . . could be exercised only for the purpose of completing the project as a whole in a more satisfactory manner, or to eliminate therefrom non-major items found unnecessary to the project. This is manifest from both the literal language of the agreement and the object contemplated by the parties . . . The right to make changes in the quantities of work reserved to the engineer . . . is not only limited to a percentage of the total cost . . . (but is limited as well) to such changes as may be considered necessary or desirable to complete . . . the proposed construction in a satisfactory manner."

"There is no question but that . . . this agreement looks to a complete work of public improvement . . . By the terms of the agreement, plaintiff bound himself to deliver the completed work required by him. The corollary duty assumed by the City was to permit plaintiff to consummate the work he had undertaken, subject to its right to make changes, within designated limitations, in order to complete the project more satisfactorily. The deletions ordered by the engineer did not have for their purpose the satisfactory completion of that which both parties set out to accomplish; the fact is that the project was abruptly terminated in an unfinished state, thus leaving the so-called improvement unusable in connection with the existing runways.

"The power vested in the engineer to effect changes in the quantities of the work is not so extensive as to enable him to abrogate or change the contract which the parties executed . . . nor does it authorize (the City) to employ such right to defeat the object of the contract . . . (Such changes) must clearly be directed either to the achievement of a more satisfactory improvement or the elimination of work not integrally necessary to the project . . . (The) discretion committed to the engineer . . . cannot be used in an arbitrary manner, divorced from the object and intention of the contract."

The defendant City also argued that it was impossible to permit the plaintiff to do the work because of the failure of a third party (the State). The court held that the City did not sustain the burden of establishing impossibility, pointing out there is an implied covenant in every construction contract that the owner will furnish the site of operations to the contractor. "One who binds himself to a contract which cannot be performed without the consent or cooperation of a third person is not relieved of liability because of his inability to secure the required consent or cooperation."[2]

1. Hensler v. City of Los Angeles, 124, Cal. App. 2d 71.
2. 6 Williston on Contracts, Page 5413.

Duty to avoid damage

It is the duty of the county in the construction and maintenance of its public ways across the easement to avoid interference with the exercise of the easement rights and to avoid damage to the existing structures through which those rights are exercised and if it fails to do this it is liable for the damage so caused. It has, however, no obligation to maintain the pipeline itself. Its duty is to so construct and maintain its public ways that the pipeline will not be injured through the use of its ways. It must respond in damages if it fails in that duty.

Bd. of Dir. Turlock Irr. Dist. v. Fair, 128 Cal. App. 2d 833.

Notes

The general purpose of the law is to award just compensation to the victim of a wrong; however, full compensation is not always made in view of limitation of wrongdoer's liability to only proximate results of his acts and due to expense of initiating suit.

Kinzua Labor Co. v. Daggett, 281 P. 2d 221.

"A contract made by telephone is entered into at the place where the recipient of the call is at the time he accepts the offer."[1]

1. Ward Mfg Co. v. Miley 281 P. 2d 343.

In a suit by the State for damages caused when a bridge with a 30,000-lb. gross load limit collapsed under a truck carrying a crawler tractor and having a gross weight of 51,560 lb., it is no defense to show that others customarily had exceeded the load limit without such disaster. "Generally custom cannot supersede or abrogate a statute, or justify or excuse its violation, and particularly where the custom conflicts with a penal statute."[1] It is a misdemeanor in many states to violate weight limitations properly posted on public highways.

1. State v. Richardson (Idaho), 277 P. 2d 278.

ditch in 3 hours—Excavating ter main in Henderson, Texas, itional "300" wheel tractor dug yds of clay hourly. Backfilling ndled by rig's front-end loader. is 4 ft deep, 22 in. wide.

"We saved 100 man-hours by lifting zonolite roofing slabs with our International-Drott TD-6," reports M. G. Aldrich, Macon, Georgia, on the 13,000 sq ft building job shown. Lifts of 1 ton were made to 10 ft eave height.

Rugged in rugged rock—"TD-6 is ideal for opening underground mines," says Malcolm McDonald of Kiabob Uranium Corp, Green River, Utah, "It gets around fast in narrow tunnels, yet brings out big loads."

WESTERN CONSTRUCTION NEWS

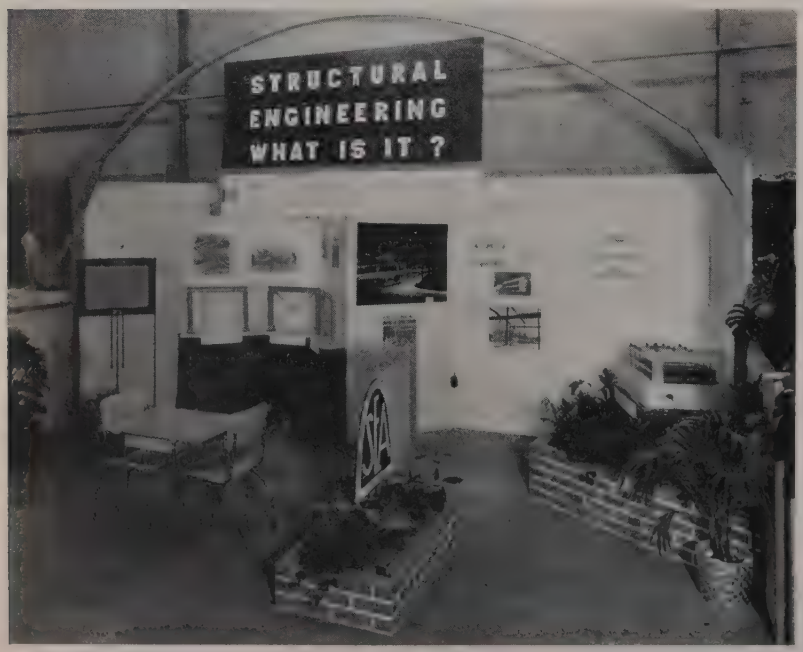
ARIZONA

REVISED PLANS for construction of a $2,500,000 apartment building in Phoenix have been disclosed. The site of the 13-story structure, containing 64 apartments, is at Central and Monte Vista. Under the revised plans half of the apartments must be sold before construction can be started. The planning group and owners consist of Ralph W. Applegate, J. Arthur Friedlund, and Arnold Johnson. Del E. Webb Construction Co. will erect the apartments.

ON AUGUST 16 a total of 32 projects costing $11,600,000 were under construction in Arizona. This was $4,000,000 more than the total cost of projects under construction on the same date a year ago. If this trend continues, at the year's end $18,000,000 will have been invested in construction, exclusive of maintenance.

RECENT MAJOR CONTRACT AWARDS and low bids in Arizona include a $300,733 award to **San Xavier Rock & Sand Co.**, of Tucson for the reshaping and surfacing of about 12-mi. of highway east of Globe on Route 70. **Phoenix-Tempe Stone Co.**, was awarded a contract of $426,312 by the State Highway Department for 1.4-mi. of grading and the construction of two concrete overpasses and two steel bridges on U. S. Route 89 north of Prescott. **Arizona Sand & Rock Co.**, of Phoenix was awarded a contract of $235,854 for grading and surfacing of 2.75-mi. near the town of Fry.

Tanner Bros. Construction Co. of Phoenix submitted a low bid of $278,756 for grading and surfacing 8 mi. of the Ashfork-Prescott highway south of Ashfork. **Heiskell Construction Co.** of Phoenix submitted a low bid of $127,574 for grading and surfacing 5.3 mi. of the Cordes Junction-Bridgeport highway, northeast of Cordes Junction.



STRUCTURAL ENGINEERS HAVE EXHIBIT AT STATE FAIR

"Structural Engineering—What Is It?" was this year's theme used by the Structural Engineers Association of California in their display at the California State Fair in Sacramento. Exhibits featuring outstanding structural works and the elementary principles of structural engineering were shown. An important attraction was an electrically operated model which realistically demonstrated the techniques of lift slab construction by lifting and lowering the roof and second floor slabs. Model steel frames were also displayed to show the various methods of structural bracing.

CALIFORNIA

THE CIVIL ENGINEERING department at Stanford University is now offering a one year graduate program directed at construction. Its aim is to give students a fundamental background in subjects important to the industry, including management techniques, law, labor problems, and human relations as well as engineering. The course, which has been established with the advice and counsel of leaders in the construction industry, is among the first leading to a Masters Degree in civil engineering. It is an extension of the undergraduate construction program that was established as an option in civil engineering in 1946.

PLANS for the construction of a $100,000 building in Los Angeles to house the offices of the Southern California Chapter of Associated General Contractors have been announced. Charles O. Matcham, AIA, has been selected as architect for the job. Since the AGC works constantly with scores of architects the selection was made by lot. Plans are to be completed in preparation for ground breaking and start of construction about December 1st.

THE EAST BAY Municipal Utility District has placed in service the world's largest tank-type water storage reservoir. The tank holds nearly 11,500,000 gal. of water and is located in Richmond. The dome-topped reservoir is 630 ft. in circumference and 43 ft. high. More than 2 years were required to complete the reservoir, constructed of prestressed and reinforced concrete. In 1953 John H. McCosker Co. began excavation of the hillside and grading of the reservoir site. Work on the steel reinforced concrete foundation and base began in 1953 by contractors Erickson, Phillips, and Weisberg. Total cost of the project was $175,000. The tank was the first made of prestressed concrete by the Freyssinet method.

WORKMEN for the Murphy-Kiewit superstructure contract of the Richmond-San Rafael Bridge have connected the lower chords of the east cantilever span. This closes the gap of the first of two cantilever spans over the main navigation channels. Only the 2,140-ft. cantilever structure over the west navigation channel remains for completion

Workmen have erected the two main steel towers and are now progressing out on each side of one of the towers with the placement of steel truss members. The two cantilevers are of identical design each having a span of 1,070 ft. with 535-ft. anchor arms. For shipping over this channel the vertical clearance is 135 ft. while a clearance of 185 ft. will be provided over the main channel.

THE BECHTEL CORPORATION has sent a crew of engineers to Oroville to start a survey of the engineering factors in the Feather River Project. The San Francisco firm was awarded a contract for the study as part of legislation passed during the last session in which $250,000 was appropriated. The contract calls for a report to the Legislature by December 31 of this year. The project is planned to hold about 3,500,000 acre-feet of water.

RECENT MAJOR CONTRACT AWARDS and low bids in California include a $4,275,510 contract awarded to **Peter Kiewit Sons' Co.**, of San Francisco for grading and surfacing in Alameda County for a length of 5.4 mi. and the construction of 10 bridges. A $2,638,616 contract was awarded to **Stolte Inc.-Gallagher & Burk, Inc.**, of Oakland, for grading and paving of 2.8 mi. in Contra Costa County. **Carl N. Swenson Co.**, of San Jose was awarded a contract of $856,850 for 1.2 mi. of grading, surfacing, and a concrete bridge in Marin County. **R. M. Price Co.**, of Altadena was awarded a contract of $784,876 for an interchange structure and approaches and one girder bridge in San Bernardino County. **H. Earl Parker, Inc.**, of Marysville was awarded a contract of $244,119 for the construction of 2.7 mi., including grading and surfacing, on the highway south of Angels Camp.

F. W. Case Corp., of Newhall was awarded a contract of $235,162 for grading and surfacing 0.6 mi. on the Topanga Canyon Road north of the Pacific Coast Highway in Los Angeles County. **Fredrickson & Watson Construction Co.**, of Oakland was awarded a $185,555 contract for grading and surfacing 3.5 mi. of highway at Goleta in Santa Barbara County.

COLORADO

TOTAL NEW CONSTRUCTION in Denver and its suburban areas at the beginning of September stood $19,000,000 ahead of construction totals a year ago despite the decline in the summer building pace for the third straight month. Construction totaled $137,700,000 compared to $118,000,000 a year ago.

RECENT MAJOR CONTRACT AWARDS and low bids in Colorad include a $448,435 job to **G. L. Tar ton Contracting Co.**, of St. Loui Mo., for earthwork and structures o the Coal Ridge section of the Col rado-Big Thompson project. **Eme son S. Ellett, Inc.**, of Denver wa awarded a contract of $198,622 fo the rehabilitation and enlargement the Firestone Section on the Col rado-Big Thompson project.

IDAHO

THE IDAHO POWER CO. ha changed plans for three dams it pro poses to build in the Hells Canyo stretch of the Snake River betwee Idaho and Oregon. Final design filed with the Federal Power Com mission called for rockfill dams wit impervious clay cores instead o rockfilled structures with concret facings as originally planned. Th designs are subject to approval b engineers of the FPC which has ap proved Idaho Power's license ap plications for projects which woul flood the site of the proposed federa Hells Canyon Dam.

RECENT MAJOR CONTRACT AWARDS by the Idaho Depart ment of Highways include a $551,81

contract to the **Wangsgaard Construction Co.**, Logan, Utah, for constructing roadway and surfacing on 12.9-mi. of State Route No. 11 in Clearwater County. **Duffy Reed Construction Co.**, of Twin Falls was awarded a $241,113 contract for construction of 12.3-mi. of highway and a separate 0.9-mi. section on U.S. 93 in Lincoln and Blaine counties. The same organization was awarded another contract of $71,733 for construction of 2.1-mi. of roadway and a concrete bridge in Franklin County. The Bureau of Reclamation awarded a contract of $163,540 to **C. B. Lauch Construction Co.**, of Boise for rehabilitating the face of Black Canyon Dam on the Boise project.

MONTANA

WORK IS STARTING on Yellowtail dam of the Missouri River Basin project, a Bureau of Reclamation job on the Big Horn River. Plans call for 1,375,000 acre-foot storage capacity and 200,000-kw. generating capacity. Total estimated cost is $89,583,000. Funds available this year total $300,000.

RECENT MAJOR CONTRACT AWARDS by the Montana Department of Highways include an $873,844 job to **F & S Contracting Co.**, of Butte for the grading and surfacing of 4.3 mi. together with structures in Silver Bow County. **James Crick & Sons** of Spokane was awarded a $522,997 job for grading, surfacing 8.1 mi. of highway in Lake County. **O'Neill Construction Co.**, of Havre was awarded a $396,262 contract for grading and surfacing 8 mi. in Toole County. **Long Construction Co.**, of Billings was awarded a $367,874 contract for grading and surfacing 7.3 mi. in Fergus County. **Clifton & Applegate** of Yardley, Wash., was awarded a $328,949 contract for grading and surfacing 6.7 mi. in Lincoln County. **Long Construction Co., Inc.**, of Billings was awarded a $247,452 contract for grading and surfacing 5.9 mi. in Yellowstone County. **Sundling Construction Co.**, of Big Timber was awarded a $244,797 contract for grading and surfacing 9.7 mi. in Dawson County.

NEVADA

RESULTS of a fact-finding survey of residential building in the Las Vegas area have been released by the Federal Housing Administration. The survey discloses that in a period of 5 years and 7 months ending July 1955, 15,600 dwelling units of all types have been authorized for construction. There is an estimated 30,500 dwelling units which is 87% greater than the entire inventory of units reported at the time of the 1950 housing census. The all-time peak in single family home construction in the Las Vegas area was reached in 1954 when builders took out permits for 3,265 homes. This year's rate of home building is 39% below the same period a year ago.

THE LAKE MEAD RESERVOIR at Hoover Dam at present contains enough water to meet all irrigation needs downstream for the next year and a half without further Colorado River run-off, according to Region III of the Bureau of Reclamation. With run-offs like those of the past 3 years, the reservoir can continue to meet several years' irrigation needs.

RECENT CONTRACT AWARD for $192,008 was made by the State Highway Department to **Stewart & Hitchcock** of Las Vegas for grading and surfacing 8.5-mi. on the State Highway System in Nye County.

NEW MEXICO

RECENT MAJOR CONTRACT AWARDS and low bids in New Mexico include an award of $561,000 to **Skousen-Hise Contracting Co.** of Al-

buquerque for grading and surfacing 9.6 mi. in Valencia County. **Henry Thygesen and Co.** of Albuquerque received a $393,000 contract for grading and surfacing 3.9 mi. in McKinley County. **Harry Trotz** received a $279,000 contract for 26.7 mi. of grading and surfacing in Chaves and Lea counties. **D. D. Skousen and Son** of Albuquerque submitted a low bid of $233,000 for grading and surfacing 4.8 mi. in San Juan and Rio Arriba counties. **Skousen-Hise Contracting Co.** of Albuquerque received a $232,000 award for grading and surfacing 2.6 mi. in Guadalupe County. **Allison and Haney** submitted a low bid of $188,000 for earth work, clearing, and structures for rehabilitation of drains on the middle Rio Grande project. **Miller, Smith and O'Hara, Inc.,** submitted a low bid of $99,000 for earth work, clearing and structures for rehabilitation of drains on the middle Rio Grande project.

OREGON

POSSIBILITY of another dam and hydroelectric plant on the Clackamas River is being considered by Portland General Electric Co. The dam site is about 5 mi. southeast of Estacada at the head of the lake impounded by the PGE Cazadero Dam. It is known as the North Clackamas site. Engineers have been drilling test holes at the site for several months to determine the character of the foundation and other pertinent factors.

STATE ENGINEER Louis E. Stanley announced approval of applications of the Eugene Water & Electric Board of the Beaver Marsh hydroelectric project on the McKenzie River. Permits will be issued granting the right to construct the Fish Lake Reservoir to store 1,600 acre-feet of water and to store 1,288 ft. in Clear Lake and to appropriate 1,200 cfs. of water from the two reservoirs.

THE STATE HIGHWAY COMMISSION has opened its $4,000,000 by-pass of Roseburg. Traffic engineers estimate about 40% of the traffic which now clogs downtown Roseburg will be transferred to the new highway, part of the Pacific Highway relocation. About 15 min. driving time will be the estimated saving for motorists though only about a half mile will be trimmed. Also opened recently was the 11-mi., $11,000,000 Banfield Freeway. This freeway is planned to be extended eventually to the Willamette River bridges.

A YEAR-LONG DETOUR in Parleys Canyon is in effect to permit completion of the removal of one of the worst bottlenecks on U.S. 40. Gibbons and Reed Construction Co. is holder of the $1,000,000 project. The Parleys Canyon Road will be 4-lane all the way after completion in October 1956.

RECENT MAJOR CONTRACT AWARDS and low bids in Oregon include an award of $4,000,000 to **Atkinson and Ostrander Construction companies** for the last construction work on The Dalles Dam on the Columbia River. **Rogers Construction Co.** of Portland received a $1,000,000 award for 4/10 mi. of grading and 18.8 mi. of paving in Malheur County. **Rogers Construction Co.** of Portland submitted a low bid of $844,000 for grading and surfacing in Clatsop County. **General Construction Co.** of Portland submitted an $881,000 low bid for construction of road and bridges in Multnomah County. **Hamilton and Thoms** submitted a low bid of $406,000 for the construction of two bridges in Douglas County. **Vernie Jarl** of Gresham submitted a low bid of $299,000 for grading and draining 0.8 of a mile and constructing 1.3 mi. of levee for The Dalles Dam project in Wasco County. **Babler Brothers, Inc.,** of Portland received an award of $99,000 for grading and surfacing 4.4 mi in Polk County. **R. A. Heintz Construction Co.** of Portland received an award of $275,000 for grading 1.2 mi in Douglas County. **Rogers Construction Co., Inc.,** of Portland received an award of $903,000 for grading and surfacing 4.4 mi. in Polk County.

IDAHO GETS 13.7 MI. OF NEW HIGHWAY

Idaho, which employs a sufficiency rating system to improve or replace inadequate sections of highway on a "poorest-section-gets-first attention" basis, this fall will have a new 13.7 mi. stretch on its major route connecting the northern and southern areas of the state. Located about 60 miles north of Boise, the two-lane section, part of Highway 15, runs the full length of Round Valley north through the town of Cascade. The earthmoving phase, handled by Tournapulls, is now 95% complete. Duffy Reed Construction Company, Inc., of Twin Falls, Idaho, which was awarded a near million dollar contract for the 1,500,000 cu. yd. of earthmoving (organic mud, granite and decomposed granite) began work on the job in mid-May.

UTAH

WORK PREPARING the area for construction of the $3,500,000 administration building at Salt Lake City municipal airport will start this fall as a forerunner to calling for bids for its erection. The cost was originally estimated at $2,500,000. Now available is $320,000 to begin building additional drainage systems and hauling in 850,000 yd. of fill material before construction begins.

RECENT MAJOR CONTRACT AWARDS and low bids in Utah include a low bid of $413,000 submitted by **W. W. Clyde and Co.** of Springville for grading and surfacing 4.6 mi in Summit County. **Gibbons and Reed Co.** of Salt Lake City submitted a low bid of $116,000 for 2 mi. of grading and surfacing in Weber County. **Nelson Brothers Construction Co.** in Salt Lake City submitted a low bid of $96,000 for construction of three concrete bridges in Grand County. **L. A. Young Construction Co.** of Richfield submitted a low bid of $460,000 for 7 mi. of grading and surfacing in Sevier County. **Reynolds Construction Co.** of Springville received an $83,000

award for grading and surfacing 19.9 mi. in San Juan County.

WASHINGTON

A 6- X 7½-FT. relief map of the Seattle area will help officials with their planning problems. The new map is a plastic model produced by Aero Service Corp. The map covers an area from Puget Sound to the crest of the Cascade Mountains, east to the King County line and south to Starr Lake. With the relief model at hand, an engineer can demonstrate water flow problems by pouring water on a mountain divide and watching it flow down into Puget Sound.

SEVENTY-TWO WORKMEN are now on the job at Aluminum Company of America's Wenatchee plant doing excavation, grading and railroad relocation work in a $2,000,000 expansion program. Snitily Brothers of Wenatchee is moving 57,000 yd. of earth for filling and grading. About 100 employees will be on the job at the height of construction. The job is expected to be completed by next May.

OSTRUSKE-MURPHY, INC., of Tacoma was the successful bidder on a contract calling for the construction of the 50,000,000 gal, reservoir. The firm bid $638,000, lowest of five bids submitted to the Department of Public Utilities. Pipe for the reservoir has begun arriving from the American Pipe and Construction Co. of Portland. The work is expected to take about 6 months.

THE WATER DIVISION of Tacoma is engaged in preparing designs for the construction of a 100,000,000 gal. reservoir in the area of Eagle Gorge about 45 mi. from Tacoma in the Green River Watershed. The reservoir will provide the city with water when its regular source, the Green River, is affected during the construction of Eagle Gorge Flood Control Dam by the Army Corps of Engineers.

THE WASHINGTON STATE legislature has appropriated the largest sum ever for roads for a 2-year period. $147,000,000 will be spent on projects either underway or in the planning stage during 1955 to 1957. About $148,000,000 was spent in 1953 to 1955.

A LOW BID of $4,319,000 was submitted to the Army Engineers for the last major construction work on The Dalles Dam on the Columbia River. It was a joint bid from the Guy F. Atkinson Co., San Francisco, and Ostrander Construction Co., Portland, the firms that have done the major share of construction work at the dam, 90 mi. upstream from Port-

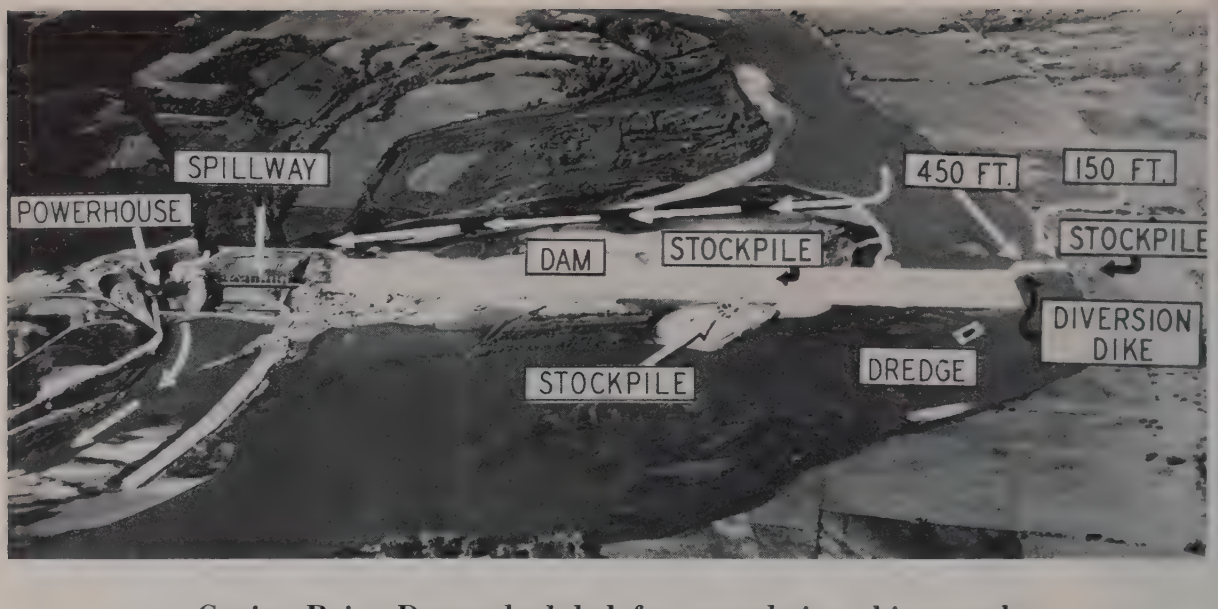
land. The work calls for construction of the last arm of the dam to close the river. There also will be fills and grading work, miscellaneous roads, removal of cofferdams and salvage of equipment from The Dalles-Celilo Canal which will be flooded by the dam. There still remains one large contract for installation of equipment in the power house. The dam is expected to begin producing power in November 1957.

RECENT MAJOR CONTRACT AWARDS and low bids in Washington include an award of $448,000 to **C. E. Oneal and Riverside Sand and Gravel Co.** of Ellensburg for grading and surfacing 7.5 mi. in Yakima County. **Northwest Construction Co.** of Seattle received a $292,000 award for grading and surfacing 1.4 mi. in Thurston County. **Henry C. Werner, George W. Lewis,** and **Touf Charneski** of Eugene, Ore., received a $281,000 award for earth work and structures on the Columbia Basin project. **Pieler Construction Co.** of Port Angeles received a $117,000 award for grading and surfacing 1.5 mi. in Clallam County. **Hannan Brothers Co.** of Portland, Ore., received a $218,000 award for grading, surfacing, and railroad overcrossing in Benton County. **Charles A. Power** of Spokane received a $94,000 award for construction of an under-crossing and approaches in Spokane County.

WYOMING

WORK ON THE UPPER North Platte River hunting and fishing access road has been finished. It is 13.4 mi. long and runs from French Creek Road to the North Platte River in Carbon County. It is located entirely within the boundaries of the Medicine Bow National Forest. Lichty Brothers Construction Co. of Casper was awarded the contract last fall on a bid of $70,000. The job was subcontracted to John W. Lusher of Buffalo.

RECENT MAJOR CONTRACT AWARDS and low bids in Wyoming include a $1,500,000 award to **Strong Co.**, Springville, Utah, for 20 mi. of grading and surfacing in Grand Teton National Park. **Summit Construction Co.** of Rapid City, S. Dak., received a $442,000 award for grading, joining, and surfacing in Niobrara County. **Forgey Brothers Co.** of Casper received a $320,000 award for grading and draining in Washakie County. **Western Paving Construction Co.** of Denver, Colo., received a $247,000 award for grading and surfacing in Carbon County. **Asbell Brothers Construction Co.** of Riverton received a $243,000 award for grading, draining and surfacing in Sublette County. **Sims Construction**



Gavins Point Dam scheduled for completion this month

TYPICALLY WESTERN is the Gavins Point Dam project near Yankton, S. Dak. The powerhouse substructure, spillway, and most of the earthwork, an $18,017,335 contract held by a joint venture of Western, Massman and Jones construction companies, is scheduled for completion Nov. 20, 1955. The powerhouse superstructure, switchyard, and transformer yard, a $4,058,290 contract awarded Sept. 1954 to a joint venture of Foley Brothers, Inc., and Donovan Construction Co., will be completed Feb. 1957.

