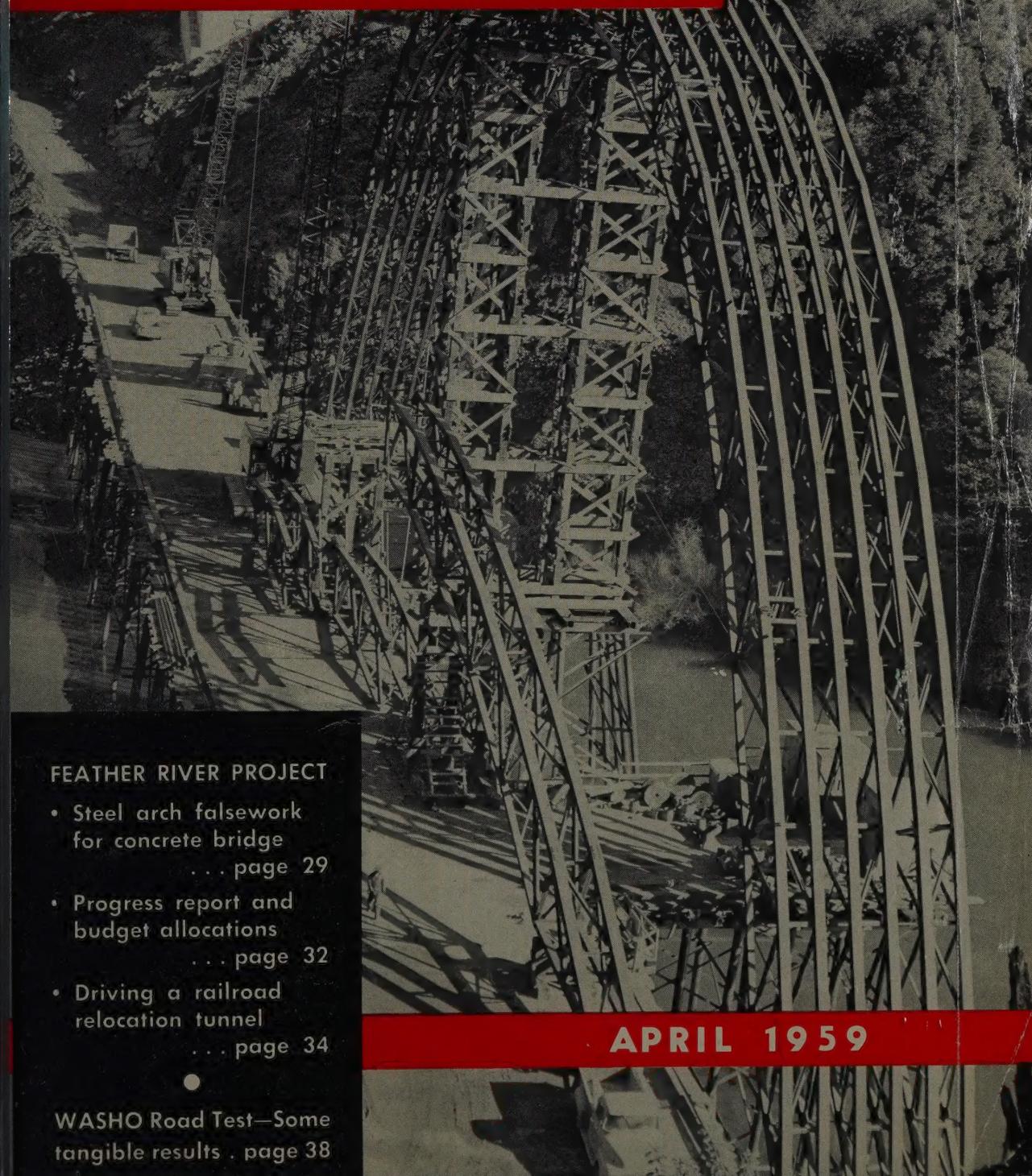


# WESTERN

# CONSTRUCTION

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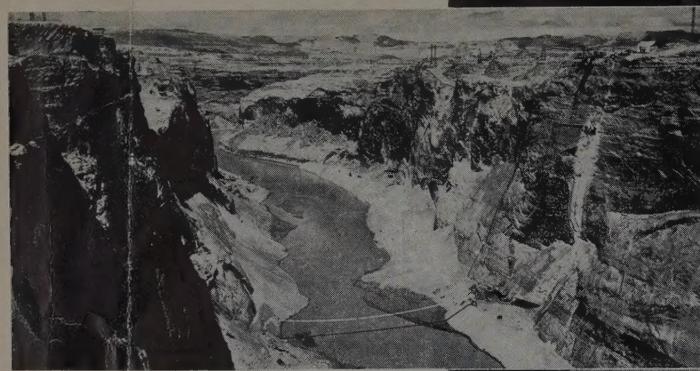


## FEATHER RIVER PROJECT

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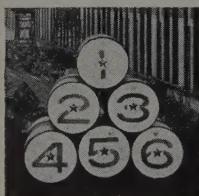
APRIL 1959



**SECOND LARGEST DAM IN THE U.S.**, at Glen Canyon, Ariz., will incorporate two of these 2,800 ft. diversion tunnels. Frazier-Davis equipment runs dependably, stays on the job, thanks to the Texaco Simplified Lubrication Plan.



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**Texaco Marfak Multi-Purpose 2**—protects wheel bearings, chassis, water pumps against dust, moisture and wear.

**Texaco Track Roll Lubricant**—prolongs the life of crawler mechanisms.

**Texaco Rock Drill Lubricant**—guards against wear and rust whether drills are running or idle.

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# WESTERN CONSTRUCTION

April

1959

Vol. 34 No. 4

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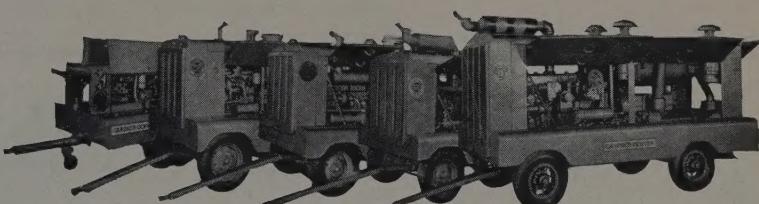
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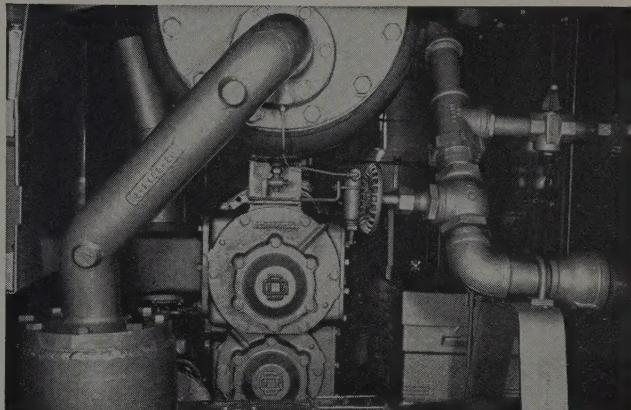
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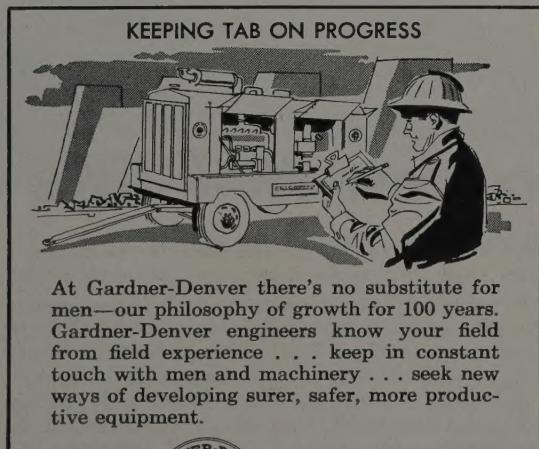
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Left to right, Models RP125, RP210, RP365, RP600, RP900.



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# NEW EQUIPMENT

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



## Multi-purpose key to new M-F line

Multiple uses are featured in the six new or modified machines introduced as part of its 1958 industrial equipment line by **Massey-Ferguson Industrial Division**.

Representative of the line is the new Work Bull 1001 multi-purpose tractor loader (above), which with various attachments, is a virtual one-unit motor pool. Improvements in the basic 1001 cover larger, more streamlined profile, more convenient cockpit with weather protected controls and optional cab, increased rated capacity to 1 cu. yd. and struck capacity of  $\frac{3}{4}$  cu. yd. Better flotation also is achieved with larger tires on rear steering wheels.

The tractor is convertible on the job site to eight different machines. As a loader with standard 75-inch bucket, the 1001 has a 43-deg. tilt back at ground level with 5,200 pounds of breakaway power. A street sweeper attachment has a 63-in. broom with  $\frac{3}{4}$ -yd. dust pan. Operating as a rotary broom, the 1001 sweeps a 96-in. swath with 30-deg. of hydraulic control right and left. With a rotary Davis backhoe, it has

its own backfill blade. It also can be fitted as a scarifier, fork lift, angle dozer, and swinging crane.

Two other industrial tractors, and three loaders complete the 1959 Massey-Ferguson line additions. Tractors are the Work Bull 204 which incorporates instant no-shift change of direction, torque converter, and other features formerly found only on big tractors; and the Work Bull 406, a  $\frac{7}{8}$ -yd. industrial tractor-loader with instant direction reversal, five equal speeds forward or backward and full visibility.

The new Davis loaders, 101 and 102 are 15% stronger with thicker lift ram and wider frame, operate at 2,150 psi, and feature faster operation. Both can be used with companion Davis backhoes. The Davis 99 economy loader, a low-priced loader that maintains the Davis standard of quality, has a capacity of 2,000 pounds at half-height, and 1,500 at full height. Does not have backhoe mounting.

... Circle No. 150

(Continued on page 18)

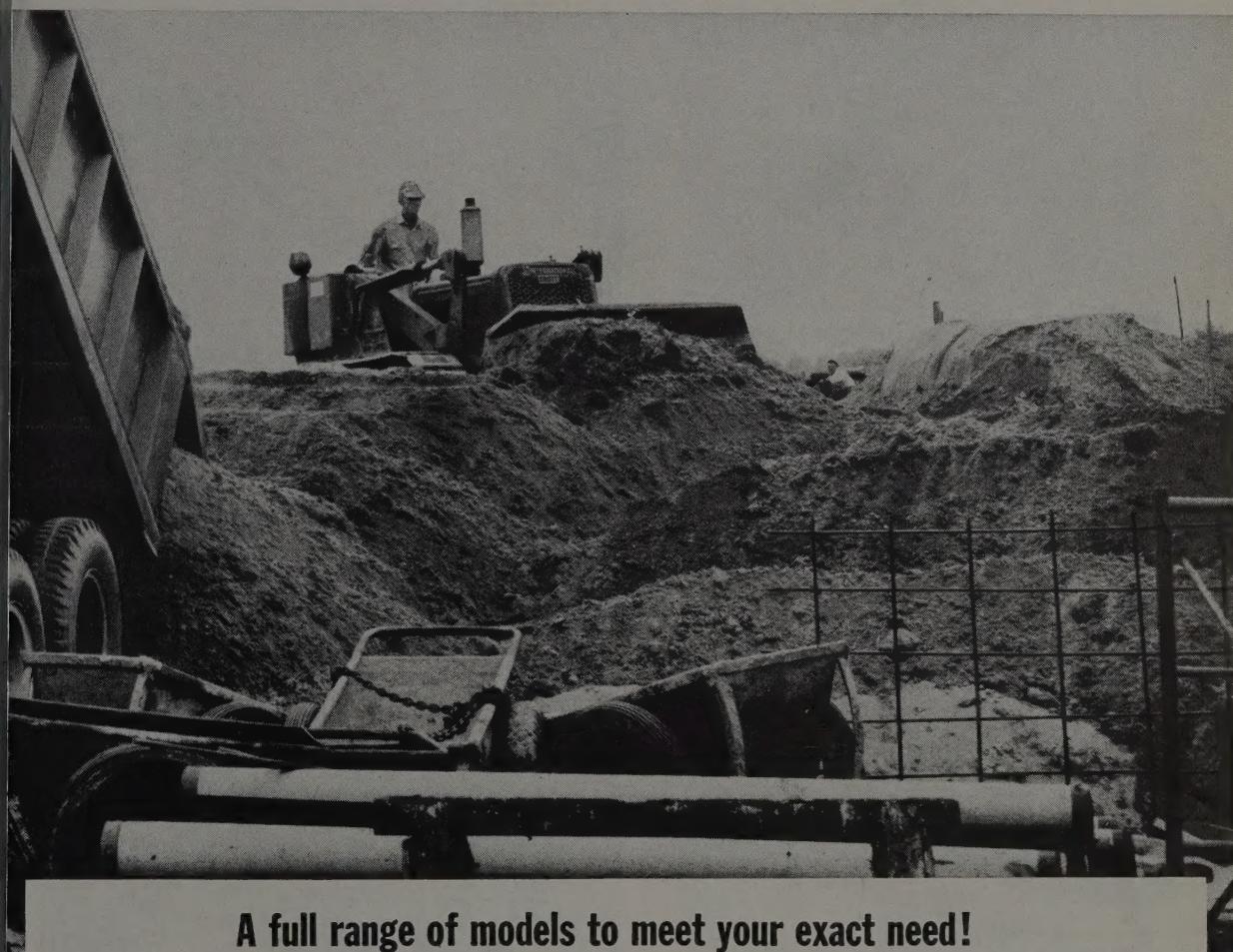
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Model Series	164	182	184	182	192
Gross Vehicle Rating	19,000	21,000	23,500	33,000	38,000
Body	4 Yd.	4 Yd.	4 Yd.	8 Yd.	8-10-Yd.
Wheelbase	129 in.	141 in.	141 in.	149 in.	157 in.
Engine	264 cu. in.	308 cu. in.	308 cu. in.	308 cu. in.	450 cu. in.
Transmission	4-speed Synchro-mesh	5-speed Direct	5-speed Direct	5-speed Direct, 3-speed Auxiliary	5-speed Direct, 3-speed Auxiliary
Rear Axle and Capacity	15,000 2-speed	16,000 2-speed	18,500 2-speed	28,000 single-reduction tandem	34,000 single-reduction tandem
Tires	8.25 x 20 10 ply	9.00 x 20 10 ply	10.00 x 20 12 ply	9.00 x 20 10 ply	9.00 x 20 10 ply
Frame Reinforcements	Inverted "L"	Inverted "L"	Inverted "L"	Inverted "L"	Inverted "L"
Heavy Duty Springs	Yes	Yes	Yes	Std.	Std.

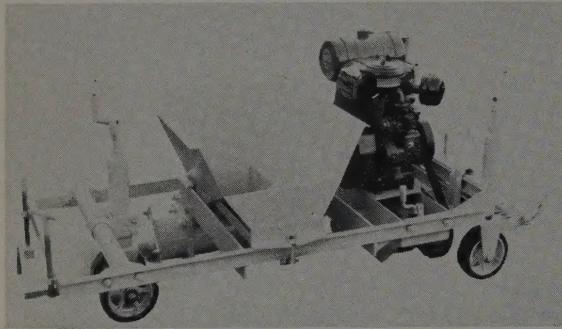
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# NEW EQUIPMENT

(Continued from page 13)

## High speed two-man curb machine

The Miller MC-500 extruded curb machine provides easy interchange of compaction chamber for laying curb from either side at speeds of 2,500 to 3,000 ft. per day. Compaction has been increased 12% with a new 8.5 hp. motor. Features include new centrifugal clutch and kick-out torque bar to prevent damage to screw and mechanism. Hopper is easily reversible

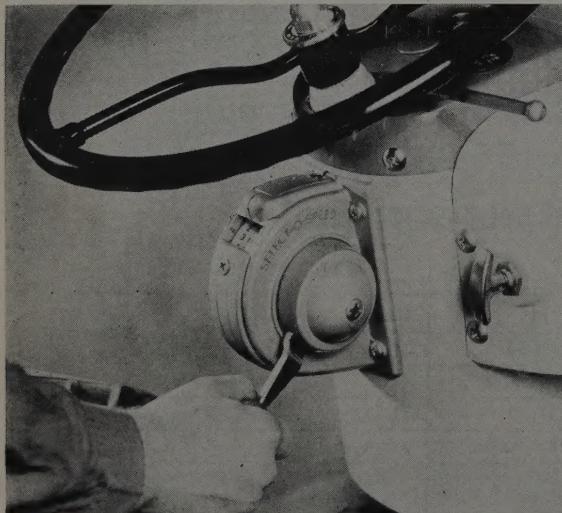


by loosening two wing nuts, and entire right-left changeover can be made in 8 minutes. Wheels adjust right or left, up or down, forward or trailing position. Curb forms for the two-man machine are available in a wide range of specification shapes for both asphalt and concrete extrusion. One form, of buyer's choice, and set of hand finishing tools are included with each machine.

... Circle No. 151

## Selective tractor transmission by Ford

A new tractor transmission which eliminates clutch shifting but permits selection of desired gear speed by operator is announced by Ford Motor Co. Named



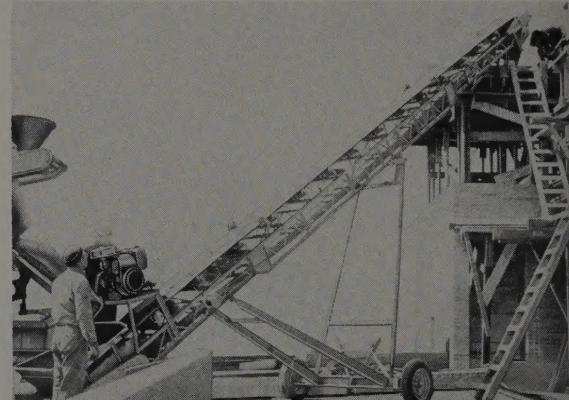
"Select-O-Speed", the unit is a ten-speed fully selective power shift unit controlled by a small hand lever mounted immediately below the steering wheel. Gear ratio changes are made with the tractor in motion and with virtually no hesitation. Hydraulic control shows tractor ground speeds at three rpm-settings on dial. Mechanism involves three internal hydraulic

clutches and three bands controlling simple planetary gear sets; a fourth planetary gear set gives constant reduction. Combinations of various bands and clutches activate different sets of gears, providing 10 forward and two reverse speeds.

... Circle No. 152

## High lift concrete conveyor

A 40-ft. mobile belt conveyor for lifting concrete from mixer to job has been developed by Fairfield Engineering Co. The wheel-mounted unit has a ca-



pacity of 40 yd. per hour at a maximum height of 26 ft. The belt, which moves over shallow V idler rolls, is driven by a 12.5-hp. Kohler engine equipped with a lever operated clutch.