Closure of the 600-ft. gap with a diversion dike was accomplished in nine days. To facilitate the operation the flow was choked down at Fort Randall Dam 80 mi. upstream by regulation of the control gates and by reducing releases through the power tunnels. During the critical two days the flow averaged 4,000 cfs. as compared to a normal flow of 27,000 cfs.

During the first four days of the nine-day operation two draglines and a fleet of dump trucks built the 450-ft. chalk rock dike (above right). For the next 48 hr. two draglines working around the clock placed the remaining 150-ft. section from chalk stockpiles on each side of the channel. When the dike is raised to sufficient height the full flow of the river will be diverted to the powerhouse structure on the Nebraska side of the river (above left). The dike will contain more than 90,000 cu. yd.

Co. of Lander received a $216,000 award for grading, draining and servicing in Fremont County. **Northwest Engineering Co.** of Denver, Colo., received a $102,000 award for grading, draining and surfacing in Goshen County.

ALASKA

THE $10,000,000 Elmendorf Air Force Base Hospital has been completed. Planned, designed, and built under supervision of the Alaska District Corps of Engineers, it is the biggest and most complete military hospital in the Territory. The prime contract was awarded to J. C. Boespflug Construction Co. of Seattle in February 1953 for $8,613,000.

THE ALASKA DISTRICT Corps of Engineers has announced receipt of Civil Works appropriations totaling $877,000 for the construction of harbor improvements at three locations in southeastern Alaska. The work involves enlarging small boat basins at Petersburg and Wrangell and the construction of a small boat harbor at Metlakatla. The projects will be advertised for bids this winter.

ONE BLOCK of an Anchorage hill will have a heating device under the pavement to melt ice and snow. An iron wire will be laid under the pavement and will serve as a heat conductor with the temperature kept at the proper level. The project will cost $5,500 and will be done by Birch and Green Construction Co. as part of a paving contract.

RECENT MAJOR CONTRACT AWARDS and low bids in Alaska include a low bid of $577,588 by **Ramstad Construction Co.** of Anchorage for construction of 3.3 mi. of access road near Haines. **C. C. Moore & Co.** of Seattle received a $522,584 award for construction of a steam generating unit in Anchorage. **Reed & Martin, Inc.**, of Fairbanks received a $450,575 award for construction of facilities at Eielson Air Force Base. **E. M. Peterson Construction Co.** of Spenard received a $388,888 award for construction of a building at Fort Richardson. **Roark and Bertram Curry** of Palmer received a $310,529 award for construction of housing improvements.

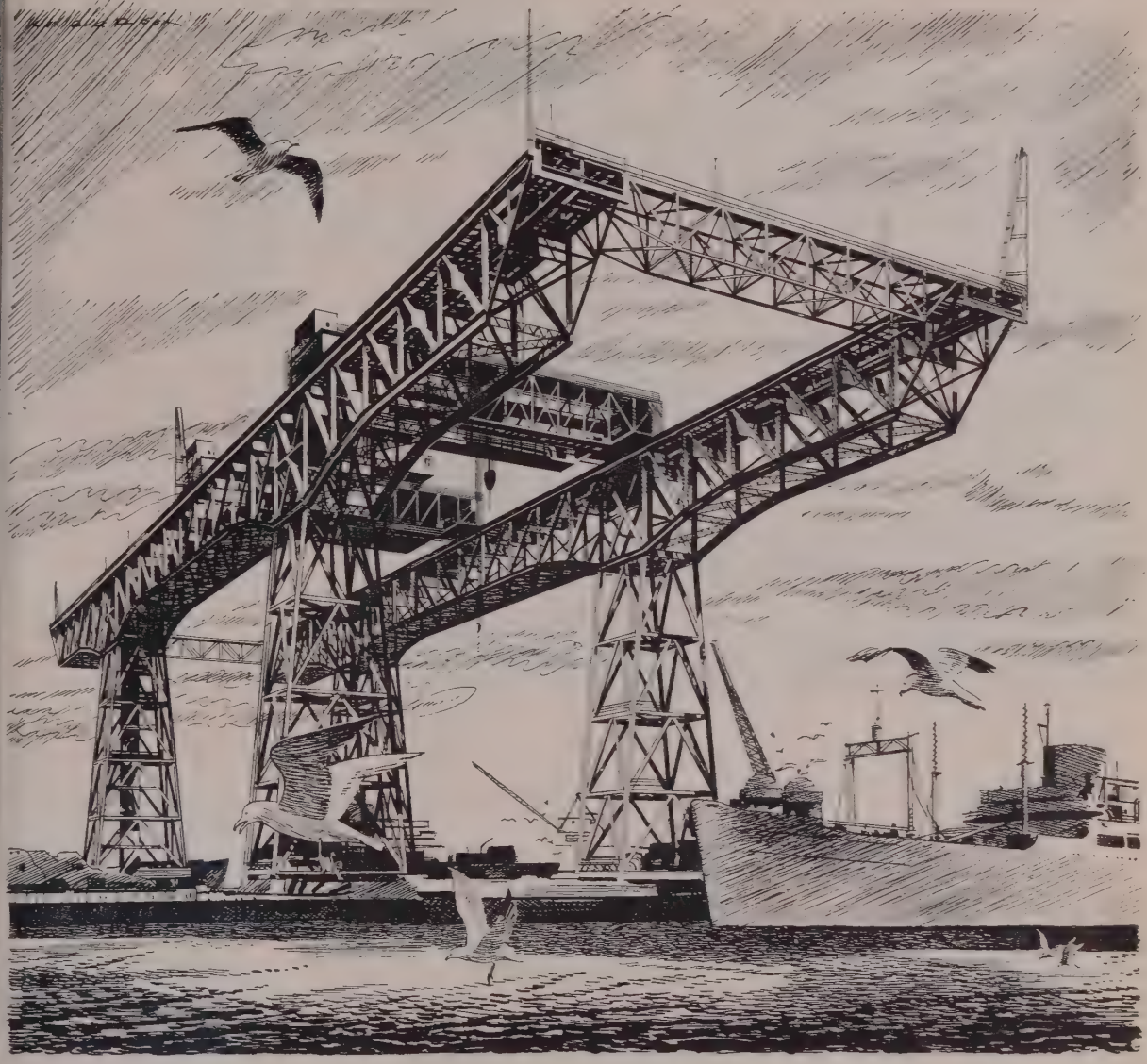
Here and There

CONGRESS VOTED $4,000,000,000 for construction in the fiscal year ending June 30, 1956, which represents a large increase over the amount appropriated last year. The Air Force received the largest allocation with $994,000,000. The Atomic Energy Commission which spent $110,000,000 for construction last year received $256,000,000 this year.

PRESIDENT EISENHOWER has signed into law an Act which will provide $500,000,000 for airport construction in the next four years. Previously the appropriations were made on a year to year basis. The new arrangement will make advance planning possible.

MILITARY INSTALLATIONS in Nevada and California are due for construction projects totaling $11,000,000 under a Supplemental Military Appropriation Bill approved by both Houses and signed by the President. The major projects are as follows: Sierra Ordnance Depot, Herlong, $1,000,000; Fallon Naval Auxiliary Air Station, $1,000,000; In-

UNITED STATES STEEL AT WORK IN THE WEST—largest overhead traveling crane, 730 feet long!



NAVY WEIGHTLIFTER . . . has muscles of steel

San Francisco's Naval Shipyard boasts the world's champion weightlifter, a crane capable of hoisting 630 tons . . . designed to lift battleships' main gun turrets. But with most of its battlewagons in "mothballs" the Navy now has the crane at other chores—like handling cumbrous cargo and reconversion work on aircraft carriers. It took 8400 tons of steel to build this mightiest of all cranes . . . all of it from *United States Steel.*

Yesterday, Today, and Tomorrow—Columbia-Geneva has for years helped to fill the steel needs of the West. We hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer

United States Steel Corporation • Columbia-Geneva Steel Division

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USS TRADE MARK

UNITED STATES STEEL

yokern Ordnance Test Station, $2,600,000; Inyokern Station No. 2, $375,000; Indian Springs Air Force Base, $556,000; Nellis Air Force Base, $1,000,000; Stead Air Force Base, $4,000,000.

FUNDS TOTALING $97,000,000 have been allocated for civil works construction in the Pacific Northwest according to the Army Corps of Engineers. The allocations include $63,500,000 for The Dalles Dam, $18,000,000 for Chief Joseph Dam, $11,000,000 for McNary Dam, and $750,000 for improvements in the mouth of the channel of the Columbia River including dredging to 48-ft. depth.

CANADA IS CARRYING out engineering studies of an undertaking in British Columbia that would divert the flow of two rivers away from the United States in a manner that engineers estimate would cost the Pacific Northwest 5,000,000,000 kw. hours of energy annually. This figure is a calculated loss to all American power plants that are built or planned for development south of the border on the Columbia and Kootenay that would be affected adversely by Canada's proposal to diminish the flow of those rivers.

CONSTRUCTION CREWS are slightly ahead of schedule on the 22-in. natural gas pipeline being laid from Laramie, Wyo., to Denver by Colorado Interstate Gas Co., of Colorado Springs. Scheduled for completion this fall, the 140-mi. pipeline will be extended 240 mi. from Laramie to Rock Springs to tie in with a line being built from the San Juan basin to the Northwest by the Pacific Northwest Pipeline Corp.

THE $40,000,000 Haines-to-Fairbanks pipeline, representing two years of construction work, was turned over to the U. S. Army, Alaska, in a ceremony at Haines Oct. 12. A major project in the defense construction program in Alaska, the line will supply jet and diesel fuels and gases to military installations in the central interior of the Territory.

The pipeline, called Alcango, was designed and constructed under supervision of the Alaska District Corps of Engineers. The major contractors were: Williams Brothers of Tulsa, Okla.; McLaughlin, Inc., of Great Falls, Mont.; and Marwell Construction Co., of Vancouver.

Work got under way in December 1953 with crews clearing the right-of-way despite severe winter conditions. In April 1954 pipeline spreads started welding together the 40-ft. lengths of steel pipe across Alaska and Canada and crews began building the pumping stations and tank farms. After the winter layoff work began again and by July the line was ready for testing. Nearly 170 mi. of water was admitted into the line at pressures up to 1,900 psi.

YOUR INDUSTRY is served by a team of Shell Lubrication Specialists, every man an outstanding expert. Call in any member of this team and you benefit by Shell's quarter-century of documented experience with lubrication problems in your field!

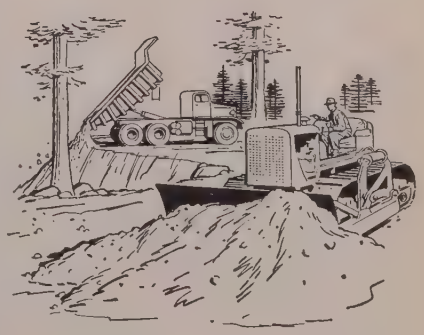
Shell's men and techniques —with SHELL TRACROL LUBRICANT—can now

Save track roller bearings from daily beating

In Shell Tracrol Lubricant Shell Scientists have created a tough-bodied, water-resistant lubricant that protects against dust, dirt, muck, water—even severe sidehill loading.

Shell Lubrication Specialists are in the field constantly. They study gasoline and diesel equipment under day-to-day operating conditions in all parts of the country. That's why — when you use Shell Tracrol Lubricant as Shell recommends — you can be sure of track roller bearing protection under the most extreme conditions.

The documented experience of others in your own field is available to your Shell Lubrication Specialist. He can analyze your entire operation from Shell's quarter-century backlog of experience . . . end expensive guesswork in *all* your lubrication problems. It will pay you to call him today.



SHELL TRACROL LUBRICANT

SHELL ®

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

BACK TO SCHOOL for hundreds of Alaska children and the return of moppets to classrooms, in many areas has school officials concerned over the serious shortage of classroom space. Vacant buildings, churches, even homes have to pinch-hit for the 1955-56 school year. This is news for the construction industry because it's a straw in the wind indicating the trend of future construction in the territory. When radar outposts are completed, when military projects are no longer available to the contractor, he can begin to look for a greater volume of municipal, school, and commercial construction in Alaska. In connection with the classroom shortage, William H. Olsen, area director of the Alaska Native Service, believes it will be necessary to construct $12,000,000 in new schools within the next few years to make up for the woeful lack of educational facilities for Eskimo tots. Olsen states that because of this situation, many children are now unable to obtain the education they're entitled to.

WINTER ARRIVES—In the states, some of you are still having Indian summer weather but up here in Alaska it's winter again, unquestionably. North of the Arctic circle, cold weather has set in with a vengeance on a wide front and much construction has been halted. In Western Alaska, there's been rain and increasing cold, with snow in the high mountains (getting lower every day.) In this section of Alaska, work's still going on, but at a slower pace. Southeastern Alaska is least affected by the severity of Alaska's winter, having the advantage of coastal currents. The problem there, however, is rain in fantastic amounts.

PAYROLL CLIPPED—Just about every major contractor right now is engaged in the annual, sometimes painful, process of clipping payrolls. One Alaska construction boss told this reporter lay-off time is a real pain in the neck. For one thing, by October, if you're a good foreman, you've gathered around you a hard-working, capable crew. Then, just as their efficiency is at a peak, weather and volume of construction force you to lay them off. Next spring, just as likely as not, you'll have to start all over again with greenhorns and Cheechakoes (newcomers from the states) and whip 'em into shape again. For the construction worker himself, lay-off time isn't quite so bad. Generally, if he's the saving kind, he has several thousand dollars to the good. If he's single, he can take it easy during the winter. If married—he can take several weeks vacation.

RETURN TO ARCTIC—A unique experiment in Alaska hiring has worked out well for the Alaska Railroad and might be followed by private contractors. Faced with a shortage of track laborers, the railroad decided to hire Eskimos from Alaska's remote villages for the work, in the face of advice from some quarters that this might result in getting virtually no track work done. Railroad personnel men put out the welcome sign for Alaskan natives and large numbers from all corners of the vast northland flocked to railbelt centers. Each village contingent was hired as a crew and worked together. The result? The Eskimos are cracker-jack laborers — hard-working, willing, quick to learn and highly enthusiastic. If you're an Alaska contractor with an Alaska job, it's good public relations if nothing else to sprinkle a few Eskimos among your working forces.

BIG DAY AT HAINES—By the time you read this, the final ceremony marking completion of the big $40,000,000 Haines-Fairbanks pipeline will have been held at the little North Pacific seaport of Haines. At that ceremony, the Army formally accepted the new pipeline built by the firm of Williams Brothers and its partners. The pipeline starts at sea level at the Haines terminal, rises through the 3,700-ft. Chilkat pass 57 mi. out of Haines and gradually descends to an elevation of 425 ft. above sea level at the terminus at Fairbanks.

SOME PIPELINE FACTS—Newsletter readers will be interested in a few random facts not hitherto reported concerning the big pipeline project. For example the job is the largest single project to be constructed in Alaska since the start of the $750,000,000 post-war defense construction program in the territory in 1946. The line carries five different types of petroleum products . . . It is the most northerly major pipeline in the world . . . Bears gave many a construction worker along the wilderness line a fright—much of the territory through which the line passes is bear-infested . . . Pipeline is 626 mi. long.

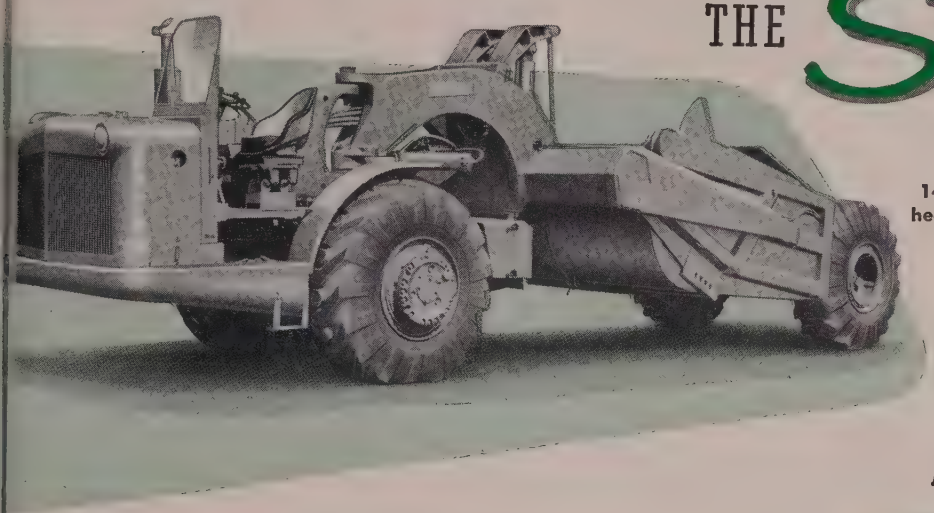
CONSTRUCTION HISTORY—When the laurels are being handed out to construction men, let's hope the fellows who pushed through the Haines-Fairbanks pipeline won't be forgotten. Many a man who worked on the project can remember: tractors sinking to their hoods in a muskeg bog . . . Cats dropping out of sight—and their operators scrambling to high ground . . . men working in waist-deep icy water to free stranded equipment . . . bitter forty-below zero cold—and country just as lonely and desolate as Robert Service ever wrote about. I've talked to construction men from all parts of the world and they've got a healthy respect for the manner in which this big job was done—and for the men who did it.

OIL, TIN, GOLD—The Anchorage Gas and Oil Development company has reported it has had "a showing of oil" at its properties 30 miles north of Anchorage. This caused high excitement in Anchorage; however since the initial report there's been no indication from the firm that oil in commercial quantities has been struck. The same goes for more than a half dozen other oil ventures in the territory. So far as this reporter has been able to find out, not so much as a single barrel of oil has been produced for commercial oil distribution within the past five years . . . the big Lost River tin mine near Nome has closed down, cutting off production at the territory's only tin property . . . quite a number of gold operations are still thriving on Alaska's gulches. I talked with several sourdoughs, now down from their diggings and preparing to spend the winter in Anchorage, and they informed me that some of the miners are cleaning up as much as $10,000 annually on small diggings—not too bad considering the present price of the precious yellow metal.

UNEMPLOYMENT FUND in Alaska is still having its troubles. This fund, from which unemployed construction workers can draw "rocking chair" money, is now reduced to less than $4,000,000 including a $3,000,000 loan from the federal government. A number of statements have been issued to the press that it is altogether possible the unemployment fund may be depleted this winter.

CONSTRUCTION NEWS NUGGETS . . . Possibility of erecting atomic power plants in Alaska has been announced in Washington . . . construction contracts at Eielson base in Alaska will pass the $15,000,000 mark this month . . . A shortage of power in the Anchorage area has been predicted within two years unless additional generating facilities are constructed . . . Anchorage plumbers ended their seven-week-long strike Sept. 17, accepting a 10-cent an hour pay boost . . . A quarter of a million dollar shopping center is being constructed at the small community of Chugiak north of Anchorage . . . More than $2,000,000 in construction is slated in the Kenai area.

NEW "EUC" SCRAPERS



THE S-12

12 yds. struck...

14 yds. at 3:1 slope . . . 16 yds. heaped at 1:1 . . . 26.5 x 25 tires . . . 218 h.p. . . . top speed loaded of 28 mph. . . . 9′ 6″ width of cut . . . makes non-stop 180° turn in 31′.

AND THE S-18

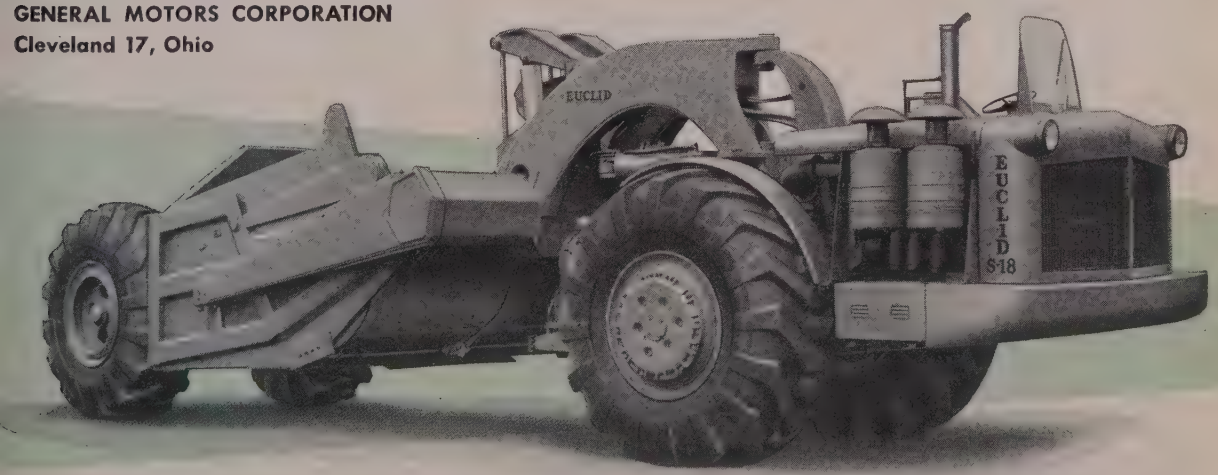
18 yds. struck...

21 yds. heaped at 3:1 slope . . . 24 yds. heaped at 1:1 . . . 27.00 x 33 tires . . . 300 h.p. . . . Torqmatic Drive with torque converter and semi-automatic transmission . . . top speed of 20 mph with full payload . . . 10′ width of cut . . . makes non-stop 180° turn in only 36′.

These two new Euclid Scrapers bring you a new high in scraper performance and low cost yardage. Both incorporate the advanced design that have made "Euc" Scrapers the fastest growing line in the industry. With lever action and 4 section cutting blades, and 16 to 18 h.p. per yd. of capacity, they load easy and travel fast. The entire power train of the S-12 and the S-18 is designed for exceptionally good accessibility.

Before you decide on any scraper for your present or future work, check the money saving features of these "Eucs". Your Euclid dealer will be glad to give you facts and figures that show why so many users have found that ***Euclids are your best investment.***

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

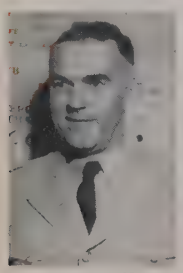
GM GENERAL MOTORS

ENGINEERS on the move

The American Society of Civil Engineers announces the election as president of **Enoch R. Needles** of New York City to serve one year. He succeeds **William R. Glidden. Glenn W. Holcomb,** professor and chairman of the Department of Civil Engineering, Oregon State College, Corvallis, is one of two vice presidents elected. Of the seven new directors chosen for three years, three are from the West: **Clarence E. Eckel,** dean of the College of Engineering, University of Colorado, Boulder; **R. Robinson Rowe,** supervising bridge engineer, California State Division of Highways, Sacramento, and **Louis E. Rydell,** chief engineer, planning branch, Corps of Engineers, Walla Walla, Wash.

* * *

Col. Robert E. Cron, Jr., has been named to succeed **Col. Lynn C. Barnes,** district engineer of the Albuquerque District, Corps of Engineers. Colonel Barnes, who came to the Albuquerque District in January



Col. Cron

Col. Barnes

1953, has received an appointment as district engineer with the Joint Construction Agency with headquarters in Paris, France. Colonel Cron returns to the United States after a two and a half years' assignment in Brazil.

* * *

George W. Poulsen, Jr., Salt Lake City, Utah, was recently chosen president of Intermountain Institute of Consulting Engineers. Other new officers are **Richard L. Sloane,** 1st vice president; **David L. Sargent, Jr.,** 2nd vice president; **Warren D. Curtis,** secretary, and **Arthur Monsey,** treasurer.

* * *

Robert C. Poolman, an assistant professor of engineering at the University of Nevada, has been named the university's engineer. Poolman will be engaged in full-time capacity as U. of N.'s advisor for construction projects. During the next year he will oversee the beginning of several million dollars in new construction in Reno and Las Vegas, including a new college of agriculture, a home economics building, and a student union building in Reno and a proposed classroom building in Las Vegas.

* * *

William S. Peterson has been appointed to the position of general manager and chief engineer of the Department of Water and Power of the City of Los Angeles, Calif., succeeding **Samuel B. Morris** who retired Oct. 1, but will be retained as an advisor. Peterson, who has risen through a career of 31 years of service in the Department, has held the post of assistant general manager and chief engineer since 1953. To fill the position vacated by Peterson's advancement, **Burton S. Grant,** who has been chief engineer of water works since 1950, has been promoted. **Samuel B. Nelson,** assistant chief engineer of water works, succeeds to Grant's former position.

* * *

O. Donald Miles is chief design engineer for Parley's Canyon project being constructed for the Utah State Road Commission by Gibbons & Reed Co. **E. D. Kennelly** is resident engineer on this highway work, which begins 2.5 mi. east of Salt Lake City east urban limits, easterly to Mountain Dell reservoir. Scheduled for completion by November 1956, total cost of project including engineering is about $1,101,073.

* * *

T. E. McCarty, Albuquerque, district engineer of the New Mexico State Highway Department, was recently appointed as materials and research engineer in charge of the Department's testing laboratory. **Charles O'Bannon** moved up from assistant district engineer to district engineer.

* * *

C. D. Rickman is named resident engineer on the Tesuque bypass project of the New Mexico State Highway Department north of Santa Fe. Features of the project are a 3-span concrete and steel bridge and a 4-lane divided highway. Bridge design is under direction of **W. E. Strohm,** bridge engineer, and road design under **H. F. Hall,** engineer of plans.

* * *

Appointment of **William L. Welch** as district engineer of District VI, (with headquarters at Fresno) of the California State Division of Highways, to succeed **Earl T. Scott** who retires as of Nov. 1 was recently announced. Scott held the post since 1938 and has nearly 40 years' service with the Division. Welch has been an engineer with the Division since 1929 and for the past five years was chief assistant to the engineer of design at Sacramento.

* * *

Maurice L. Dickinson, chief hydraulic engineer for Bechtel Corporation, has been elected president of the Engineers Club of Los Angeles. Other officers elected are **L. C. Chasteen,** vice president; **Robert F. Stewart,** secretary, and **Wallace W. Kenney,** treasurer.

* * *

George A. Lindquist was recently appointed construction manager of H. K. Ferguson Co.'s 10-state Western district. Lindquist, a 30-year Ferguson veteran, who will make his headquarters in San Francisco, has served as project manager on some of the company's largest construction jobs.

* * *

Charles L. Nichols was recently appointed chief engineer in the Los Angeles regional office of Dames &

C. L. Nichols

Moore, soil mechanics engineers. Nichols has served the firm in the New York and Seattle offices and on foreign assignments in Australia and Iraq. Before moving to Los Angeles he was in the San Francisco office.

* * *

Elwood E. Bass was recently promoted by the Wyoming State Highway Department to assistant road design engineer, a post which has been vacant for the past two years.

* * *

Edward W. Adams, construction and plant development engineer at the New Mexico Institute of Mining and Technology, recently resigned that position to engage in private practice as a consulting engineer in Albuquerque.

* * *

M. A. Ellsworth has been named head of the engineering and construction operations of The Fluor Corporation, Ltd., Los Angeles, Calif. These two operations are being combined into one division, effective Nov. 1.

Lloyd Aldrich, who has held the office of city engineer of Los Angeles for 22 years, recently announced his retirement. Until a successor is named, **Lyall Pardee,** chief deputy city engineer, will act in the vacancy.

DEATHS

F. N. Holmquist, 71, city engineer of Phoenix, Ariz., died recently after a three-month illness.

* * *

Leon B. Reynolds, 70, emeritus professor of hydraulic and sanitary engineering at Stanford University, died at his home in Palo Alto, Calif., on Sept. 26. Receiving his degree in civil engineering from Stanford in 1909, he did graduate work at Cornell and was for 14 years associated with a consulting engineering firm in Kansas City, Mo. In 1923 he returned to his alma mater to serve from then to his retirement in 1950. During his distinguished career Professor Reynolds held many important positions related to his field, and at one time was a consulting sanitary engineer for the City of San Francisco. He served the San Francisco Section of the American Society of Civil Engineers as its president in 1931 after two years as vice president.

* * *

Henry T. Reynolds, 67, senior partner in the Reynolds Construction Co., Springville, Utah, and a past president of Intermountain Branch of Associated General Contractors, died Sept. 4.

* * *

Edwin L. Oliver, 77, noted engineer and founder-chairman of Dorr-Oliver Incorporated, internationally known engineering organization, died suddenly at his summer home at Lake Tahoe, Aug. 28.

CALENDAR

Nov. 18-19—Professional Engineers of Oregon, annual state convention, Multnomah Hotel, Portland, Ore.

Jan. 29-Feb. 2, 1956—Associated Equipment Distributors, 37th annual meeting, Conrad Hilton Hotel, Chicago, Ill.

Feb. 9-10, 1956—Society of American Military Engineers, annual technical meeting, Palmer House, Chicago, Ill.

Feb. 13-18, 1956—International Union of Testing & Research Laboratories for Materials & Structures (RILEM), Symposium on winter concreting theory and practice, Copenhagen, Denmark.

Mar. 6-10, 1956—American Concrete Pipe Association, 48th annual convention, Broadmoor Hotel, Colorado Springs, Colo.

Steel pipe replaces irrigation ditches

USING GAS PIPELINERS' methods, the Intermountain Co. of Boise, Idaho, is installing a system of steel water pipe for a $350,000 irrigation project near Coeur d'Alene, Idaho. The project came about after two co-operatively owned irrigation districts found that their ancient lines were no longer functioning efficiently and appealed to the Bureau of Reclamation for advice.

The Bureau's engineers devised a complete new system. As a pilot model venture, careful cost accounting will serve as a guide for any similar future projects that might be undertaken.

Since the Idaho project was begun, several irrigation districts in Colorado have made similar applications to the Bureau of Reclamation. The two Idaho districts are Avondale, consisting of 922 ac., and Dalton Gardens, 944 ac.

Intermountain Co. is using 50 men on the job, with an International TD-14A crawler with International Superior sideboom to handle the pipe. The pipe size runs from 24 in.—to carry water from the lake intake—to 4 in. for field laterals.

The work is being done under the supervision of Bureau of Reclamation engineer inspectors.

WELDERS double joint 24-in. pipe to save installation time.

INTAKE pipe into lake is placed with TD-14S and sideboom.

SUPERVISING the jobs

Don Weaver, area manager for Ben C. Gerwick, Inc., is in over-all charge of the recent award to this firm covering 2.5 mi. of grading and surfacing and a concrete bridge near Eureka, Calif. Project superintendent on this $842,407 job is **William Goss.** July 1 saw the start of the work, with completion date scheduled for January 1956.

* * *

J. H. Trisdale is acting as his own project manager on the $474,360 award recently won by J. H. Trisdale, Inc., for earthwork and structures on the Corning Canal, Sacramento Canals Unit of the Central Valley Project, Calif. **W. A. McBryde** and **J. M. Brown** are assisting as carpenter foremen on the job, which has been under way since April and is scheduled for completion about Nov. 1.

* * *

Donald L. Boots as general superintendent is in charge of 1.4 mi. of grading, 3.8 mi. of stone base and 4.6 mi. of paving on the North Plains-Hillsboro section of Shadybrook-Hillsboro County Road in Washington County, Ore., for Rogers Construction Co. Boots is being aided by **Homer Paxton,** crushing superintendent.

* * *

James W. Kirwan is J. N. Conley's superintendent of construction on 1.4 mi. of the Wind River to Wind Mountain section of P.S.H. 8 in Skamania County, Wash., a $228,962 project which is just about complete. **Wayne W. Weien** is grade foreman and **Harold M. Gross,** plant foreman.

* * *

John Felton, superintendent, and **Waldon Westermann,** engineer-concrete superintendent, are two top men working for Murphy Bros. on construction of earthwork, canal lining, and structures, main canal, Hoover wasteway, Kennewick Division of the Yakima Project, Washington. This job went to Murphy on a low bid of $319,717.

* * *

Jack Shirley and **Charles Kernan,** superintendent and assistant superintendent respectively, are working on the North Wilmington Junior High School at Wilmington, Calif., contract for which was recently awarded to H. B. Nicholson at about $2,211,000. Job has just started. **Carl Smith** and **Don Smith** represent the School District.

"Bud" King, head of L. A. Woodward Construction Co., is directing a $111,280 contract which recently was awarded his company for grading and surfacing various roads in Granite, Mineral, Missoula, Ravalli, Lake, and Sanders counties, Mont. Other important men on this $111,280 job are **Stacey Gordon,** crusher operations foreman, and **Denny Washington,** general foreman.

* * *

Gordon Johnson and **George Welton,** grade foremen, and **Edward Johns,** labor foreman, are top men on a recent award to O. K. Mittry & Sons in the amount of $287,912 for 1.9 mi. of grading and surfacing in Tuolumne County, Calif., between 0.5 mi. east of Chinese Camp and Woods Creek. Work started May 24 and will probably end by Nov. 1.

* * *

Ronald G. Jorgensen is superintending the job of erecting a gymnasium at Davis High School, Kaysville, Utah, for the Davis County School Board. M.A.C. Construction

Jorgensen *Perry*

Co. won the award at about $310,000. **Ray Perry** is general superintendent for Mountain States Steel Co., which is handling the steel erection under a subscontract. Northwest Crane—Shurtleff & Andrews are on the job with rental equipment. Schdeuled for completion by the end of this year, work has been under way since April.

* * *

Ed Kivinew, superintendent for S. Birch & Sons Construction Co., is directing a recent award to the company for 11.9 mi. of grading, gravel surfacing, and draining on section of the Harlem-Turner-Canadian line highway, Blaine County, Mont. Other key men on this $134,386 job are **Herbert Krushensky,** foreman, and **John Nykalaya,** mechanic. Under way since mid-July, finishing date is set for the middle of November.

* * *

William Ille, superintendent for S. Birch & Sons Construction Co., recently completed a job of surfacing and oiling 8.7 mi.of highway in Cascade and Teton counties, Mont. Two other key men on this work were **Larry Heilman,** street foreman, and **Paul Larson,** plant foreman.

* * *

James D. Cave, vice president of Robertson & Cave, Inc., is acting as project manager for the company on a recent award in the amount of $433,064 for 9.7 mi. of grading and draining and construction of a bridge on the White Sulphur Springs-Kings Hill highway in Meagher County, Mont. Other key men on this job, soon to be finished, are **Lyle Rogers,** foreman (morning shift) and **S. R. "Buck" Willis,** foreman (afternoon shift.)

* * *

Quite by accident, **Herb Dale,** our circulation man, recently ran into **R. J. "Tiny" Lugo** completing reserve training at the Naval Amphibious Base at Coronado, Calif. Tiny, who was for many years a key man on construction for Fisher Contracting Co. of Phoenix, Ariz., is now returning to Phoenix where he is a heavy construction contractor for himself, operating as E & R Construction Co.

* * *

H. A. Fowler is superintendent for M. H. Golden Construction Co. on this contractor's job at Mira Mar Base, San Diego, Calif., involving radio communication facilities, six buildings and utilities. **Troy Beaver** is carpenter foreman.

* * *

P. J. Moore is superintending a $550,000 contract for Cory & Longworth, Inc., at National City, Calif. Structure is a junior high school. Work is nearing completion.

* * *

Art Gussa, superintendent for Chamco Construction Co., is in charge of work on the engineering building at State College, San Diego, Calif. Completion date is set for December.

* * *

Ed Gibson is supervising a $124,510, 325-day contract for construction of a 313-ft. reinforced concrete bridge over the Siletz River in Lincoln County, Ore., for Lee Hoffman who started work on this job Sept. 5.

* * *

Ken Baird, grading superintendent, and **D. A. Wagner,** surfacing superintendent, are in charge of a $424,640 job recently awarded Woodward Construction Co. for grading, draining, surfacing, and miscellaneous work on 14.7 mi. of the Rock Springs-Hiawatha road in Sweetwater County, Wyo. Work got under way Sept. 1 and will take 150 workdays.

THE NEW D7, D8 and D9

here's what they can mean on your job

The new 286-HP CAT* D9 Tractor

Choice of torque converter or oil clutch drive. First track-type tractor with Turbocharger. Completely new 286-HP engine. "Live-shaft" drive for rear-mounted equipment. Many other important features.

The new 191-HP D8

With torque converter (Series D). With exclusive oil clutch drive (Series E). Completely new 191-HP engine. "Live-shaft" drive for rear-mounted equipment independent of flywheel clutch. New easy-working controls. Many other improvements.

The new 128-HP D7 Series C

Gear-type balancer gives six-cylinder smoothness. New 128-HP engine. Drawbar pull now 28,700 lb. maximum. New starting engine for simpler, easier operation. Track shoes hardened by "water quench" process. And many other important advances.

The year's biggest news on tracks: Caterpillar's three great new Diesel Tractors.

They're big news because they give you greater power and better performance than ever before.

The D9 and D8, for example, give you your choice of torque converter or exclusive oil clutch drive so you can best match your machine to your own job requirements.

All three give you features like one-piece frame-steering clutch case assemblies, and track shoes specially hardened by a new "water quench" process which means longer shoe life.

All three are easier to operate, with simpler, more powerful starting engines, easier working controls and other improvements.

They're easier to service, too; an exclusive trouble-free oil clutch, separately removable power train components and a fuel system that needs no adjustments in the field are only three of many reasons why.

Better be sure you get *all* the news about the new D7, D8 and D9. Call your Caterpillar Dealer today. Or mail the coupon below.

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

CATERPILLAR*

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I'd like *all* the big news about the new D7, D8 and D9.

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THE NEW D9, D8 AND D7 —EXAMPLES OF CATERPILLAR LEADERSHIP IN ACTION

Straw Martin Boyer

Healey Schellenbarger Robbins

Skelton Prescott

Randol Montgomery McClelland Heasley

Morrison-Knudsen at Utah's Gateway Canal

I. D. Robbins, project manager, and **Russ Healey,** general superintendent, are top men on the over-$1,948,000 contract of Morrison-Knudsen Co., Inc., for the Gateway Canal, part of the Weber Basin Project in Utah, described in **Western Construction** last month. Other important personnel are **George Skelton,** master mechanic; **Tom Randol,** project engineer; **John Heasley,** office engineer; **J. B. McClelland,** office manager, and **Dave Montgomery,** paymaster. Excavating foremen are **"Red" Martin, Dean Straw, Merle Schellenbarger. Bob Boyer** is field mechanic. Structures and pipe foremen are **Carl Prescott, Harold Green,** and **Don Dike.** Among the large crew on this important work are the following dozer and scraper operators: **L. Baer, W. Payne, S. Stevens, A. Olsen, W. Bernard,** and **R. Wright.** Work should be finished this year.

Bert R. Wooten, assisted by **N. A. Nisonger,** is directing Turner Construction Co.'s $270,000 contract for construction of sewage disposal plant for the city of Midvale, Utah. Assisting these superintendents in this work, which is now in the completion stage, are the following foremen: **Tony Wallace** and **James Horne,** carpenter, and **J. Jacobsen,** mechanical.

* * *

Glenn V. Stevens, general superintendent, and **Frank Davis,** project engineer, are top men working for Green Construction Co. and S. Birch & Sons Construction Co. which started construction on July 1 of additional ordnance storage facilities, Eielson AFB, Alaska. This $2,872,615, 540-day job got under way July 1.

* * *

Oren A. Nelson is acting as superintendent on a recent award to Nelson Bros. Construction Co. for construction of 3 concrete bridges and approaches on Nigger Hill, Castle Creek, and Big Bend washes in Grand County, Utah. This $96,785 contract is scheduled for completion 90 days from starting date, Sept. 26, 1955.

* * *

Bruce Woodward, project manager, and **Earl Owen,** superintendent, head the construction of a $577,588 access road near Haines, Alaska, on which Ranstad Construction Co. started work Aug. 22, with completion date set for July 1, 1956.

* * *

Ed Gibson is superintendent on construction of a bridge on the Siletz River bridge section of highway in Lincoln County, Ore. **Lee Hoffman** was awarded the contract on a $124,510 bid and started work Sept. 6.

* * *

Dan Handy, superintendent for Lowdermilk Brothers, is supervising a 6.7-mi. grading and surfacing job in San Juan County, Colo. **R. G. McGillivray** is assisting as concrete superintendent. Other key men are **John T. Guthrie,** powder foreman; **Frank K. English,** grade foreman, and **Lloyd C. Smith,** timekeeper. Work started Aug. 8 and is expected to take 150 calendar days.

* * *

"Slim" Merrick is superintending a $837,824 job for A. S. Horner Construction Co., located in Mesa Verde National Park, Colo., consisting of 0.2 mi., Project 1-F tunnel, Park Entrance Road. **Dale Thayer** is office manager. Job started July 1 and will probably end July 1956.

* * *

Clayton Hoon as a project manager is in charge of Utah Construction Co.'s recent award at $1,372,766 for construction at the Weber Basin Project in Utah. Work involves Pineview Dam enlargement and highway relocation. Project engineer is **William H. Lee.** Others among the key personnel are **C. J. Getz,** office manager; **Arthur Rudford,** assistant superintendent, and **Tony Zakotnik,** master mechanic. Field engineer is **Howard P. Yocum.**

* * *

Cal Rickel is general superintendent on construction of Stoddard diversion dam and gateway canal, Weber Basin Project. A. S. Horner Construction Co. was the successful bidder at $495,917. Work started on this Utah job Aug. 3 and is expected to be complete in 540 days.

* * *

Bill Hamilton is supervising a job for T. C. Holmes, contractor on the $132,566 award covering grading and surfacing about 9.4 mi. of Phoenix-Payson highway northeast of Mesa, Ariz. **Glenn Bagwell** is handling the bookkeeping end of the job. Work will soon be completed.

* * *

L. C. Arpin, project manager; **G. F. Chinnici,** general superintendent; **Bob Butler,** office engineer; **Jack Filance,** field engineer, and **Gordon Elmore,** foreman, comprise the top supervisory personnel for Vega Engineering & Grading Co. which has the $1,519,646 contract for earthwork, concrete lining and structures, Texas hill canal and distribution system, Wellton - Mohawk Division, Gila Project, Ariz. Work on this 440-day project got started Aug. 28.

* * *

W. J. Harrison, superintendent for Phoenix-Tempe Stone Co., is handling a 3-mi. grading and surfacing job on the Prescott-Phoenix highway near Congress, Ariz. **Charles Lukin** is in charge of the office. Going since Aug. 30, work is set for completion by the end of the year.

* * *

Carl L. Croft is project manager and is also doing the purchasing for I. L. Croft & Sons, Inc., which recently won an award for 4.2 mi. of grading and surfacing, west of Independence and Forest in Inyo County, Calif. General superintendent on the job is **John Molinar. Lewis E. Nebe** is assisting as tractor foreman. This is a 95-day job which started in early September. Contract price $195,740

Dirtmoving for Disneyland

After 20 years of dreaming and planning, Walt Disney's fabulous Disneyland is at long last a reality. Located just off the Santa Ana Freeway about 30 minutes from Los Angeles, this giant playground is expected to attract 5 million visitors early. Main attraction will be a castle filled with life-size Disney cartoon characters (Fantasyland). There'll also be a log fort and authentic buildings of the Old West (Frontierland). There'll be boat voyages past lifelike displays of romantic parts of the world (Adventureland) and "rocket trips" to a city of the future (Tomorrowland).

To the realization of this whole magical $10,000,000 Disney kingdom, Contractor S. A. Cummings, Compton, California, played an important part. Cummings' 5 C Tournapulls handled nearly all dirt work on the 160-acre tract . . . moving 280,000 cubic yards of sand and sandy loam in 6 months. Almost all of the yardage moved was precision work. The "C's" dug boat channels, hauled material for railroad embankments, built artificial hills and even rocket platforms. They graded a parking area for 10,000 cars, leveled building sites, dug several lakes, a castle moat, and a storm drain.

5 Tournapulls move 300 yds. hourly

In typical operation — excavating a 5-acre lake and spreading the material to build up 20′ berms for a ⅝-scale model railroad — each of the 5 Tournapulls was push-loaded with 12 pay yards of sand per load. Typical 6,600′ cycles, with most of haul up 5 to 10% grades, took 10 minutes. Output per machine per 50-minute hour averaged 60 pay yards . . . output for the fleet of 5 "C's" averaged 300 pay yards per hour.

Ralph Gastelum, Supt. for Cummings, reports, "I believe this job was ideal for Tournapulls because of the sand we had to work with, and the small places we had to maneuver in. Fills were high and narrow, and cuts, particularly the channel cuts, small and winding, which made it very difficult to load . . . yet Tournapulls did an excellent job."

Let us show you how Tournapulls can help speed your jobs, too. Call or write for details on performance . . . price . . . and delivery!

Tournapull—Trademark Reg. U.S. Pat. Off. P-838-B-b

NOW . . . a size Tournapull TO FIT YOUR NEEDS

Model B . . . 23 yds. heaped Model C . . . 16 yds. heaped Model D . . . 7 yds. heaped

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Walsh Construction Co. at San Jose treatment plant

R. L. Mitchell

Construction of a new sewage treatment plant at San Jose, Calif., is a joint venture project of Walsh Construction Co. and E. V. Lane Corporation. Important personnel, headed by **R. L. Mitchell,** general superintendent, are **W. C. McCandliss, Jr.,** assistant structure superintendent; **John P. Martin,** assistant mechanical superintendent; **John Cook,** project engineer, and **J. J. Kennedy,** office manager. Shown here is Superintendent Mitchell and group of the Walsh-Lane men: L. to r.—**Jack Mitchum,** crane foreman; **Joe Franklin,** reinforcing steel foreman; **Luis Nunes,** pipe foreman; **John Bridewell,** reinforcing steel foreman; **George Bender,** carpenter foreman; McCandliss; **Art Weathers,** carpenter foreman; **"Tex" Martin,** master mechanic; Kennedy; **Charles Smith,** cement finisher foreman; **Jim Story, Harry L. Carlson** and **Charles Roberts,** all carpenter foremen; **Homer Ramsey,** pipefitter foreman; Cook, J. Martin, and **Jack Williams,** pouring foreman. Other foremen not shown here are **Lawrence Dunlap,** labor; **Andy Ness,** pouring; **Dominic Barbaria,** pipefitter; **Thomas DuBose,** millwright.

Sam Ball is Griffith Company's superintendent on its dirt moving contract at the Del Cerro Subdivision at San Diego, Calif. **Fred Cody** is equipment superintendent, and **Clem Waters** is master mechanic.

* * *

Gordon Henry is superintendent, **Curtis Knudson** is carpenter foreman, and **W. G. "Whitey" Spalding** is labor foreman on a $1,200,000 contract of M. H. Golden Construction Co. for erection of barracks for 860 men at the Naval Amphibious Base, Coronado, Calif. Contract is scheduled for completion in June 1956.

* * *

Wayne Lowdermilk as superintendent for Lowdermilk Brothers is in charge of a $392,016 highway contract covering 6.3 miles of grading, surfacing, and structures in Boulder County, Colo. Assisting on this 120-day job which started Aug. 1 are the following foremen: **Roy Bailey,** grade; **R. C. McGillivray,** structures; **Ruben Richmond** and **Anton Jensen,** labor.

* * *

A. M. Willis is superintending a contract for Big Horn Construction Co. which covers grading, surfacing, and miscellaneous work on 6.6 mi. of the Sheridan-Buffalo road in Johnson County, Wyo. Base course construction started in early September on this $234,797 award. Oiling work will be done next year.

* * *

Charles McInroe and **Don Boots** are directing Rogers Construction Co.'s $237,504 grading and surfacing contract for 2.4 mi. of the Hillsboro section of Tualatin Valley Highway at Hillsboro, Ore. These two men are also superintending another Rogers contract covering grading and paving. This is a $844,000 job for 2.6 mi. on the Bradley Park-Wauna section of the Columbia River Highway, 21 mi. east of Astoria, Ore.

* * *

In addition to **Frank C. Wood, Wes Myers** and **James Hall** reported in our August issue as key men for Clyde W. Wood & Sons on improvements to the Los Angeles River channel, here are some more important men on the job: **Joe Muscolo,** paving superintendent; **Paul Suckow,** engineer and chief of party; also the following foremen: **Harry Schultz,** general; **A. H. Wright, Ellis Daniel,** and **J. D. Hogard,** concrete; **Bob Nutt, Claude Skaggs,** and **V. D. Burks,** excavation; **J. A. "Lefty" Wilson,** carpenter, and **Tom Rice,** master mechanic. In the office, **Leonard Ball** is manager, and **Bob Simmons** is timekeeper. Involved in the project, scheduled for completion in December, is a concrete slab 300 ft. wide and 10 to 12 in. thick.

For the USED, **L. G. Hogue** is project engineer. Other engineers on the project are **Bill Robinson, Larry Skanter, Bill Chambers,** and **Sam Barker.**

* * *

R. W. Bailey is superintending the $3,000,000 contract of Robert E. McKee, General Contractor, Inc., for new maintenance facilities, including offices and hangar buildings, for American Air Lines in Southern California. **D. E. Waters** is office engineer and **F. W. Anding** is field engineer. Among the foremen are **J. W. Helton,** general carpenter, and **R. C. Meeks,** general labor.

For Quinton Engineers, **Carl Lucas** is office engineer, **Ralph H. Winnes,** field engineer, and **A. L. Reaugh,** soils engineer.

* * *

Chester A. Allen, Jr., project manager, is in charge of a $3,458,285 award to Peter Kiewit Sons' Co. for runway construction at Hill AFB, Ogden, Utah. Project engineer is **John P. Briggs. Harland Gottbrecht** is grading superintendent, and **Ray Hegarty** is gravel-laydown superintendent. **Roy Stroud** is master mechanic. Other superintendents are **Roy Rekanstrud,** concrete paving; **R. C. Brown,** utilities; **Robert Hoyt,** asphalt paving. Among the foremen are **Orville Broson** and **Mel Babcock,** crusher; **Carter Basset,** batch plant; **John Kaufmann** and **Ivan Beaudoin,** grading. **David K. Van Allen** and **Jack H. Braithewaite** are party chiefs. Office manager is **Joe Lamb,** and **Wayne J. Eldredge** is office engineer. This Corps of Engineers' Project was started in May, with completion date set at September 1956.

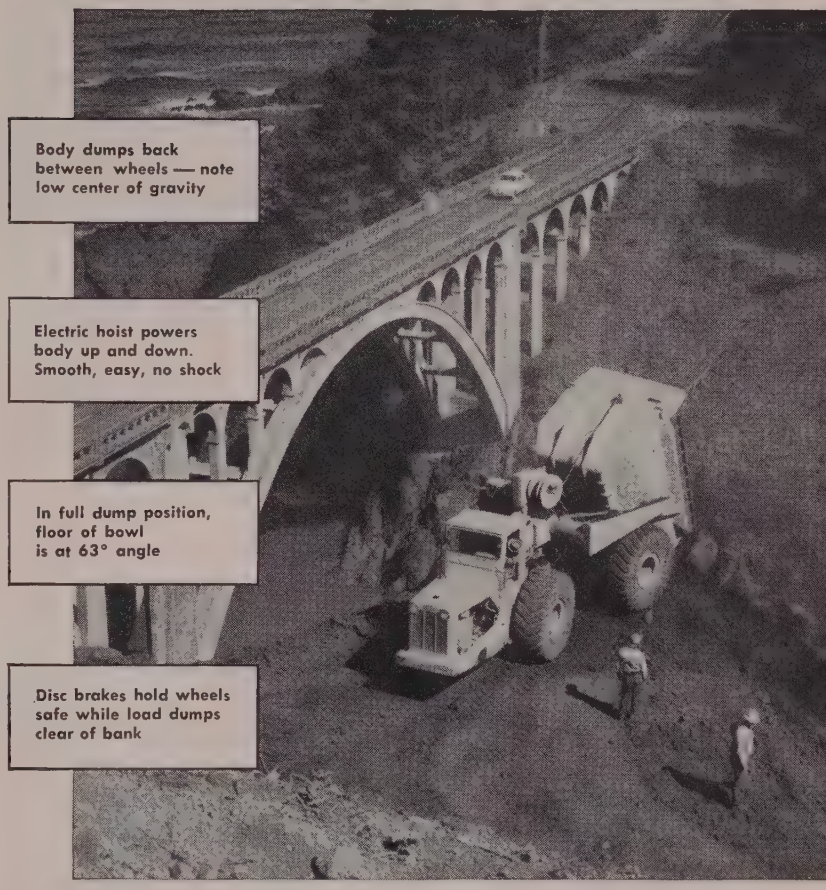
* * *

Paul Cross is supervising grading and surfacing 3.9 mi. on US 666, near Gallup, New Mex., for Henry Thygesen & Co., which is doing the work at a cost of $393,726. A 200-day project, work got under way Sept. 12.

Dumps anywhere— over-the-edge or on-the-move

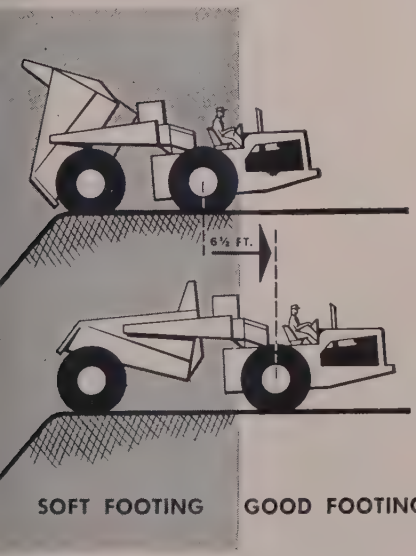
Tournapull Rear-Dumps can go anywhere—on or off-the-highway — to place loads exactly wherever you want them.

To dump over the edge of bank, all you do is back close to dump point. Rig's big single tires and power steer take you over rough footing and soft fills where many trucks can't go. Dump is made by flicking electric switch on control panel. This instantly activates hoist motor. Body "rocks" back easily over rear axle. You have power up and power down. Movement is under positive cable control at all times, can be stopped at any angle. At full dump angle, bowl lip is at ground level *behind* rear wheels. This position prevents material from rolling forward under wheels. It also provides free dump over edge of bank and greatly reduces need for dozer cleanup.



Safe at all times

In dumping, Tournapull Rear-Dumps are safer than any truck. Front-wheel-drive keeps power and traction on solid footing well ahead of rear wheels. Because body does not need to clear frame, springs, axle, or differential, its center of gravity stays low, even during dump. Oversize multi-disc air brakes — *with more braking surface on one wheel than comparable-size trucks have on all four* — prevent creeping or rolling.



Separate braking of front and rear wheels can be used with action of hoist to help front wheels pull away from edge of soft dump. In case of trouble, rear brakes are set, front brakes released. When bowl is lowered from normal dumping position, free-rolling prime-mover wheels are pushed forward. On the "C" size Rear-Dump, they move 6½ ft. — usually enough to find good footing. If front drive wheels do not reach good footing after bowl is lowered, same "leap-frog" process can be repeated. Simply pull rear wheels forward by setting front brakes and raising bowl, then set rear brakes and push front wheels ahead by lowering bowl.

Accurate spreads while moving

Tournapull Rear-Dumps can also spread on the run. Bowl can be safely raised and lowered at normal haul speed. Operator simply positions bowl for desired flow of material and continues to drive.

There's a Tournapull Rear-Dump size to fit your needs

"D"	"C"	"B"
9 TONS	22 TONS	35 TONS
138 HP	208 HP	293 HP

Prime-movers for these Rear-Dumps also power scrapers, bottom-dumps, flatbeds, and cranes.