... Circle No. 153

## Versatile utility wheel tractor

A heavy-duty utility wheel tractor suitable for a wide variety of jobs now is in production, International Harvester Co. announces. The model 660 tractor has an estimated horsepower of 75 at the belt and 68 at the drawbar, and offers a choice of gasoline,



diesel or LP gas engines. Equipped with International Wagner or Pippin backhoe with 14½-ft. working depth, the unit also is designed to work with Wagner ¾-yd. front-end loader, and four models of the Johnson elevating scraper with 4 to 8-yd. capacities. Pulling power of the 660 with sheepsfoot rollers is said to equal crawler units of 100-hp. class. The new tractor has a road speed of 16.5 mph., with attachments.

... Circle No. 154

(Turn to page 128 for more New Equipment.  
New Literature can be found on page 124.)

# WESTERN CONSTRUCTION

## Another look at "end-result" specs

AGAIN, some remarks seem logical on the unresolved question of whether engineers should move further in the direction of indicating only the end-results they want from contractors, or tell them the methods they should use. Much may be said on either side.

Western contractors have long been noted for their ingenuity and their eagerness to try new field methods. So they would naturally be out in front when it comes to urging the adoption of more end-results in construction specifications.

As stated here in the past, many engineers lean toward the idea of telling the contractor how he is to carry out plans and specifications, using procedures they are sure will provide desired results. They are quite willing to have others try out new ideas. This does little to secure advantages from more speed, savings in cost, and possibly improved results that originate with the developments of equipment manufacturers and the ingenuity of Western contractors.

On the other hand, the contractors, aided by these manufacturers of equipment, lean distinctly toward the other side. Final results, only, would be specified by the engineer. This free rein speaks of progress, of innovations, of new methods, and, finally, reductions in costs. It is forward-looking and progressive. It has much to be said in its favor.

There remains, however, an area between these points of view where the contractor has much at stake and should be inclined to be cautious.

The engineer remains the final judge of the results to be accomplished in the field. Today, the very speed of modern construction creates a basic problem and a secondary one that are of direct concern to the contractor. Time is always required between the completion of any field operation and the results of test that permit its acceptance by the engineer.

If possible, the contractor would like to have every load of fill or yard of concrete approved as it is placed. He dislikes the thought of adding another yard of dirt or another lift of concrete until his previous work has been accepted. However, in spite of much advance that speeds check testing,

there is a necessary lag at this point. Further, the contractor knows that engineering costs have an economic limit, and an inspector cannot be on hand to check every unit of output.

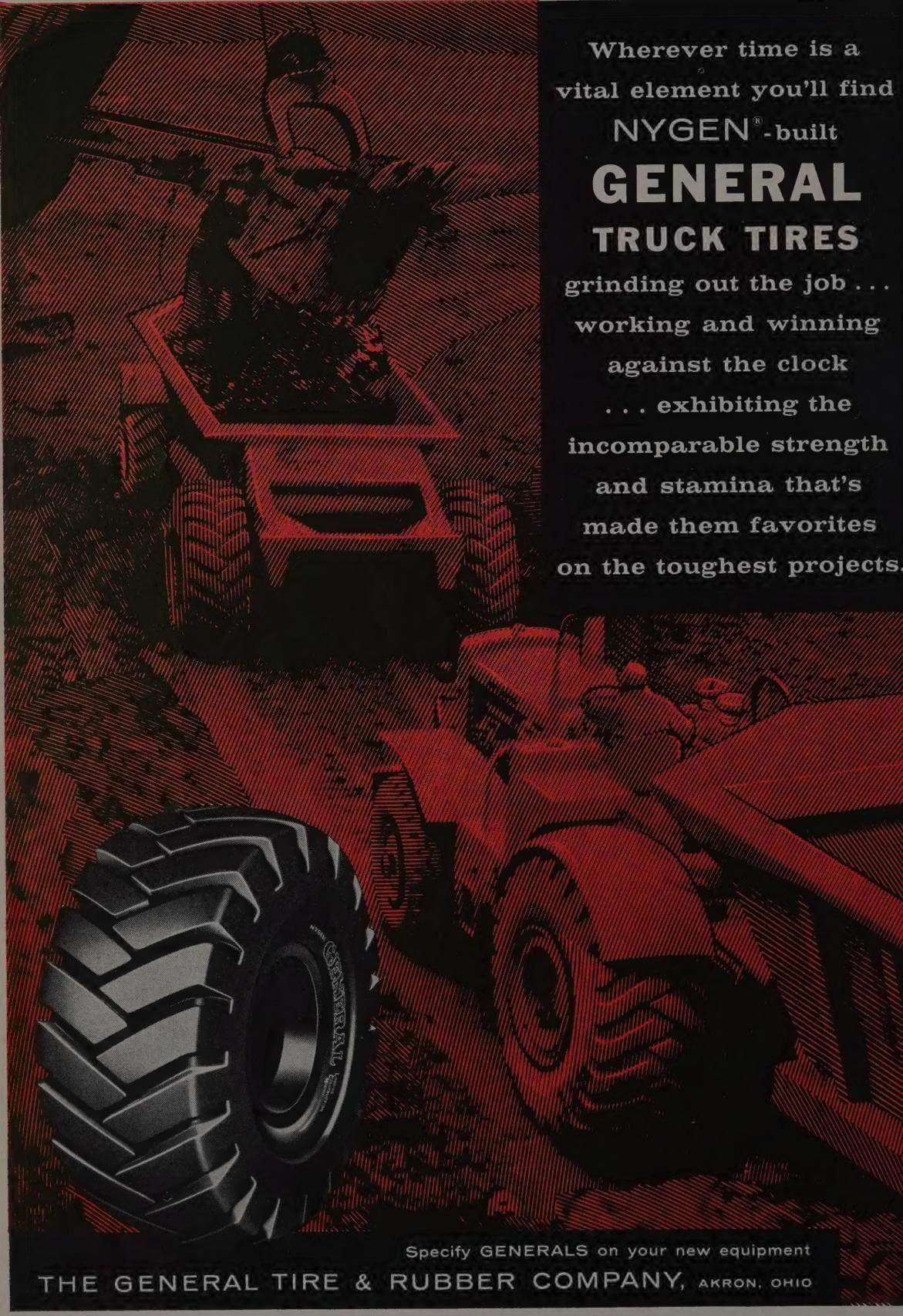
If the tests fail to demonstrate the satisfactory condition of the work carried out by the contractor, it is obvious to both parties that the work must be corrected. Thus, the first problem in using end-results is the need for tests that provide without delay the information as to acceptance or rejection. That day has not yet arrived.

The secondary problem is the need for the contractor to have a suitable procedure available by which he can correct any deficiency without undue cost. If such correction requires a serious halt in the work, or the return of heavy equipment, or the readjustment of his work schedule, it could quickly destroy the advantage of the end-result specifications. Further, it would tend toward more points of controversy and efforts to compromise—factors undesirable from the point of view of the engineer.

With proper understanding of the lag in test results, and having a means for correcting any deficiency, a contractor is in a position to campaign for use of end-results with their obvious advantages.

The engineer, on the other hand, should take every opportunity to reduce the extent of the methods prescribed for the contractor and permit the trying of new ideas, procedures and equipment. A growing understanding of all factors involved will tend to close the gap between the present difference in "methods" vs. "end-result" specifications.

*Jim Ballard*



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WESTERN CONSTRUCTION—April 1959



APRIL 1959

# WESTERN CONSTRUCTION

## Falsework is key to arch bridge

**Construction of concrete arch railroad bridge is spectacular feature of Feather River Project. Here are three articles covering field work on the bridge, tunnels, and overall project.**

WHAT IS the West's toughest current bridge job? Without much doubt it's the concrete arch structure which will carry the Western Pacific railroad across the north fork of the Feather River, 20 mi. north of Oroville, Calif. Construction of a concrete arch bridge with a main span of 308 ft. would be tough enough under the best conditions, but this one is located in a remote area, at a hard-to-reach site, and across a treacherous river.

The contractor is Pacific Bridge Co., which received the \$1,538,660 contract in February of 1958. The firm's long experience in the West is an essential asset in solving the field problems such as this project presents.

The work is being carried out under the jurisdiction of a relatively new state agency, the California Department of Water Resources. The Western Pacific railroad and Highway U. S. 40 Alternate are being taken out of the Feather River canyon and relocated to avoid the reservoir of the proposed Oroville Dam. Relocation of the railroad requires construction of 22.9 mi. of new line, 4.01 mi. of which are in tunnels. At the north end of the new route the railroad will emerge from a tunnel, cross the bridge which is described in this article, and rejoin the present track.

### Access

The problem of access was complicated by the fact that there was no level working area near the site. One plan involved using the existing railroad for access, building a siding at the site, locating the concrete batch plant on a steep rocky slope below the siding, and placing concrete by means of a highline. Further study showed that the rela-

tively small volume of concrete the job required, about 15,000 yd., did not justify the expense required to set up such a sidehill plant.

Two other schemes which involved building access roads several miles long were rejected because of the lack of suitable work area, even though the roads required no temporary bridging of the river.

The method of access was not spelled out in the specifications. It was left completely up to the contractor.

The contractor eventually decided to locate his batch plant and equipment and materials yard on a gravel bar about one-half mile upstream from the job site. This involved a certain calculated risk, for stream records showed that the area was susceptible to flooding in particularly bad years. The gravel bar can be reached on a road originally built during the construction of the recently-completed Poe powerhouse, owned by the Pacific Gas & Electric Co. PG&E granted Pacific Bridge the use of the road provided it is maintained.

From the gravel bar a temporary access bridge was built to the opposite bank, using timber and steel pilings. While the bridge was being constructed a D8 dozer worked its way down from the top of the ridge on a pioneer road in order to have the one-half mile connection from the job access bridge to the job site completed by the time the bridge was finished.

To handle materials at the site during construction the contractor decided on a temporary construction trestle strong enough to take two 100-ton cranes, and high enough that the cranes could place concrete at the highest points in the structure. The trestle is made of 12-in. diameter pipe piles, some of which are 95 ft. long, and gird-



**TWO CRANES** on the construction trestle work together to lift the first section of falsework into place on the temporary supporting tower. Supporting piles for trestle and tower are as long as 95 ft.

ers consist of salvaged railroad car beams.

Some thought was given to bringing in a derrick barge which can be disassembled for highway travel, but the cost of this was found to be prohibitive.

It was not until July, four months after work started, that the contractor reached the first pay item in the contract: concrete for Pier 2. The contractor's start-up



FALSEWORK consists of 8 arches and was brought to job in sections preassembled into pairs. Additional framework at each end of trusses was needed for mounting on truck and dolly.

### Selected unit bids—North Fork Bridge

The Division of Water Resources received bids on January 29, 1958. Seven of the ten bids were for the steel truss structure, two were for the concrete arch alternate, and one firm submitted figures on both designs.

(1) Pacific Bridge Co. (Concrete Arch) . . . . .	\$1,538,660
Fruin-Colnon, LeBoeuf-Dougherty (Steel Truss) . . .	1,705,700
(2) Dan Caputo Co. (Concrete Arch) . . . . .	1,772,850
Erickson, Phillips and Welsberg	
Concrete Arch . . . . .	1,826,100
Steel Truss . . . . .	1,854,650

All six higher bids were for steel truss

		(1)	(2)
Structure excavation above elev. 910 . . . . .	1,800 cu. yd.	\$ 25.00	\$ 25.00
Structure excavation below elev. 910 . . . . .	1,200 cu. yd.	25.00	10.00
Cofferdams, in place . . . . .	lump sum	200,000.00	415,000.00
Concrete for foundation, except			
piers 2 and 3, in place . . . . .	1,420 cu. yd.	50.00	25.00
Concrete for foundations,			
piers 2 and 3, in place . . . . .	2,630 cu. yd.	42.00	20.00
Concrete above foundations, in place . . . . .	11,530 cu. yd.	54.00	65.00
Portland cement, in place . . . . .	23,000 bbl.	4.66	5.00
Bar re-steel, in place . . . . .	1,820,000 lb.	.17	.18
Damproofing, in place . . . . .	lump sum	3,000.00	500.00
Membrane waterproofing, in place . . . . .	lump sum	15,000.00	18,000.00
Miscellaneous metalwork, in place . . . . .	lump sum	25,000.00	40,000.00

expenses ran to about \$200,000, very high for a contract which totals only \$1,500,000.

When the project is completed early in 1960, the bridge will take its place among the largest of its type ever built. The main arch itself is unusually heavy, being a solid ribbon of concrete rather than the more standard individual rib members. The specifications for the project included an alternate for a steel truss structure.

The main concrete arch is 308 ft. long, and has a rise of 155 ft. Because of a 1 and 24 batter it varies from 26 ft. wide at the skewback to 20 ft. wide at the crown, sufficient to carry a single line railroad track. The arch, which will require 2,300 cu. yd. of concrete, is 8 ft. thick at the skewback and 5 ft. at the crown, measured radially. The entire structure calls for 15,580 cu. yd. of concrete, including pier foundations. Other major quantities are: 23,000 bbl. of cement, 3,000 cu. yd. of structural excavation and 1,820,000 lb. of bar reinforcing steel.

For the river pier foundations the specifications gave the contractor a choice of placing concrete under water or in the dry. The Department of Water Resources had arrangements to use diving geologists to inspect the work should the contractor elect to place concrete under water. However, Pacific Bridge chose to do this work in the dry after considerable discussion and analysis of the foundation materials. Standard Z-piles were used for cofferdam cells and blasting was done with very light



charges (one-half dynamite sticks in 4-ft. holes) to avoid damaging the piling. Only minor troubles were experienced during this phase of the work, justifying the contractor's method, and very good cleanup and inspection conditions were obtained.

Nearly all of the structure can be reached from the working trestle by a Manitowoc 3900 crane with a 130-ft. boom and a 30-ft. jib. Pier No. 1 at the extreme western end of the bridge is one of the few places that the big crane can't reach. Concrete for this pier was placed by a transfer system. A P&H 255A crane was spotted up the hill near this pier next to a specially constructed transfer platform. The Manitowoc picked up concrete buckets from the trestle, swung through 200 deg., and placed the buckets on a transfer platform. The P&H took it from there. This same system may be used on the east end of the bridge later this year.

It is expected that no more than 50 yd. of concrete an hour will be needed at any time during the project. To meet this demand the contractor has set up a Noble-Mobile, 3-*yd.* batch plant at his gravel bar work area, one-half mile from the job site. Concrete is brought from the plant to the job by 6 Challenge transit-mix trucks. Barging concrete buckets to the job was considered for a time but was rejected in favor of trucks because of their greater speed and flexibility.

#### Falsework

In May of 1958, Pacific Bridge Co. asked several steel fabricating



**COMPLETED FALSEWORK** for center span. Fine adjustments in elevation are made by jacking and shimming at the skewbacks and top of supporting tower. Falsework will be re-used for side spans.

companies for designs for the main arch falsework. The use of timber had been carefully studied and rejected mainly because of the excessive deflections which would occur. The falsework selected was designed and fabricated by Herrick Iron Works of Hayward, Calif. The falsework consists of eight 2-hinged steel arches spaced 4 ft. apart, spanning 281 ft. and rising 127 ft. at the center. The trusses are 400 ft. long and 10 ft. deep at the crown. The upper chord members are the heaviest, ranging from 12WF53 at the crown to 12WF133 at the skewback. Lower chord members are also wide flange beams, while web members, connecting members and diagonal bracing are steel angles.

One of the main advantages of the Herrick design is that the false-

work will have great value after the project is completed as it can be used as a permanent roof truss by simply spacing the arches up to 80 ft. apart. It was because of the possibility of reusing the falsework that led Herrick to design a 2-hinged rather than a 3-hinged arch. The 2-hinged arch selected is shallower and has parallel top and bottom chords, and thus is more easily used for a roof.

The use of 8 arches spaced 4 ft. apart rather than a smaller number spaced further apart minimizes the strength needed in the wooden formwork. The maximum lift was 41 tons at 45 ft. Another advantage in using the relatively light-weight arches is that they could be lifted two at a time already tied together, a stable form which required little temporary guying.

Hairpin turns on the 5-mi. long access road which leads from U. S. 40 Alternate to the bottom of the canyon were carefully studied in de-

**BELOW**—Artist's conception of finished bridge shows Western Pacific train emerging from Tunnel 5 (not yet finished). Isolated site means structure will be seldom seen.



termining the maximum length of the sections which could be brought to the job from the Herrick Iron Works yard 150 mi. away. It was found that 60 ft. was the longest any section could be. One of the pictures accompanying this article shows how the trusses, assembled in pairs, were brought to the job by special low-bed or semi-trailer. The height of the load was about 13 ft. and the over-all length close to 100 ft., which required a special routing and travel permits from the State Division of Highways.

The shop connections in the top and bottom chords were butt welded. Field connections were made with high strength bolts as well as connections in the web members built in the shop and field. Secondary bracing is connected with high strength bolts.

During the design of the falsework it was necessary to check the stress which would occur in each member during the 7 double concrete pours and one single pour in the arch. Two pours are to be made simultaneously on opposite sides of the arch, and one single pour at the crown.

After the main concrete arch is self-supporting the falsework will be used again to support the concrete in the partial arches on each side of the center span.

In the field, the steel truss falsework is assembled on the work trestle in the form of boxed half-arch one at a time and lifted into place on top of the 85-ft. high erection tower with two cranes positioned on the work trestle. The erection tower consists of spliced 14 x 14-in. redwood timber 22 ft. long braced with 3 x 8-in. timbers and connected with  $\frac{3}{4}$ -in. bolts. At the top of the tower is a platform used for blocking and jacking to bring the falsework to the proper elevation. The erection tower was assembled into bents on the sand bar, floated  $\frac{1}{2}$  mi. down to the job site, picked out of the river and erected.

Jacking and shimming were also done in place, for fine adjustments of the falsework. Tolerances in the finished concrete range from  $\frac{1}{4}$  to  $\frac{1}{2}$  in.

In making the fill connections the contractor used impact wrenches to install the high strength bolts, and torque wrenches to check them.

When *Western Construction* visited the job in late February, the falsework was in place and the wooden forms were being installed. By the time this appears in print, concrete will be going into place. Two cranes will be used simultan-

eously to place concrete on each side of the arch to keep the load completely balanced.

The forms consist of timber stringers cut on the job to the correct radius covered by a grid of 8 x 20 and 4 x 16 cross planks, topped with  $\frac{5}{8}$ -in. plywood. For the side forms the contractor is using double 4 x 8s and 2 x 8s for wales (radial) and 2 x 6s on 1-ft. centers for studs (circumferential) along with  $\frac{5}{8}$ -in. plywood.

A top form will be used two-thirds of the way up the arch, or where the arch is more than a 30-deg. slope. Where top forms are used a 3-ft. wide section will be left out through which concrete will be placed.

#### Concrete

Aggregate for concrete is specified in three sizes, 2 $\frac{1}{2}$ -in. maximum (40%), 1 $\frac{1}{4}$ -in. (40%), and  $\frac{5}{8}$ -in. (20%). Sand makes up about 29% of the aggregate. Generally speaking, the structural concrete is a 6-sack mix with a 2-in. slump, and 25 gal. of water per cu. yd. Concrete in the arch will contain about 2 oz. per sack of Plastiment, a water

reducing retarder, produced by Sika Chemical Co. Air-entrainment will be provided by 2 $\frac{1}{2}$  oz. per cu. yd. of Protex, a product of the Autoline Chemical Co.

#### Personnel

Project engineer for the California Department of Water Resources is Charles V. Heikka. Samuel S. Dulberg is senior bridge engineer. Resident engineer is James G. Self, assisted by Ed Johnson, Leroy Plett, Jim Justice, Quentin Keener, and Larry Silva.

For Pacific Bridge Co., Merrill Bird is project manager, John Dean is assistant project manager, and William Griggs is project engineer. Ernie Williams is carpenter superintendent, Sonny Clark is structural superintendent, and Alva Miller is master mechanic.

J. Duane Naillon, chief engineer of Herrick Iron Works, designed the falsework, and John Rideout, field manager for Herrick, devised the method of transporting the steel members to the job site.

Bridge was designed by Woodruff and Sampson of San Francisco for The Western Pacific Railroad Co.

## Feather River progress

### Roads, bridges, tunnels, and Oroville Dam bids coming up

WITH AN appropriation of \$25,190,000 made available by the California State Legislature in 1957, the Department of Water Resources has carried out the following active phases of construction work relative to the Oroville features of the Feather River Project. The appropriation was designed for carrying out initial stages of relocating the Western Pacific railroad tracks and a state highway around the Oroville Dam and Reservoir sites.

1. Tunnel driving is about 50% completed by Peter Kiewit Sons' Co., designated No. 4 and No. 5 on the railroad relocation. Tunnel No. 4, with a length of 4,440 ft., has been holed through and concrete curbs are being placed as the first step in concrete lining. Excavation work in Tunnel No. 5 has advanced about 6,500 ft. of the total 8,440 ft. Tunnel driving procedure on this contract is reviewed in the accompanying article.

2. Relocation of the state highway has been advancing with a construction contract covering 13.3 mi. awarded to McCammon-Wunder-

lich & Wunderlich Co., with the work about 85% completed. Construction of the West Branch Bridge will be necessary before this section of highway relocation will be usable, and funds are not yet available for the construction of this bridge unit.

3. The most spectacular bridge of the entire relocation program is the concrete arch structure with an overall length of about 1,000 ft. that will carry the relocation of the Western Pacific tracks over the North Fork of the Feather River. This work is being carried out by the Pacific Bridge Co. and is now about 35% finished. The design and erection of the falsework for this concrete arch are reviewed in detail in the accompanying article.

4. Near Oroville, construction is under way on a 1,100-ft. steel girder bridge crossing the Feather River. This project is being carried out under a contract awarded to John C. Gist Co., and the work is about 35% completed.

#### Work provided by new budget

Additional construction funds were requested by Governor Brown in his proposed budget. A fund of

\$22,637,000 to be available in the 1959-60 fiscal year will provide for the following features, carrying forward the Feather River program:

A combination highway and railroad crossing of the West Branch of the Feather River. Construction of Tunnels No. 2 and No. 3 on the railroad relocation and required grading necessary between Tunnels No. 2 and No. 4 would be provided. Lastly, the construction program would include the building of Frenchman Dam on Little Last Chance Creek in Plumas County. This dam would actually be the first storage reservoir to be constructed in the Feather River Basin as part of the overall conservation plan. The dam would be situated about 75 mi. northeast of Oroville and would be an earthfill embankment containing about 600,000 cu. yd. with a crest length of 800 ft. and a height of about 130 ft.

In addition to the construction funds called for in the budget, about \$23,900,000 is being requested for acquisition of land and right-of-way for the Oroville Dam and sections of the aqueduct south from the Delta area. This appropriation would also make possible the construction of the first stage of an aqueduct that would extend into the Livermore Valley.

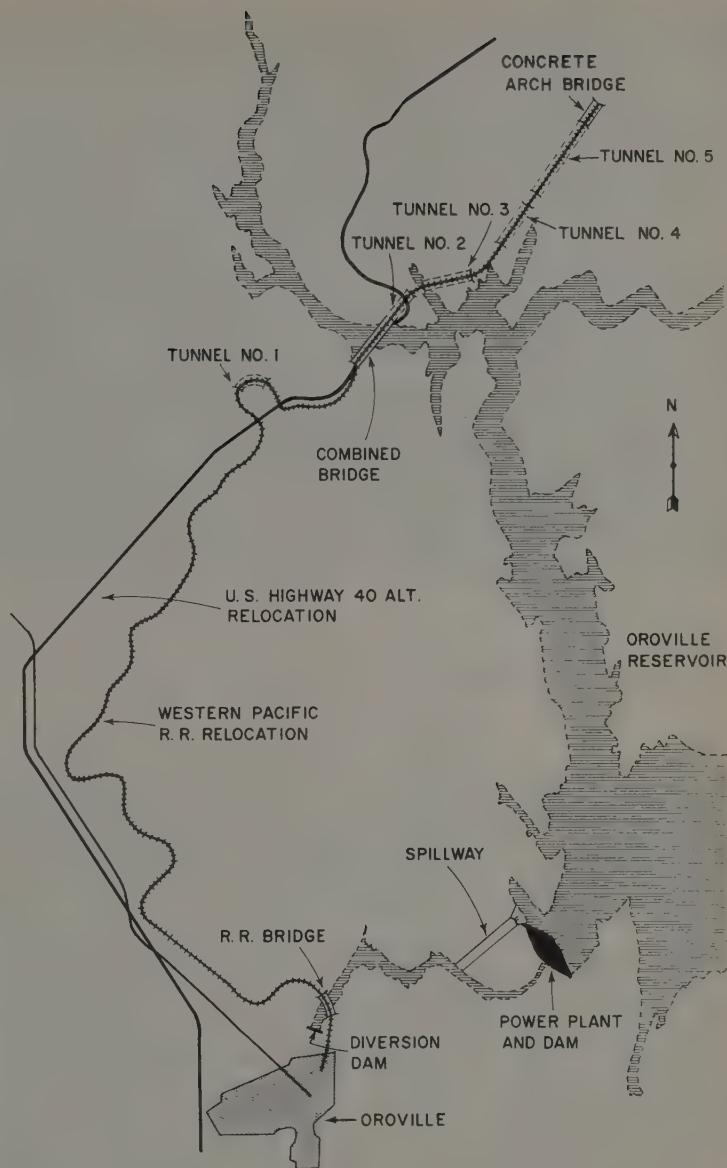
The present tentative construction schedule for the Oroville Reservoir program provides for completion of all highway and railroad relocation work early in 1962. Further, it contemplates the advertising for bids on the construction of the first features of the Oroville Dam late in 1961. These dates, and the time schedule, are predicated on necessary funds being made available.

### Evolution of Oroville Dam design

As the key feature of the Feather River Project, and representing a structure of record size, Oroville Dam has been the subject of extensive engineering study, geological investigation and appraisal by a board of consulting engineers.

As originally proposed, the design called for a concrete gravity dam. Further studies were made on an embankment type of structure as the proposed type, as well as several other types of concrete structure including arch buttress, multiple arch, and straight buttress type of concrete dams.

The embankment type of design was finally recommended by the Board of Consultants as the best suited to the site. The structure would be 730 ft. high above stream



**SIMPLIFIED MAP** shows relocation work on Feather River Project. Reservoir of Oroville Dam will flood Feather River Canyon where U.S. 40 Alternate and Western Pacific Railroad are located. New routes traverse rugged country and required extensive study. Note horseshoe railroad tunnel needed to gain elevation. Construction contracts now underway include highway relocation, railroad tunnels 4 & 5, railroad bridge near Oroville, and concrete arch railroad bridge (top of drawing). Next contracts to be awarded will include tunnels 2 & 3 and the large combination railroad and highway bridge. Dates depend on appropriations.

channel with a crest length of 5,770 ft. and a crest width of 80 ft. The embankment would contain about 80,000,000 cu. yd. of material. Extensive geological explorations at the site have been going forward since 1952 with 11,000 ft. of diamond drill holes and 4,540 ft. of exploratory tunnels and drifts carried out to date. The drilling and exploratory program will be continued.

About one-half mile upstream from Oroville, a concrete gravity diversion dam will be built across the river, having a height of 140

ft. and a crest length of 251 ft. This dam will divert water into a 5½-mi. canal with a 27,000-sec. ft. capacity. Flow through this canal will pass through a power plant with an installed capacity of 105,000 kw. To re-regulate the water released through the two power plants, an afterbay will be constructed off stream about 4 mi. southwest of Oroville.

The foregoing information was furnished by Walter G. Schulz, chief engineer of the division of design and construction of the Department of Water Resources.



## King size muck cars speed tunnel

**Railroad tunnel driving is spearheaded by huge standard-gauge muck cars loaded by cable-operated slusher which eliminates need for car passing. Highly skilled mining crews meet variable ground conditions by burn cut pattern and millisecond delays.**

THE USE of huge interconnected muck cars, the largest ever to be loaded by the slusher method, is one of the unusual methods reducing costs in a railroad tunnel project in Northern California. Mounted on standard-gauge tracks, each car carries about 130 tons. Two trains, each with 3 cars, handle the entire mucking operation.

The project is the driving of

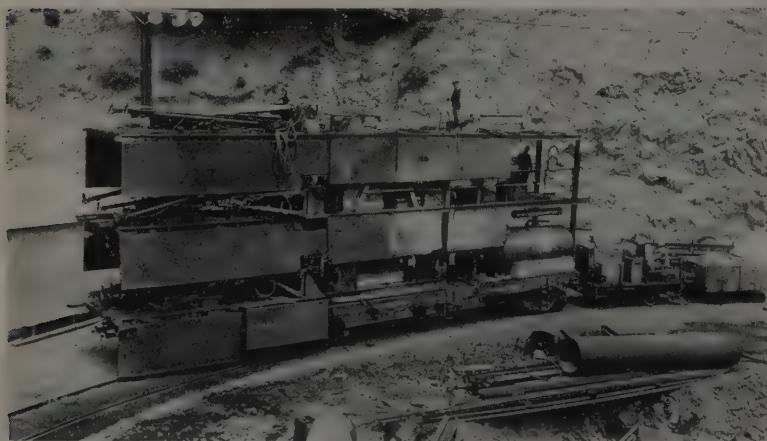
tunnels 4 and 5, part of the relocation of the Western Pacific railroad around the future reservoir of the Oroville Dam. Tunnel 5 opens directly onto the concrete arch railroad bridge described in a previous article.

The California Division of Water Resources awarded the \$8,499,235 tunnel contract to Peter Kiewit Sons' Co., in May of 1957. The con-

tractor expects to complete the driving and lining early in 1960.

Before deciding to use the slusher or dragline method to load the big muck cars, several Kiewit tunnel men studied a project in South America where Anaconda was using this method on relatively large equipment in a mining operation. They came away convinced that the technique could be used economically on even larger cars. The big advantages of the slusher method are that it cuts down the workmen required and completely eliminates passing cars from one end of the train to the other.

The cars being used on the Oroville Dam railroad relocation project are about 50 ft. long, 8½ ft. wide and 13 ft. high. The cars have an articulated bridge between them so that the slusher can drag material from one car to another. The slusher runs on rails mounted about 4 ft. from the tops of the cars and is pulled from one end of the train to the other by cables operated by a 150-hp. electric hoist. The slusher operator is positioned in a protective cage at the heading end of the muck train. Dragging 4 to 5 yd. of material each pass, the slusher fills



DRILLING JUMBO is mounted on standard-gauge flatcar and has hinged platforms for ease of movement. Note concrete counterweight and air receiver on rear of jumbo.

the car nearest the heading first up to the level of the rails. Next, material is dragged all the way through the first car to the second until the second is filled to the rails. After the third car is filled to the rails, the space above the rails is filled working from the far end of the train back toward the heading. Muck is placed in the slusher by a conventional overshot loader.

Each of the two 3-car trains is powered by 25-ton diesel locomotives with exhaust scrubbers.

At the spoil area outside the tunnel the cars are dumped by means of hydraulically-operated gates located at the lower side of each car. Steel partitions inside the cars are angled at 45 deg. to make sure the material readily discharges through the gates, which are 45 in. wide and 25 ft. long.

Under normal operating conditions in dry weather the cars discharge directly down the side of the muck pile. But in wet weather it is risky to have the side slope of the muck pile so close to the tracks because of the tremendous weight of the cars, so a crawler tractor bulldozes the material from the sides of the cars to the edge of the pile.

#### Quantities and dimensions

Tunnel 4 is 4,412 ft. long and tunnel 5 is 8,830 ft. long. Kiewit set up his batch plant, offices, and materials yard in the 160 ft. of daylight which separates the two tunnels. The tunnels are rectangular in cross section with a circular arch roof. Overall dimensions are about 20 ft. x 30 ft. When the concrete lining is in place the single track tunnel will be 18 ft. wide and 24 ft. high above the top of the rail.

The major quantities as estimated in the specifications include the following:

300,800 yd. of tunnel excavation.  
1,000 lineal feet of feeler or pilot holes.

900 sq. ft. of line drilling.  
82,000 yd. of concrete lining.  
5,015 cu. yd. concrete invert.  
135,000 bbl. cement.  
7,361,000 lb. re-inforcing steel.  
500 MBM permanent timber lagging.

It was originally estimated that about 3,000,000 pounds of structural steel supports would be required for roughly one-third of the total length of the tunnels. But as the tunnel work proceeded, the nature of the rock prompted the Division of Water Resources to issue a change order calling for the entire length of the tunnels to be sup-



DRIFTERS are mounted on hydraulic jibs and controls are located 20 ft. from the face to keep miners in safe position. Rounds are 10 to 12 ft. without a change of steel. Holes are 1 3/4 in.



JUMBO with platforms extended easily covers full face. There are eleven drifters on four levels which drill an average of 100 holes per round. In center is 6-in. drill for burn cut.



ODD RIG called the "high car" serves two functions. It has hinged platforms used by workmen when installing timber lagging between steel supports and rock, and it has a stiff-leg derrick for installing steel supports which it also carries to the heading.

ported with steel sets.

Geologically, the rock ranges from very hard metamorphic to highly fractured slatey shales. The Division of Water Resources has 10 geologists on the overall Oroville Dam project to study the ground conditions.

#### Drilling and blasting

The extremely variable nature of the rock has been a constant headache to the contractor for it means that production cannot be predicted and that drilling and blasting methods must constantly be changed.

The tunnel is being advanced full face by means of a large drilling jumbo on standard gauge tracks. The jumbo has eleven 3½-in. drifters plus a larger drifter in the center for a 6-in. burn cut. The drills are on 4 levels and are capable of handling an entire 10 or 12-ft. round without a change of steel. The drills are mounted on hydraulic jibs and the controls are at least 20 ft. from the face to provide full protection for the miners.

Because of the burn cut pattern being used all holes are advanced straight ahead, except the perimeter holes which must be angled

slightly to permit the drifter to clear the previously placed steel support. An average round involves about 100 holes but the number of holes and the spacing between them varies widely with the ground conditions, which often changes from one shift to the next. A wide variety of rock bits are used, from the hardest tungsten carbide inserts, to the one-use type. Most holes drilled are 1½ in. in diameter, 10 to 12 ft. deep.

Because much of the rock tends to form large blocks which interferes with loading and unloading the muck cars and sometimes requires expensive secondary blasting, the contractor is using millisecond delays in blasting. Millisecond delays are not often used in tunnel work because, although they tend to produce much better fragmentation, and reduce the powder factor, they are often more destructive to previously installed track and steel sets, because of the greater difficulty in controlling the throw. However, thanks to the contractor's highly trained and skilled crews, these disadvantages have been held to a minimum. As many as 16 delays are used in an average shot, with the powder factor running anywhere from 1 lb. to 6 lb. per cu. yd. of rock removed.

The charge is 60% dynamite sticks, sometimes spaced out in the holes by means of wooden pegs.

#### Two-tunnel sequence

When the project started the contractor set up his yard in the space between the two tunnels and began driving them simultaneously. One set of equipment could be used in both tunnels simply by alternating the operations. For this reason a special car for placing steel sets and placing permanent timber lagging was developed rather than using the jumbo for this purpose. Called the "high car" it is built up from a standard railroad flat car and mounts a small stiff-leg derrick made of pipe sections and powered by air tuggers. At the other end is a high platform from which workmen can place the protective timber lagging. The 8-in. wide flange ribs which are spaced in the tunnel on 6-ft. centers, are carried in the middle of the special car.

Late in 1958 the shorter tunnel was holed through with extraordinary accuracy. The error of closure was .032 ft. in elevation, .035 in alignment, and .098 in length.

At the present time all tunneling operations are confined to the longer tunnel, which is expected to be

### Selected unit bids—tunnels 4 and 5

Bids for the construction of the two tunnels described in the accompanying article were received on May 15, 1957. Five firms submitted proposals.

(1) Peter Kiewit Sons' Co.	\$ 8,499,235
(2) S. A. Healy—Brown & Root, Inc.	10,444,160
Utah Construction Co.—Morrison-Knudsen	10,877,750
Kaiser, Macco, Raymond, Shea, Perini	11,925,144
Ukropina, Polich, Kral, Vinnell, Wunderlich	13,443,846

	(1)	(2)
Access road to tunnel portal	\$144,440.00	\$50,000.00
Roadway excavation	10,000 cu. yd.	6.00
Structure excavation	9,600 cu. yd.	7.00
Tunnel excavation	300,800 cu. yd.	12.00
Concrete for structures in place	2,450 cu. yd.	40.00
Concrete for tunnel lining in place	82,000 cu. yd.	18.50
Concrete for tunnel invert in place	5,015 cu. yd.	12.00
Metal drains and weep pipes in place	215,000 lb.	.40
Portland cement in place	135,000 bbl.	4.00
Reinforcement in place	7,361,000 lb.	.12
Permanent steel supports in place	3,120,000 lb.	.30
Rock bolts in place	70,000 lin. ft.	2.00
Permanent timber lagging in place	500 MBM	170.00
		500.00



**STEEL STRAPPING**, a common industrial device, is new to tunnel work. Here it is used to attach 3-ft. ventilation pipe to supports.

holed through late in 1959. Concrete lining operations have begun in the shorter tunnel, where curbs and gutters are being placed by means of steel forms. Concrete is brought to the point of pour by two transit-type truck mixers on a flat car. When the curbs and gutters are finished, a large flatcar-mounted tunnel form 48 ft. long will be used, and concrete will be pumped into place.

The contractor is working 24 hr. a day, 5 days a week with a payroll of about 150 men. Maximum tunnel advance per tunnel heading on any one shift so far has been about 25 ft.

#### Water, power and air

The contractor built his own water supply system to supply water to the batch plant and to the drilling jumbo. In a nearby creek a small dam was built of concrete sacks and the water is pumped to storage tanks on the hillside overlooking the project. Air-driven pumps supply the pressure for the hydraulic equipment on the jumbo, which requires in excess of 4,000 cfm. Compressed air is generated in a stationary compressor house.

The Pacific Gas & Electric Co. supplies electric power for the proj-



**SETTING STEEL** with stiff-leg derrick mounted at front of "high car." Derrick is made of pipe sections, is powered by three air hoists. Steel is 8-in. wide flange spaced at 6 ft.

ect over a special high tension line.