Tournapull—Trademark Reg. U.S. Pat. Off. R-778-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

C. F. Denton

Gulbranson *Glaesemann*

On the job with Northwestern in Montana

C. F. "Spot" Denton recently superintended a paving contract for Northwestern Engineering Co. costing about $170,000 for the City of Glendive, Mont. **Roy McDuffee** was plant superintendent. **Walt Linderman** was office manager. Others among the crew were **G. M. Glaesemann,** master mechanic; **George Gulbranson,** plant operator, and **Russ Larson,** crusher operator. General field marshal is shown in lower right hand corner.

G. Henry Eberhardt, superintendent for Northwestern Engineering Co., is directing the grading and surfacing of 21 mi. of the Anthony-State College road in Dona Ana County, New Mex. Other key men are **Gordon R. Campbell,** office manager; **Emmett L. Richardson,** quarry foreman; **Lawrence E. Savoie,** master mechanic, and **Leonard F. Pont,** crusher foreman. This is about a 150-day job which started Aug. 1. Northwestern got the award at $353,543.

* * *

"Shell" Hatch is supervising a 8.5-mi. grading, draining, and 4-span bridge job on the Mexican Hay Lake road in Apache National Forest, Arizona, which went to the Sheldon G. Hatch contracting firm at $136,200. Two other key men are **H. C. King,** bridge superintendent, and **Lee M. Olsen,** foreman.

* * *

Art Smith is project manager, and **Fred Snow,** general superintendent, on a 4-story addition and remodeling job on the First Security Bank in Salt Lake City, a contract which has

Lazenby *Christman* *Snow*

been under way by Utah Construction Co. since September 1954, and is about finished. Assisting are **Jay Lazenby,** carpenter foreman, and **Joe Christman,** labor foreman.

Foley Electric Co., subcontractor, has **Bill English** as superintendent. Another sub is James Bros. Plumbing Co., heating, plumbing, and air conditioning.

Bernhard Tullinen is in the top spot as superintendent on construction of a main PX building at Fort Richardson, Alaska, being erected by E. M. Peterson Construction Co. at a cost of $388,888. Other key personnel are **Joseph Yawney,** office manager; **Frederick Pearson,** engineer; **Joel C. Johnson,** carpenter foreman, and **Al Saulsbury,** labor foreman. As of Sept. 15, the job was over 21% completed.

* * *

Barney Bell, superintendent, is in charge of Granite Construction Co's contract on the new Santa Cruz, Calif., freeway. He has the assistance of **Ken Foote,** concrete and bridge superintendent; **John Naur,** excavation superintendent, and **F. W. Hull,** labor foreman. The office is in charge of **Ollie Grimes.**

* * *

Robert H. Hordyk is superintending Swinerton & Walberg's contract covering addition to the General Foods Co. building at San Leandro, Calif. **Alex Paul** and **Gordon Tyndall** are foremen. **J. A. Watkins** is saw man. Job accountant is **Lorraine Kero.**

* * *

David O. Fletcher is quarry superintendent for Morrison-Walsh-Perini at Wishon Dam, near Fresno, Calif. Of rock-fill construction, Wishon Dam is a M-K sponsored project for the Pacific Gas & Electric Co.

* * *

Elmer Cross, superintendent, and **E. A. Kemp, Bill Mueting, Don Kerman,** assistant superintendents, are directing the work of MacDonald-Young & Nelson, Inc., contractor on the terminal separation at San Francisco for the San Francisco-Oakland Bay Bridge. Job engineers are **Al Crowl, Lorn E. Anderson, Dan Apker** and **Jack Hilligoss. Bob Russell** is in charge of the office and **Ronney Helling** is timekeeper. Carpenter foremen are **Emil Kallio, E. T. Kemp, Emil Kemp, Walter R. Gibson, Donald V. Kerman, Oscar A. Koskella, Jack Nelson, Robert Scott,** and **Eine E. Sinisalo. Walter Masche** is piledriver foreman, and the labor foremen are **Ray Kidder, Dell K. Patterson,** and **Forest L. Wilson.** Completion of this over-$5,000,000 project is expected to be in early 1957.

* * *

F. C. Harp, project manager, **Ed Enstrom,** superintendent, and **Lloyd Vaughn** and **Clyde Bush,** assistant superintendents, are key men for Lindgren & Swinerton, Inc., which is building a plant for Kimberly-Clark Corp. at Fullerton, Calif. Engineer (at the company office in Los Angeles) is **R. J. Dietrich. Karl Siegmund** is office engineer and **Wayne Hodgeson** is field engineer for the contractor. **Dick Finan** is expeditor. **John Leigh** is in charge of the office. Concrete foreman is **Tony Perrotto** and the following are carpenter foremen: **O. B. Stureim, Victor Hugo, John A. Daley, P. G. Freese, A. L. Miller, W. B. Lawson, W. H. Couch. Mike Savadra,** and **Don T. Robertson** are labor foremen.

Willard Lowry represents Skidmore, Owings & Merrill, architects, of San Francisco. **Wesley B. Woodside** is inspector for the architect and owner. **Jim Murphy** is project manager also for owner. Representing Blue Diamond Steel Co. is **Fred Pfeuffer.**

Now three months under construction, this $10,000,000 steel building will have a porcelain enamel panel exterior and is expected to soon go on two shifts for early completion. Bethelehen-Pacific is erecting steel.

* * *

Ben Sloter is supervising construction of the $1,500,000 Cecil B. DeMille High School going up at Long Beach, Calif., contract for which is held by F. E. Norcross. Other key men are **Dick Unz,** assistant superintendent and engineer; **Curt Neely, Joe Hoyem, Lee Vanderhagen,** carpenter foremen; and **Jim Conte,** labor foreman.

* * *

Ennis E. Johnson, employed by Peter Kiewit Sons' Co., recently moved to Topeka, Kansas, where he is office engineer in connection with the construction of a 1,000-bed Veterans Hospital.

(Continued on page 92)

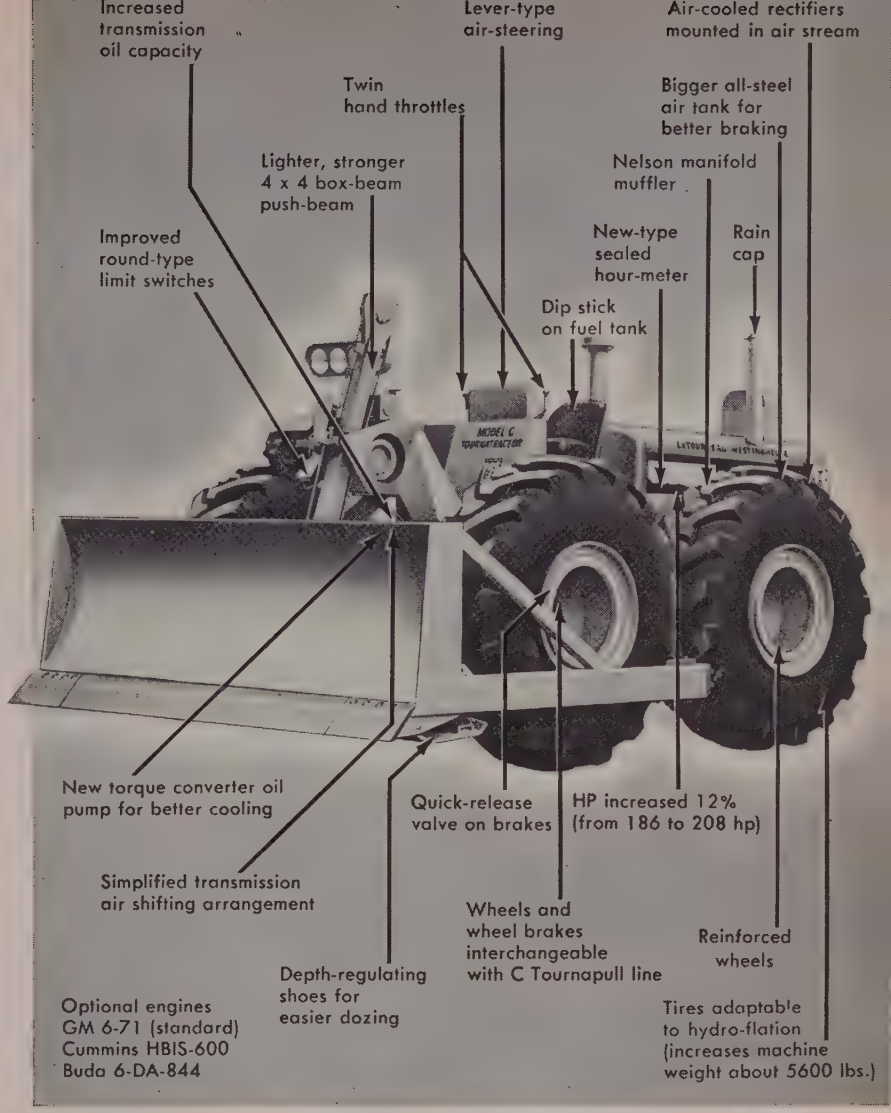
MPORTANT CHANGES

nave been made

Since the LeTourneau-Westinghouse Company was formed in 1953, many important machine improvements have been made. All these shown are standard on current-production models of the rubber-tired C Tournatractor. Study them for yourself . . then let us show you first-hand what they can mean to you.

Ask for demonstration

Call us anytime. We'll be glad to drive a *new model* Tournatractor to your job, then work it until you're convinced. There is no obligation, no cost to you.

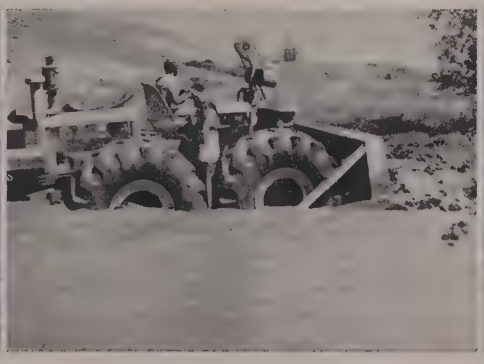


Tournatractor—Trademark Reg. U.S. Pat. Off. T-800-G-b

Breaking up rock seams, pavement, etc., Tournatractor can tackle as tough jobs as any crawler. Loading may be slower and cuts thinner on some heavy materials, but faster push and return save time. On long pushes, Tournatractor often doubles crawler output.

Tournatractor's sealed power-train takes it safely through water, mud, dust . . . prevents damage and wear to bearings and moving parts. Lubricants are not washed away nor filled with abrasives. Maintenance is lower since 4 wheels do work of 500 track parts.

Ideal for scattered jobs, Tournatractor spends minimum time in travel. Top speed is 19 mph . . . 1,670 ft. per minute. Rig goes anywhere without planking . . . travels over pavement or cross-country . . . needs no loading, no extra men or expense for trailer-haul.



LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

TRICKS of the TRADES

Cleveland trencher with two conveyors lines sides of canal with 3.5-ft. dikes

A CLEVELAND MODEL 320 Trencher recently completed digging some 23 mi. of trenches on a 27,000-ac. ranch located in the dry bed of Buena Vista Lake between Bakersfield and Taft in California's San Joaquin Valley. Trench was excavated at the rate of more than 18 earthbound cu. yd. per min. by a standard Model 320 specially equipped at the Cleveland factory to do this job. The Cleveland was fitted at the factory with sloper blades, an extra dirt conveyor and an extra conveyor drive transmission.

The trenches dug will be used at times for drainage and at other times for irrigation of the ranch land, as water conditions in the dry lake bed require. This two-fold employment of the trenches means that only a minimum amount of the tremendously fertile soil of the lake bed is required for drainage and irrigation canals.

The trenches are 12 ft. wide at ground surface, 7½ ft. deep and 52 in. wide at trench bottom. Digging to accurate grade at a speed of 8 lineal ft. per min., the trencher threw up spoil banks measuring approximately 5½ to 6 ft. high and 12 to 14 ft. wide at the base. It discharged spoil simultaneously and evenly to both sides of the big trench.

Bulldozers compacted the high spoil banks to form water-holding dykes 3½ ft. high above the level of the surrounding ranch land. Thus the trench and the dykes together formed huge water channels 11 ft. deep and 18 to 20 ft. wide at the top—economically constructed and highly efficient canals.

Convenient cable clamps

THE TASK of suspending heavy armored electrical cables in vertical shafts can be conveniently done by using hose clamps made by Punch-Lok Co., 321 N. Justine St., Chicago 7, Ill. The workman need carry only two items—the clamps and the locking tool. No screws, screwdrivers, drills, or other tools. The open-end clamps are slipped around both the 3-in. cable and Wooden vertical support at 3-ft. intervals. They are then tensioned and locked by means of a special locking device. The clamps will not loosen but they can be removed for moving the cable. Many other applications are described in a booklet available from Punch-Lok.

Filling tires with liquid cuts slippage, tread wear

LIQUID FILLING of farm and industrial tractor tires is an old and accepted practice. In the last few years, it has been tried extensively in self-propelled scrapers and big rubber-tired tractors, too. While all the benefits and possible faults are not yet known for dirtmoving uses, certain obvious advantages make it worth consideration.

Biggest advantage is that liquid filling greatly increases the weight—and the traction—on drive wheels. For example, the weight of the liquid alone increases the weight of one 16-ply 21:00 x 25 tire—700 to 1,400 lb.

If you weight the four tires of a LeTourneau-Westinghouse Tournatractor in this way, you add up to 5,600 pounds to its working weight. Even allowing for greater rolling resistance (due to the added weight), pull is increased by 3,000 lb.

Liquid filling the drive tires of other earthmoving equipment increases drawbar by similar margins. And, because the solution counterbalances as the wheel rotates, you lose practically no power on the haul. The weight also cuts slippage and tread wear, and reduces need for frequent re-inflation.

The liquid usually used for weighting is either plain water or a mixture of calcium chloride and water. The calcium chloride solution increases weight and also provides protection against freezing.

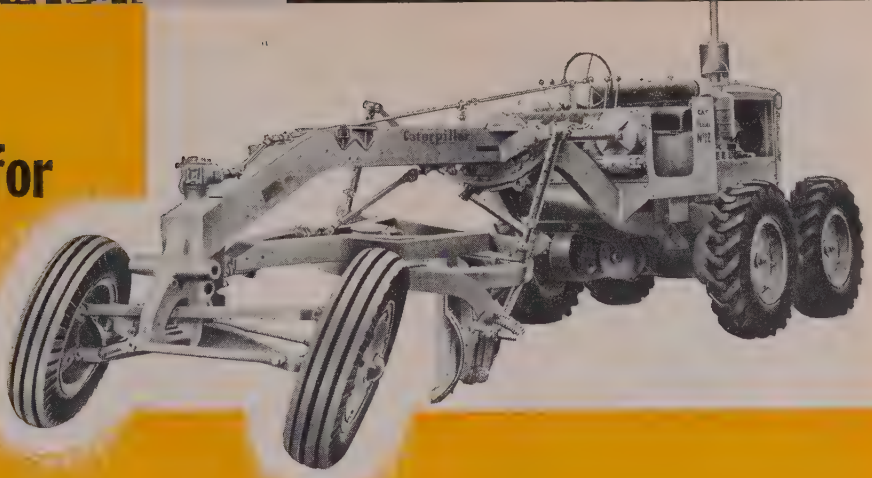
Directions for filling

Liquid filling is simple. First, thoroughly mix the calcium chloride with water. Follow recommendations of the tire manufacturer—usually three to five pounds of the chemical are added to each gallon of water. Next, jack up wheel of machine to remove all weight from tire. Then, rotate tire until valve stem is at top and perpendicular to ground. Remove as much air as possible. Attach nozzle of hydro-inflater to valve stem. Remaining air will escape as solution is pumped in.

When solution reaches valve stem level, remove nozzle and inflate tire with air to manufacturer's recommended pressures. On construction equipment, tires should not be filled with liquid above 75% capacity. Valve should be at highest position when checking air pressure.

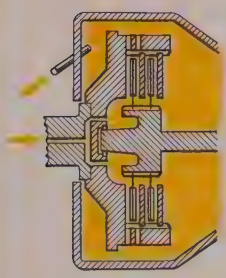
One word of caution if you use the recommended calcium chloride solution instead of just water . . . be sure to obtain tubes with special rubber-sealed base valves. This type valve will prevent separation of the rubber valve base and the metal. Special corrosion-proof gage should be used for checking pressure, too. Equipment for the liquid inflation can be obtained from any agricultural implement dealer or any large tire distributor or dealer.

Exclusive new oil clutch for CAT* No. 12 Motor Grader can give you

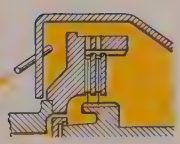


1500 HOURS without clutch adjustment

How the new oil clutch works



Crankcase oil is directed, under pressure, into clutch compartment through holes in flywheel. It is circulated by centrifugal force and returned to the crankcase by the flywheel ring gear. When the clutch is disengaged, cool oil surrounds the specially bonded cork facings.



As clutch discs move to engaged position, facings are "oil protected." Once engaged, they are completely free of oil.

Cork facings have a network of grooves that enable oil to escape during engagement. Oil constantly lubricates all moving parts.

Extensive tests have shown that clutch facings wear an average of only 2½ *thousandths of an inch per thousand hours of operation* with the new oil clutch for the Caterpillar No. 12 Motor Grader. Here are four good reasons why this new oil clutch can mean lower cost, better performance on *your* job:

1 LONG LIFE: new clutch facings greatly extend clutch life by reducing slippage. This is possible because of the high frictional qualities of the bonded cork facings. Since the clutch runs in oil, constant "oil bath" lubrication cuts wear on moving parts.

2 GREATER EFFICIENCY: clutch action stays smooth and "like new." Clutch "fade" due to overheating is practically eliminated, since facings are kept cool by engine oil.

3 EASY MAINTENANCE: nine months without clutch adjustment is not unusual in road maintenance work. Constant oil splash makes ordinary lubrication for clutch or throwout bearings unnecessary.

4 JOB PROVED: in exhaustive, on-the-job tests, this exclusive oil clutch in the No. 12 has delivered the same efficient, reliable performance as the thoroughly proved oil clutch on Caterpillar track-type Tractors.

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

CATERPILLAR*

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

99% OF ALL CAT MOTOR GRADERS ARE STILL IN USE

TOOLS of the TRADES

Use the addresses listed for further information on any of these items

Graphic grading markers

SURVEYORS ARE TAKING the guesswork out of land leveling with a new kind of grading marker, developed by W. D. Hargus, a member of San Diego State College engineering faculty.

It is a heavy water resistant paper sleeve which is placed over a stake. The sleeves are clearly marked graphically so that the excavating operator can read them as far as 600 ft. away.

Because the markers have varying border widths which give the amount to be cut or filled, errors of judgment are eliminated. The excavator can check the amount to be cut or filled by glancing at the marker instead of relying on his memory or getting off the equipment and checking the crayon marked stake.

Black on white

A border of black at the bottom of the marker designates the fill wanted and the top of the border indicates the finished grade. The marker used to designate fill has an "F" at the top in black on a white background. Under the "F" is a numeral indicating in increments of tenths of feet how much it is to be filled.

Cut markers are marked at the top with a "C" and also use a border to designate graphically the depth of cut at the stake. Obviously, the finished grade cannot be indicated directly for it is below the surface of the ground. However, the next best thing is done. The bottom of the cut border automatically falls one foot above the finished grade when the bottoms of the markers are placed at the original rod reading elevation. Cut markers are printed in red.

This reference plane is automatically set one foot above the finished grade where cuts are less than one foot. If a deeper cut is desired, a slight modification of this method will produce the same results.

The marker is made of waterproof paper and glue and slips over the regular wooden stake normally used in land leveling.

HARDFACING PASTES which can be applied without special skill have been developed by **Western Carbide Corp.**, subsidiary of Superweld Corp., 6840 Vineland Ave., No. Hollywood, Calif.

Available in tubes or jars, the new paste can be used on any metal whose melting point is higher than that of the paste (1850 deg.) F. Using gas flame, it can be applied to metal of less than ¼-in. thickness; with proper induction heating, any thickness of metal can be hardfaced. The paste is expected to be of value in manufacture and maintenance of farm tools, earthmoving equipment and general industrial use.

RAMSET IS OFFERING a package which will permit a ¼-in. threaded stud-pipe fastener to be used in a ⅜-in. barrel. This means that 90 per cent of normal fastening in construction jobs would be possible without the change of the barrel by the operator of a Ramset ⅜-in. power-actuated tool.

The double use of the ¼-in. fastener was made possible by replacing the ¼-in. plastic tip normally used with a ⅜-in. plastic tip. Then a reusable screw-on utility driver head is supplied for use on the threaded end of the stud making the ¼-in. fastener fit in the ⅜-in. barrel.

The package contains one hundred ¼-in. fasteners fitted with ⅜-in. red plastic tips and ten reusable utility driver heads.

Ramset fasteners are made by The Ramset Fastening System, Winchester-Western Division of **Olin Mathieson Chemical Corporation,** New York 22, N. Y.

NOW AVAILABLE is the Star Chief line of 25-, 50-, and 100-ft. white steel tapes. The line provides such features as jet black stud markings on every 16-in. center the full length of the ⅜-in. wide white steel tape for convenience in laying out studs. The tool steel end-hook grips tight for hook-on measurements and has a nail-hole at exact zero for surface measuring.

A take-apart case permits opening for cleaning or tape replacement. No special tools required. This feature eliminates the old problem of dust and dirt collecting in the case, gumming up the works. Manufactured by **Carlson & Sullivan, Inc.,** Monrovia, Calif.

A NEW MOTOR conditioner which cleans and lubricates internal combustion engines has been announced by **Revere Chemical Corporation,** Cleveland 6, Ohio.

Known as "Monolube," the liquid conditioner is recommended for use after each oil change or chassis lubrication. Revere advises that it can be advantageously poured in (1) combustion chamber, (2) crankcase, (3) gasoline tank.

When placed in the combustion chamber, is softens and dissipates gum, varnish, sludge, heavy carbon and lead deposits. It will not stall a running engine.

Monolube increases lubricity of motor oil.. It is recommended that in new and rebuilt engines, especially when cleaning up hydraulic valve lifters, Monolube be placed above the oil level.

Addition of one pint or more to every 20 gallons of gasoline is advocated. When used in this manner, the conditioner emulsifies and absorbs water, thus preventing gas tank freezeups and choking of carburetor jets.

A SAW BLADE has been designed especially for use where it is necessary to saw flush or very close to studding and rafters. Among its major uses are: flush cutting of door plates, cutting into a wall or floor, and cutting off ends of siding or roof overhang. The circular blade fits on to the No. 77 Skil Saw. **Barnes Blade** Co., 16249 Colorado Ave., Paramount (Los Angeles County), California.

BUILDERS, carpenters, plumbers, and electricians will find plenty of use for a 25-page 1956 catalog just published. Described in the book are 52 portable electric tools and kits with over 400 accessories. Pictures, specifications, and prices are given for electric saws, sanders, drills, planes, routers, shapers, grinders, shears, and trimmers. Ask for catalog No. 102. **Porter-Cable,** 58 Exchange St., Syracuse 8, N. Y.

ELECTRICAL CORD for portable machinery, claimed to have a service life three times longer than present highest quality cords, has been developed by **United States Rubber Co.,** 5675 Telegraph Road, Los Angeles 22, Calif. The cord is made for use with grinders, drills, power saws, buffers, and other heavy portable tools.

A PRESS which provides 35 tons of thrust has been developed by **Manco Mfg. Co.,** Bradley, Ill. By changing dies the unit can be adapted to a variety of production and maintenance applications. It is powered by a 5-hp. electric hydraulic pump. Complete information is available.

MIR-O-COL electrodes for hard facing have been announced by **Mir-O-Col Alloy Co.,** 312 North Ave. 21, Los Angeles 31, Calif. The rods are recommended for use on tractor rails.

EFFECTIVENESS OF ICE REM, ice and snow melting pellets, is increased by the addition of a new chemical ingredient.

The new element retards rust action and increases storage life.

According to the manufacturer, Ice Rem is an activated chemical that has 30 times the thawing capacity of salt. A light sprinkling on slippery surfaces is said to remove ice and snow without harming vegetation, rubber, asphalt, and paved surfaces.

Ice Rem is available in 10-lb. cans, 25-lb. pails and 100, 200, 300 and 500-lb. drums. Ton lots are shipped in 100-lb. waterproof bags. For additional information, write to **Speco, Inc.,** 7308 Associate Ave., Cleveland 9, Ohio.

$750 SAVED IN ONE SEASON

using Torque converter on power shovel

A prominent contractor recently reported that he saved $750 in one season using a Twin Disc *Three-Stage* Torque Converter on one of his power shovels.

This total was comprised of savings on three different phases of the shovel's application. (1) Cable—on two shovels with direct drive, cables were replaced *seven times* on one and *eight times* on the other. With torque converter drive, however, the cable was replaced *only three times.* Resultant saving: $350. (2) Maintenance costs — a saving of 12½ cents per hour, or a season total of $250 on the shovel with the Twin Disc Converter. (3) Fuel consumption — the torque converter unit used ½ gallon less fuel per hour, saving $140 in the 2,000 hour season.

You can realize a *similar* saving from *your* power shovels. *Specify* Twin Disc Torque Converters for your new units or *install* them in your existing equipment. For full details see your equipment or engine distributor. Write for bulletin 135-D.

All facts in the above story are contained in an actual case history. We have not identified the operation because publishing the owner's name would reveal confidential information.

Here are *five* money saving advantages that torque converter drive provides *your* particular power shovel application.

CABLE PULL — Torque converter automatically adjusts for wide variations in dipper loading, substituting greater digging effort for speed when required.

ENGINE OUTPUT HORSEPOWER — Torque converter allows engine to produce near maximum hp when load requires it. High engine power always available for hoisting and crowding.

ENGINE SPEED — Torque converter provides high engine speed throughout its working range, and higher hp output is available for heavy digging and hoisting loads. Converter equipped engine can't lug. Heavy overloads will not kill the engine.

LOWER MAINTENANCE COST—Torque converter reduces peak loads throughout shovel drive train. Cushioning shocks increases wear life for most parts subject to fatigue failure.

LONGER CABLE LIFE — In proved installations, even frayed cables with short life expectancy have been known to last a year or more where a torque converter has provided smooth, sustained output power.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC
Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

SUPERVISING

. . . Continued from page 86

Vaughn Chaisson McGuire

Glass Reed Rounds Pratt

Webb & Knapp in Denver

T. J. Smith is Webb & Knapp Construction Corp.'s project manager on the current Court House Square development at Denver, Colo., a resume of which appears in **Western Construction**, August 1955, p. 17-19. Assistant project manager and author of the article is **J. E. Smith. F. G. Chaisson** is general superintendent; **G. E. Lapham**, assistant general superintendent; **A. J. Magee**, resident engineer. **J. T. Wetzel** is business manager, and **J. W. Allison** is purchasing agent.

J. D. Vaughn is master mechanic. Other key men are: **William McGuire**, general welding foreman, assisted by **A. R. Kendricks**, foreman. **Don Glass**, general carpenter foreman, with **Walt Pratt, Art Reed, M. S. Rounds**, and **G. E. Longbotham**, foremen. **Guy Mertz**, general labor foreman, and **William York, E. D. Hause, J. P. Monseu, Art Tyree**, and **R. D. Yingling**, foremen. **Gregory Aimes** is chief of party.

Blaine Clyde is general superintendent for W. W. Clyde Co.'s over-$700,000 award from the Utah State Highway Department for grading, surfacing and oiling 5.3 mi., relocation of Highway 189, Wanship, Utah. Grade foreman on this job, now about completed, is **Jodie Jensen; Adam Bickel** is patrol operator.

LINED UP HERE with *Vincent A. Plancich* (center), project manager for Lewis Construction Co. on the Fairchild AFB hospital job, are *Elwyn Olcott* (left), labor foreman, and *Jess Christie*, carpenter foreman. This $2,020,500 project, now nearing its finishing stages, is located near Spokane, Wash.