#### Personnel

For the Department of Water Resources, Charles G. Heikka is project engineer, and D. C. Steinwert is resident engineer. Fenwick Carlile is survey party chief.

For Peter Kiewit Sons' Co., J. W.

Alltucker is project manager, and Paul Eller is project superintendent. Harvey Gorham is project engineer, Pete Janopaul is excavation superintendent, and Clyde Ingram is concrete superintendent. Mechanical superintendent is George Smith, electrical superintendent is Meredith Ward, and safety supervisor is Doug Tarr.

## PG&E plans to start Kings River plant

PACIFIC GAS and Electric Company will begin preliminary work late this year on Kings River Powerhouse, the third hydroelectric plant of the company's \$80,000,000 Kings River Project. Haas Powerhouse, America's first large underground plant, and an enlargement of the existing Balch Powerhouse were put into operation on the north fork of the river last December. The Kings River Powerhouse will be located about 6 mi. down-

stream from Balch. The site is at the upstream end of Pine Flat Reservoir. A semi-outdoor plant of 42,000-kw. capacity, it will bring PG&E's total generating capacity on the Kings River to 261,500 kw.

Water storage for all three plants is provided by the company's new Courtright and Wishon reservoirs. From Balch Powerhouse the water will be diverted through a 3 1/2-mi. tunnel consisting of two sections of approximately equal length con-

nected by a steel pipe siphon where the tunnel route is broken by the canyon of Dinkey Creek. The inverted siphon will dip down the slope, bridge over the creek and rise on the other side to the second half of the tunnel.

At the tunnel outlet a steel penstock pipe 1,770 ft. long will drop the water under pressure to the Kings River Powerhouse turbine. Turbine and generator, connected by a short vertical shaft, will be housed below the water level when Pine Flat Reservoir is full.

# WASHO ROAD TEST —

## Its effect on highway design in Western States

Western highway departments, aided by other participants, made an extensive investment in the WASHO Test Road. Much thought went into its location, layout, design details, and testing routine. In 1955 the final report on the WASHO Test Road was released. An abstract was presented in the January 1956 issue of *Western Construction*. Three construction seasons have passed, with an accelerating volume of highway activity in these Western states.

What information obtained from the WASHO Test Road has been used in today's design of bituminous roads? Did the test develop new design criteria, or

was it more effective in confirming design elements already in use? In general, did the test project prove to be an effective aid to highway building in our Western region?

Because nothing has been published on this subject, **WESTERN CONSTRUCTION** considered it a responsibility to secure and present a report as an answer to questions in the minds of highway engineers and contractors. The logical source for such a round-up of factual information was The Asphalt Institute, and we are privileged to present this authoritative summary by Barney Vallerga. —Editor

By B. A. VALLERGA

Managing Engineer  
Pacific Coast Division  
The Asphalt Institute

WITH TRAFFIC testing of the WASHO Road Test pavements completed over four years ago, it would seem appropriate at this time to bring to light some of the tangible benefits this full-scale test project has contributed to highway design and construction. It is our purpose here to present briefly some of these benefits as reflected by changes in highway design in the five Western states which have been made since the completion of this test.

The road test was sponsored by the Western Association of State Highway Officials (WASHO) and was supervised by the Highway Research Board, a branch of the National Research Council of the National Academy of Sciences. Testing was conducted on two full-scale sections of four-lane divided highway, specially designed and constructed for this purpose near

MODERN divided highway with paved shoulders climbs through the California foothills. Economic advantages of paved shoulders were confirmed by the WASHO Test Road findings. In this case an experiment was tried with a solid white line to separate the outer edge of the pavement from the shoulder.

Malad, Idaho. Construction was completed in 1952, with test traffic starting in November of that year and continuing until May of 1954.

Purpose of the test, in brief, was to determine the effect of heavy traffic on asphalt pavements and the behavior of various pavement designs, with soil and weather conditions typical of much of the West. Complete details on all phases of the project may be obtained by reference to the two reports issued by the Highway Research Board. Special Report 18, "The WASHO Road Test, Part 1: Design, Construction, and Testing Procedures," issued in 1954, and "Part 2: Test Data, Analyses and Findings" as Special Report 22. A brief resume of the conduct of the test and of the principal findings is taken from these reports.

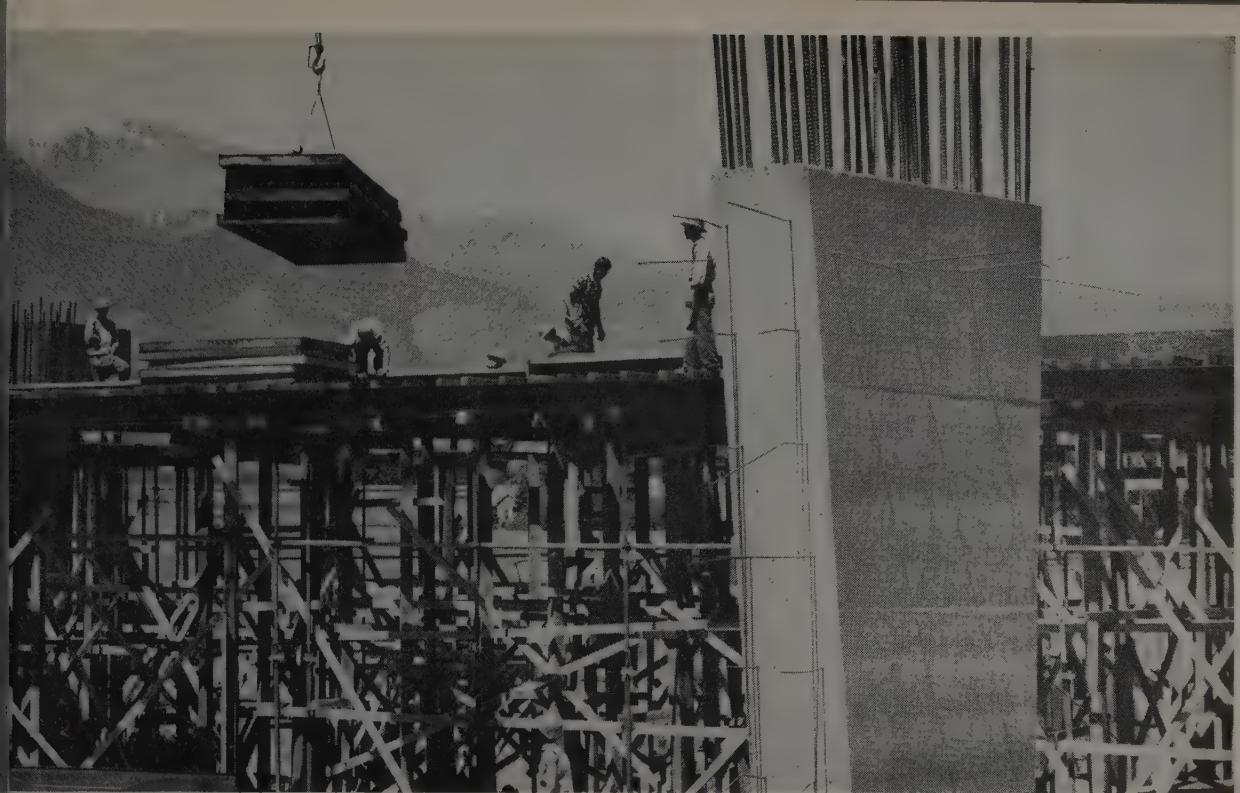
### Description of test section

A total thickness of pavement of 18 in. was agreed upon as normal for the climate, soil and paving materials at the site for traffic assumed to consist of 4,000 vehicles per day, including 1,000 commercial vehicles, 400 of which are 3-axle trucks or heavier.

Actually, there were five different thicknesses of pavement con-

(Continued on page 42)





# Pike at Pikes Peak

## C.I.T. Is On The Job, Too

A mile and a half segment of 4-lane freeway in the shadow of Pikes Peak is a Gardner Construction Company contribution to jam-free crosstown driving at Colorado Springs. The project—one of 9 current Gardner jobs—will also serve the new Air Force Academy.

The job included major structural work, grading, asphalt and concrete surfacing. Much of the massive roadbuilding equipment used to build the highway was financed by C.I.T. Corporation. According to General Manager Richard Gardner: "The C.I.T. 'Pay-as-You-Depreciate Plan' conserves operating capital that would otherwise be depleted by heavy equipment purchases. It's proven to be a very convenient and realistic method of retiring equipment obligations."

### *How Job-Engineered Finance Plans Help Contractors*

Payd Plan equipment financing terms to 6 years with payment schedules related to depreciation, or equal monthly payments over 36 months, or skip-payment plans are just a few of the helpful financing tools offered by C.I.T. Corporation.

In addition to equipment purchase financing, C.I.T. can help improve contractors' bid and bond capacity, meet current operating expenses or other business needs by arranging capital loans. C.I.T. representatives know how to lay out "job-engineered" finance plans, carefully devised to fit the needs. Why not call or write today. No obligation, of course.

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655 Broadway  
Denver 3, Colorado

Northern Life Tower  
Seattle 1, Washington



... for more details, circle No. 19 on Reader Service Postcard



PAVED shoulders can be identified for the driver by use of a seal coat with a distinctive color as shown in this view. This is a common practice of District VII, California Division of Highways. The WASHO Test Road proved that the paved shoulder provided lateral support to strengthen the pavement under the outer wheel track.

## WASHO ROAD TEST

(Continued from page 38)

structed: (1) the 18-in. "normal" thickness, (2) a 22-in. thickness representing 25% greater than normal, (3) a 14-in. section representing 25% less than normal, (4) a 6-in. thickness, and (5) a 10-in. thickness. The latter two thicknesses were admittedly much less than adequate, but were selected because they represented a considerable mileage of existing highway.

Two more separate sections (called "loops" because of the turn-arounds at each end, so arranged that traffic could move around the loop in a continuous manner) were constructed so as to be as nearly similar as possible in every way. Each side of each loop was made up of five separate sections of the thicknesses agreed upon, each section being 24 ft. in width and 300 ft. long. There was a 100-ft. transition between each section.

Although the total thickness of the sections on each side of the loop was the same, a significant difference was introduced by having a 2-in. asphaltic concrete surfacing on one side and a 4-in. surfacing on the other. Thus, in each of the identical loops, there were in reality ten different sections under test, five on each side. Another important variation was introduced by paving the shoulders on portions of three of the test sections. The shoulders on all of the other sections were not paved.

### Test traffic

Test traffic was applied in a relatively simple, but effective, pattern. A total of only eight test vehicles

were used—all conventional tractor-semi-trailer rigs. On one loop, single-axle vehicles only were used, and on the other identical loop, all traffic consisted of tandem-axle vehicles. On the south loop, two single-axle vehicles with 18,000-lb. axle loads were used on the inner lanes, and two single-axle vehicles with 22,400-lb. axle loads were used on the outer lanes.

On the north loop, traffic consisted of two 32,000-lb. axle load tandems on the inner lane, and two 40,000-lb. axle load tandems on the outer lane. Each vehicle always followed its assigned pattern—starting in its designated lane on one side of the loop, continuing through a turn-around to the corresponding lane in the other side of the loop, and then through the second turnaround to start its circuit again. Traffic was operated until there were a total of 119,000 vehicle passages over each lane of each test section.

This traffic was not representative of that which we find on our highways here in the West. It was, in fact, not intended to be representative in the usual sense of the word. Since a pavement is usually designed to handle its expected traffic for a considerable number of years, running a test of this type with normal traffic would take much too long to get results in a reasonable period of time. Consequently, the test must be "accelerated" in order to get results in a shorter period.

In effect, this test was accelerated by scheduling truck traffic on a closely spaced pattern and by using some vehicles with loads greater than the general legal limits on state highways. Of further accelerating effect was the fact that all test

traffic consisted of fully loaded vehicles, whereas normal highway traffic consists of many empty trucks and of many trucks with less than the maximum legal axle load, and, of course, a high percentage of passenger cars. Exactly what the test traffic represented in terms of years of normal traffic would be hard to say; however, it appears reasonable to assume that it represents a period appreciably longer than the test.

### Test results

Although there are other conclusions which are significant, it is believed that the following are of major importance insofar as their immediate application to pavement design is concerned:

1. A pavement thickness in the inner wheel path about 4 in. thinner than in the outer wheel path will provide the same load support.
2. Paving of the shoulder will increase the load-carrying capacity in the outer wheel path about equal to that provided by an additional thickness of pavement of 4 in.
3. Pavements with an asphalt surfacing 4 in. thick were far superior to those pavements with a 2-in. asphalt surfacing but with the same total thickness.

There are, then, two important concepts demonstrated by this test which are readily adaptable to design of asphalt pavements for heavy duty traffic. One of these is the construction of a thicker asphaltic concrete surfacing. It could be concluded that, if thickness design were considered to be completely adequate, the total thickness could be reduced somewhat if a thicker surface were constructed, or, if thicknesses were slightly inadequate, or borderline, the additional load-carrying capacity might be most economically provided by increasing the surface thickness without changing the design for total thickness.

The second concept is the provision of additional load-carrying capacity in the outer wheel path, where this test demonstrated it to be necessary. Two solutions to this were indicated by the test findings—the provision of greater total thickness in the outer wheel path than in the inner wheel path by the construction of some type of "thickened-edge" or "tapered" section, or the use of the conventional



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TRINIDAD: Neal and Massy, Ltd., Port of Spain, P. O. Box 544, San Fernando

*... for more details, circle No. 20 on Reader Service Postcard*

section of uniform thickness but with paved shoulders. It was concluded that paving of shoulders would increase the load-carrying capacity in the outer wheel track by approximately the same amount as would increasing the pavement thickness by 4 in.

Let's now have a look at recent changes in design and construction practices in the highway departments of the five Western states of Arizona, California, Nevada, Oregon, and Washington. These changes have been made as a result of the WASHO Road Test, or at least this test was one factor which contributed to the decision to make the change.

#### Arizona

In Arizona, asphaltic concrete surfacing thickness had been standardized at 2 in. throughout the state before the road test. As a direct result of evidence presented by the WASHO Road Test, asphaltic concrete surfacing thickness has been increased on Interstate Highways to 3 in. in the southern part of the state, and 4 in. in the northern part. No other change in design or construction was made as a result of this test.

Regarding paving of shoulders, the findings of the road test served to confirm Arizona's practice. Shoulders were already being paved, not only for the obvious additional driving safety offered by this type of construction, but also for the beneficial effects of the lateral support obtained from the shoulder pavement.

#### California

Like Arizona, California has made a practice of paving shoulders for some time before the WASHO Road Test; however, the test did serve to confirm the desirability of this practice insofar as increased load-carrying capacity in the outer edges of the traveled way is concerned.

On the Interstate System, as well as on other mainline highways carrying extra-heavy traffic, surfacing thickness was increased in 1956 from a minimum of 3 in. to the present minimum of 4 in. Findings of the WASHO Road Test no doubt contributed to the evidence which showed such a change to be desirable.

In addition to this change to 4-in. surfacing on the Interstate System, the California Division of Highways is now, at the suggestion of The Asphalt Institute, planning at

least two projects on which the total thickness of asphaltic concrete will be 7 in. Although the lower 3 in. will be referred to as asphaltic concrete base and will have slightly different requirements, the resulting pavement will have 7 in. of the highest type of asphaltic concrete surfacing. All indications are that this should result in a pavement which will be essentially maintenance-free, even under the very heaviest traffic volumes and loads, both current and anticipated.

#### Nevada

In the State of Nevada, the first paved shoulders were placed as early as 1941 and by 1954, when the road test was completed, practically all shoulders were being paved. In fact, Nevada's representative at the Test was one of those who suggested that an evaluation of paved shoulders be included in the test. The road test confirmed Nevada's confidence in the value of shoulder-paving.

Nevada is another state which increased the thickness of asphaltic concrete surfacing on heavy traffic roads—in this case, from 2½ in. to 4 in.

#### Oregon

In the State of Oregon, structural thickness was considered to be adequate, and no change in pavement thickness design was made. However, the thickness of the asphaltic concrete surfacing was increased by ½ in.—from 3½ in. to the present 4 in. Oregon does not pave shoulders with asphaltic concrete except in urban areas.

#### Washington

Washington is the only state of the five which has provided for the additional load-carrying capacity in the outer wheel path by constructing a pavement of greater thickness on the edge than in the center. This greater thickness is provided by tapering the surface thickness from 2½ in. in the center to 4 in. at each edge. Thus, there is provided both a greater total thickness and a greater surface thickness in the outer wheel path where indications were that it is most needed.

Shoulders on Washington's highways are not paved.

#### Conclusions

The very marked difference in the performance of the test pavements with 2-in. and 4-in. asphaltic surfacing appears to have made the greatest impression on highway de-

sign in the five Western states as measured by actual changes made. All five states have increased the thickness of surfacing on heavy-traffic highways since the test. All of these changes were, more or less, a result of the findings of this test.

None of the five Western states made a change in shoulder-paving practice; however, three of the five were already paving shoulders, while a fourth recognized the importance of the findings relative to the necessity for increased load-carrying capacity in the outer wheel path by increasing the thickness of both surfacing and total pavement at this point.

Without considering the similar improvements which may have been made in other states throughout the country, it may well be that in these five states alone the savings resulting from longer pavement life, reduced maintenance, and better service may justify the cost of the entire test project.

Beside the obvious and relatively straightforward results which we have discussed, there are many more findings which have contributed and will continue to contribute to better design and construction which have not been touched on here. For example, the data obtained on such factors as pavement thickness requirements, pavement deflections under a variety of load conditions, comparisons of effect of single-axle versus tandem-axle loadings, frost penetration, and the effect of periods of critical weather, have been an extremely valuable contribution to asphalt pavement technology.

Was the WASHO Road Test a success? We think it was!

#### Asphalt plant manual published by Institute

An authoritative text on asphalt plant inspection, the first of its kind, has just been released by The Asphalt Institute. Titled the "Asphalt Plant Inspector's Manual", the 190-page illustrated volume describes in careful detail the operation and function of the continuous mix plant and batch plant. It discusses material handling and storage and devotes an entire chapter to sampling, testing and mix control.

The text is complete with five appendices that include tables and forms. For further information, write to your nearest Asphalt Institute engineering office or to The Asphalt Institute, Asphalt Institute Building, College Park, Md.

In the chart below are five important crawler tractor advantages. These features have earned recognition by all makers of crawler tractors—one or more are now included in their latest designs. It stands to reason that the more of them you get on your next crawler, the more it is worth to you.

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Allis-Chalmers is the only manufacturer offering double reduction final drives on *all* models. One other manufacturer offers it on three models.