Raymond Blanchard, project manager, and **B. H. Pebley**, general superintendent, are directing Northwestern Engineering Co.'s $700,000 award for earth, gravel, and asphalt work on Valley Highway, Denver city limits 6.3 mi. north, for the Colorado State Highway Department. Assisting on the job, which is now about completed, are **"Hank" Nelson** and **Robert Houston**, crusher foremen; **Louis Parigi**, truck mechanic; **L. H. Lewis**, general mechanic; **L. Thorbjornson** and **George Slater**, field clerks.

Blanchard Nelson

Job accidents take their toll

THESE were the accidents that resulted in death or serious injury on the West's construction jobs during the last reported month.

Charles Beagle, 59, Lyle, Wash., a carpenter, was killed at The Dalles Dam project in Oregon and six other men were injured when a 3-ton wooden panel swinging from a crane crashed into a crew. It was believed the accident was caused by a structural failure affecting the lifting eye.

Merle Baldwin, 30, Kooskia, an Idaho county highway department employee, was killed when the loader he was driving over a narrow road plunged over an embankment.

Ernest Evern, 28, Puyallup, Wash., was killed at Anchorage, Alaska, when a crippled Air Force jet fighter overshot a runway and landed on a construction project where Evern was employed as a civilian worker.

Arthur Sherke, 37, Redding, Calif., was fatally injured on a construction job when he was knocked to the ground by a truck, the wheels passing over his body. Sherke had been employed as an inspector by the California Division of Highways for only three days when the accident occurred. The truck driver was unaware of the accident until he saw the body.

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND July 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF WESTERN CONSTRUCTION, PUBLISHED MONTHLY AT LOS ANGELES, CALIFORNIA, FOR OCTOBER 1, 1955.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Arthur F. King, 609 Mission St., San Francisco, Calif.

Editor: James I. Ballard, 609 Mission St., San Francisco, Calif.

Managing Editor: Robert L. Byrne, 609 Mission St., San Francisco, Calif.

Business Manager: Luther P. Vrettos, 609 Mission St., San Francisco, Calif.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

King Publications, Inc.
Arthur F. King, 609 Mission St., San Francisco, Calif.
Louise B. King, 609 Mission St., San Francisco, Calif.
M. K. Lyons, 609 Mission St., San Francisco, Calif.
M. K. Vogel, 609 Mission St., San Francisco, Calif.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

LUTHER P. VRETTOS
(Signature of business manager)

Sworn to and subscribed before me this 22nd day of September, 1955.

(Seal) (Signed) RUTH POWELL POOL
(My commission expires Sept. 11, 1958)

and gutter work, as well as for concrete walls and circular structures. The bulletin reviews the special system used to align these metal forms.

Bulletin on Bucyrus-Erie 71-B

A new 16-page bulletin is available describing the features and general specifications for the Bucyrus-Erie 71-B shovel (3-yd. capacity). The bulletin illustrates various uses for the machine which can be converted from shovel to dragline, clamshell or crane. Basic engineering features are described. The shovel is powered by a 6-cylinder GM diesel engine equipped with Torcon torque converter. Copies of Bulletin 71-B may be obtained from **Bucyrus-Erie Co.**, South Milwaukee, Wis.

Building forms handbook

Information on the use of panels designed for building forms used in concrete wall construction has just been published by Richmond Screw Anchor Co. The handbook contains information meeting the many requests for this type of information coming from construction men interested in the Richmond Foundation Method. Features include modular panel designs, fabrication details, diagrams and all necessary data. Methods shown have been proved in research carried on by Richmond, based on suggestions from the field. All methods shown are based on using stock lumber. Copies of the handbook may be obtained by writing **Richmond Screw Anchor Co., Inc.**, 816 Liberty Ave., Brooklyn 8, New York.

Electric plants for the job

A 4-page folder illustrating and describing models forming the broad line of electric plants produced by **Kohler Co.**, at Kohler, Wis., is available from the company. Information includes detailed dimensions, weight, and other technical data on various models.

New scraper of Allis-Chalmers

The engineering, design, construction, and mechanical features of the new Allis-Chalmers TS-360 Motor Scraper are described in a catalog now available from the Construction Machinery Division of **Allis-Chalmers Mfg. Co.**, of Milwaukee, Wis. Both drawings and photographs are used in this 8-page brochure to provide a complete understanding of the features of this 20-yd. heaped or 15-yd. struck scraper powered by a 280-hp. A-C diesel engine. Of particular importance are the features which make for operator comfort and add to the productive output of the unit. Complete specifications are provided.

NEW EQUIPMENT

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

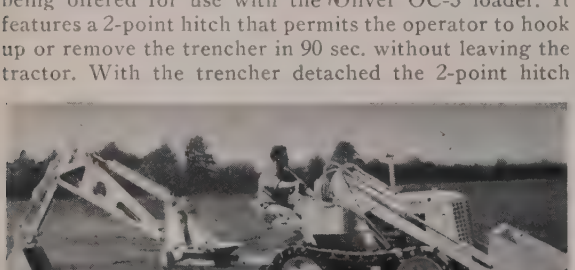
Conveyor-car for bridges spreads 80 cu. yd. per hr.

A new type of concrete conveyor-car for use in bridge construction can handle up to 80 cu. yd. of concrete per hour. Capacity of the conveyor-car is from 5 to 6 cu. yd. carried in four separate hoppers. It is used to convey and deposit concrete wherever required on bridges for subsequent spreading and finishing. The machine weighs 5

tons assembled, motor included. It has a 8-ft. wide frame and runs on the same track as that used by the standard cement finishing machine. Length of the conveyor-car can be varied to suit the width of any concrete highway strip. When desired addition of the vibratory screed permits use of the car for finishing as well as conveying concrete. **Penn Iron Works, Inc.**, Reading, Pa.

Trencher for Oliver tractor detaches in 90 sec.

An all-hydraulic attachment called the jet trencher is being offered for use with the Oliver OC-3 loader. It features a 2-point hitch that permits the operator to hook up or remove the trencher in 90 sec. without leaving the tractor. With the trencher detached the 2-point hitch



holds the counterweight for front end loader or takes a number of attachments such as scarifier bar, grader blade or logging tongs. The jet trencher digs to a depth of 12 ft., lifts to 11½ ft. and clears 7½ ft. for loading of high trucks. Two dipper sticks are available: the longer stick is for digging in moderately heavy soils at depths to 12 ft.; the short one digs to 10 ft. A specification sheet is available. **The Oliver Corporation,** Department 3 T, 400 West Madison St., Chicago 6, Ill.

Truck mixer uses power take-off

A hydraulic drum drive which is powered by a front-mounted, two-speed power take-off, has eliminated the need for an extra engine in a truck mixer made by **Willard Concrete Machinery Sales Co.**, 11700 Wright Road, Lynwood, Calif. The unit, called Hydromixer, with a capacity of 6 cu. yd., has less than a 32,000-lb. load on the rear tandem axles. Charging, mixing, and discharging are controlled by a hydraulic valve. The total weight of the Hydromixer is 7,100 lb.

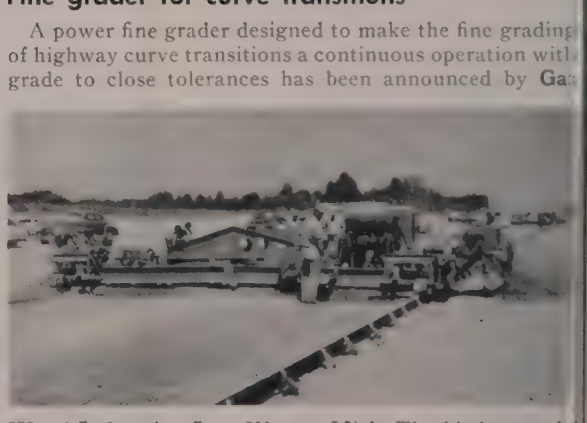
Plow can move at 35 mph. in snow 2 ft. deep

To meet the requirements of various branches of the Government, state and county, a new 4-wheel drive truck snow plow has been developed by **Duplex Truck Co.**, Lansing, Mich. The truck is designed primarily for the removal of snow from airport runways, highways and expressways, as well as general maintenance work. The plow, called FA-844, is powered by a 295-hp. V8, 844-cu. in. engine which develops 730 ft. lb. of torque at 1,600 rpm. and features a torque convertor, automatic transmission with power shift and power steering. Under tests the FA-844 has attained a speed of 35 mph. while clearing snow up to 2 ft. deep in depth off airfield run-

ways. Equipped with a hydraulically actuated Root Spring Scraper reversible angle plow (which allows the snow to be deposited on either side) the operator has great maneuverability which cuts down job time. A ballast box (shown in the photo) can be replaced by dump body or an engine for driving a rotary snow plow. Full specifications are available.

Fine grader for curve transitions

A power fine grader designed to make the fine grading of highway curve transitions a continuous operation with grade to close tolerances has been announced by **Ga**



Wood Industries, Inc., Wayne, Mich. The blades can be changed from a level cut to a crown cut without stopping the machine. This eliminates extra concrete for a slab that's too thick and protects against penalties for a slab that's too thin.

Extra wheels for job-to-job moving

The Hydrotrail roller, available in 1-, 2½- and 2-ton sizes, eliminates the need for a roller trailer and permits one-man handling of the roller from job to job. The balance permits one man to lift the roller by the towbar

into trailing position when the trailing wheels are lowered. The steering roll locks to prevent pivoting when towing. The rubber wheels can be quickly removed for rolling near buildings or curbs. Water system, dual self adjusting scrapers, cocoa mats are standard equipment. **Western Welding & Mfg. Corp.**, 2025 W. Clybourn St., Milwaukee 3, Wis.

Vibratory borer removes no soil

An underwalk and under-driveway borer powered by a gasoline engine has been announced by **Mall Tool Co.**, 7725 South Chicago Ave., Chicago 19, Ill. The borer re

moves no soil and makes a 2-in. diameter hole under side walks and driveways. Portability is provided by rubber tires which allow the borer to be rolled from one place to another on a wheelbarrow mounting. One man wheels while another carries the boring head and flexible shaft.

Harms Brothers, Sacramento, California, reports—

"Our high-output Austin-Western 111 crushing plant produces big tonnage at low cost"

This big, high-speed Austin-Western 111 crushing and screening plant is turning out 1″ and ¼″ aggregate for Harms Brothers, Sacramento, California, contractors.

They report: "Individual electric motors drive all conveyors and screens on our 111 plant for smooth, high-speed operation. The 10″ x 36″ jaw crusher, 40″ x 24″ roll crusher and 4′ x 14′, 2½ deck screen give us really big capacity. And the construction extras built into this rugged plant keep downtime at a minimum. It all adds up to high output at low cost for more profitable operation."

Harms Brothers' experience is typical of users across the country who have found that Austin-Western wins "hands down" when compared feature-by-feature with other crushing and screening plants. Study the chart at right to see just a few of the reasons why it will pay *you* to compare before you buy. To get complete, detailed information, see your nearby Austin-Western distributor today . . . or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Why it will pay you to COMPARE before you buy:

COMPARE	A-W	MAKE "X"	MAKE "Y"	MAKE "Z"
1. Steel plate frame for high strength without weight of cast steel frame.	YES	NO	YES	NO
2. Machined steel toggle plate for absolute protection instead of cast iron.	YES	NO	NO	NO
3. Inclined positive-throw type vibrating screen.	YES	YES	NO	YES
4. All moving screen parts operate in rubber bushings that need no lubrication.	YES	NO	NO	NO
5. Over-size self-aligning spherical bearings in crusher.	YES	YES	YES	YES
6. Heat treated chrome vanadium steel shaft in crusher.	YES	NO	NO	NO
7. Individual electric drive motors for all screens and conveyors (optional).	YES	NO	NO	NO
TOTAL	100%	28½%	28½%	28½%

Distributors in Principal Cities of the world

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Keremi Tractor and Equipment Company
902 West 22nd Street
Cheyenne, Wyoming

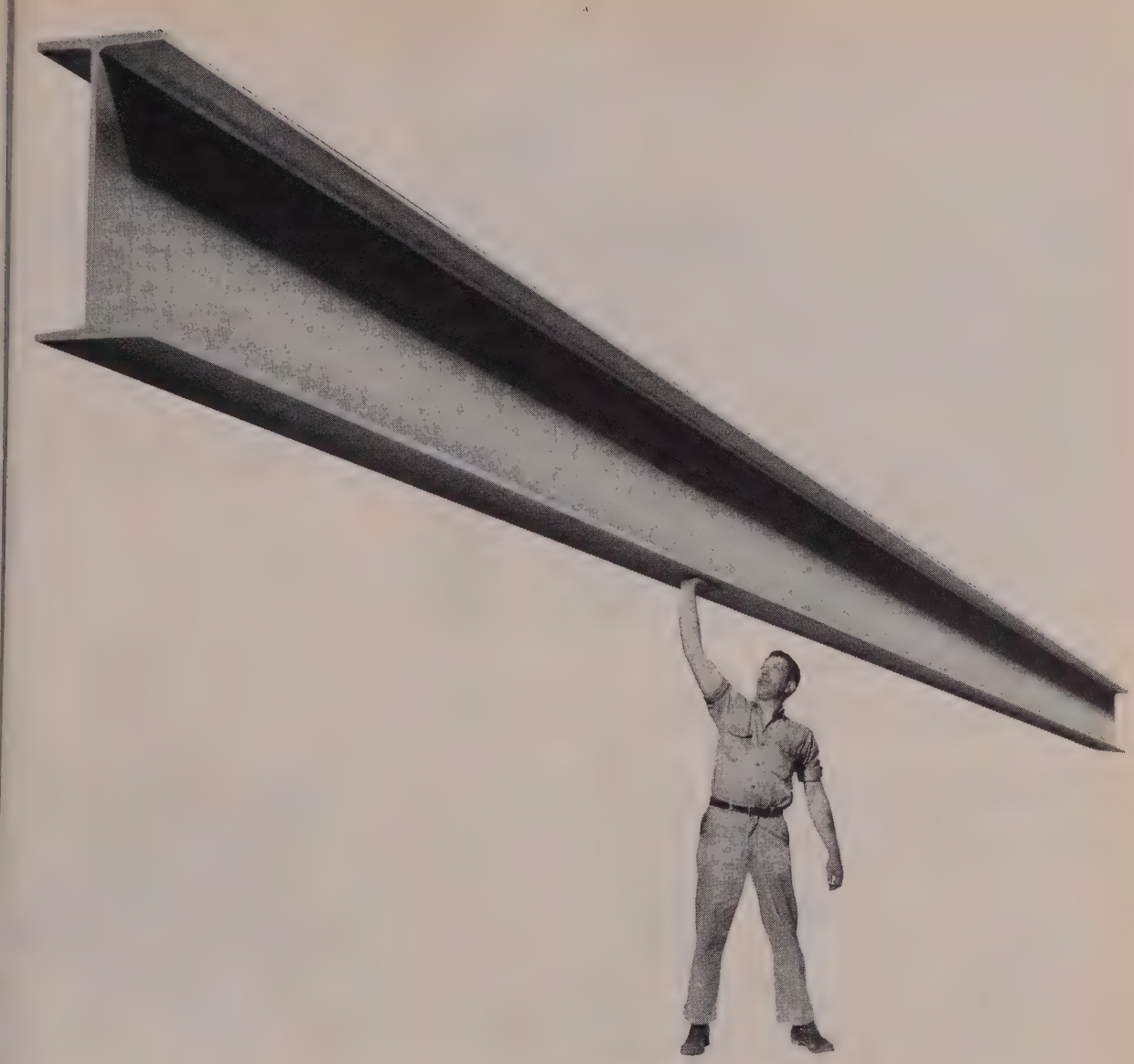
Hall-Perry Machinery Company
1116-15th Street N.
Great Falls, Montana

Northwestern Equipment, Inc.
Fargo, North Dakota
Minot, North Dakota

World's largest earthmover announced

Now available is the world's largest rubber-tired scraper unit, the M-R-S 200. The hauling unit is designed to meet production problems and schedules encountered on multi-million yard grading jobs. Power for the unit is supplied by a 500-hp. M-R-S 200 tractor which is capable of supplying necessary energy to assist a push tractor in

securing a payload at speeds up to 33.9 mph. The power plant of the 33,000-lb. prime mover is a V-12 diesel engine capable of delivering a full 500 hp. in altitudes up to 5,000 ft. The scraper, called the Wooldridge OS-300B, is equipped with broadbase tires for high flotation over spongy and loose surfaces. The weight is distributed over four axles instead of two or three thus reducing the ground bearing pressure. The machine has a struck capacity almost twice as large as the largest competitive model. The manufacturers are **M-R-S Manufacturing Co.** of Flora, Miss., and **Wooldridge Manufacturing Division,** Continental Copper and Steel Industries, Inc., Sunnyvale, Calif.



Big lift for Western builders

THERE ARE three ways that Kaiser Steel is giving a lift to the West's vital building industry.

1. Kaiser Steel produces the most complete line of structural shapes of any mill on the West Coast.

2. Our nearby location assures the shortest possible delivery time.

3. Our locally-available service makes possible immediate, on-the-spot attention from our full staff of trained metallurgists, technical men, production men and sales personnel.

These are the all-important reasons why Kaiser Steel can best meet the needs of western builders.

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tinplate • hot rolled strip • hot rolled sheet • alloy bars carbon bars • structural shapes • special bar sections • semi-finished steels • cold rolled strip • pig iron • ingot molds • coke oven by-products • ferro-manganese • silico-manganese

For details and specifications, write: KAISER STEEL CORPORATION • LOS ANGELES • OAKLAND • SEATTLE • PORTLAND • PHOENIX • DENVER • TULSA • NEW YORK

Portable wood spreader box

Demountable wheels attached to an axle mounted transversely to working position has converted the Pettibone Wood spreader box into a

portable unit. An elevated detachable draw bar permits towing the unit from job to job. The spreader box which is towed behind a dump truck forms imported materials into accurately measured windrows. Specifications and prices are available. **Pettibone Wood Mfg. Co.**, Box 620, 6900 Tujunga Ave., North Hollywood, Calif.

Portable batching bin

Ready-mix operators who need an accurate way to batch truck mixers will be interested in the Conveyex batching bin. With 2 or 3 compartments which can be readily loaded with a front end loader, the Conveyex batches each aggregate separately onto a troughing belt

conveyor for charging mixers. Scale is of the decumulative type which comes back into balance as the indicated amount is discharged from each compartment. The unit is offered with separate cement compartment and scale beam. Literature is available. **Construction Machinery Sales Co.**, Glenwood and Vinton, Waterloo, Iowa

50- to 100-hp. compressors

A line of 2-stage, air-cooled, electric motor driven compressors has been announced by Le Roi Division of **Westinghouse Air Brake Co.**, 1706 South 68 St., Milwaukee 14, Wisc. The stationary compressors have displacements of 260, 415, and 550 cfm. at 125- psi. operating pressure and are available in sizes of 50-, 75-, and 100-hp. Standard equipment of these built-driven compressors includes a control which gives the operator a choice of start-and-stop duty of both motor and compressor or a continuous running of motor with intermittent compressing. Literature is available.

CEMENT TRAINS

C-B Bottom Dump Cement Trains provide the utmost in lightweight top payload performance. Equipped with hold-downs, hatch, access ladder, they also are available with either aluminum or steel covers.

COOK BROS. Bottom Dump Equipment!

...engineered with your hauling needs in mind!

...built for extra-ruggedness, power, and top payload performance!

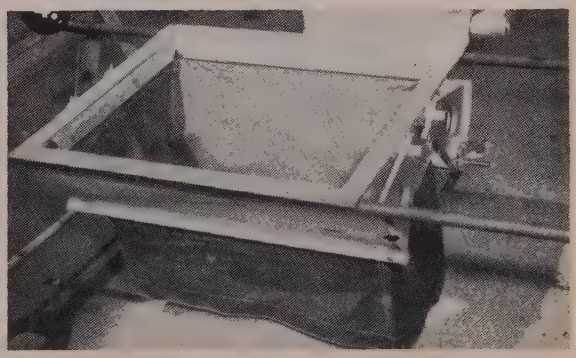
HEAVY-DUTY TRAINS

combine simplicity of design; lightweight rugged construction; and top payload capacity for the roughest, toughest hauling jobs. Each trailer features 42" x 60" clam gates with individual cab controls, air-actuated to prevent load bridging.

NEW COMBINATION CEMENT-AGGREGATE GATE ...with plastic boot (Pat. Pend.)

This new gate with Nylon boot has been developed by Cook Bros. especially for use with rock, gravel, sand, cement and other fine materials.

Hinged gates, clam gates, and single and double acting Butterfly gates are available to meet your operating requirements.



MANUFACTURERS OF: HEAVY DUTY TRUCKS • TRUCK EQUIPMENT • DUAL CENTER CHAIN DRIVES • DUAL GEAR DRIVES • DUMP BODIES HYDRAULIC HOISTS • TRAILERS • TELESCOPIC DUMP TRAILERS • BOTTOM DUMP TRAILERS • SIX WHEEL ATTACHMENTS • FRAME EXTENSIONS

DISTRIBUTORS FOR: CHALLENGE TRUCK MIXERS • C. S. JOHNSON BATCH PLANTS • PIONEER ROCK PLANT EQUIPMENT • AMERICAN HOIST & DERRICK CO., CRANES & SHOVELS

COOK BROS. TRUCK EQUIPMENT

COOK BROS.
EQUIPMENT COMPANY
3334 San Fernando Road, Los Angeles 65
Telephone: CLeveland 6-5151

Setting steel tunnel supports with hydraulic jacks saves time and money...

• **What's Going On Here?**—Look how these heavy steel crown rib tunnel segments are raised and held in exact position with 20-ton hydraulic jacks until the complete rib is in place and bolted together. One man governs the action of these jacks by operating remote control valves. If unstable ground conditions should be encountered another set of jacks can be quickly set up to provide immediate support to the roof, sides and face until the next rib can be advanced and set. Spacer angles bolted between the ribs locate and tie the ribs together into a composite labyrinth. Shallow-depth formed steel lagging plates bolted to the outside of the ribs furnish protection from spalls and provide a surface to support back packing.

• **What This Means for You**—Using the hydraulic jack method requires fewer men in the erection crew and ribs are set into place faster—erection cost is less. Erection equipment takes up less space because these jacks telescope into such a low shut height in their closed position and space in the heading of a tunnel is really at a premium. No stoppage in the mucking operation is necessary while the bore of this tunnel is being trimmed and the steel supports set. The whole cycle in driving and supporting the heading is speeded up and this means additional savings.

"Commercial", with a background of years of experience, designs and furnishes complete tunnel support systems using the strength of steel in its most efficient treatment. No matter which steel tunnel support products are recommended—ribs, lagging, spacer angles, wall posts and beams, liner plates, hydraulic jacks—because they are all made by "Commercial" you may be sure of a system that gives you the lowest cost benefit of every ton of steel used.

The Commercial Shearing and Stamping Company, Youngstown, Ohio—Chicago, Ill.—Salt Lake City, Utah.

COMMERCIAL
shearing and stamping

Sealer coat for liquid storage

The Storage & Sealing Corp., 826 Andrus Building, Minneapolis 2, Minn. has been using with success a series of new coatings called Rock-Seal. The coatings can be used to seal underground excavations and concrete tanks to provide a source of storage for bulk liquids. Tests have shown that satisfactory sealing can be secured in porous sandstone, limestone, shale, granite and concrete. Rock-Seal can be applied by brushing or by paint spraying equipment. The product was developed by West Chester Chemical Co., of West Chester, Penn.

24-in. rotary trowel

Now on the market is a 24-in. rotary trowel Model G 24. It weighs 69 lb. and can be moved around the job by one man. Rotation is stopped

the instant the operator lets go of the handle but the engine continues running. It is powered by a Brigg and Stratton engine rated at 2.2 hp Combination trowel blades can be used for both floating and finishing by adjusting the pitch control knob Further information is available **Stow Manufacturing Co.**, 56 Shea St., Binghampton, New York.

Reflectors for hazards

A liquid which can be painted o sprayed directly on the surface make

night time traffic hazards and ob structions brightly visible to motor ists. It is designed for application t wood, concrete, and other rough o porous surfaces. The manufacture reports that the entire traffic side o

In Selecting Your Next Excavator Be Sure You're Getting *Today's Design!*

Excavators may **look** alike but it's what they have inside that really counts. Sometimes you can't put your finger on the difference. You just know it's there because, in a good machine, it goes to work for you in the form of greater efficiency. And you find it in bigger output . . . bigger profits.

Take the Bucyrus-Erie 1½-yd. 38-B and 2-yd. 51-B, for example. Compare them with other machines in the same size range. Among many important features, you'll find Bucyrus-Erie's ahead of the field — the wide use of special alloy steels, selectively hardened for strength and long life; anti-friction bearings at vital points to minimize power loss and to insure concentricity of rotating parts; generous size clutches that require no adjustment for temperature or weather variations; twin rope crowd for shovel operation that increases digging stability, speed and output while reducing destructive shocks and vibrations; independently operated power boom hoist with power controlled cushioned lowering for precision crane work.

All down the Bucyrus-Erie line — from ⅜- to 4-cu. yd.— the story is the same. For you, they are better tools for bigger profits. Get complete details from your distributor listed below; then, you be the judge! Bucyrus-Erie Company, South Milwaukee, Wisconsin.

157E55-1

A full dipper every time means extra profits on the job! Illustrating this principle, the 38-B shovel above excavates for a highway in southern California. Highly maneuverable, the 38-B gets into tight places easily, delivers swift, efficient output.

SEE US FOR COMPLETE INFORMATION

Border Machinery Company . . . . . El Paso, Texas; Carlsbad, N. M.
Clyde Equipment Company . . . . . Portland, Ore.; Seattle, Wash.
The Colorado Builders' Supply Company . . . . . Denver, Colorado
Crook Company . . . . . Los Angeles & Bakersfield, California
Great Northern Tool & Supply Company . . . . . Billings, Montana
R. L. Harrison Company, Inc. . . . . Albuquerque, New Mexico
Intermountain Equipment Company . . . . . Boise & Pocatello, Idaho; Spokane, Washington
The Lang Company . . . . . Salt Lake City, Utah
Nevada Equipment Service, Inc. . . . . Reno, Nevada
Northern Commercial Company (For Alaska & Yukon Territory) . . . . . Seattle, Washington
State Tractor & Equipment Company . . . . . Phoenix, Arizona
Westmont Tractor & Equipment Company . . . . . Missoula & Kalispell, Montana
West Coast Engine & Equipment Company . . . . . Berkeley, California

75 Years of Service BUCYRUS ERIE **to Men Who Shape the Earth**

a concrete abutment 4 ft. high and 4 ft. wide can be reflectorized in less than 5 min. at a cost of $1.80. About 15 cents worth of the reflective liquid covers an area of one square foot. An application will last about one year, depending upon the surface to which it is applied and weather conditions. **Minnesota Mining and Manufacturing Co.**, St. Paul, Minn.

Direct drive chain saw

A direct drive chain saw has been announced by **Lombard Governor Corp.**, Ashland, Mass. The saw features positive automatic clutch, all-

weather starter, automatic chain oiler, direct-connected carburetor, and high voltage magneto. The saw weighs 25 lb. and is designated Model DD.

Plastic coated wire rope

A plastic coated cable made under the name of "Plasteel" is on the market. It is available in sizes 1/16x⅛ to ¼x⅜ in. inclusive. Strengths are from 480 to 7,000 lb. The plastic resists sunlight, oxidation, and provides color stability. Circular No. 5540 and prices are available by mailing a card to: **Macwhyte Co.**, Kenosha, Wis.

Aluminum flat bed trailer

Now in production is an all-aluminum flat bed trailer, the first of its kind ever to be built. The use of aluminum in the construction of this

8 x 35-ft. flat bed trailer with 2 speed landing gear has reduced the weight of the unit 2,500 lb. below that of a comparable steel unit, thereby permitting operators to haul 2,500 lb. more payload per trip. It is also available on a 40-ft. single unit and train combination. **Beall Pipe and Tank Corp.**, 12005 North Burgard, Portland 3, Ore.

Hydra-hammer gets new cab

The Ottawa Hydra-hammer has been equipped with an all weather

cab. It is 5 ft. 2 in. high, 4 ft. long and 3 ft. 1 in. wide. It can be set up with no special skilled workers required, and fits all models of the Ottawa Hydra-hammer. It is available for machines already in the field as well as new models from the factory. For further information and price, write **Ottawa Steel Division**, L. A. Young Spring & Wire Corp., Ottawa, Kan.

Cutter by air reduction

A flame-cutting machine featuring a permanent magnetic roller has been introduced by **Air Reduction Pacific Co.**, 220 Bush Street, San Francisco,

Calif. The machine cuts any shape up to a full 42-in. circle and straight lines to 92 in. The machine also serves as an auxiliary unit to supplement the output of larger, more expensive shape-cutting machines. The permanently magnetized tracing roller follows a metal template, and the motor drive shaft is equipped with a worm-gear drive. There are no couplings, pulleys, or belts.

Third Traxcavator is announced

The third Traxcavator to be announced in Caterpillar Tractor Company's line of tractor-shovels is the No. 933. It has a 1 cu. yd. bucket and is designed as an integral tractor-shovel. This smaller tractor-shovel includes such features as unit design, 30-deg. bucket tilt-back at ground level, in-seat starting and oil flywheel clutch. It has reverse speeds up to 264 ft. per min. and for forward speeds up to 520 ft. per min. The length is 13 ft. 10 in., width is 70 in., height is 75¼ in., ground clearance 10 in., and weight 15,750 lb. Literature is available from **Caterpillar Tractor Co.**, Peoria, Ill.

Diesel driven welder

A diesel-powered welder for construction, pipe line, and structural welding has been announced by **Lincoln Electric Co.**, Cleveland, Ohio. The welder, called the "Shield-Arc SAE-250" is rated 250 amp. at 40 v., 60% continuous duty cycle. The arc can be controlled as to type as well as intensity to permit efficient welding in all positions and under varying conditions of field welding. It has a range of 50 to 250 amp., handling electrodes from 1/16 to 1/4 in. in diameter.

Dump bodies by Galion

Galion Allsteel Body Co., Galion, Ohio, has announced a two axle, four dual wheel trailer dump designed for

towing behind heavy duty dump trucks and a tandem axle trailer dump designed for use with tandem rear axle tractors. The trailer dump is designed for materials hauling use in localities where weight laws require wide axle spacing for hauling maximum payloads. It is offered in body lengths of 15 or 16 ft. with payload capacities of 10 to 20 cu. yd. The tandem axle dump is good for materials hauling use in areas where weight laws allow maximum credit for two tandem axles. It is available in body lengths of 19 to 24 ft. with payload capacities from 10 to 3[illegible] cu. yd.

Arc welders

Two new engine-driven A-C arc welders are now on the market. They are well suited for all welding applications where AC or AC-DC electrodes of 1/16 in. to 3/16 in. diameter are required. Welding current range is 15 to 200 amp. Open circuit voltage is 85 v. In addition to welding power both models provide 1 kw, 110 v. AC auxiliary power. The welder weighs 435 lb. Further information is available. **Air Reduction Pacific Co.**, 22[illegible] Bush St., San Francisco, Calif.

PRECAST PANEL 32' high, 18½' wide with two large window areas.

TRUSS has 60' span at top

114,000 LB. SLAB being positioned

PANEL with door and two window areas

SUPERIOR

Complete Accessories Plus Experience on Tilt-Up Jobs!

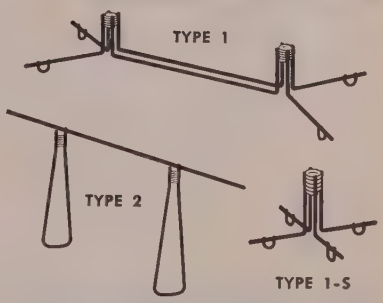
On every Tilt-Up job the proper type of Pick-Up Inserts and Brace Anchors as well as their location in the slab or precast structural member are of prime importance in order to withstand the stresses occurring when *tilting, lifting,* and *positioning.* As pioneers in this field, SUPERIOR has developed various types of accessories and correct procedures resulting from the experience of thousands of job applications.

SUPERIOR accessories are designed for fast and efficient handling of all types of precast panels and structural members. The Pick-Up Insert provides dependable anchorage for bolts which secure a lifting angle to which slings are attached when the panel is raised. Brace Anchors secure the temporary bolts by which the Braces are attached. The exclusive pivoting action of the adjustable Braces permits quick positioning and alignment of panels. Braces are assembled with 2 x 4's or pipe of lengths to fit job conditions.

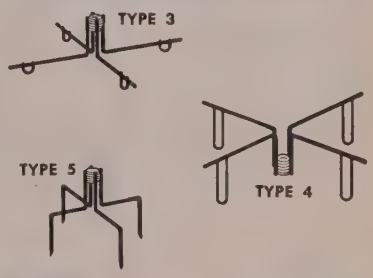
The many types of SUPERIOR Inserts, Anchors, and Braces for every job condition together with complete layout service provide a combination which offers safe and efficient handling of precast panels and structural members.

For further details refer to Sweet's Catalog or send for Bulletin TU-3.

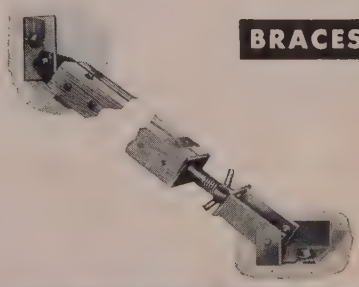
PICK-UP INSERTS



ANCHORS for BRACES



BRACES



SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office
1775 Broadway, New York 19, N. Y.

Pacific Coast Plant
2100 Williams St., San Leandro, Calif.

Bulk material body

A bulk material body available in lengths from 10 to 34 ft., truck or trailer mounted, with chain and flight or belt discharge is now available. The hydraulic operation is controlled

from rear-of-body position. Two methods of discharge are posible, directly into grills or hoppers or onto the ground, and from the swivel conveyor which can discharge 15 ft. above the ground. An illustrated brochure has been produced and is available from the manufacturer, **Baughman Manufacturing Co.**, Jerseyville, Ill.

New line of International trucks

Nine diesel-powered International trucks have been added to the line manufactured by the Motor Truck Division of **International Harvester Co.**, 180 N. Michigan Ave., Chicago 1, Ill. The models include four in the 4-wheel series, three in the 6-wheel series, and two 6-wheel off-highway

models. They range in gross vehicle weight from 26,000 to 60,000 lb. Another new model is the 4-wheel drive light-duty truck. Gross vehicle weight rating of this truck is 7,000 lb. It is offered in four wheel bases between 115 and 134 in., and is powered by a Silver Diamond 220 engine. The Silver Diamond 240 engine, developing 131 hp., is optional. Optional tires are offered for high ground clearance or for added flotation. Pictured is the Model RD-220 H.

New equipment by Euclid

Two new machines manufactured by **Euclid Division** of General Motors Corp., Cleveland 17, Ohio, have been introduced, the C-6 crawler and S-12 overhung engine rubber tired tractor scraper. The crawler is in effect a half-section of its big brother, the TC-12. It is powered by a single 194-hp. engine. Its operation will be similar to that of conventional tractors but it will have the same type styling controls, automatic track tensioning, planetary gearing and rear mounted radiator as featured on the TC-12. The scraper is powered by a 218-hp. engine, has a standard transmission with 5 forward and one reverse speeds, hydraulic steering and scraper controls, and planetary final drive bearing.

5,000-lb. lift truck

The HC-50 lift truck, a maneuverable 5,000-lb. unit, is now available. The outside turning radius is 79 in.,

lowest in the field. The weight is 7,110 lb. The units are powered by Waukesha gasoline engines. Diesel engine or LP Gas Conversion Kit are optional features. Additional information and specifications can be secured from **Hyster Co.**, 2902 N.E. Clackamas St., Portland 8, Ore.

How to wash your face with Jaeger pumps

TO SCOUR THE FACE OF THE TAILRACE CUT for Virginia Electric and Power Company's power station dam at Roanoke Rapids. N. C., Stone & Webster used this ingenious set-up. Two Jaeger pumps (a self-priming 6P and high pressure 5CPH, connected in tandem) traveled in dump truck. Jets with 15/16" nozzles were handled from platforms on crawler-mounted crane. Moving along the cut, they knocked all loose rock and earth from the face with two powerful streams each shooting 370 gpm at 170 lbs. pressure. This method was also used to scour the rock before pouring wings of the dam.

EMERGENCY FIRE PROTECTION: Stone & Webster set up other Jaeger 5CPH pumps like this for standby protection against fires. Their capacity and pressure exceeds that of standard 500 gallon "pumpers".

SURE-PRIME AND HIGH PRESSURE TEAM TOGETHER: Jaeger 6P, which maintained prime automatically, was connected in tandem to a Jaeger 5CPH which boosted water pressure to 170 psi. Pumps were set up in dump truck for easy moving along job.

GENERAL VIEW OF CONSTRUCTION. Roanoke Rapids Power Station of Virginia Electric and Power Co., built by Stone & Webster Engineering Corp. Eleven Jaeger pumps were used on this job.

For full information on Jaeger dewatering and pressure pumps, see your Jaeger distributor or send for catalog P-4.

Sold and Serviced by:

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

Torque-converter crawler

Crawler tractors with hydraulic transmission and torque converter drive are now being manufactured by

American Tractor Corporation, Churubusco (Ft. Wayne), Ind. The tractor provides automatic shifting in any speed or direction without loss of momentum. It provides four speeds forward up to 5.6 mi. per hour, and 4 speeds in reverse up to 6.2 mi. per hour. Complete details concerning new TerraTrac models are available from the manufacturer.

Loader for International tractor

The Davis Model 102 loader manufactured by **Mid-Western Industries, Inc.,** Wichita, Kan., has been designed as equipment for the new International 300 Utility tractor. The

loader utilizes the tractor's hydraulic system. It features twin dump cylinders with down pressure, heavy-duty box-frame construction, and an 11 cu. ft. material bucket. All standard attachments are available.

Portable electric plant

A new lightweight model of the AK series of electric generating plants has been announced. The Model 105 AK is a 1,500 watt, 60 cycle, A-C electric plant. It is offered in two versions, one weighing 125 lb. equipped with tubular aluminum carrying frame and 2-wheel dolly optional. For complete information on the models write to **D. W. Onan & Sons, Inc.,** Minneapolis 14, Minn.

Air-cooled diesel engine

A 15-hp. air-cooled diesel engine has been announced by **D. W. Onan & Sons, Inc.,** Minneapolis 14, Minn. manufacturers of electric generating

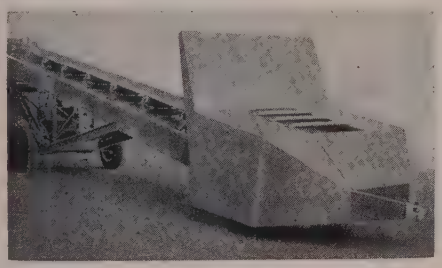
KOLMAN

COMPLETELY PORTABLE
CONVEYOR-SCREEN PLANT
CONVEYOR • SCREEN • TRAP • FEEDER

KOLMAN Model Junior Conveyor 40'x24" with gasoline engine and 6'x36" Model SB-60 Kolman Vibrating Screen

KOLMAN 'JUNIOR' CONVEYOR

Ideal for city and county operations, the Junior Conveyor-Screen Plant pictured above is owned and operated by the city of Yankton, S. D.



Sturdy design permits installation of Loading Trap on tail section for ease of feeding with dozer, shovel, front end loader, dragline, etc.

RUGGED BOX-TYPE CONSTRUCTION OFFERS BIGGEST BUY ON MARKET

It's easy for you to own top quality conveyor equipment now with the new **KOLMAN** Junior conveyor. Prices are so low you'll be amazed—yet the design and operating features are the finest.

The Junior Conveyor is designed to meet the demand for a conveyor in the low price field stout enough to carry a large vibrating screen and loading trap in a completely portable conveyor-screen plant. Fully tested and proven by field operation, the Junior has met all requirements with the greatest satisfaction.

The rugged "box type" construction of the Junior or Model 202 conveyor gives it unusual strength and rigidity. The sides are fabricated of 3/16" steel plate formed into a channel 16" deep with 2" legs. The steel belt cover reaches completely across the top, completing the box and completely encasing the return belt to prevent materials from working in to cause belt damage.

The under-slung power unit provides easy access for servicing and operation from the ground. This is an ideal feature for the operator who stops and starts his plant frequently. The V-belt drive assembly assures positive and efficient transmission of power and the motor mount design allows quick and easy adjustments to maintain proper belt tension through a turnbuckle arrangement.

Other features include the self-cleaning tail pulley, bar type head pulley, anti-friction bearings throughout, and choice of regular or greaseless idlers. Heavy duty truck-type axles, wheels and pneumatic tires are standard equipment, and these units can be towed for long distances at moderate rates of speed.

The Junior is available with the Head Pulley Clutch feature which allows the belt to be stopped and started while the screen remains in operation.

All plants with screens attached have the folding feature, which permits the screens to be folded back under the conveyor while towing without removing any of the mounting or drive assemblies.

See Your Nearest Dealer

CALIFORNIA

BERKELEY—West Coast Engine & Equip. Co., 1077 East Shore Hwy.
EUREKA—E. W. Pierce Company, 4th and Broadway
MARYSVILLE—Valley Truck & Tractor Co., 100 "D" Street
SACRAMENTO—Sacramento Valley Tractor Co., Broadway and 19th St.
SANTA ROSA—Empire Farm Equipment Co., 1470 Santa Rosa Ave.

IDAHO

BOISE—The Sawtooth Company, 1115 Grove St.

NEVADA

ELKO—A-D Machinery Co., 251 W. Commercial St.

OREGON

PORTLAND—Western Equipment Co., 2244 N.W. Savier St.
EUGENE—Western Equipment Co., 1360 W. First Ave.

UTAH

SALT LAKE—Rasmussen Equip. & Supply, 1960 S. Second, West

WASHINGTON

SEATTLE—Andrews Machinery of Wash., 3640 E. Marginal Way
SPOKANE—Andrews Machinery Service, 126 S. Walnut St.

Western Representative—S. A. MADRID
1739 32nd Ave., San Francisco 22

SEND for FREE literature

KOLMAN Manufacturing Co.
5670 W. 12th St., Sioux Falls, S. D.

Please send free literature on—

☐ Model 202 Junior Conveyor
☐ Model 101 Heavy Duty Conveyor
☐ Screens ☐ Feeders
☐ Traps

Quote.....size or .....capacity

Name .....

Address .....

City .....

plants. This engine is being offered for the first time as a separate item. Formerly, it was manufactured as a prime mover for the company's 5,000 watt generating plant. It is rated at 15 hp. at 2,300 rpm. The opposed two-cylinder design of the engine provides good running characteristics and the air-cooling eliminates the necessity to maintain the radiator and fan belt as on water-cooled units. A 12-v. battery charging generator and 12-v. electric starter are included as standard equipment. List price $1,295.00.

Aerial platform

Maneuverability at heights up to 65 ft. is possible with an aerial platform introduced by **Pitman Manufacturing Co.**, 300 W. 79th Terrace, Kansas

City, Mo. The machine has a rated capacity of 500 lb. at any radius or boom position. The boom rotates 360 deg. continuously in either direction and the lower and upper boom sections can be operated either independently or at the same time. Complete information is available.

Power brakes for road rollers

The first application of power brakes to the 3-wheel road rollers has been announced by **Buffalo-Springfield Roller Co.**, Springfield, Ohio. Tapered roller bearings on both the guide and drive rolls are standard

MAKE NEW PROFITS WITH A CONVEYCO COMPLETELY PORTABLE BATCH PLANT

No Over-width Highway Permit Needed for this Plant

The 1½ and 2½ yard completely Portable Conveyco Batch Plants with capacity of 95 tons (135 tons with surcharge section), are designed specifically to move with the job—anywhere a truck can take them—and set up or take down in one work day. All components when loaded on 42" truck beds or semi's will measure no more than 8' x 9'6", giving adequate height clearance and within width requirements of most states. Plant is fully automatic or can operate manually. Recirculating Bulk Cement Silo, 10' wide, is equipped with dead axle and pneumatic tires to travel as a semi-trailer. Aggregate Loading Bucket Elevator travels assembled on trailer ready to set in place. Rescreen Unit is mounted on bin. Does not require a separate structure.

Made to be Moved...

Anywhere a truck can take it with no over-width permit needed

Modern contractors and concrete producers know the importance of bringing the source of concrete close to the job. Conveyco has used its 35 years' experience in batch plant engineering to design a portable plant with every detail planned to produce components in easy-to-transport sizes . . . in a ready-to-run condition. It takes just one work day to erect a plant—and dismantling is equally as fast with a minimum of labor. All components travel by truck or trailer *without an over-width permit.* The Recirculating Silo with integral bucket elevator and operating mechanisms travels on its own pneumatic wheels as a semi-trailer. You only find this matchless portability and operating efficiency in Conveyco Batch Plants.

Built for Capacity as well as Portability, Conveyco "portables" feature either belt feed, bucket elevator, or crane-operated clam shell loading of aggregates.

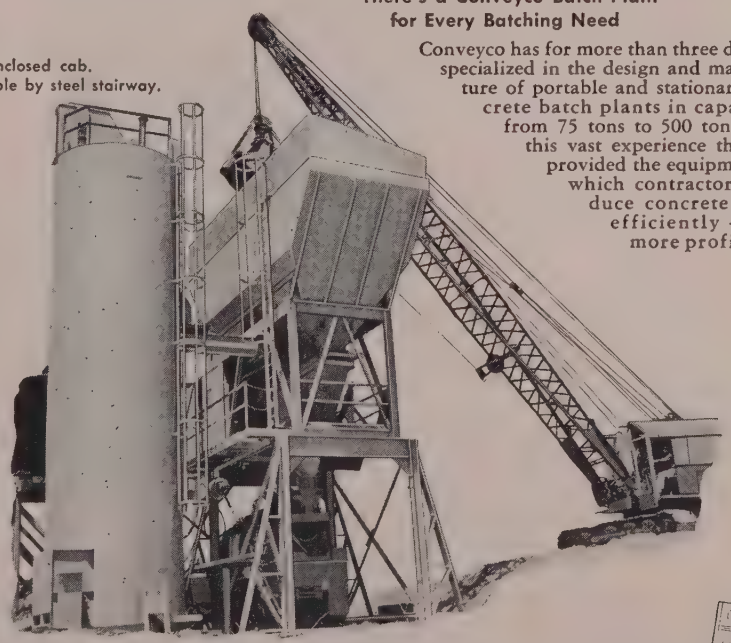
Fully enclosed cab. Accessible by steel stairway.

The Conveyco 2½ yard Portable Batch Plant

(requires a 9' over-width permit) gives you needed capacity with a 4 compartment aggregate bin 9'0" 10'6"x 28'0" (115 tons or 165 tons with surcharge section). The operator's section is transported without changing any parts from their operating positions; all controls are connected. Plant can be operated fully automatic or manually. A single switchboard control panel with flexible wire leads can be connected to electric motors in one hour. Belt conveyor bucket elevator or crane-operated clam-shell can be used for aggregate loading. Recirculating Silo is 10' in diameter and travels on its own pneumatic wheels as a semi-trailer. Rescreen Unit can be added without additional structure.

There's a Conveyco Batch Plant for Every Batching Need

Conveyco has for more than three decades specialized in the design and manufacture of portable and stationary concrete batch plants in capacities from 75 tons to 500 tons. It is this vast experience that has provided the equipment by which contractors produce concrete more efficiently — and more profitably.



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Engineers and Manufacturers

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The Conveyor Company, Dept. WC11
3260 E. Slauson Avenue
Los Angeles 58, California

Please send free Catalogs describing Conveyco batch plants and auxiliary equipment.

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City _____ Zone _____ State _____

equipment on the 10 to 14 ton and 12 to 15 ton variable weight 3-wheel rollers. The vacuum hydraulic powered brakes on both the drive rolls and the mechanical parking brake mounted on the transmission, provide complete braking control at all times and under all conditions.

Single column hoist

A hoist consisting of a platform which rides on a single column can be completely erected by two men in 3 hours. The hoist operates on a rigid vertical rail that can be extended to

any desired height. A steel cable passes over a pulley on top of the column to raise and lower the platform, and is operated by a 5-hp. electric motor or a gasoline engine. It has a load capacity of one ton. If the cable should break, a safety lock automatically prevents the platform from dropping, even with full load. **Hawkeye Engineering Co.,** Syracuse 4, New York.

Coil chain lever hoists

Two coil chain ratchet level hoists have been introduced by **Coffing Hoist Division,** Duff-Norton Co., Danville, Ill. The hoists are models L-1½ (capacity, 1½ tons) and LD-3 (capacity, 3 tons). Reduction in the hoists is achieved through compound levers instead of gears. The two new hoists are made either in malleable iron or aluminum alloy. For safety, the hoist will not lift the load while in a free-chain position and will not free the chain while under load.

Adjustable rear blade

A 6 ft. adjustable rear blade designed to mount on all Ford tractors and featuring tilt, pitch and offset adjustments as well as blade angling has been announced by **Tractor and Implement Division,** Ford Motor Co., Birmingham, Mich. The rear blade angles 45 deg. each side of center with 7-hole stops and tilts 40 deg. each side of center with 9 holes. Blade pitch is adjustable to 10 deg. plus or minus by means of an adjustment at the rear of the blade, with intermediate pitch adjustments made with an adjustable top link. Available

as accessories are gage wheels, end plates, skid shoes and ditching points. The weight of the blade is 360 lb.

Turbocharged diesel engines

Production of two new turbocharged diesel engines, the Cummins NTO-6 and NT-6 Turbodiesels, has been announced by **Cummins Engine Co., Inc.,** Columbus, Ind. The NTO-6 develops 262 hp. while the NT-6 is rated at 250 hp. Maximum speed of both is 2,100 rpm. Compression ratio for both is 15.5:1, while the weight for both is 2,546 lb. The engines are available mounted either on the side or top.

Two new Mack trucks

Mack has introduced two new truck models, the B-60X gasoline powered, and the B-61X diesel powered. Rated at 46,000-lb. gross vehicle

weight, they are offered with a 158-in. wheelbase, adapted to 10- or 11-ft. dump bodies. Standard tires are 11.00-24, 14-ply, single front and dual rear, on 8.5 rims, mounted on steel spoked wheels. The driver's seat is fully adjustable in all directions. Instruments are grouped on a pull-out panel and all fuses are grouped on a panel exposed when the glove department door is opened. **Mack Motor Truck Corp.,** 2001 S. Alameda St., Los Angeles 58, Calif.

Mobile hydraulic hammer

A self-propelled hydraulic hammer which can travel over any type of road is now available from **Arrow Mfg. Co.,** Box 4120, South Denver Station, Denver 9, Colo. There is no special setting up, if your state highway code permits transport over the highway with the tower assembled. If necessary, the tower may be broken at the center to comply with all highway regulations for height and allowable overhang. It can be reset in working position in just a few minutes. Hand control valves enable the tire to be positioned at any angle. An illustrated brochure is available describing this piece of equipment.

Pneumatic chain saw

A pneumatic timber chain saw powered by a rotary air motor that requires 46 cfm. at 90 psi. for maximum efficiency is now available. It has an automatic motor oiler and trigger throttle. It is capable of sawing timbers up to 60 in. in diameter by cutting from both sides. The price, $240.00, includes a chain repair kit,

file, assembly tools, gear lubricant, and a ⅜-x10-in. air hose. For further information write: **Mall Tool Co.,** 7725 South Chicago Avenue, Chicago 19, Ill.

Stationary hot plant

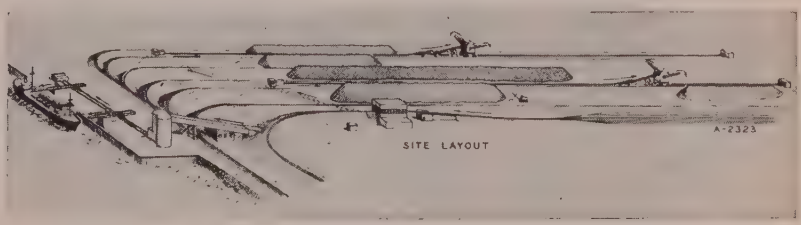
Bituminous paving mixes made with cold dry aggregate and heated bitumen are being produced in a new stationary plant added by **White Manufacturing Co.,** Elkhart, Ind., to its line of hot plants. It has a capacity of 40 to 50 tons per hr. It consists of twin axle pug mixer, 2 compartment aggregate bin with recombining hopper, weigh scales for

aggregate and for bitumen, bucket elevator, 2 bin reciprocating feeder with adjustable gates. One engine or electric motor drives the entire plant. A vibrating screen can be placed above the storage bins. Hot mixed asphalt can be produced when using dryer for heating aggregate.

CONVEYING LABRADOR IRON ORE-- 10,000,000 TONS ANNUAL CAPACITY

IRON ORE COMPANY OF CANADA— THE PORT OF SEVEN ISLANDS, QUEBEC

The S-A Conveying System provides for stockpiling or loading at dockside. Here, the traveling stacker is building a stockpile at the rate of 3750 net tons per hour. Conveyor booms stockpile to either side.



After crushing S-A Amsco Feeders carry the ore to these 60" belt conveyors which feed the ship loading boom belts.

At the docks, twin boom belts on traveling bridges with a combined capacity of 10,000 net tons per hour can load even the largest ocean-going ore ships in about 5 hours. Booms pivot up or down to compensate for tide or ship conditions.

• From the Port of Seven Islands, Quebec, 10,000,000 tons a year of Labrador iron ore will pour into America's industries. This feat of production must be done in the 150 to 160 days of good weather, during which ships can be loaded. An S-A Conveying System, handling an average of 70,000 tons of ore every day for loading and stockpiling, is helping make the job possible.

You may never need a conveying system as large or complex as the one at the Port of Seven Islands. But, whatever your bulk handling need, S-A engineers can show you an economical answer. Write for a free survey. No obligation, of course.

SINCE 1901 S-A STEPHENS-ADAMSON MFG. CO.

STEPHENS-ADAMSON MFG. CO.

Factories at Aurora, Illinois; Los Angeles, Calif.; Belleville, Ontario

2227 E. 37th Street
Los Angeles 58, Calif.

145 Mission St.
San Francisco 5, Calif.

1007 E. Burnside St.
Portland 14, Ore.

714 Joseph Vance Bldg.
Seattle 1, Wash.

210 W. 33rd St. South
Salt Lake City, Utah

Tamper has adjustable handles

A narrow tamper now available permits backfill tamping in trenches as narrow as 10 in. and operation at ground level in ditches up to 5-ft.

deep because of its adjustable handles. It is operated by one man and features close-coupled design to permit tamping in narrow gas water line trenches. The handles may be adjusted both vertically and horizontally to allow tamping at any level from the surface to a 5-ft. depth with quick adjustments. **Thor Power Tool Co.**, Aurora, Ill.

Radiophone by Motorola

A line of mobile two-way radio units is being produced by **Motorola** Communications and Electronics Division, 4545 West Augusta Blvd.,

Chicago, Ill. A squelch circuit blocks the receiver when only noise is present, but clears the receiver for communications whenever a modulated carrier, even a weak one, is present. No modifications of any type are required to place the unit in either a 6 or 12 v. vehicular installation. Further information is available from the manufacturer's Technical Information Center at the above address.

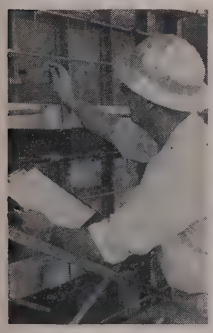
Kohler electric plants

Two new 35KW electric plants are now in production at **Kohler**, Kohler, Wis. One of the plants has a rated capacity of 35,000 watts of alternating current and is diesel-powered. The other unit also produces 35,000 watts of alternating current, but is

PREPAKT concrete construction methods being used on the world's largest fluid coking plant being built by the Bechtel Corp. at the Tide Water Associated Oil Company's refinery near San Francisco. The massive columns and beams will support the reactor, burner, and incidental equipment weighing approximately 15,000 tons.