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asta Truck & Equipment Sales—Redding  
ast Coast Engine & Equipment Company  
berkeley Branch: San Jose and Ukiah  
nity Tractor Company—Eureka

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

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

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

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

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

**UTAH**  
Cafe Equipment Company—Salt Lake City

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

**WYOMING**  
Studer Tractor & Equipment Company—Casper

... for more details, circle No. 22 on Reader Service Postcard

# No-Joint pipe goes to 72-in. size



**Record diameter for cast-in-place concrete pipe installed by Latimer Construction Co. in Colorado.**

IN COLORADO, installation of No-Joint pipe has advanced up to a 72-in. diameter size which is believed to be a new record. Equipment and general field procedure followed the established practice for this type of unreinforced concrete pipe installation. It was carried out by the Midwest No-Joint Pipe Co. About 1,000 ft. of the record-size pipe was laid in the one installation.

A comprehensive description of the machine used for installing this cast-in-place pipe was described in considerable detail and the field operations for an extensive installation in Arizona were reviewed in a comprehensive article appearing in *Western Construction* issue of November 1957.

The No-Joint Concrete Pipe Co. of Yuba City, Calif., holds the rights for the method, and the new organization in Colorado is a licensee.

The photographs were supplied by Clifford Latimer of the Latimer Construction Co., Denver, the organization which carried out the record-size pipe job.

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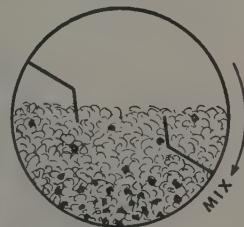
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material out of the mass . . . the mixing fin pours material into the center of the drum . . . it's the "T" that mixes to the test . . . there is *no segregation* in the mix.



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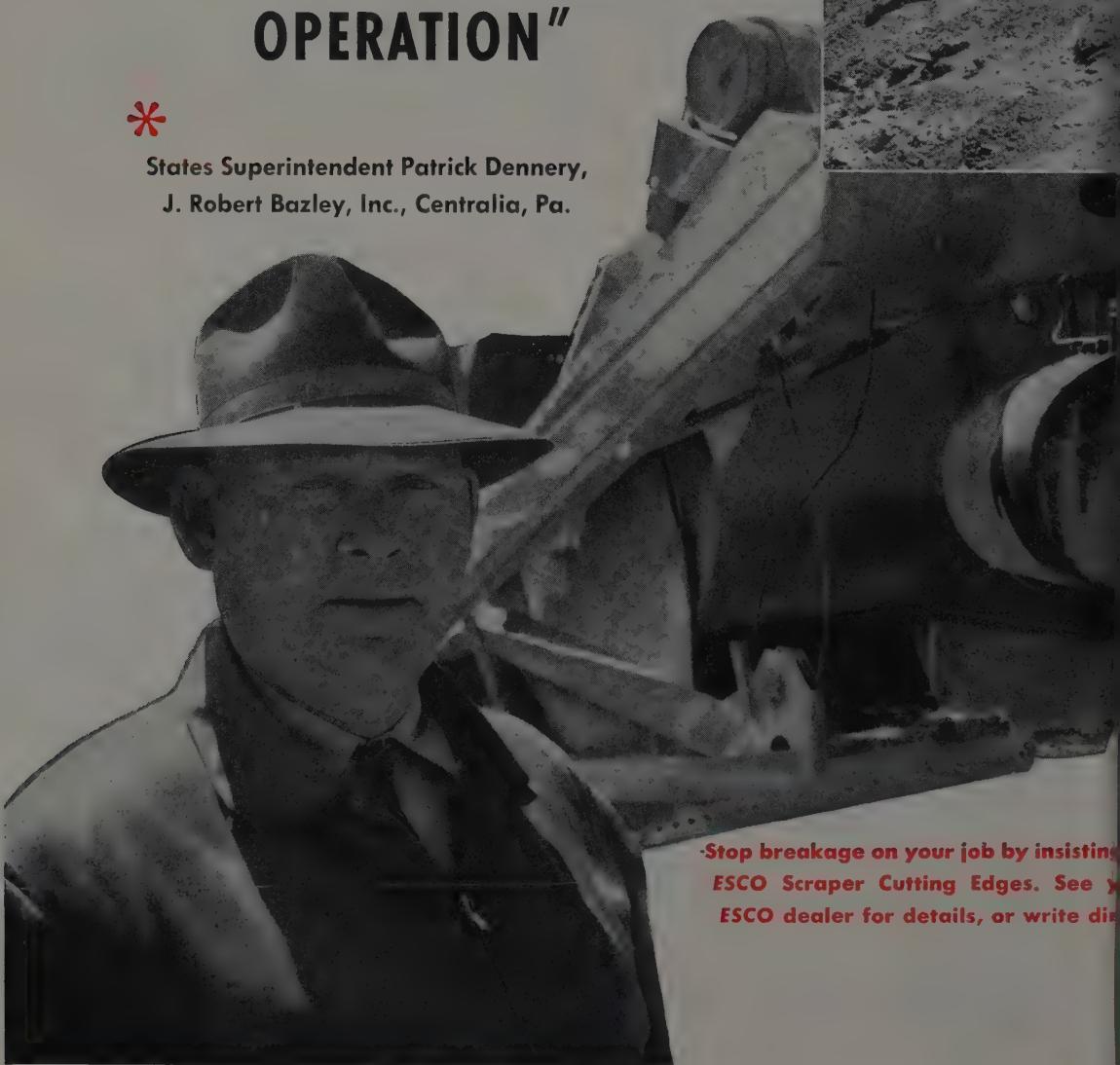
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States Superintendent Patrick Denney,  
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Stop breakage on your job by insisting  
ESCO Scraper Cutting Edges. See your  
ESCO dealer for details, or write direct.





"We have to fight for every inch of soil we remove", explains Dennery, superintendent on the J. Robert Bazley, Inc., open pit coal mine at Centralia, Pennsylvania. "And cutting edge breakage seriously affects the efficiency of our operation. The scraper cutting edges we were using previously were prone to breakage. Gashes up to 4" deep would occur. But *ESCO* blades, which we have been using exclusively for over three years, have never shown the least sign of chipping.

"Furthermore", continues Dennery, "ESCO scraper cutting edges give us longer service than our previous blades. The task of reversing or replacing blades is definitely made easier by *ESCO*'s two-section design of the center blade." Concludes Dennery, "ESCO Scraper Cutting Edges give us the low down-time insurance that is imperative on our operation."

#### QUICK-CHANGE CENTER SECTION

Four-piece design of *ESCO* scraper cutting edges simplifies the task of reversing center sections and reduces down-time.



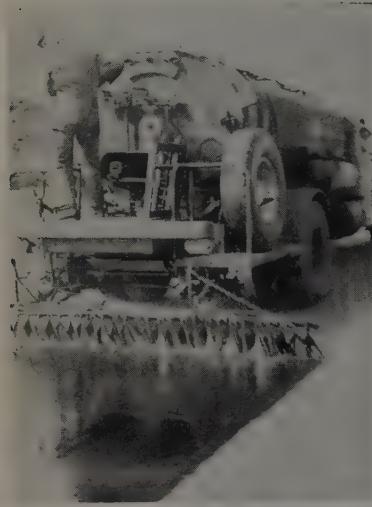
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COVERING chips were applied by a Flaherty spreader. Crushed gravel was used on most of the test sections. Equipment and crews were provided by the highway department.



APPLICATION followed standard procedure using a 1,300-gallon Etnyre distributor.



TEST SECTIONS were placed when temperatures averaged 80 deg. and humidity 33%.



ASPHALT from the Husky refinery at Cody, Wyo. started with a 200 F. temperature at loading, which was maintained during the five-day shipping period in insulated tank cars.

# Rubberized asphalt for seal coats

Colorado conducts extensive field testing of three types of rubber-treated asphalts. Information on materials, application and observation of initial results.

RUBBERIZED ASPHALT was used by the Colorado State Highway Department in a comprehensive field experiment on seal coatings. The work was carried out last summer using three different types of rubberizing materials. Obviously, results of this experiment will have to await service and progressive observations.

A comprehensive review of this field experiment, including data on materials, method of application, and cost information has been prepared by the Natural Rubber Bureau and that report forms the basis for this description of the project.

The experiment was undertaken to compare performance of three rubberized cutbacks and a non-rubberized cutback as binders for seal coats. The rubberizing materials used were styrene-butadiene, Neoprene, and natural rubber. Each type of binder was placed in triplicate sections about 9,000 ft. long. The project site is on U. S. Route 60 west of Walsenburg, and is approximately 10 mi. long. The maintenance division of the Colorado Department of Highways provided the aggregate, equipment, and labor for the project.

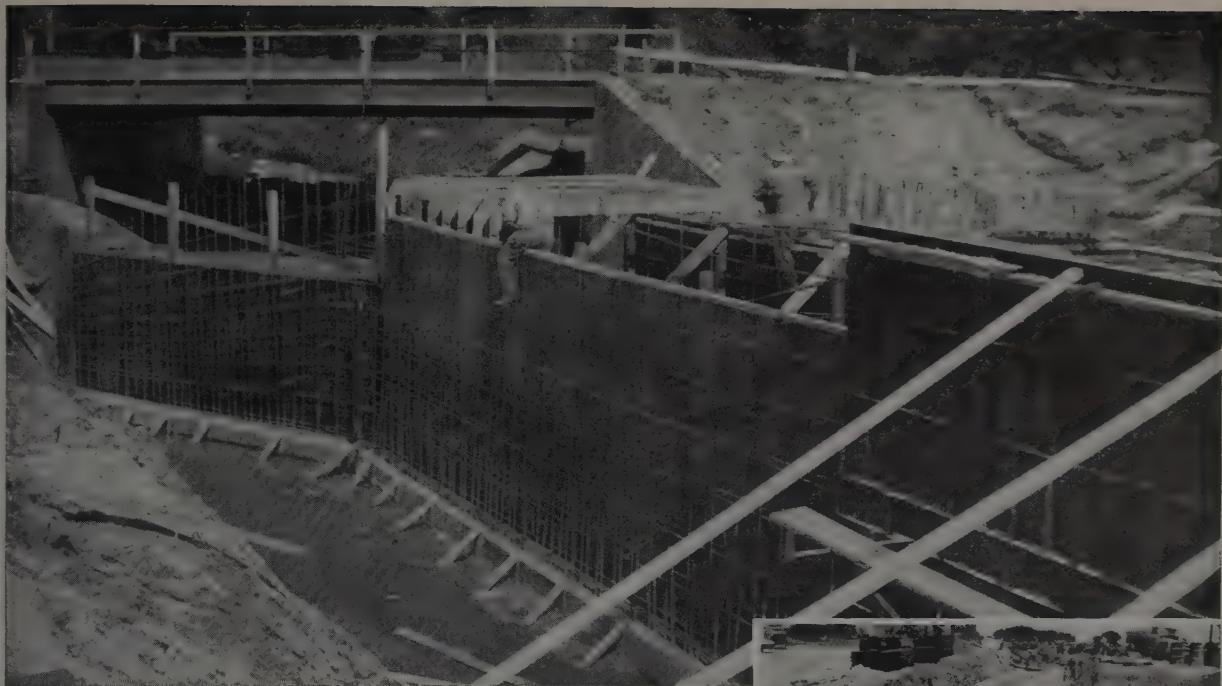
Average temperature during the days of applying the seal coats was about 80 deg. (August 1958) and the average relative humidity was 33%.

## Materials used

RC-3—A commercial cutback supplied by Socony Vacuum, Casper, Wyo. and used as the control material.

RC-3D—A butadiene-styrene rubberized bitumen containing 3.0% rubber hydrocarbons.

RC-3DN—A Neoprene rubber-



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WITH 1½% of natural rubber plus 0.15% dispersed sulfur, this material was placed at temperatures as high as 230 deg., but trouble was experienced with viscosity.



GOOD spread of the natural rubber treated asphalt. Results apparently related to viscosity.



POOR spreading and lack of uniformity produced this result. Cover removed by traffic.

ized bitumen containing 1.5% rubber hydrocarbons concentration.

RC-3DNR—A natural rubberized bitumen containing 1.5% rubber hydrocarbons plus 0.15% dispersed sulfur.

Rubberizing and cutting operations took place at the Husky refinery at Cody, Wyo., using a continuous process developed by Jewell R. Benson of Denver. The synthetic and natural rubbers, in latex form, were incorporated into the bitumen using essentially the same production techniques. The control bitumen was supplied from a different refinery, but the basic bitumen is reported to be the same as that used for the incorporation of the rubbers. The quantities of rubberized cutbacks of each type were about 10,000 gal. After blending, the cutbacks were shipped to Walsenburg in insulated railway tank cars. The loading temperature of 200 F. was maintained for the five day shipping period.

A crushed gravel was used for the greater part of the project. When these chips were exhausted a local supply of gravel was used to complete two sections.

#### Observations on application

On arrival at the project an inspection was made of the surface to which the seal coat would be applied. The wearing surface was in good condition, and it was the opinion of the engineer that this site would provide a satisfactory set of conditions for the experiment, since there are gentle slopes throughout the project, curves, and high speed traffic which would accelerate test results.

Installation of the RC-3 control sections was first using an application temperature of 200 F. Good construction practice was followed although it was noted that the cover chips were somewhat dusty. On the following day the remainder of the RC-3 was installed with no incident.

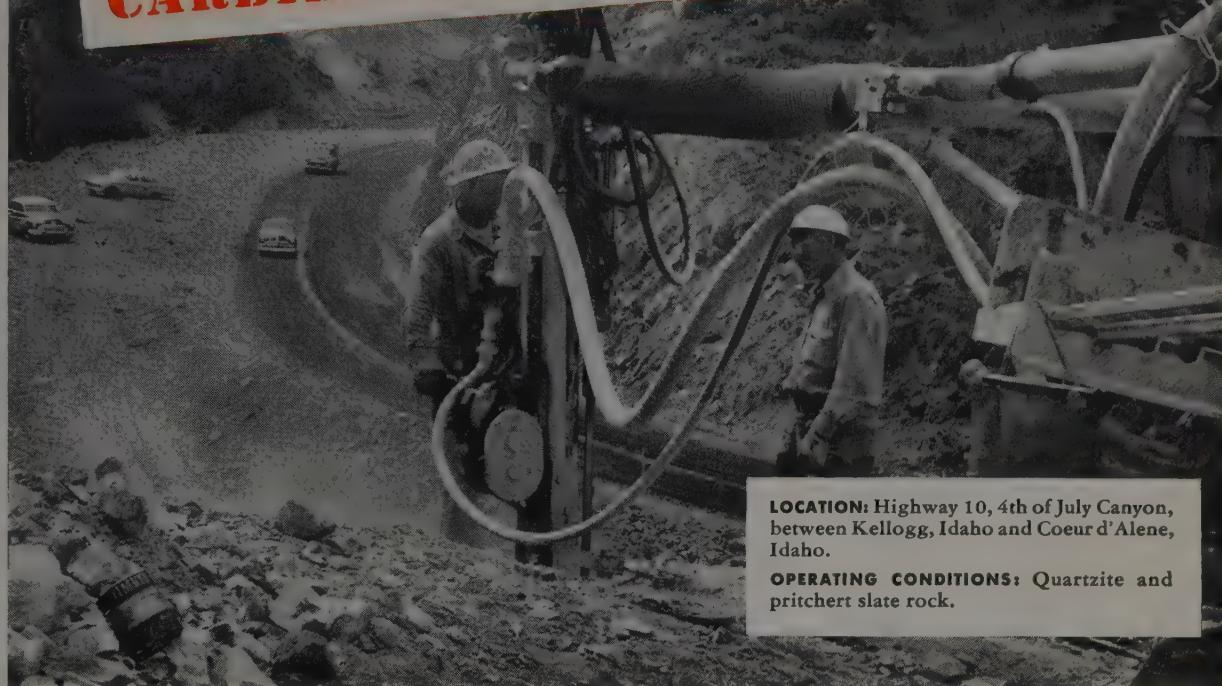
On the same day the two sections with styrene-butadiene were applied at a temperature of 215 F. Small "holidays" were noted throughout the spreading. Judging from the application and cold flow of the cutback, it would seem that this material was more viscous than the control. The next day was assigned for the installation of the Neoprene cutback. No difficulty was experienced in applying this rubberized material at a temperature of 218 F.

On the following afternoon, the

(Continued on page 72)

COST FIGURES ON THE USE OF NATURAL RUBBER			
	Amount	Cost/lb.	Total cost
RC-3DNR	9,399 gal.		
Asphalt content			
77.2% of cutback	7,256 gal.		
8.62 lb./gal.	62,547 lb.		
Rubber content			
1.5% of asphalt	938 lb.	\$0.375	\$ 351.75
Sulfur content			
10% of rubber	93.8 lb.	0.12	11.26
Freight charges			
Rubber		0.097	91.38
Sulfur		0.093	8.77
Drum charge			13.17
Sub-total			476.33
Rubberizing charge, 9,399 gal. @ 0.06/gal.			563.94
Total			\$1,040.27
Additional cost of the rubberizing (RC-3DNR) per gal.			\$ 0.111

# CARBIDE INSERT? or ALL STEEL?



**LOCATION:** Highway 10, 4th of July Canyon, between Kellogg, Idaho and Coeur d'Alene, Idaho.

**OPERATING CONDITIONS:** Quartzite and pritchett slate rock.

## "We get more re-grinds per bit, lower cost with TIMKEN® carbide insert bits"

... Reports F. H. Slate and E. C. Hall Co.

**I**N constructing 7.2 miles of new four-lane highway in 4th of July Canyon between Kellogg, Idaho and Coeur d'Alene, Idaho, F. H. Slate and E. C. Hall Co. must drill through quartzite and pritchett slate rock. Using Timken® carbide insert bits, they average 12 to 14 re-grinds per bit, drill 20 to 100 feet of blast hole per pass. And with proper grinding, they use all of the carbide height with no fracturing of carbides when discarded. Bit cost per foot-of-hole stays at the minimum, production at the maximum.

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your best bet, too, for drilling in hard, abrasive ground. But in ordinary ground, you should use Timken all steel multi-use bits. They're interchangeable in the same thread series. Without changing drill steels, bits can be changed quickly and easily as the ground changes.

All Timken rock bits are made from our own electric furnace fine alloy steel. We're the only American removable bit manufacturer that makes its own steel. And for even longer life, Timken bits have a specially developed shoulder union that protects threads against drilling impacts.

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Timken threaded all steel multi-use rock bit



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## Washington city engineer outlines —

# Big savings with standard specs

**Use of steel curb forms and uniform grating design yielded substantial cost reduction on a recent Puyallup street contract. Additional savings are possible for all cities if they will agree on standardization.**

By C. S. SEABROOK

City Engineer  
Puyallup, Wash.

UNIFORM designs, materials, and, ultimately, standard general construction specifications for municipalities in the Northwest are being developed by the Washington State chapter of the American Public Works Assn. in a long term project which began two years ago. Objective is not to create cities that look alike, but to save each one large sums of money by making possible maximum re-use of forms and equipment by contractors and thus reduce bids on municipal construction.

Thus far, standardization program has been confined to designs and materials. Work for the coming year will entail the much more difficult task of preparing a set of general construction specifications acceptable to all cities in the area.

This is not as easy as it may sound. Human nature being what it is, many people will doggedly defend the old procedures and will question whether there is any actual economy in this thing called standardization.

There is.

A good illustration of the savings possible was provided at Puyallup last year on a conventional street improvement contract involving integral curb and gutter, storm drainage facilities and asphaltic concrete pavement. Total contract was about \$250,000, and included two items that provided excellent examples of benefits that can accrue from standardization.

### Curb and gutter savings

The first of these involved curb and gutter construction. Curbs and gutters in the Tacoma area have almost always been constructed with wooden forms simply because none of the local contractors has ever invested in steel forms. Prices,

over the years, have become pretty well standardized, even if designs haven't. In the case of the previous year's contract in Puyallup, as an example, the bid prices on curb and gutter were all between \$1.60 and \$1.65 per linear foot, a figure that is typical for the area.

In connection with the 1958 contract, however, which was almost identical in every respect with the previous year's work, something unusual and unforeseen happened. One eastern Washington contractor who owns steel curb and gutter forms decided to bid the Puyallup work and submitted his price to all the prime contractors interested in the job. The resulting bids were quite interesting, especially to the city of Puyallup.

Estimate (based on past experience) \$1.75 per foot  
Bid No. 1 ..... 1.34 " "  
" " 2 ..... 1.36 " "  
" " 3 ..... 1.43 " "  
" " 4 ..... 1.45 " "  
" " 5 ..... 1.45 " "

Why this contractor was able to bid as he did became very evident during the course of the work. It

was simply the speed made possible by the steel forms. He commented to begin with that he was going to shoot at 2,000 feet a day and when the job was completed his average for the whole project was just that.

The implication, as far as standardization is concerned, is of course obvious. As long as cities insist on adhering jealously to their own pet designs, few contractors will invest in steel forms and no one can blame them. If the cities can all agree on a standard design, however, the contractors will very quickly invest in steel forms and prices will very probably go even lower than they were in Puyallup last summer.

### Bicycle hazard

Curbs and gutters, of course, are just one of the items to which standardization applies. Catch basin gratings represent another such item and are subject to just about as many different designs as there are engineers who designed them. Such gratings provided the second interesting aspect of the Puyallup



OLD grating in wood-formed curb and gutter. Wide spacing was a menace to bicycles.



NEW design is safe for small-tired bikes, the equal in capacity and \$10 cheaper.

job last summer. Prior to that time we had been using the standard grating developed by the writer for the City of Tacoma some ten years ago and which was practically a duplicate of the highly efficient grating developed by the City of Los Angeles many years before. Both of these gratings served their purpose admirably up to the advent of the European bicycles with extremely narrow tires, at which time the relatively wide spacings of the grating become a distinct hazard to cyclists.

Los Angeles solved the problem by narrowing the spacings in the grating to  $\frac{3}{4}$  in. We conducted our own research study on the subject at the University of Washington hydraulics laboratory and came up with a grating with  $\frac{3}{4}$ -in. spacings, but also with the tops of the bars well rounded, and with a 5-in. shortening of the whole assembly. The net result — a grating that eliminates the bicycle hazard, one that actually has a slightly increased capacity over the old, and which costs exactly \$10 less per grating than the old. This perhaps may not sound like a monumental sum, but on last summer's job alone where over a hundred gratings were installed, the City of Puyallup not only enjoyed all the advantages of the new grating but saved over \$1,000 as well.

While the savings resulting from the standardization of materials can be important enough, those to be expected from the standardization of procedures are equally important and can sometimes amount to even more, in terms of money. This is especially true in the case of smaller cities where the development of a set of individual specifi-

cations for a large construction job could easily result in the omission of essential details or in being ambiguous to the point where a contractor would have to bid high in self protection.

#### Fine print funny business

Only a short time ago the writer listened to the story of a contractor who was the low bidder on one of last summer's jobs in a nearby small city. After he was well into the work he discovered a sentence hidden away in the specifications in a context where no one would ever look for such a thing. His failure to see the sentence prior to bidding cost him a large sum of money and while there was nothing he could do about it legally, he nor any other contractor who has heard the story will ever bid any of that engineer's work again without adding plenty to cover such eventualities.

Perhaps the city of Puyallup might again be cited as an example of what the standardization of specifications could achieve. The writer took up his work in Puyallup some two years ago at a time when a great deal of construction work was contemplated. The program required a complete and detailed set of specifications for street, sewer and water work. Generally speaking there would be about three ways that such specifications could be acquired, first by using material that had proved satisfactory in some other locality; secondly, by accepting whatever was currently in existence in Puyallup; or lastly, by writing out a brand new text from start to finish.

Any of the above procedures

would have been possible but all would have involved serious difficulties of several kinds. Fortunately, Puyallup is a close next-door neighbor to Tacoma. The obvious procedure was to adopt the general specifications of that city. Not only was the writer thoroughly familiar with them (having helped to prepare them), but, more important, all the contractors in the area had used them over a long period of years and knew exactly what they contained and how they were normally interpreted. Under such circumstances all that had to be done in Puyallup was to write up the "Special Conditions" for each contract as they materialized. For the \$250,000 job, probably not more than a day's time was devoted to specifications.

If and when a set of standard specifications for the whole state is developed, then every city and town in the Northwest can do exactly the same thing.

The Standardization Committee of the Washington State Chapter of the APWA under the chairmanship of R. G. Anderson, construction engineer for the City of Tacoma, has been working on a standardization program for two years, and notable strides have been made. Unfortunately, stumbling blocks are periodically encountered, all arising from that most common of human tendencies — the reluctance to depart from conventional procedure.

This seems to be extremely difficult for many people, and one of the most trying things the standardization committee has to face is the persistence of a few individuals

(Continued on page 71)



WOOD form curb and gutter from previous street contract. Construction is slow and costly, averaging \$1.65 to \$1.75 per front foot.



STEEL form curb and gutter. Cost was \$1.35 per front foot and quality was superior to old type. Contractor averaged 2,000 ft. per day.



**PRIMITIVE WASHDAY...** Washing in a river—inefficient and exhausting—is still done in many undeveloped countries. Clothes never really come clean and are often contaminated.



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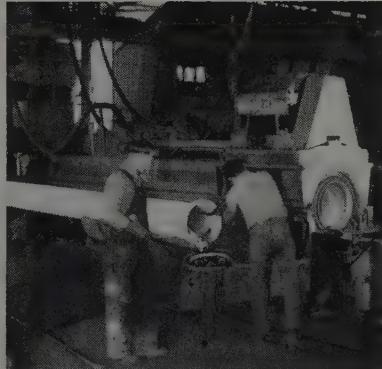
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We supply much of that pipe. To make sure it's as good as human care, skill and integrity can make it, U. S. Pipe controls every production step. From mining of ore to modern packaging, our pipe is tested, checked and rechecked for quality every step of the way.

Dependability is built into U. S. Pipe...literally, from the ground up!



**PROBING THE EARTH...** Our own iron ore is mined from deposits as much as two miles distant from the portal.



**INSPECTING HOT PIPE...** U. S. Pipe, just removed from the mold, is checked and inspected for quality.



**SCIENTIFIC TESTING...** Determining the chemical properties of U. S. Pipe - one of many quality checks.

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# Restore non-skid pavement surface

**Confronted with a serious problem expressed by the old highway sign "Pavement Slippery When Wet or Frosty," the Oregon Highway Department has taken steps to find an effective and economical solution. After testing of both equipment and procedures, a machine has been developed from the type of unit built for burning roadside weeds.**

**A review of the problem, its causes and the evolution of the burner was given at the recent Northwest Conference on Road Building, held at Oregon State College. The two papers covering the subject are presented in slightly condensed form.—Editor**

facing with asphaltic concrete both seemed to rule themselves out as a long range solution on two counts: (1) They were both unable to bury the excess asphalt for long, and (2) the tremendous cost.

## Source of the problem

Why, we may be asked, do we have so many slick highways? A brief review of the development of the oiled road in Oregon may help us to understand.

The use of fuel oil as a dust palliative was started in 1923, but the actual advent of the oiled road began in 1925 when R. H. Baldock was appointed maintenance engineer. There followed a multitude of experimental applications of various types of road oil with various rates of application of oil and rock. There were primers, roadside cover jobs, road mixes, oil mats and bituminous macadams. We wound up a few years later with a set of standard specifications for single and double shot oil mats, and light and heavy bituminous macadam; all designed with a ratio of asphalt and rock calculated to produce a stable wearing surface. We have continued to use these specifications and, today, have many miles of excellent oil mats and bituminous macadams.

However, we find a great variation in texture and composition,

## Problem and its solution

By I. A. DeFRANCE

Maintenance Engineer  
Oregon Highway Department  
Salem, Oregon

COMPLAINTS of slick highway pavement during the fall and winter of 1957 were not exactly new, but served to make us keenly aware of the growing seriousness of the hazard under present fast driving and heavy traffic conditions.

We urged our men in the field to pay particular attention to the problem. We were sanding, and had

organized special shifts for round-the-clock sanding, and in some cases were using salt and calcium chloride as well. In addition, we were doing a stop-gap type of burning that was very effective, the burning of transverse strips across the slick highway with patch-kettle torches.

Some of our annual re-oil schedule was performed to non-skid slick surfaces even though it was agreed the non-skidding effect did not last as the newly-applied rock sank into excess asphalt that had been covered. The reoiling and some resur-

**PROPANE burner developed and built by the Oregon Highway Department based on extensive field testing. The 8-ft. hood houses five torches which burn the excess asphalt as the truck moves at speeds from 10 to 36 ft. per min. Hoist and boom design allows burner to be lifted for job-to-job travel.**





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CREW of four includes truck driver, operator and two flagmen. Exclusive of truck, the burners represent a cost of about \$3,500 for each of the five machines built by the department.

with many sections of slick surface where there is considerable fat or excess asphalt. This is not surprising when we remember the many variables that entered into the oiling. First, there was a considerable latitude in the amount of asphalt and rock specified, and we had engineers and oil foremen who had their own ideas as to what was the proper spread. Oiling equipment has been greatly improved during the years, and there were, and still are, vast differences in the road oil or asphalt used. In the early days much 95 road oil was used; later we used 200-300; and today we use 120-150. At the same time there were then, as now, the SC, MC, and RC's, and many different combinations of them were tried out and their location shortly forgotten.

There were also many different types of rock used. Some areas used pea gravel and sand. Other areas part fractured, others all fractured. Some rock was produced on round screens, some on square. Some was not screened, and some was almost hidden in fines. Some was plain dirty. Some of the rock was found to be hydrophilic, some hydrophobic. Then finally, there was a wide range in weather conditions, the temperature, and the season. Some oil was laid in the sun, some in the rain, and some late in the season with the result that much rock was lost and we had fat surfaces.

The same variables affected our pavement patching. There was the same latitude in the mix, the kind and quantity of asphalt, the kinds and sizes of rock, and the same variations in weather conditions. We patched for many years without pug mill mixers, with open flame on the mix. We used every type of road oil and asphalt and every kind of rock.

### The problem is complex

The degree of subgrade compaction obtained in the field varies under different weather conditions and early or late in the season. Our rapid fire construction schedule does not always allow the desired time for optimum results. Complete compaction of the grade and subgrade is difficult to obtain, and delayed compaction of the subgrade has a serious effect on asphaltic concretes and bituminous macadams. Another factor that contributes to the problem is delayed compaction of the pavement or oil mat, itself. Asphaltic concrete or bituminous macadam laid in hot weather receives greater compaction than that laid in cold weather. The effect may be slight, but delayed compaction of bituminous macadam or AC surface usually results in some flushing of asphalt.

The smooth texture design of newly constructed highways may also contribute to the problem. Possibly we should finish to a coarser texture. A few years ago there was some oiling done that had a coarse texture. Some users immediately complained of a rumbling noise in their cars. We had to change back to the smooth texture oiling. Many skidding accidents might have been prevented had we retained the coarse texture specifications.

The problem is one of great complexity due to the many variables involved. Is it any wonder, then, that some of our highways are slick?

### Studying the problem

To evaluate the problem and consider methods of correction, we

investigated and tabulated the sections of slick pavement throughout the state. The equipment was studied and was found to be limited in kind, capacity, speed, and effectiveness. Aside from reoiling and paving equipment, we were using four types of equipment:

1—The patch-kettle torches used to burn transverse strips.

2—The converted old-type pavement heater. Several torches had been added, and they had been converted to propane. This equipment was towed at slow speed to thoroughly heat the surface so that rock spread ahead of the heat could be rolled in. Many miles of slick surface had been treated in this manner and with fair results. Results were shortlived, however, as the new rock either sank into the excess asphalt or shelled out under traffic. Apparently the heating of the excess asphalt and the rock by the direct flame coated both with smoke and soot so that the bond was not lasting.

3—The pavement heater planer, that has fuel oil torches which heat the surface so that the planer knives can cut off high spots. It is designed for planing and leveling, and for these jobs it is effective. For non-skidding it is slow and expensive.

4—We had the propane "weed burner". Our engineers at Pendleton and La Grande had developed plans for this equipment. It was used with success for burning roadside weeds and grass for fire breaks, and later used for burning excess asphalt from slick pavements. It was successful in this work, also, but in a limited way for two reasons: (1) The tractor that towed it could not go slow enough and left a jerky burn pattern, and (2) its three torches were not capable of burning all of the excess asphalt.

With the help of the entire maintenance division staff we reviewed the work of the four types of equipment and made special test runs with each.

### Conclusions reached

It was agreed that the excess asphalt was our enemy, and that our problem was how to dispose of it. For years there had been a feeling that whatever we did we must not burn the asphalt. Instructions to the operators of pavement heaters and planers had been "heat but do not burn" the asphalt. After observing the results of the patch-kettle strip burning, and the burning by the propane weed burners

(Continued on page 66)

# specialized tool? not the **D-17**

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**BIG POWER . . . BIG CAPACITY . . . BIG PERFORMANCE !**

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*30 yds. heaped . . . 336 h.p. engine . . . 4 speed Torqmatic Drive with converter lock-up . . . independent hydraulic controls for bowl, apron and ejector . . . 27.00 x 33 tires with 33.5 x 33 optional.*

*Two engines with a total of well over 500 h.p. . . . separate Torqmatic Drives . . . 24 yds. struck . . . 32 yds. heaped . . . NoSpin differentials . . . all wheel drive . . . unequalled grade-ability.*

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## **EUCLID EQUIPMENT**

**FOR MOVING EARTH, ROCK, COAL AND ORE**

## NON-SKID

(Continued from page 62)

we questioned the value of the excess asphalt or that it was essential to the pavement or the oil mat below.

Many sections of pavement were burned to observe the results and search for damaging effect. When we applied torches long enough to burn the surplus asphalt the asphalt and rock mixture below was protected from burning by its rock content.

We then began the design of specialized equipment for the express purpose of burning excess asphalt with positive speed control to avoid damage to the highway surface. The best points of the existing equipment were adopted, aiming for a unit that would be effective, fast, and economical. Fi-

nal design included the following:

1. A flatbed truck geared down by the addition of two standard 4-speed transmissions, one behind the other, to permit a smooth operation at speeds of from 6 ft. per min. to 45 mi. per hr. Two tanks were mounted on the truck, one 400 gal. for water, one 500 gal. for propane.
2. A hood 8 ft. wide mounting five 8-in. propane torches placed vertically to provide a powerful down draft that would actually burn to cinders the excess asphalt as it passed over it at speeds varying from 10 to 36 ft. per min. Individual valves and flexible fuel lines for each torch.
3. A hoist and boom on the truck to raise the hood from the pavement to the truck bed for traveling to and from the job.

generated so much heat the flexible fuel lines caught fire and burned. The burner was taken to the Klamath Falls shops and protective shields were constructed across the top of the boot with vent stacks on the front.

### Further refinements

These corrections improved the operation of the burner, but it still was not performing satisfactorily, as it was not getting enough draft. After burning about one-half mile of two-line pavement it was decided to send the burner back to the Salem shops for further improvements. Better protection was constructed for the rear of the truck and for the flexible fuel lines to the burners. The following tests proved satisfactory, and it was decided to construct five pavement burners, one for each highway division. Numerous other improvements have been made and difficulties overcome, so that we are now able, under normal conditions, to burn up to speeds of 36 ft. per min. with only one-half the original fuel consumption.

Through experience it was learned that the water spray was more of a detriment than benefit. The water tank is retained, however, and has been fitted with fire hose and the water kept under pressure for use in case of fire. We have raised the burners approximately 4 in. above the boot and have finally solved our burner oxygen supply problem. By cutting the pressure of the liquid fuel according to amount of excess asphalt to be burned, it is possible to obtain more burner efficiency with less fuel.

The wind blows the flame and smoke badly and we find it necessary to operate according to the direction of the wind, so that the flame and smoke is blown away from the passing traffic lane. In many cases, the burner is raised and the torches shut off while certain vehicles such as gas trucks and school busses are passing the operation.

One serious difficulty was the burning of the burner boot itself, but we have increased its size and lengthened its life by 200% or more. We are now attempting to line the inside of the boot with diatomaceous silica blocks as insulation against the heat, but so far have had little success. Another idea is to try stainless steel lining at those areas where the heat is most

## Burner and its operation

By VICTOR H. COFFEY

Assistant Maintenance Engineer  
Oregon Highway Department

On July 21, 1958, we made our first trial run with the propane pavement burner. Elements of the unit were noted by Mr. DeFrance. The 400-gal. water tank was used to wet the pavement back of the flame with a spray designed to cause the excess asphalt to boil up and be burned. The first test was with 110-lb. pressure of liquid gas. The burner was run at various speeds. Best results were obtained at 10 ft. per min.

The water spray hit the pavement too far back of the flame, and

it was decided to try to shoot it into the flame to get better results. It was also noticed that the rear of the truck was subjected to too much heat and would need a protective shield. After burning a 500-ft. stretch, the burner was taken back to the shops, and the suggested corrections made.

A few days later the burner was sent to Klamath Falls where another test was made. The correction made on our water spray did not prove satisfactory, as it set up a curtain in back of the boot, shutting off burner exhaust. The spray was again adjusted on the job. We were burning on extremely fat pavement and the burning asphalt

**LIFE of the burner boot has been the most serious operating problem. Increase in size and length has helped, and use of insulating materials or stainless steel as lining has been considered. Fuel tank holds 500 gal. Fire protection is provided by a 400-gal. water tank.**



(Continued on page 76)

# NEW International Earthmovers

## NEW CAPACITIES

(24 yd. scrapers, 27 yd. wagon)

## NEW POWER

(375 hp)

## NEW SPEEDS

(to 29.1 mph)

Higher speeds possible with optional equipment.

## International

### 24 cu. yd. 295 Payscraper

Heaped: 31 cu. yd.

Overall length: 44'8".



**NEW high visibility**  
color. Optionally available on all three models in either Federal yellow or International Harvester red.

**NEW positive push-type ejection** assures quick clean dumping of all materials.

**NEW advanced lift frame construction** with A-frame-type gooseneck that: 1) increases visibility; 2) distributes weight evenly along cross tube; and 3) protects sheaves of bowl lift system.

**NEW** automotive comfort and control features: 16-adjustment bucket seat . . . reach-easy controls . . . unobstructed vision . . . air brakes . . . flush deck.