MODERN CONSTRUCTION METHODS REQUIRE "JOB-TAILORED" CEMENTS

Thermometer being checked during chilling process. Bechtel Corp. selected the Prepakt method of concrete construction to reduce expansion due to heat of hydration, and to assure positive rock-to-rock contact of the aggregate.



Pre-chilling the close packed aggregate to less than 60-degrees Fahrenheit. When chilled, a grout of 35° F. ice-water, sand, and cement will be pumped into the forms.

This unusual construction method calls for low temperature control of the concrete during placement and setting action, and for precise aggregate contact. Pre-cooling would be dissipated in transit – and cooling in place normally requires elaborate piping and refrigeration. The unique system illustrated above (by Intrusion-Prepakt, Inc., of Cleveland) requires that select aggregate be tamped dry into the forms and ice-chilled to below 60-degrees Fahrenheit. A grout of cement, sand, and 35-degree ice water is then pumped into the aggregate. The mass of concrete is now at less than 60-degrees... the temperature being checked by means of thermometers inset into the forms. NET RESULT – reduction of expansion due to heat of hydration, and positive rock-to-rock contact.

The Permanente Cement Company is supplying 45,000 barrels of Permanente Modified Portland Cement, ASTM type II, for the extensive expansion program at Tide Water Associated's Avon plant. Strict laboratory controls in the production of Permanente cements assure the user of cement types specifically designed for today's modern construction methods. Our technical consultants are at your service to recommend the proper cement type for your construction needs.

Job-Tailored Permanente Cements for Every Modern Construction Method

On the job PERMANENTE CEMENT COMPANY *On time**

PERMANENTE CEMENT COMPANY

PERMANENTE, SANTA CLARA, YOSEMITE AND KAISER BRANDS OF PORTLAND CEMENT AND PERMANENTE LIME PRODUCTS

OAKLAND • PORTLAND • SEATTLE • EAST PASCO
ANCHORAGE • FAIRBANKS • HONOLULU

*SERVICE MARK

powered by gasoline. Both models feature remote controlled, electric starting by a switch at the plant or two-wire remote control. Starting panels are equipped with over-cranking protection. Standard equipment includes low oil pressure cut-out, high water temperature cut-out, oil pressure gauge, fuel line, muffler, battery cables, and lubricating oil filter.

The Merton overloader

The Merton overloader consists of a winch and cable operated bucket and an overhead rail assembly. Bucket digging depth is adjustable. Fingertip operated bucket hoisting, braking, and travel control is completely independent of master clutch. Material is gathered into the lowered bucket by driving forward into the stockpile. The loaded bucket is hoisted and hauled back along the overhead rails as the loader travels rearward to the discharge point. To discharge, the bucket contacts a crossbar connecting two spring compressed levers, which tilt and shake the bucket. Literature and specifications are available from the manufacturer. **Seaboard Equipment Co., Inc.,** 7 Hanover St., New York 5, N. Y.

Fuller transmission and torque converter couplings

The **Fuller Mfg. Co.,** Kalamazoo, Mich., has announced a semi-automatic transmission, Model R-1150. The transmission provides 9 selective gear ratios for use in off-highway vehicles equipped with engines in the 1,150 cu. in. class. The air valve and cable provide pneumatic control. Also available is the Fuller torque converter coupling rated at 280 foot pounds. It consists of three elements; impeller, runner, and reaction member. Typical applications are: fork lift trucks, winches, loaders, self-propelled cranes, truck cranes, and lumber carriers.

Hoist and winch units

Now under manufacture are hydraulic underbody truck hoists and

winch units. The hoist is rated at 8-tons and the winch at 8,000 lb. The 25 deg. angle of incline permits easier loading. The units are available in proper lengths for standard trucks. **Henderson Mfg. Co., Inc.,** Cedar Rapids, Ia.

Carbide tipped saw blades

Carbide tipped saw blades are now available from **Mall Tool Co.,** 7725 South Chicago Ave., Chicago 19, Ill. Unless a carbide tipped blade accidentally strikes a nail, it will outwear up to six ordinary blades before needing resharpening. The 6-in. blade is $11.50; 7-in. blade is $12.50; the 8-in. blade is $13.50. Literature describing the proper use of carbide blades is available from the manufacturer.

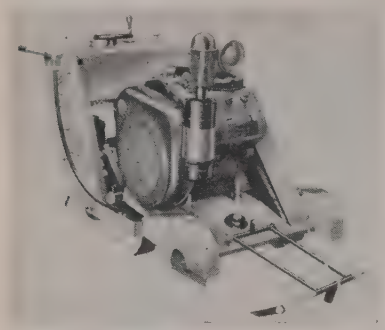
Conveyor attachment for mixing

A new delivery conveyor attachment that mixes water and calcium chloride with aggregate, before it is discharged from surge bins or gravel

plants into a truck body, has been announced by **Iowa Mfg. Co.,** Cedar Rapids, Ia. The unit fits under the head pulley of a delivery conveyor. Optional equipment which adapt the unit to various road surfacing methods include a Calcium Chloride feeder, a water meter, a valve, and a water pump. The unit is driven by the conveyor power. For complete information write the manufacturer for Form No. 2524.

Clipper concrete saw

Clipper's self-propelled concrete saw, Model C-360, combines 36 hp. with automatic retractable turning



wheels. This feature eliminates lifting, breaking back or tilting forward when moving into sawing position. The saw can operate at speeds up to 26-ft. per min. All controls are dashboard mounted. Brocure No. 4006 describes the saw and detailed specifications are given on Sheet No. 4007. **Clipper Mfg. Co.**, Suite 696, Kansas City 8, Mo.

New engine for tractor shovel

Introduction of a turbocharged diesel engine rated at 165 hp., for the Michigan Model 175A makes it the world's most powerful rubber-tired tractor shovel. The Model 175A, with 2¼-cu. yd. bucket capacity and weighing 24,100 lb., has four-wheel drive and rear-wheel steering. It has four forward and reverse speeds, with a maximum of 27-mi. per hr. Additional information is available. Construction Machinery Division, **Clark Equipment Co.**, Benton Harbor, Mich.

Henderson Krawloader

A loader for use on the John Deere 40-C 5-roller tractor is being manufactured by **Henderson Mfg. Co., Inc.**, Cedar Rapids, Ia. The unit

features double-action cylinders, auxiliary relief valve, oil filter and control valves. Full information and prices may be obtained by writing the manufacturer.

Paving joint sealer

Presstite No. 99 is the product identification of a jet-fuel, blast-and-heat-resistant paving joint sealer developed for jet airfields. It is designed for sealing sawed and formed joints in Portland Cement Concrete. A 6-page bulletin is available on request. **Presstite Engineering Co.**, 3798 Chouteau Ave., St. Louis, Mo.

Caterpillar scraper announced

Caterpillar Tractor Co., Peoria, Ill., has announced the No. 463 scraper, the second largest in the company's line. It has a struck capac-

ity of 18 cu. yd. and a heaped capacity of 25 cu. yd. The cable-operated scraper has load capacity of 55,000 lb. Overall dimensions are: length 38 ft.; width 11 ft. 9 in.; height 11 ft. 1½ in. (blade on ground); wheelbase 23 ft. 1½ in.

Parsons trenchliner

The Model 155 Trenchliner is capable of producing from 5.8 in. to 12.75 lineal feet of trench per min. in a range of 30 digging speeds selected by lever control. Maximum trench depth is 8 ft. with widths ranging from 16 through 26-in. The machine is 7-ft. 4-in. high and 5-ft. 4-in. wide. Buckets are available in the choice of sizes 16, 20 or 24-in. wide. A descriptive bulletin may be obtained by writing to the **Parsons Co.**, Newton, Ia.

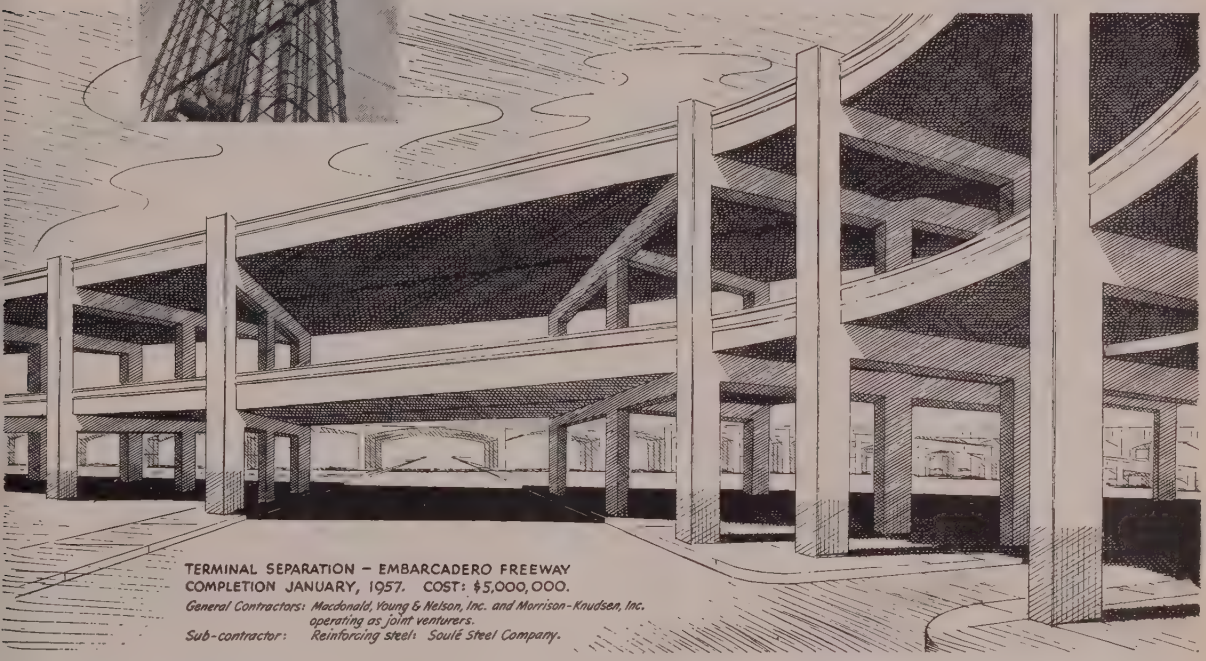
Equipment Briefs . . .

A COMPLETE LINE of rubberized asphalts for roof coatings, waterproofing, corrosion prevention, and highway surfacing has been developed by **Berry Asphalt Co.**, Magnolia, Ark.

LOW-FUMING bronze rods in 36-in. lengths for brazing are now available. The flux-coated rods are shipped in 10-lb. packages packed in 60-lb. cartons. **All-State Welding Alloys Co., Inc.**, White Plains, N. Y.

FOUR-WHEEL hydraulic brakes previously available only on larger machines in the line, are now standard equipment on the Michigan Model 75A tractor shovel manufactured by Construction Machinery Division, **Clark Equipment Co.**, Benton Harbor, Mich.

Here you see one use of the big 2⅜" Di-Lok reinforcing bar. Eventually this column will reach nearly 90′ (by butt welded splices), giving the name "skyway" to the project. At the time of this picture, the column approached 40′. *Below* is a sketch that catches the flowing, functional beauty of overlapping roadways.



TERMINAL SEPARATION – EMBARCADERO FREEWAY
COMPLETION JANUARY, 1957. COST: $5,000,000.
General Contractors: Macdonald, Young & Nelson, Inc. and Morrison-Knudsen, Inc. operating as joint venturers.
Sub-contractor: Reinforcing steel: Soulé Steel Company.

San Francisco's New "Skyway" Introduces

New Use of 2⅜" Reinforcing Bar

Motorists approaching San Francisco from the south or east can look forward to unhampered travel right to the heart of the city. A new viaduct freeway system will interlace as many as 6 one-way traffic aisles . . . some running 90 feet above street level. At no point on the freeway will traffic intersect or run side by side in opposite directions.

Unusually slender columns and horizontal caps support the maze of roads. Yet in some places, these relatively delicate-looking columns are rated at a 1,500-ton load capacity. The "secret" of so much strength from so small an effective design depth is USS Di-Lok 2⅜" round (2" square equivalent) reinforcing bar. The advantage gained in using the large bar is significant: smaller columns, footings, and beams can be designed around the 2⅜" re-bar.

1,100 tons of the 2⅜" reinforcing bars were supplied for the project. Much of this tonnage was rolled at the Pittsburg (Calif.) Works of United States Steel.

Only Steel Can Do So Many Jobs So Well

USS Products for Heavy Construction

United States Steel Corporation • Columbia-Geneva Division

UNITED STATES STEEL

UNIT PRICES

Selected abstracts for Western projects

BRIDGE—Two bridges, part of 20 mi. highway to be built to bypass Grand Teton national park in Wyoming

Wyoming—Teton County—BPR. Strong Co. submitted a low bid of $1,377,686 for grading and surfacing and the construction of two bridges in connection with a 20 mi. highway to be built east of Grand Teton national park. Unit bids were as follows:

(1) Strong Co.	$1,377,686
(2) LeGrand Johnson Co.	1,459,888
Knisely-Moore Co.	1,486,668
Peter Kiewit Son's Co.	1,525,989
Taggart Construction Co.	1,531,434
Morrison-Knudsen Co.	1,584,760
A.E. & W.R. Schmidt.	1,606,689

		(1)	(2)
Contingent Sum	Miscellaneous force account work.....$	C.S.	$ C.S.
90,000 cu. yd.	Stripping and storing top soil.....	.36	.38
360,000 cu. yd.	Unclassified excavation.....	.36	.38
4,500 cu. yd.	Unclassified excavation for structures.	5.15	8.00
695,000 cu. yd.	Unclass. excav. for Borrow, Case 1	.36	.35
2,000,000 sta. yd.	Overhaul (1,000 feet free haul).....	.015	.015
410,000 cu. yd.-mi.	Spec. overhaul of Borrow (1,000 ft. free haul).....	.15	.14
30,000 cu. yd.	Replacing topsoil.....	.50	.38
Contingent Sum	Obliteration of old roadways to be paid for as earned.....	C.S.	C.S.
9,200 units	Watering of embankment.....	1.25	1.50
3,500 units	Watering of base course.....	1.25	1.50
Lump Sum	Prov. and maint. water plant or plants	L.S.	L.S.
4,600 hr.	Rolling of embankment.....	4.50	7.50
950 hr.	Rolling of base course.....	8.00	9.00
107,000 ton	Subbase material.....	.64	.74
118,000 ton	Crushed gravel or crushed stone base course, Class 2, grading D-1.....	.74	.90
347,000 sq. yd.	Processing bituminized base.....	.09	.07
420,000 gal.	M.C. cutback asphalt, grade 0, 1 or 3.	.145	.15
36,000 gal.	R.C. cutback asphalt, grade 2 or 3, for seal.....	.145	.16
2,352 cu. yd.	Concrete Class A (air-entrained concrete, low-alkali cement).....	73.50	85.00
186,000 lb.	Reinforcing steel.....	.15	.14
374,300 lb.	Structural steel—furnished, fabricated, and erected.....	.18	.20
783 lin. ft.	Railing.....	9.50	17.00
193 cu. yd.	Cement rubble masonry.....	86.53	80.00
6,926 lin. ft.	24 in. C.G.S.M. culvert pipe.....	6.15	5.75
1,156 lin. ft.	30 in. C.G.S.M. culvert pipe.....	7.60	7.00
590 lin. ft.	36 in. C.M.S.M. culvert pipe.....	12.00	11.00
190 lin. ft.	42 in. C.G.S.M. culvert pipe.....	15.00	13.00
56 lin. ft.	48 in. C.G.S.M. culvert pipe.....	17.50	15.00
2,896 lin. ft.	29 in. x 18 in. arch culvert pipe.....	6.50	6.00
108 lin. ft.	36 in. x 22 in. arch culvert pipe.....	8.00	7.40
60 lin. ft.	58 in. x 36 in. arch culvert pipe.....	17.50	15.50
174 ea.	24 in. Metal pipe end sections.....	43.00	40.00
21 ea.	30 in. Metal pipe end sections.....	70.00	70.00
15 ea.	36 in. Metal pipe end sections.....	102.50	104.00
6 ea.	42 in. Metal pipe end sections.....	160.00	166.00
2 ea.	48 in. Metal pipe end sections.....	190.00	200.00
90 ea.	29 in. x 18 in. Metal pipe arch end sec.	36.50	38.50
2 ea.	36 in. x 22 in. Metal pipe arch end sec.	50.00	53.00
8,440 lin. ft.	Untreated timber piling.....	3.00	3.25
120 lin. ft.	Test piles.....	8.50	17.00
214 ea.	Pile shoes.....	4.00	.50
1,000 lin. ft.	8-in. perf. C.G.S.M. pipe underdrain..	6.00	3.75
1,330 lin. ft.	Combination concrete curb and gutter	3.25	2.50
2,750 lin. ft.	Treated log curb.....	6.75	3.20
114 ea.	Concrete maintenance marker posts..	25.00	8.00
1 ea.	Cattle guard (14-foot).....	1000.00	700.00
8 ea.	Gates (swinging pole).....	50.00	60.00
55,100 lin. ft.	Buck and 3-pole fence.....	.48	.65
360 ea.	Barrier posts (treated).....	18.00	10.00
1,400 units	Turf shoulders.....	23.00	25.00
1,000 cu. yd.	Post, rock, and wire bank protection..	9.00	13.00

HIGHWAY—Grading and bituminous surfacing in Montana

Montana—Lake County—State. James Crick and Sons were awarded a $522,997 contract for grading and surfacing 8.2 mi. and the construction of drainage facilities. Unit prices were as follows:

(1) James Crick and Sons.	$522,997
(2) TF & S Contracting Co.	584,217
Kiely Construction Co.	679,901
Max J. Kuney Co., Inc.	635,796
S. Birch & Sons Construction Co.	713,439

		(1)	(2)
731,729 cu. yd.	Uncl. excav. & borrow & des. borrow.....$	.20	$ .25
5,940 cu. yd.	Culvert excavation.....	3.00	2.00
481 cu. yd.	Gravel backfill.....	6.00	3.00
137,008 mi.-yd.	Overhaul.....	.15	.14
124,109 ton	Sel. bor. base course cr.....	.85	1.15
21,895 ton	Type "A" top crs. sf.....	1.50	1.40
6,264 ton	Crushed gravel cover material.....	5.00	6.00
62,664 gal.	1st appl. MC-2 liquid asphalt.....	.18	.20
62,664 gal.	2nd appl. RS-2 emulsion asphalt.....	.18	.20
14,000 M gal.	Watering.....	1.50	2.00
1,465 unit	Rolling embankment.....	6.00	8.00
1,080 unit	Rolling surface courses.....	7.00	8.00
1,786 lin. ft.	Reinforced concrete pipe C. 15 in.....	4.50	3.00
356 lin. ft.	Reinforced concrete pipe C. 18 in.....	5.00	4.00
2,032 lin. ft.	Reinforced concrete pipe C. 24 in.....	8.00	6.00
94 lin. ft.	Reinforced concrete pipe C. 30 in.....	10.00	8.00
344 lin. ft.	Reinforced concrete pipe C. 36 in.....	14.00	11.00
82 lin. ft.	Reinforced concrete pipe C. 48 in.....	24.00	20.00
146 lin. ft.	Reinforced concrete pipe ex. st. 24 in....	8.50	7.00
158 lin. ft.	Reinforced concrete pipe ex. st. 48 in....	29.00	22.00
156 lin. ft.	Reinforced concrete pipe ex. st. 60 in....	40.00	40.00
436 lin. ft.	Std. sec. reinf. C. underpass.....	40.00	40.00
40 lin. ft.	Cor. metal pipe C. 15 in.....	4.50	4.00
102 lin. ft.	Cor. metal pipe C. 18 in.....	5.50	4.00
18 lin. ft.	Cor. metal pipe C. 36 in.....	14.00	14.00
826 lin. ft.	Cor. metal syphon P.C. 18 in.....	8.00	6.00
582 lin. ft.	Cor. metal syphon P.C. 24 in.....	11.00	8.00
148 lin. ft.	Cor. metal syphon P.C. 30 in.....	12.00	9.00
70 lin. ft.	Cor. metal perf. P. cul. 24 in.....	4.00	4.00
408 lin. ft.	Cor. metal perf. P. cul. 14 in.....	8.00	7.00
76 lin. ft.	Str. plate P. cul. 84 in. 10 ga.....	60.00	50.00
64 lin. ft.	Relay pipe culverts.....	3.00	3.00
3 ea.	Con. proj. markers.....	20.00	20.00
121 ea.	Con. R/W monuments.....	6.00	5.00
44 ea.	Con. station markers.....	8.00	7.00
200 lin. ft.	Steel guard rail.....	5.00	6.00
100 lin. ft.	Str. pl. P. cul. 12 ft. 10 in. x 8 ft. 4 in.....	90.00	100.00

CANAL—Enlargement and rehabilitation of South Platte canal on the Colorado-Big Thompson project

Colorado—Colorado-Big Thompson Project—Bureau of Reclamation. G. L. Tarlton Contracting Co. submitted a low bid of $258,746 on Schedule 2 for rehabilitation and enlargement of the Coal Ridge section of the South Platte canal on the Colorado-Big Thompson Project. Unit prices were as follows:

	Schedule 2
(1) G. L. Tarlton Contracting Co.	$258,746
(2) Emerson S. Ellett, Inc.	271,314

			(1)	(2)
.....	L.S.	Clear. right-of-way and reconst. canal sta. 653-00 to sta. 1026-84.	$.....	$.....
2,400	cu. yd.	Excav. for drain. channels & ditches	.32	.60
26,000	cu. yd.	Compacted earth bottom.....	.10	.80
5,440	cu. yd.	Excavation for structures.....	2.00	1.75
4,100	cu. yd.	Backfill about structures.....	.50	.60
3,385	cu. yd.	Comp. backfill about structures...	4.50	4.50
12,000	cu. yd.	Excavation from borrow.....	.32	.40
2,400	mi. cu. yd.	Overhaul.....	.50	.40
1,050	cu. yd.	Riprap.....	7.00	8.75
43	cu. yd.	Coarse gravel protection.....	7.00	5.25
525	cu. yd.	Sand and gravel bedding for riprap.	7.00	4.00
350	cu. yd.	Selected surfacing for roadways...	3.00	4.00
.....	L.S.	Bit. surfacing at state hi-way cross.	.....	.....
30	acre	Furnishing and sowing grass seed..	25.00	100.00
832	bbl.	Furnishing and handling cement..	7.00	7.00
63,300	lb.	Furn. and placing reinf. bars.....	.18	.21
554	cu. yd.	Concrete in structures.....	75.00	98.00
65	sq. ft.	Furn. and placing ½ in. elastic filler material in joints.....	1.00	2.50
21	M.b.m.	Furnishing and erecting untreated timber in structures.....	340.00	375.00
27	M.b.m.	Furnishing and erecting treated timber in structures.....	390.00	400.00
75	lin. ft.	Furn. and erect. beam-type grd. rail	3.50	6.00
205	lin. ft.	Furn. and erect. treated wood posts	1.50	2.00
23	post	Furn. and erect. wood guard posts.	10.00	10.00
.3	mi.	Furn. and erecting new barbed-wire fence.....	1,800.00	2,000.00
.4	mi.	Removing fences.....	300.00	800.00
4.2	mi.	Removing and rebuilding fences...	1,000.00	2,500.00
280	post	Replacement and additional posts for rebuilding fences.....	2.00	2.00
.014	mi.	Furn. and erect. V-mesh safety fen.	5,000.00	50,000.00
32	lin. ft.	Furn. and laying 60 in. dia. HC50 precast-concrete pipe with type R joints.....	52.00	48.00
32	lin. ft.	Furn. and laying 30 in. dia. HC 50 precast-concrete pipe with type R joints.....	41.50	36.00
262	lin. ft.	Furn. and laying 12 in. dia. presast-concrete pipe.....	2.10	3.50
24	lin. ft.	Furn. and laying 15 in. dia. precast-concrete pipe.....	2.70	4.00
52	lin. ft.	Furn.and laying 18 in. dia. precast-concrete pipe.....	3.35	6.00
68	lin. ft.	Furn. and laying 30 in. dia. precast-concrete pipe.....	8.00	10.50
64	lin. ft.	Furn. and laying 36 in. dia. precast-concrete pipe.....	10.50	14.00
80	lin. ft.	Lay. 36 in. dia. precast-con. pipe..	4.00	10.00
2	transition	Furn. and laying precast-concrete transitions for 36 in. pipe.....	160.00	175.00
375	lin. ft.	Furn. and laying 12 in. corrugated-metal pipe.....	3.50	4.5
42	lin. ft.	Furn. and laying 15 in. corrugated-metal pipe.....	4.00	4.5
24	lin. ft.s	Furn. and laying 18 in. corrugated-metal pipe.....	4.75	5.5
715	lb.	Furn. and install. metal pipe flumes	.75	.8
8	gate & lift	Furn. and install. 12 in. metal slide gates and lifts.....	60.00	70.00
2	gate & lift	Furn. and install. 18 in. metal slide gates and lifts.....	90.00	125.00
1	gate & lift	Furn. and install. 30 in. dia. metal slide gate and lift.....	170.00	225.00
1	gate & lift	Furn. and install. 36 in. rectangular metal slide gate and lift.....	500.00	525.00
20	gate	Furn. and install. 12 in. dia. metal flap gates.....	35.00	45.00
1	gate	Furn. and install. 15 in. dia. metal flap gate.....	50.00	50.00
1	gate	Furn. and install. 18 in. dia. metal flap gate.....	65.00	60.00
4,400	lb.	Furn. and install. misc. metalwork.	.85	

COMPACT-

ewest addition to a fleet of Whites owned by United eady Mix Concrete Co., South Gate, California, hauls 4 ards legal payload on 2 axles and a wheelbase of only 127"

yet Packed with Payload!

nited also depends on Whites for hauling gravel. This 3 ton capacity dump trailer is powered by a White 22 PLT

When it comes to the payoff combination of maximum payload and minimum overall length—White's 3000 is in a class by itself. Along with greater hauling capacity, you get unmatched maneuverability, due to shorter wheelbase and wide-tread front axle.

You, too, can profit by White's "specialized design". It will pay you to call your local White Representative.

White

THE WHITE MOTOR COMPANY

CLEVELAND 1, OHIO

Factory Branches, Distributors and Dealers Everywhere

OR MORE THAN 50 YEARS **THE GREATEST NAME IN TRUCKS**

News of DISTRIBUTORS

New West Coast agents

In order to make its equipment available for the large highway construction programs now under way and planned for the West Coast region, The F. D. Cummer & Son Co. has announced four agents to supply Cummer asphalt plants of all types: Nelson Equipment Co.—Scott S. Corbett, Jr., president, Lynn Perrott, manager, Construction Machinery Division, Portland, Ore. Edward R. Bacon Co.—W. F. McGouirk, manager, San Francisco, Calif. Hatten Machinery Co.—Jack F. Hatten, manager, Seattle, Wash. Smith-Booth-Usher Co.—A. W. Ginther, general sales manager, Los Angeles, Calif.

The Lang Company

The Lang Company, Salt Lake City, Utah, announces recent personnel advancements in its Industrial Division. Wally Anderson has been made assistant to the division manager; George Hardy has become assistant to the service manager. Ned Ruesch has been promoted to serviceman, and Charles Curia to shop foreman. To afford faster service and closer liaison with owners and equipment operators in the uranium fields, Owen Confer has been sent to Moab, Utah. Recent new equipment added to the shop facilities includes a dynamometer, believed to be the only one available in an industrial service shop in the area. Recently Lang was assigned the distributorship in their area for Galion motor graders and road rollers.