**NEW** Model 280 cable control unit . . . fingertip control . . . fast acting . . . high capacity . . . simple adjustments . . . less maintenance.

**NEW** 375 hp DT-817 turbocharged 6-cylinder diesel engine. See page 4.

**NEW** cycle-shortening haul speeds to 26.2 mph plus unmatched maneuverability.

**NEW** exclusive tapered bowl. See next pages.

**NEW** high 98" apron opening. See pages 2-3.

**See 3-axle models on inside pages...**

**NEW** full 90° turns with power steering.

# 27 cu. yd. International 495 Paywagon

Heaped: 40.5 cu. yd.  
Payload: 40.5 tons.  
Overall length: 50' 4 1/2".



Here in the 27 cu. yd. International 495 Paywagon is everything that's new and productively *different* in bottom dump design. New 375 hp engine for greater power *per struck yard than any comparable rig*. New higher side and rear end clearance to roll away from any dumped load. New power-opened clamshell doors for positive controlled dumping. New wiper plates put 100% of each load on the fill. New automotive comfort and control features that let the operator produce more with less effort. New full 90° turning in either direction. New low design for haul road stability.

**375 HP 495 prime mover** gives both 495 Paywagon and 495 Payscraper more hp per struck yard with less gross weight per hp than any similar sized earth mover. Speeds to 29.1 mph, 10' 8 1/4" wheel base. Full 180° non-stop turns can be made within 39' 11 3/4".

**Unmatched 60" rear end dumping clearance** lets rig pull fast from fill with no dangling doors dragging on dumped material. Open rear frame lets loader spillage fall through — prevents buildup of "free loading" material.



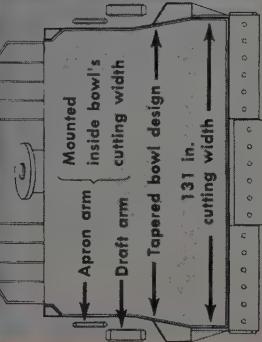
**NEW**

**high speeds**

**big capacities**

# fast dumping unmatched control

This new International 495 Payscraper hauls a heaped load into a 24 cu. yd. bowl in less time than any other three-axle scraper in its class and hauls it at speeds up to 29.1 mph. The trailing unit, common to the 295 Payscraper, offers this unmatched combination of features that cut dirt costs: big 131-in. cutting width . . . tapered bowl permits efficient ejection of all materials with equal ease . . . positive forced ejection . . . improved lift frame construction . . . full 90° turns . . . more hp per struck yard than all competitive units . . . wheels and bowl leveling adjustment . . . advanced sheave bearing design . . . and custom designed cable control unit.



**Exclusive tapered bowl design:** 1) permits scraper and pusher to work inside cut for best traction, less wear on tires, and tracks; 2) causes dirt to boil toward center, reducing side spillage; 3) extra wide bowl bottom provides wider spread, speeds dirt breakaway and lets scraper work cuts against banks.

**Gaping 98" apron opening** plus no bowl cross member permits sure ejection of all materials. Apron opened by exclusive, rear-controlled mechanical linkage. Apron is synchronized with ejector for positive controlled spreading.

**Positive forced ejection** dumps all materials — even wet or frozen clay and gumbo — cleanly and quickly. Six large ball bearing mounted rollers center and guide ejector gate, have 240-hour lube intervals.

## 24 cu. yd. International 495 Payscraper

Heaped: 31 cu. yd.  
Overall length: 50'6 $\frac{1}{4}$ '.

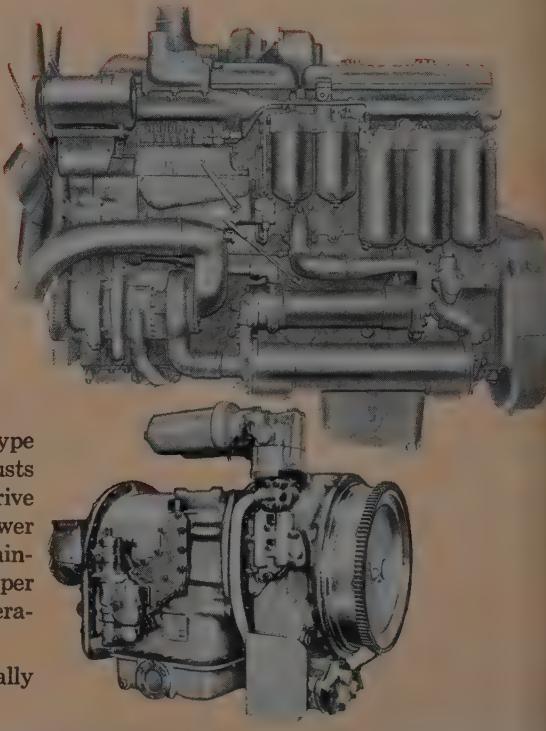


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Both prime movers are available with 4-speed, planetary type torque converter power shift transmission. It automatically adjusts output torque and speed to fit load requirements. Torqmatic drive makes more power available over the entire range; applies power smoothly and continuously, resulting in less wheel slippage; maintains high tractive effort; and cuts the number of gear shifts per cycle, letting operator concentrate on loading and spreading operations.

A constant mesh 9-speed manual shift transmission is optionally available on both prime movers.



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**TREASURE STATE**  
Equipment Company

# Flood control work with tough access problem

TO PREVENT recurrence of the disastrous flood of December 1955, which cost 17 lives, the Federal Government financed a \$3,861,295 contract with Granite Construction Co. of Watsonville, Calif., as general contractor, for a 3 1/4-mi. flood control project at Santa Cruz, Calif., now nearing final stage.

Starting with the San Lorenzo River phase, 120 ac. were grubbed, cleared and the brush burned on the embankments. Dredging of the channel was done with suction dredge and dragline, the latter also ditching for the 120,000 ft. of 12-in. to 72-in. drainage lines, that are equipped with 124 gate.

Excavation involved 1,250,000 cu. yd. with 345,000 cu. yd. on the em-

bankments. As erosion control, 200,000 tons of rip-rap were placed on the slopes to give a thickness varying from 30 in. at the bottom of the slopes to 18 in. for the balance. About 8,000 tons of derrick stone were placed around bridge abutments. The finished channel varies from 100 ft. to 200 ft. at the south terminal, with depths diminishing from 25 to 20 ft. On the levees will be 12-ft. roads of stabilized base with bituminous surface treatment.

Surface water behind the levees from existing street and surface systems is disposed of by a drainage system involving paved ditches, pipe lines, and intake and discharge structures. Supplementing the collecting system are 3 pumping sta-

tions. The pumps will cut in when the level of the river rises to the point where the surface drainage flap gates cease to function.

Adjustment of the original Branciforte Creek channel, the major tributary to the river, involved legal proceedings on 102 land parcels to give adequate right-of-way. The final routing of the fully lined rectangular concrete structure, 35 ft. wide, side walls from 12 to 24 ft. high, follows the creek to confluence with river channel. Drainage is handled by 10,000 ft. of 6-in. perforated pipe under the floor slab. Because of the close proximity of adjacent property lines, no equipment movement outside the walls was possible.

Knute Hansston, resident engineer for the U. S. Engineer Corps, reports the project well ahead of schedule for a finish date of August 1959, with a former associate in many governmental projects, Edwin G. Spaith, project engineer for Granite Construction Co.

## STANDARDIZATION

(Continued from page 57)

in defending their own pet ideas even after an unbiased appraisal of the situation fails to warrant such a defense.

Fortunately, cases of this sort are in a minority and with the rapidly growing interest in the problem such minor annoyances will for the most disappear completely.

Committee members preparing the proposed standards include R. G. Anderson, Tacoma city construction engineer, chairman; Phil Holmgren, Spokane assistant city engineer; H. E. McMorris, Seattle, principal engineer; Sam Hobbs, Yakima city engineer; Peder Heamstead, Ephrata city engineer; Oscar Olson, Centralia city engineer; Chester E. Waggener, Moses Lake city engineer, and C. S. Seabrook, Puyallup city engineer.

Committee members do not underestimate the task before them, especially in the matter of preparing specifications that will be acceptable to every city in the area. They are completely confident that the job will be done however, and the only difference of opinion is over the length of time it will take. It is to be hoped that all municipal officials who are interested in getting the best possible results at the least possible cost will make every effort to aid and cooperate with the American Public Works Assn. in this undertaking.



## RUBBER ASPHALT

(Continued from page 54)

cutback with natural rubber was brought to a temperature of 220 F. and its application was started. It was noted initially that this material was more viscous than the others, although the appearance of the first section installed was comparable to the sections where the butadiene-styrene was used. With each successive distributor load this material (RC-3DNR) became more viscous. The temperature for the

fourth distributor load was increased to 230 F., but no improvement was evident. Spreading lacked uniformity and "drilling" became evident to a marked degree near the end of the last panel. At this time the engineer decided to dilute the last distributor load to 1% rubber hydrocarbons by addition of the control RC-3. Even with this dilution no improvement could be observed.

On the control sections, bleeding was observed during and after construction; aggregate loss was noticeable and replacement was required

in areas where traffic whip-off was severe. Advantage shown by all types of rubberized cutbacks were improved aggregate retention and less bleeding. The appearance of strands of bitumen on stones hand-picked from the road indicated greater rubbery characteristics were

### EQUIPMENT

1—3,500-gal. transport truck  
1—1,500-gal. transport truck  
1—1,300-gal. Etnyre distributor  
2—10-ton tandem rollers  
1—10-tire 4-ton pneumatic roller  
1—Flaherty spreader  
5—5-ton trucks



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imparted by the natural rubber.

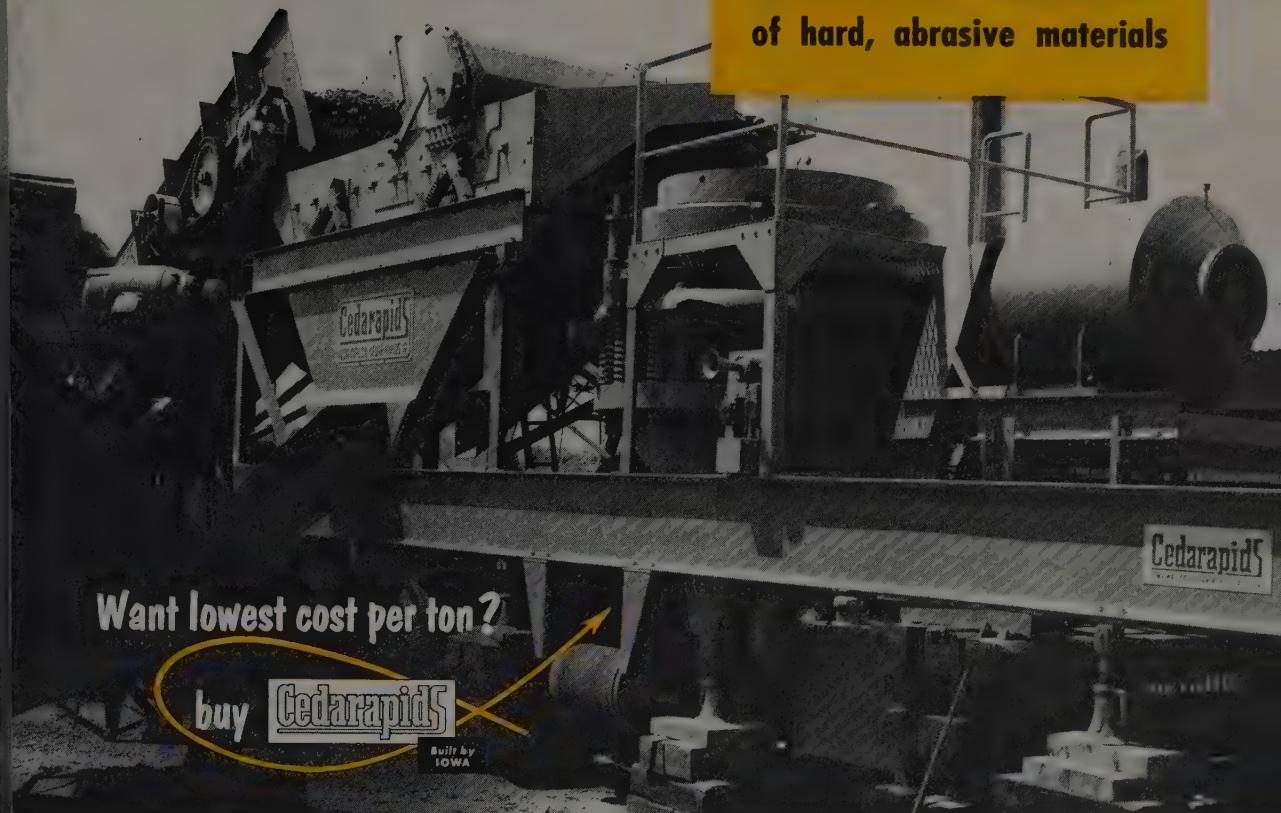
The difficulties encountered in the application of the natural rubberized cutback, that is, progressive increase in viscosity and uneven spraying, indicated a non-homogeneous material. The cutback was pumped from the bottom of the railway tank car and the material in each additional distributor load was more viscous. It appears that separation had occurred, leaving the bulk of rubberized asphalt on the surface. Unfortunately, the tank car was sampled only before the first load was pumped into the distributor, therefore analysis of this material will not be representative of the entire tank car.

Later it was learned that the producers of the rubberized cutback would have recommended a higher application temperature than was used. This modification might have eliminated some of the spraying and spreading difficulties, but would not have overcome the problem of separation in storage. The effects of this separation could probably have been minimized by mixing and circulation before withdrawal from the tank car.

### Observers and personnel

Jewell R. Benson, bituminous consulting engineer; Walter Howat, Asphalt Institute; William Snyder, Du Pont Company; Walter Harris, district engineer; Herbert Abel, district maintenance engineer; and John Babashak, Natural Rubber Bureau, observed the tests. The Natural Rubber Bureau Road Research Laboratory appreciated the cooperation of authorities of the Colorado Department of Highways, including C. E. Shumate, assistant chief engineer, E. G. Swanson, Walter Harris, and H. J. Abel. The assistance provided by J. R. Benson and Husky Hi-Power, Inc. was also acknowledged.

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Cedarapids Cone Crusher Intermediate Plant, fed by a 42" x 30' Cedarapids Ground Level Feeder, produces 200 tons per hour of 2" and down glacial gravel for Ohio Gravel Company, Cincinnati, Ohio.

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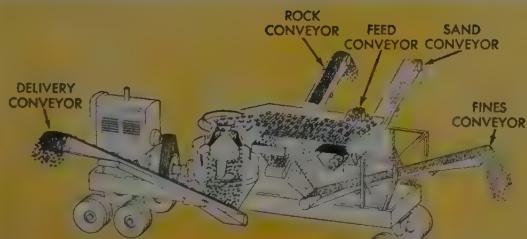
Look at all you can do in hard, abrasive materials with this Cedarapids-engineered portable plant consisting of a Cedarapids 4' x 12' double deck horizontal vibrating screen and a 4' Symons® Cone Crusher, with conveyors for handling up to four different products.

Sand and fines can be scalped off, while another specified size (determined by screen opening) is taken off by the second deck. Oversize from the top deck is reduced by the Cone Crusher to desired size. Finished products are finely crushed and fairly uniform in size . . .

the kind required in so many specifications.

Cedarapids Cone Crusher Intermediate Plants are unexcelled for secondary reduction in quarries when used after a Cedarapids Portable Primary, or for primary crushing in gravel operations. Your nearby Cedarapids Dealer will gladly show you how this unit can help you upgrade your products . . . and profits. Ask about other Cedarapids Intermediate plants with twin-jaw and roll crushers, and the many other types of Cedarapids portable and stationary aggregate producing units.

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



Flow diagram shows Cedarapids Model 4-ICS Cone Crusher Intermediate Plant set up to produce four finished products. Only oversize material passes through crusher, assuring big volume production. The Symons Cone will reduce 7 3/8" material to 3/4" in one pass. Screen cloth and crusher settings are easily and quickly changed for producing a wide variety of product sizes.

# WESTERN CONSTRUCTION

# NEWS

## AGC conference slated April 23

THE NORTHERN and Central California Chapter, Associated General Contractors, will host the AGC Western Chapters Conference April 23 in conjunction with the Second Annual AGC Spring Conference in Monterey. Bruce McKenzie, chapter manager, said officers of the Western Chapters Conference have accepted the Northern and Central California Chapter's invitation to hold the conference in Monterey, rather than in San Francisco, the traditional site.

Officers and managers of the West's 23 AGC chapters will meet all day April 23, at the Mark Thomas Inn and will participate in the opening of the AGC spring conference that evening.

Many of the delegates are expected to stay on to take part in several discussion, social and sports events. National AGC President James W. Cawdry, of Seattle, will attend both functions, along with James D. Marshall, executive director, and William E. Dunn, assistant executive director. Dunn will address the Western Chapters Conference on pending legislation now before Congress, on policies of the National Labor Relations Board regarding hiring and union security and on other labor relations matters of interest to general contractors.

Another feature of the Western Chapters Conference will be reports by an official of each chapter on the current labor relations picture in his area.

## Trinity compromise accepted by PG&E

PACIFIC Gas and Electric Co. revealed that it will go along with the proposal of two California congressmen for a clause in the new Trinity River Project which would allow the Federal government to take over the power facilities after the company builds them.

The congressmen have introduced identical bills in the House.

The measure specifies that the Federal government may take over the Trinity power facilities constructed by PG&E, at their depreciated cost, any time after the proposed San Luis Project begins operation or after July 1, 1967, whichever is earlier.

PG&E Executive Vice-President Robert H. Gerdes said the company accepts the compromise provision "in the hope of ending this controversy and getting the Trinity power facilities built and in service. Secretary Seaton found that the greatest benefits to water users and taxpayers would result from company construction and operation of the Trinity power facilities under a 50-year license. The new recapture provision would allow the Government to take over the power facilities at an early date should Congress so desire."

Gerdes declared that the joint development program, which Secretary Seaton has recommended to Congress, will immediately save the Federal Treasury approximately \$60,000,000 in construction costs. It also will provide \$175,000,000 more

net revenue to the Central Valley project and \$145,000,000 in additional taxes which will be paid to Federal, State and local treasuries, based on a 50-year contract. None of these \$320,000,000 benefits would be available under all-Federal construction.

## Pouring stepped up at Rocky Reach Dam

A GRADUAL increase in employment at the rate of a few men a day is taking place as Rocky Reach Contractors move toward around-the-clock concrete placement at Rocky Reach Dam. Goodfellow Bros. Inc., winner of Section III contract for railroad and highway relocation, has moved onto the job site in the vicinity of Ribbon Cliff, north of Entiat, and begun clearing.