Moves among branch managers

A. D. Reichard is now manager of the Portland, Ore., branch, Tractor Group, Allis-Chalmers Manufacturing Co., succeeding S. O. Anderson, who was appointed Pacific Coast territory manager. Reichard had been branch manager at Pocatello, Idaho, since mid-1952. L. D. Meyers was appointed to succeed him at Pocatello, having come from Amarillo, Texas, where he was branch sales manager.

Reichard

Meyers

Additional Hubbard partners

Two new partners have been admitted to the general partnership of The Hubbard Company, of Los Angeles, Calif., according to recent announcement by William B. Hubbard, senior partner. They are Charles R. "Bob" Sands who has been general manager of the company since Janu-

NEW DISTRICT MANAGER OF THE Oakland, Calif., motor truck district of International Harvester Co., is announced by *L. A. Hanson* (center), regional motor truck manager. He is *M. T. Sprague* (right) who comes from Portland, Ore., where he was district manager. He replaces *Roy A. Legge* (left) who recently retired. Sprague began his service with International Harvester over 18 years ago, progressing through various assignments to assistant district manager at Los Angeles where he spent several years prior to his Portland appointment to head that office two years ago.

TLANTA CONTRACTOR CALLS THEM...

the mixer champs

sten to Mr. E. J. Kelley, vice president and general manager of MacDougald-Warren, Inc., construction contractors of Atlanta, Ga., as he praises s new Mack B-42 six-wheeler concrete mix trucks.

Throughout the Greater Atlanta area, which we rve," says Mr. Kelley, "no other trucks can mease up to Mack six-wheelers for mixer operation, th in heavy traffic and over rough ground. They're champs for economy and dependability because they're free from breakdowns on the job."

Wherever you go, you'll find plenty of prominent concrete mix operators like Mr. Kelley who swear by Macks. For trucks that will keep rolling under heavy payloads . . . in fast, uninterrupted schedules . . . take their tip and make greater profits with Macks.

3484

IACK TRUCKS Los Angeles • Denver • San Francisco • Seattle • Portland • Salt Lake City

ary 1, 1952, and Stephen A. Barlow who is assistant general manager. A distributor and jobber of industrial and construction supplies, Hubbard's principal line is that of Presstite Engineering Co. manufacturer of sealing compounds.

New firm gets LeTourneau line

Vetcoa Supply Corp., Phoenix, has been appointed distributor of LeTourneau electric hoists and jib cranes for the Arizona area. Vetcoa is a newly-organized firm, owned and operated by the owners of Vernon Tool Co. of Arizona. According to Carl J. Nelson, president, Vetcoa will maintain complete parts and service facilities for this equipment.

Western Machinery Co. appointed

Appointment of Western Machinery Co., Denver, Colo., as a distributor of Marion Power Shovel Co.'s equipment in the state of Colorado, was recently announced. The office is headed by Leigh M. Jones, manager. A branch office is maintained at Grand Junction, with A. George Setter in charge. Western will maintain a stock of repair parts for Marion and Osgood-General machines, with trained service personnel, at both locations.

Portland branch manager

On October 1, Harold Foster became the new Portland, Ore., branch manager of Columbia Equipment Co. Foster is one of the firm's first employees, starting in the parts department of the Spokane branch in 1937. After a brief period there, he worked as a salesman in the Spokane area until 1950 when he transferred to the Seattle office where he worked two years in sales. For the past three years he has served in a sales position at Columbia's home offices in Portland.

Summeraire distributors

Clayton Manufacturing Co. of El Monte, Calif., has named two exclusive distributors in the West for its portable Summeraire oil fired space heater. Designed primarily to dry out new construction, but also useful in preventing freezing of freshly poured concrete while setting and curing, the equipment will be handled by Western Machinery Co., Denver, in the entire state of Colorado, while its Salt Lake City office will operate throughout Utah, southern Idaho, and eastern Nevada.

Min-A-Con adds two lines

Min-A-Con Equipment Co., Phoenix, Ariz., was recently appointed distributor for two additional lines: Buffalo-Springfield Roller Co.'s road roller and compaction equipment; and the wire rope, wire rope slings, and boom cable assemblies manufactured by American Cable Division, American Chain & Cable Co. Min-A-Con is also Arizona distributor for the Euclid Division and Detroit Diesel Engine Division of General Motors Corp., and for Stratoflex, Inc.

Dealer association elects

Newly elected officers of the Portland Machinery Dealers Association are: president—F. L. Jerome, Jr., president of Columbia Equipment Co.; vice president—F. S. Parker, vice president of Howard-Cooper Corp.; secretary-treasurer—S. S. Corbett, Jr., president of Nelson Equipment Co.

New division set up

Smith-Scott Co., Inc., Riverside, Calif.; large Western distributor of lightweight steel pipe, announces the opening of a plastic pipe and fittings division, having signed an exclusive sales agent agreement with Kerr Industries.

Clipper personnel

Bob Stubbs, district manager at San Francisco for Clipper Manufacturing Co., announces two men are now operating out of the Los Angeles office: John T. Goss and Colin Campbell, both sales engineers. With Stubbs, working out of the San Francisco office, is Ray "Mick" McCabe.

Garlinghouse founds new corp.

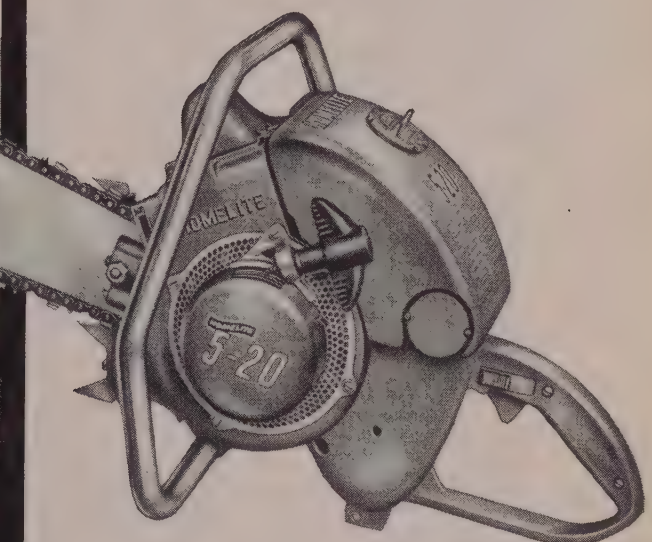
Garlinghouse Brothers, Los Angeles, Calif., announces sale of its retail sales division to a new corporation, Garlinghouse, Fremon & Co. This division, purchased as of Sept. 1

HOMELITE

5-20 CHAIN SAW

It's NEW... It's alive with power

5 HP—20 POUNDS



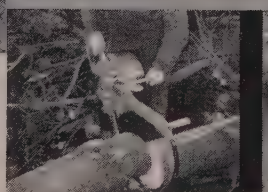
Never before has there been a chain saw with so much power per pound as the new Homelite Model 5-20. It has 5 big horsepower for faster cutting . . . a light, light 20 pounds for easy operation. What's more, it is the only chain saw that gives you a choice of attachments to do many different cutting chores easier.

The new Homelite Model 5-20 is precision built for quick starting, dependable performance, and low, low maintenance. Cuts in any position . . . it saves both time and money . . . brings bigger profits to woodcutting or clearing operations. Write for complete details or see your Homelite dealer.

See your dealer for details on the Homelite TIME PAYMENT PLAN

Packed with power, the new Homelite Model 5-20 Chain Saw brings down big trees six feet in diameter, cuts through 20" trees in 20 seconds without forcing or jamming. Anyone can operate it . . . no experience necessary.

DO MORE WITH THESE 5-20 ATTACHMENTS



Interchangeable Blades add versatility to the new Homelite 5-20 Chain Saw. For felling, bucking, limbing or plunge cutting, there's a hard track blade for every requirement. Straight blades available from 14" to 60", bow saws 14" and 18".

Brush Cutter cleans out brambles, brush, undergrowth and small saplings six times faster than conventional methods. The adjustable harness, hanger and handle bars assure perfect balance . . . make it extremely simple to operate . . . safe for anyone.

Clearing Attachment makes quick work of clearing land of small trees. Plunge cuts or plunge bucks . . . no bending or stooping . . . less fatigue. *One man keeps three men* busy carrying away limbs and piling brush!

HOMELITE

311 RIVERDALE AVENUE • PORT CHESTER, NEW YORK

A DIVISION OF TEXTRON AMERICAN INC.

Homelite Factory Branches:

ALIFORNIA — Fresno, Los Angeles, Sacramento, San Francisco
GON — Portland, Prineville • UTAH — North Salt Lake
WASHINGTON — Seattle, Spokane

by Garlinghouse, Fremon & Co., will continue to represent Construction Machinery Co., McKiernan-Terry Corp., Heltzel Steel Form & Iron Co., Gar-Bro Manufacturing Co., Viber Company and other nationally known manufacturers in the Southern California territory. The new corporation's temporary location will continue at 2415 East Washington Blvd., Los Angeles 21, until its new building is ready for occupancy.

John L. Fremon, formerly vice president and general manager of State Equipment Co., Inc., of New York, resigned that position to found the new corporation. Other officers of the new firm include Ralph W. Whitaker, vice president, and "Jack" Monson, secretary-treasurer. A. F. Garlinghouse, managing partner of Garlinghouse Brothers, the parent company, is chairman of the board of directors.

ROBINSON EQUIPMENT CO., recently founded by *Charles G. Robinson*, has opened offices in San Francisco at 371 Fourth St. At one time connected with construction firms, including Bechtel Corporation, Robinson is best known for his relationship with Industrial Equipment Co., Bay Cities Equipment, Inc., and Bay Equipment Co. where he was sales manager and vice-president. His new firm is exclusive Northern California distributor for Bay City Shovels, Inc., maker of ½-, ¾-, 1-, and 1½-yd. shovels. Cranemobile of 15- to 25-ton capacities is another Bay City product. Besides Bay City, Robinson will represent Arrow Manufacturing Co. of Denver, and Schramm, Inc., West Chester, Pa.

The American Road Builders' Association

invites you to Miami Beach to attend its

54th ANNUAL CONVENTION

EXHIBIT OF HIGHWAY MATERIALS and SUPPLIES

Both Meetings and Exhibits will be held in the

Miami Beach Auditorium

JANUARY 11-14, 1956

The Nation's leading legislators, engineers, and road builders will address this Meeting—the most important in ARBA's history. Write to ARBA in Washington for information on hotel reservations and Exhibit arrangements.

merican Road Builders' Association • World Center Building • Washington 6, D. C.

Vetchell joins Portland firm

J. A. Vetchell recently joined Contractors Equipment Co., Portland, Ore., in the sales department. He had been sales manager for Foulger Equipment Co., Salt Lake City, and prior to this was a West Coast representative for J. I. Case Co.

Shaw Sales moves

Shaw Sales & Service Co., Los Angeles, Calif., recently moved to a new location at 5100 Triggs St., Postal Zone 22. With expanded space here, the company has added necessary equipment for a repair station for Bosch pumps and injector system.

New salesman; new account

Kimball Equipment Co., Salt Lake City, Utah, recently took on a new salesman: N. E. "Ike" Hainsworth. Also, Kimball has added the Four Wheel Drive Auto Co. line in the territory.

Star Machinery acquires new line

Star Machinery Co., Seattle, Wash., recently acquired the Neo-Flasher light and barricade line manufactured by Neo-Flasher Mfg. Co., Seattle.

Cook Bros. names new dealer

Cook Bros. Equipment Co. of Oakland, Calif., was recently appointed dealer for all of Northern California for the complete line of American Hoist & Derrick Co., St. Paul, Minn. The line incorporates hoists, derricks, crawler and rubber mounted cranes, etc.

Century White dedicates plant

Formal opening of its new building on West Yellowstone Highway was recently celebrated by Century White Truck Co. of Casper, Wyo. Among the more than 500 guests were R. W. Cochran, district manager for White, and Fred Ragan, wholesale manager, both of Denver, and N. O. Gresham, wholesale sales manager from The White Motor Co. in Cleveland. "The finest and best equipped truck and trailer service building in Wyoming," is the way Stan DeVore, president of Century White, describes the new plant which has 11,000 sq. ft. under roof. Century White Truck Co. is Wyoming distributor for White, Autocar, and White-Freightliner trucks, Hobbs trailers, Clinton chain saws, and numerous other allied lines.

C.I.T. names regional rep

Frank W. Kremer, 5419 Ave. H, Lubbock, Texas, has been named representative in New Mexico and western Texas for C.I.T. Corporation.

A new man; a new line

W. Cliff Jones has joined Western Machinery Co., Phoenix, Ariz., in the sales department. Firm recently took on distributorship of Genamatic generators, and invites inquiries in the state of Arizona.

Coast Equip. Co. has new line

Clyde Iron Works of Duluth, Minn., announces the appointment of Coast Equipment Co. of San Francisco as exclusive distributor in the northern and central California area for this complete line of hoists, derricks, whirley and Handi-Cranes. Catalogs and specifications covering the Clyde line are now available from Coast Equipment, which also provides complete field coverage of trained sales engineers thoroughly familiar with all hoisting requirements.

Spot Welder line acquired

Welding Service Sales, San Francisco, Calif., announces the addition of the Miller spot welders to the many lines already handled by the firm.

Griphoist appointments

H. M. Armstrong Co. and the A. T. Glesener Co., both of San Francisco, are newly appointed dealers of the Tirfor Griphoist.

Sersanous honored in Northwest

A. F. Sersanous, president of Loggers & Contractors Machinery Co., well known distributor of Portland, Ore., was recently elected governor of Pacific Northwest District, Kiwanis International.

MANUFACTURERS

New Western plant

Clark Equipment Co., a leading manufacturer of materials handling and earthmoving equipment, will establish a West Coast plant before the end of the year, according to George Spatta, president. The facility will be located somewhere in the San Francisco Bay area and will be used as a parts depot at the outset and later expanded as an assembly plant for fork lift trucks.

Thew elects officers

M. B. Garber and E. C. Brekelbaum were recently elected vice presidents of The Thew Shovel Co., Lorain, Ohio, as announced by C. B. Smythe, president. Smythe also was elected treasurer of the company to replace the late H. L. Reynolds and will carry the title of president-treasurer.

Garber

Brekelbaum

Long-time firms to merge

A reorganization plan under which the American Hoist & Derrick Co., St. Paul, Minn., will take over ownership and operation of the principal business and facilities of American Steel Dredge Co., Inc., Fort Wayne, Ind., has been agreed upon by both companies. Under the proposed plan American Steel Dredge will become a division of American Hoist, and the products of American Steel Dredge, including excavators of ½- and ¾-yd. capacity and a complete line of dredges, will continue to be manufactured.

Le Roi names Buttner

H. J. Buttner has been appointed manager of engineering for the Le Roi Division of Westinghouse Air Brake Co., Milwaukee, Wis. Buttner has had nearly 25 years of engineering experience in the design and development of internal combustion engines.

New Hyster appointment

Announcement is made by the Hyster Company, Portland, Ore., of the appointment of Anthony A. Pack to a newly created position, assistant to President Ernest G. Swigert on

Anthony A. Pack

special staff assignments. Formerly from Detroit, Pack was for 15 years with Vickers Incorporated in executive administrative and engineering capacities. Prior to that he was with General Motors Corp. as a project engineer.

Catalane heads new P&H Division

J. F. Catalane recently became general sales manager of the Construction and Mining Division of Harnischfeger Corporation, with Robert P. Jones, assistant. Catalane also continues as sales manager of the Power Crane and Shovel Division, with Raymond A. Ehn as assistant. The new Construction and Mining Division includes P&H power cranes and shovels, electric shovels, stabilizers and Sierra loaders. Catalane has been a member of the Harnischfeger organization since 1945.

Organizational change

Alden G. Roach, president of United States Steel's Columbia-Geneva Steel Division, announces the appointment of Loren J. Westhaver as vice president—operations for the division. He succeeds Laurence S. Dahl who continues as a vice president handling special assignments. Under the organizational change, J. D. McCall, assistant general manager of operations, succeeds Westhaver as general manager.

Kingman joins Wayne staff

Appointment of William W. Kingman to an executive post at Wayne Manufacturing Co., Pomona, Calif., was recently announced. Kingman's duties will be concentrated on administration of the company's new industrial sweeper line.

A-C expansion

A $1,800,000 expansion program for the shops and offices of the Cedar Rapids (Iowa) Works of Allis-Chalmers Manufacturing Co. is announced by the Construction Machinery Division, Tractor Group. The company's motor scrapers and motor wagons are made at the Cedar Rapids Works. According to B. S. Oberlink, vice president and general manager of the Tractor Group, the enlarging of the shops and offices will increase productive capacity by fifty percent.

Loveall made v.-p.-genl. mgr.

Construction Machinery Sales Co., Waterloo, Iowa, announces the appointment of Tony Loveall to the position of vice president and general manager. For the past two years, Loveall has been in the field force of Construction Machinery Companies.

Space is sold as advertisers' inches. All advertisements in this section are ½ in short of contracted space to allow for borders and composition.

CLASSIFIED

Rates are $8.50 a column inch. Copy should be sent in by the 15th of preceding month if proofs are required; by the 20th if no proofs are required.

FOR RENT

FOR SALE

WANTED

JOBS

McGuigan named asst. sales mgr.

F. S. McGuigan, marine sales engineer at Bethlehem Pacific's San Francisco shipyard since 1949, has been appointed assistant to manager of sales—industrial. In his new position, McGuigan will concentrate his activities on the industrial phase of the yard's operations. He will maintain his headquarters at the company's general offices in San Francisco.

Kaiser ups Little

C. I. "Cliff" Little has been appointed manager of the erection department of Kaiser Steel Corp.'s fabricating division plant in Montebello, Calif. Prior to this new appointment, he was structural sales engineer, and brings to his new post more than 35 years experience in the steel fabricating industry.

Top management promotion

Angus J. O'Brien was recently appointed to the newly created position of vice president and director of engineering and manufacturing of Gar Wood Industries, Inc., Wayne, Mich. This fills a gap left in the management group by the recent retirement of George D. Shaeffer, vice president—engineering. O'Brien has been with Gar Wood since 1949.

Gilronan made sales manager

William V. Gilronan was recently named sales manager of the Flexible Road Joint Machine Co., associate of Heltzel Steel Form & Iron Co., Warren, Ohio. In addition to directing the sales of Flexible's Flex-Plane line, Gilronan will also assume the duties of advertising manager for both Flexible and the parent company.

Iowa Mfg. adds to sales dept.

F. K. "Ken" Hamilton, recently appointed to the domestic sales department of Iowa Manufacturing Co., Cedar Rapids, Iowa, brings to his new position 16 years' experience in the heavy construction equipment industry. He went to work for the Lang Company of Salt Lake City, Utah, in 1939. In 1951 he joined the Fluor Engineering Construction Co. of Los Angeles as design engineer. From 1952 to his present appointment he was engaged as engine representative for Wheeler Kersaw Co.

McGuigan

Little

O'Brien

Gilronan

B-J joins Borg-Warner

Byron Jackson Co., Vernon, Calif., pioneer West Coast manufacturer of pumps, oil tools and electronic equipment, has become the Byron Jackson Division of Borg-Warner Corp. The present B-J management and policies will continue, with E. S. Dulin as the president of the new division.

Utility plant progress

The Puente plant of Utility Trailer Mfg. Co., Los Angeles, Calif., is rapidly nearing completion. While completion is still some months away, one 48,000-sq. ft. building is finished and in full production on the Spacemaster van, and the paint shop is also completed. When the new facilities are ready and occupied, the company looks for a tripling of production over that possible at the present location.

Caterpillar receives award

Caterpillar Tractor Co. was recently awarded the 1954 Public Interest Award by the National Safety Council, the second award received in the past two years. The award was established to recognize and honor exceptional service to safety in the public information field. It represents performance above average and originality in the use of advertising.

ADVERTISERS in this issue

BACKFILL, uncompacted

Isaiah 40:4

Construction specifications taken directly from the Bible appeared on some plans in a city in Kentucky recently, according to a newspaper account. Written across the plans which related to the grading of a hilly section of the city was the reference "Isaiah 40:4." Upon looking up the biblical reference, the inspector found it stated: "Every valley shall be exalted, and every mountain and hill shall be made low, and the crooked shall be made straight, and the rough places plain." While he was there, we hope the inspector noticed Luke 23:34, ". . . forgive them, for they know not what they do."

Pick your architect out of a hat . . .

As professional men, architects would be the last to accept lottery as a method of selection by their clients. Along with professional engineers they even shun the idea of competitive bidding. However, a group of architects in Los Angeles went along with the lottery gag to help their AGC friends out of a very tough spot.

It seems that the Southern California Chapter of AGC, which includes both heavy and building groups, is ready to build a new home. For years they have been located in the Architects Building in Los Angeles. Naturally, there was a reluctance on part of the AGC Board of Directors to select an architect for their new building from among their many friends. So, those architects interested in the job were requested to make themselves known and a name was picked out of a hat. Thus the dilemma was met and solved.

The obvious conclusion to this true story will be to have the architect select the contractor to do the job by the same procedure.

Twenty-five years ago in *Western Construction*

Outlook for construction activity was painted brightly in an editorial which pointed out the start on such famous projects as the Golden Gate Bridge, Hoover Dam, All American Canal, Colorado River Aqueduct, Pine Canyon Dam, important water work improvements in Phoenix and a highway bond issue of $2,800,000 in Wyoming. Off in the future was the Columbia Basin project with its Grand Coulee Dam.

* * *

Ingenuity of Western contractors was noted, including several pieces of special equipment designed and produced in the field to meet particular Western conditions. One of the items which now seems somewhat out of date was the reference to a portable blacksmith shop.

* * *

Cushman Power Plant No. 2 for Tacoma, Washington, was the construction job of immediate interest with particular reference to the development of special lining equipment by **Roy C. Hackley** that permitted the pour of a complete circular section in one operation.

* * *

In 36 working days, 33,755 tons of asphaltic concrete was placed on a California state highway by the California Construction Co., which appeared to be something of a speed record. On this same job, **Ben T. Tanner,** engineer for the contractor, designed and built a sheepsfoot roller.

* * *

For the first time in the pages of **Western Construction News, Professor James R. Griffith** appeared as the author of an article. He reviewed the design problems for concrete grain storage bins at Portland. Several years later he began the long series of construction design charts which were reprinted in book form and widely distributed.

* * *

One of the early chapters in the **Boulder versus Hoover Dam** controversy was reported when on September 17 Secretary of the Interior Wilbur announced that the dam would be referred to as Hoover Dam rather than Boulder Canyon Dam as it had been called up to that time.

* * *

Fast steel erection was nearing completion on the **Suisun Bay Bridge** of the Southern Pacific, while transcontinental trains were still being ferried across the upper end of San Francisco Bay. The structure was scheduled for opening within a month.

Young engineers and the Bureau of Public Roads

All young engineers interested in federal service and highway work will find much interest in a publication just released by the Bureau of Public Roads entitled "Opportunities in the Bureau of Public Roads for Young Engineers."

The 14-page booklet presents in readable and attractive style a broad review of this important governmental agency outlining its organization, operations, the training program it conducts for young engineers and information relating to salary and retirement. The concluding word of history relating to the BRP indicates that its predecessor was established in 1883 as the Office of Road Inquiry as part of the Department of Agriculture. The next important step was the first appropriation of $500,000 in Federal aid to the states for improving roads which were used in carrying the mails. There has been no break in the Federal aid policy since that time up to and including the 1954 legislation which authorized $875,000,000 for each of the fiscal years 1956 and 1957 for improvement of the Federal aid system, representing an increase of 52%.

The booklet concludes with the statement that "The present highway program of the nation offers an excellent opportunity for young engineers in the Bureau of Public Roads."

NEXT MONTH

Compaction of soils is a subject of interest to everyone in the entire construction industry. From design engineers to the operators of rolling equipment there are problems to be solved and developments to be watched. The December issue will feature an article by Professor Frederick J. Converse of the California Institute of Technology who is a recognized authority on this important subject and has worked with the Navy in its extensive field studies.

At the opening of his article Professor Converse states: "It is the aim of this article to discuss some of the basic principles for compacting earthfills by vibration, in the hope that it will be of value to the contractor in using such equipment and to the equipment manufacturers in designing it."

Following the article will be a review of the equipment now on the market and available to carry out vibratory compaction.

. . . The Editors

WESTERN CONSTRUCTION

Editorials

Safety must hit the pocketbook

Safety will only begin to get real recognition in the construction industry when the contractors' pocketbooks are seriously involved. Long ago the manufacturing industries realized that safety was not just sentiment, but represented cold cash in reduced insurance premiums. Today in plants and factories safety is preached and practiced from top management down. But in contracting, the personnel changes on every new job, and the profit-and-loss statement begins with a bid and closes with the completion of the project. Continuity is lacking. The incentive for field supervisors to make the added effort to set a safety record is lacking when they will be working for another boss on the next job.

At safety conferences, such as the recent national meeting, it is customary to repeat in resolutions the same old expressions of previous years. For example, there is the usual resolution stating that safety must start at the top with the active support of management, or the equally threadbare one about construction equipment which should be properly designed and kept in good condition. Or, again, there is the old truism that a safety program will only succeed when responsibility and corresponding authority are properly delegated.

Nobody argues the soundness of these declarations. If they were carried out in letter and in spirit there would be notable results in the construction industry. But the incentive to place them in operation is lacking. There is not a realistic reward for carrying out a successful safety program on one job and getting an adequate reduction in insurance premiums on the next.

Or, reversing the situation, if a contractor failed miserably in regard to safety on one job there is not enough penalty in raised insurance rates to create a bid hurdle that might lose his next job. If so, the urge to promote safety really would begin to take hold.

Pride may be an incentive to some, but it will be the added cost of *not* doing a good job of safety that will begin to move construction up to the safety records of other industries.

That piece of used equipment

There it stands, that veteran of several rough, tough construction seasons. Is it friend or foe of the industry? If it were retired from service a new and more efficient machine would have to be purchased. That would stimulate the designing and producing of better units, helping manufacturers, and adding to the stability of the national economy. Further, it would be a boon to distributors, for reasons too obvious to review. Lastly, it would actually be a help to contracting by eliminating, or at least reducing the incentive for newcomers to buy junk and get into business. Their operations are no help to any phase of the industry. Public officials who seem to get lower bids from such new, cheap competition are dealing with contractors far below the quality standard of "Skill—Responsibility—Integrity."

The solution to this problem, of course, is more difficult than the mere stating. It's still a free country. If a distributor takes in a piece of badly mauled equipment and wants to turn around and sell it to a sub-standard contractor, that is probably his business. His contractor friends may complain about his letting in another gyppo. But, in turn, they insist on getting highest possible trade-in value. This makes the peddling of the trade-in a must for the distributor if he is to realize a reasonable margin on the new machine.

What if the distributor should turn around and ask some of these same contractors to share the cost of buying up the machine and taking it off the market? That puts the shoe on the other foot. How about the other interested party—the manufacturer? He certainly should be glad to get the old model out of circulation.

So the three—the legitimate contractor, the distributor, and the manufacturer—have a common interest in getting rid of the old veteran. Would they ever get together in sharing the cost of such a program? Where would the plan get its direction, incentive, and control?

If the distributor has in his yard a sad piece of machinery that is better off dead than alive, how would he go about securing agreement and financial contributions from both other parties to get the wreck into a quiet grave?

Legal questions might be involved. Keeping a useful tool out of circulation might in some way be considered as restraining trade. Competition might be reduced in the amount of bidding on public construction projects. Public works officials might be opposed. Complications grow as details of the idea are probed. The fact remains that any piece of expensive-to-operate, out-dated construction machinery could be removed from the scene to the benefit of the entire industry. Long-range advantages make the problem worth some exploration.

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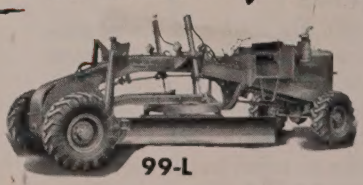

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