The number of people on the combined payrolls of the various contractors and of Stone & Webster Engineering Corp., has been holding around the 1,200 to 1,300 mark. The predicted high for 1959



Power-producing facilities have been completed at Brownlee Dam in the Hells Canyon reach of the Snake River. The fourth generator is on-the-line at Idaho Power Company's new project, bringing entire initial capacity of 360,000 kw. into full production and establishing it among the major power-generating installations in the Pacific Northwest. Brownlee is the first project of a three-dam development. The other two projects, licensed by the Federal Power Commission, are Oxbow Dam, now well along toward completion, and Hells Canyon Dam, which will be built following completion of Oxbow.

# Powerful savings...KUE-KEN® "crushing without rubbing" uses less power

Here is a table of tons per hour that will pass through crusher with jaws set at dimensions shown when measured in the closed position.

Kue-Ken crusher size	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"	Horsepower range
24" x 12"	22	26	32	36	43	50	56					15 to 30
30" x 12"	32	35	38	42	55	70	76	85	110			20 to 30
36" x 10"	38	47	57	67	80	91	105					25 to 40
36" x 20"					70	82	90	115	135	160		30 to 50
42" x 25"					90	120	150	165	180	215	250	40 to 60

Table is based on crushing average hard dry quartz or similar rock weighing at least 100 lbs. per cubic foot when crushed. 32 sizes available from 12" x 5" to 48" x 42".

In Kue-Ken, power is used to crush rock not to wear out jaw plates. By gripping rock firmly, crushing squarely and eliminating rubbing, Kue-Ken produces far more tons per hour at any given horsepower as shown in chart above. Kue-Ken jaw plates last at least 5 times longer...especially important with hard-rock crushing. Kue-Ken mechanism operates in a sealed, dust-tight crankcase lubricated by filtered oil to permit higher speed for greater capacity and a more uniform product. Wear is negligible and shutdowns common to conventional crushers are practically eliminated. Automatic flywheel release prevents breakage from tramp iron. Kue-Ken crushes at the lowest cost per ton. There is a size to meet every need.



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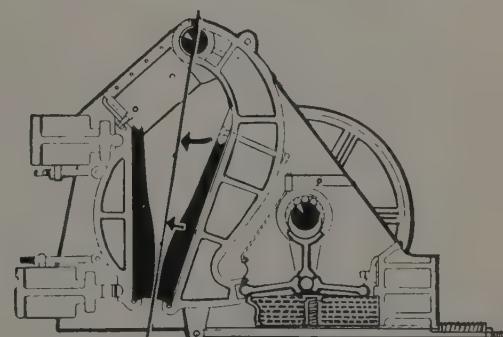
"CRUSHING WITHOUT RUBBING"

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**BEST BUYS IN NEW  
AND USED EQUIPMENT**

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is 1,620, just a few less than the peak employment of 1958.

Grouting of the 2,000-ft. cutoff is speeding up. Chemical grouting is now being done in two shifts while the cement-bentonite grouting and drilling is continuing around the clock.

Clearing of rock at Destruction Point is almost completed and the periodic halting of highway traffic at this point will soon be over. Goodfellow Bros., who also have the Section I contract, are almost ready to detour highway traffic over the new railroad grade from Swakane Canyon around the rocky point to the north.

Step III of river diversion will soon be accomplished, too. Nearly all of the fill material in the low cofferdam has been removed and the contractor is planning to remove the stoplog gates soon to allow the river to flow through Spillway Bays 2 and 3.

## \$315,000,000 housing project

THE nation's largest and most spectacular urban redevelopment project is slated for Los Angeles with the legalizing of the \$315,000,000 plan. Approval of the mammoth project, which is designed to transform a 136-ac. semi-slum area called Bunker Hill into a modern, heart-of-the-city addition, came after six months of study and hearings by the city council. Plans call for a 24-ac. residential plaza containing 3,100 modern apartment units, a 16-ac. plaza for the latest in business structures, a 6-ac. hotel site, 4-ac. shopping and office complex, and 14-ac. motel section.

Parking is provided on the perimeters of the site in multi-storyed, above-ground structures, and also by sub-surface areas below each plaza. Facilities will be provided for approximately 10,000 cars for those working or living in the Bunker Hill area. Space for an additional 10,000 automobiles will help solve the parking problem of the adjacent downtown business areas and the new Civic Center of Los Angeles.

According to Charles Luckman, president of the supervising architectural firm, some 5,087 old buildings will give way to modern structures in which 10,000 persons will live and 50,000 to 60,000 will work. Street and traffic improvements in the project include the elimination of substandard streets and alleys, as well as the grade separation of

vehicular and pedestrian traffic.

Approximately \$65,000,000 will be spent for the purchase of the land and preparation of the site for private enterprise construction. The Federal government has pledged \$58,711,461 of this as a loan and grant, and the CRA will return \$42,875,000 to the Federal government from the sale of land to private enterprise.

The Donald R. Warren Co. is the consulting engineering firm on the project. Charles A. McMahon is chief, planning and engineering department, Redevelopment Agency of the City of Los Angeles.

## NON-SKID

(Continued from page 66)

destructive.

Many experiments have been tried on the job with varying speeds, different pressures, different boot design, height, and shape. These experiments have had considerable influence on the design of the burners now being used. We tried spreading crushed rock ahead of and behind the burner, but with unsatisfactory results. The charred and sooty surface will not hold rock.

Field engineers have been encouraged to study methods of improving the efficiency of the burner operations, but cautioned against conducting experiments on their own. Many of the experiments proposed have been tried before and there is a serious hazard potential in the operation under the best of circumstances.

When experiments are conducted records are kept, the results analyzed, and when successful are incorporated into future burner operations in all areas of the state. One district engineer suggested adding narrow side plates to the boot, to be attached with chain links to ride upon the pavement and to keep the flames from coming under the sides of the boot. This eliminated the large scallops in burn design formerly left in the pavement. The plates also further protected passing traffic. This suggestion was cleared through the Salem office, was tried with great success and is now being used on all five burners.

At the present time we have five burners in operation, and have our operation costs down to \$230 per mile of two-lane pavement on a state-wide average. A total of 233.34 miles have been burned as of Feb. 20, 1959.



**PROJECT PAYDIRT\*** pays off for V. R. Dennis Construction Co., San Diego, Calif.

## "Our new DW20's power and easy loading give more yardage"



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#### NEW DW20 Series G Tractor

New HP—345 (maximum)—increased 8%  
New Rimpull—39,565 lb. (maximum)—increased 12%  
New Speeds—increased rimpull—provides up to 20%  
faster travel speeds under normal haul road  
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New HP—345 (maximum)—increased 8%  
New Rimpull—49,100 lb. (maximum)—increased 12%  
New Speeds—increased rimpull—provides up to 20%  
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#### NEW No. 482

New Capacity—24 cu. yd. (struck rating)  
34 cu. yd. (heaped rating)

#### NEW No. 456

Series B  
LOWBOWL Scraper

New Capacity—19.5 cu. yd. (struck rating)  
27 cu. yd. (heaped rating)

#### NEW No. 470

Series B Scraper

New Capacity—19.5 cu. yd. (struck rating)  
27 cu. yd. (heaped rating)

Faster cycles, greater production, more profit... you get all three with the new Cat DW20... plus Caterpillar reliability.

Dennis Construction Co. uses three new DW20s, Series G, with No. 482 LOWBOWL Scrapers to stockpile sand for a concrete and asphalt batch plant. Speed, power and ease of loading are big factors in increased production. The DW20s carry an average of 32 cu. yd. of sand over a 1½-mile round trip in 7½ minutes. This includes loading and unloading.

Dennis bought Cat equipment because it met their requirements in the past. "Long life and durability are big features we find in all Cat equipment. Dealer service has always been tops," says superintendent Pete McFarland.

Both the DW20 four-wheel tractor and two-wheel DW21 have been given major improvements. Additional new features in the tractors include stronger final drive gears, and a new turbocharger. The 345 HP Cat Diesel Engine in each tractor produces torque rise unequaled in the earthmoving

industry. Scrapers have stronger bowls, push frames and aprons.

These modern, heavy-duty rigs enable you to move more dirt at the lowest cost per yard. Get complete facts on the new DW20, DW21 and other new Caterpillar machines all powered-up by Project Paydirt. Call your Caterpillar Dealer today. Set the time and place for a demonstration.

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# ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

**SURVEYORS UNSUNG HEROES**—Before construction can move ahead in Alaska, in most cases, surveys must be carried out. In the North, surveying is a tough job. Arctic winter can be a deadly foe. The U. S. Army Engineer District, Alaska, tells of survey crews who have survived plane crashes, dodged angered grizzlies, ridden stormy seas and patiently waited-out blizzards and temperatures of 70 deg. below zero. Reuben Hack, 67-year-old surveyor, had one of the most difficult assignments back in 1954. His job was to spot elevations along the course of the Yukon River which flows more than a thousand miles through Alaska. In order to get the job done on time, Hack did his elevation-taking while riding in a light plane skimming the surface of the river. Hack said he thought this method of surveying was perfectly safe but admitted later he didn't know much about the hazards of flying at the time. The Engineer District's photographer, Jim Balog, who went along, didn't think it was so safe and frankly told Hack so. Pilot John McCormack finally convinced Hack that it wasn't such a good idea.

**WINS CLEAR BID**—A Bellingham, Wash. firm was the first to get the low bid on major construction at the Air Force installations at Clear. The firm, Baker and Ford, bid \$836,475 to make it low at the opening of bids for construction of surveillance radar antenna foundations. Interest in the project was reflected by the fact that there were 15 bidders—all of whom were below the government estimate of \$2,168,840. So far, there has been no contract award for this phase of the work.

**BURSTING AT THE SEAMS**—The influx of construction workers combined with the expected "banner year" for tourists will have both major Alaskan cities—Anchorage and Fairbanks—"bursting at the seams," according to Alaska Visitors Association estimates.

Anchorage, for example, is in for "four kinds of trouble" according to the editor of the Anchorage Times, who says he believes that "tents will have to be used." He

brought out these other points: Anchorage will have a banner year in transient or seasonal workers in connection with the construction industry; Anchorage will have a banner year on permanent families coming there to live, and Anchorage will have a banner year on transient or seasonal families seeking living quarters for the summer and fall. More construction—of both housing and hotels—is seen as the answer to Alaska's critical housing shortage, which at this juncture shows no indications of getting less critical.

**OVER THE HIGHWAY**—Travel over the Alaska Highway already is accelerating, indicating that Alaska's annual construction job rush is beginning. Information from the customs station at Tok Junction on the Alaska-Canada border reveals that in January there were 533 vehicles traveling to Alaska carrying 1,365 passengers. This compares with 350 vehicles and 848 persons passing through the border check station in January of 1958. As the weather improves, these figures are expected to go much higher—but there is no way now of estimating what the totals will be for the peak months of June, July and August. With hotel, motel and apartment facilities certain to be overcrowded, the lesson is clear for the incoming construction worker: get a trailer. R. A. (Dutch) Derr, director of the Alaska Visitors Association, says: "At least the trailer owners will have some place to sleep." Derr said one group of trailer owners told him it plans to send 40 trailers in a caravan to Alaska this summer.

**VANISHING NICKNAMES**—In the early days of Alaska's construction industry, it was virtually certain that just about every worker and every supervisory official ended up with a nickname. The practice seems to be dying out, but there are still a few nicknames. Names like "Squarehold Ohmer" and "Pelican Charlie" are a thing of the past just as are such names as "Pack Sack French" and "Midnight Eddy." However, still surviving are actual names like "Flat Roller Bill," who got his name as a result of his job—operating a flat

roller crane. Another is "Long Boom Snyder," so called because he operates a piece of heavy equipment with a long boom. One Anchorage construction stiff is named "Self-Supporting Jack." We'll leave you to figure that one out.

**SMALLER A-BLAST**—Discussion of the nuclear excavation which was planned at Cape Thompson is taking a new turn. Original plans were to blast out a large harbor installation northwest of Kotzebue on the Arctic Ocean. Atomic scientists have looked the plan over, however, and have come up with the decision that the original large project is not warranted. A new, scaled-down project, which would provide a much smaller harbor and yet provide much of the information scientists hope to get from such tests, now is in the cards. We will keep readers of this column informed of all developments on this project.

**CONTRACT TALKS**—As this is written, the negotiations between the Associated General Contractors and Alaskan unions on the subject of 1959 contracts still are at a stalemate. The stalemate was caused by a demand on the part of the unions for a hiring clause which states that all hiring must be done through union halls. A contractors' spokesman said the hiring of workers has been a historical management prerogative and if the contractors were to relinquish such a right, the question of legality would come to the front. The deadlock on the issue was so tight that legislators in Juneau took action on it. A resolution calling for resumption of negotiations was introduced in the state house of representatives. The resolution, introduced by Rep. Richard Greuel (D-Fairbanks), called for action to implement "Alaskan workers for Alaskan jobs."

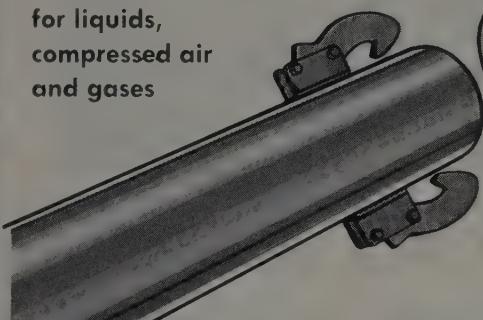
**FLOOD OF LETTERS**—Joe Nistler, manager of the Employment Security Commission's Fairbanks employment office, says he's being flooded by an increasing number of inquiries from construction men who wish to seek employment on Alaskan construction jobs. "We try to discourage as many as possible of these individuals," Nistler told me. "We do not feel sure there will be enough construction jobs to go around once the 1959 season gets under way. Still, from past experience, we know that a good percentage of the men making these inquiries will come to Alaska anyway. It creates a problem for us—

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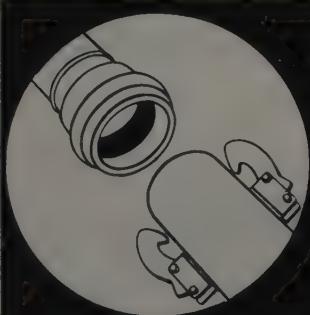
Entirely new concept in industrial transport lines for  
air, water, petroleum or chemicals. This fast, positive  
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Recommended maximum working pressure for 2" through 4" diameter QUICK PIPE is 300 P.S.I. Recommended maximum working pressures for lines over 4" in diameter is 200 P.S.I. These pressures allow for a 3-to-1 safety factor.



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allows for flexibility of pipeline  
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**SAVE up to 90%**  
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WESTERN CONSTRUCTION—April 1959

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and certainly one for Alaska's welfare agencies." Almost a thousand letters were received by the employment office in the past month.

**MODEL TOWN PLANNED**—An entirely new town is planned at Frobisher Bay in the Northwest Territories province of Canada. Architects and engineers have been appointed to plan the new community which will be "started from scratch" and have everything required for a normal town of 1,500 including housing, schools, recreational facilities, hospital facilities, stores, administrative offices, churches and hotel accommodations. Frobisher Bay is the main administrative center for the Canadian government in the Eastern Arctic.

**BIG PORT JOB**—Anchorage's \$8,000,000 port project is moving ahead on schedule with the completion date set for August 19, 1960. DeLong Corp. of New York is the prime contractor on the project, which will give the largest city in Alaska a modern port facility on Cook Inlet. Approximately 125 men will be employed on the work this summer for pile driving, form placing and concreting, according to Jim Gilshian, project manager for DeLong. Pile driving subcontractor is M. B. Gilbrough of Seattle. Ramstad Construction Co. of Anchorage holds a contract for about \$400,000 in work to put in a half-mile approach road connecting the dock with the downtown area and using two trestles. Pioneer Electric Co. of Anchorage has a \$100,000 electrical contract, with Kaiser Steel Co. furnishing the piles. The dredging contract has been awarded to Manson-Osberg of Seattle and this work will be done this summer.

## Steel contracts awarded for Clear AFB

TWO CONTRACTS for supplying structural steel for construction at the Clear Air Force Station in Alaska were awarded to Isaacson Iron Works, of Seattle, Wash. Awards were made by the U. S. Army Engineer District, Alaska, for the U. S. Air Force. A \$450,450 contract was awarded for the fabrication and delivery of an estimated 3,900,000 lb. of fabricated steel; a \$271,406 contract was given for the fabrication and delivery of an estimated 1,480,000 lb. of steel.

## Wanapum Dam bids asked

A FORMAL CALL for bids for construction of Wanapum Dam was issued last month by the Public Utility District of Grant County, Washington. Pre-bidding information was made available by Harza Engineering Co., consulting engineers, Chicago. Bids will probably be opened in May, with construction to start in September.

Wanapum Dam site is on the Columbia River, 18 mi. upstream from Priest Rapids Dam, now under construction by the District. Wanapum Dam will be a modified "Z" shaped structure, with the east earth embankment built straight across the existing channel; the powerhouse built parallel to the existing river, with the spillway section and west earth embankment connecting to the west abutment.

The dam will consist of 5,400 ft. of earth embankment, 360 ft. of concrete gravity section, 820 ft. of deep-gated concrete spillway and 1,540 ft. of powerhouse with integral intake and 200 ft. of left bank fish facilities, for a total length of 8,320 ft. The dam is designed to develop a head of approximately 80 ft. and the maximum height from deepest excavation to the roadway will be about 185 ft.

The spillway section will be a concrete structure with ogee crest and apron type energy dissipation. It will have 12 Tainter gates, 50 ft. wide by 65 ft. high, between concrete piers and will carry a bridge with 12-ft. roadway. The fully enclosed powerhouse will contain ten generators. The intake structures for six future units will also be constructed. The generators will be 83,125 kw. units driven by 120,000-hp. Kaplan type turbines.

Major quantities involved in the construction are 11,000,000 cu. yd. of excavation; 5,000,000 cu. yd. of embankment; 1,000,000 cu. yd. of concrete and 66,000,000 lb. of reinforcing steel.

The fish handling facilities include a fish ladder adjacent to the right end of the spillway, a powerhouse collection system, and a fish ladder and pumphouse adjacent to the left end of the powerhouse.

Construction will be accomplished under a fixed unit price and lump sum contract, and will include construction of the dam, power plant and appurtenances and installation of all major equipment such as turbines, generators, intake gates and other equipment necessary for the project.

... for more details, circle No. 39

# HAWAII Report

By ALAN GOODFADER, Honolulu

**HAPPY DAYS** — Economists still are predicting bigger and better things for Hawaii's construction industry as they assess the Territory's economy. The Bank of Hawaii says construction will join tourism and retail sales in climbing to new records in the first quarter of this year, now that a union-company hassle over a pineapple industry contract has been settled. The bank noted that bid openings and building permits last year totaled \$189,896,000, compared to \$154,872,000 in 1957. And, the bank said, there was a "substantial" carry-over of construction into 1959. The Territorial Tax Office estimated that \$170,000,000 worth of construction was completed during 1958. On the Territorial economy as a whole, the bank noted that December retail sales rose well over the previous year's to an estimated \$54,000,000 and employment that month was higher than on the Mainland. December unemployment was 3% on Oahu and 3.2% for the Territory as a whole, compared to 6.1% for the Mainland. The Territory's mainstay tourist industry continues to grow out of its clothes, with hotels reporting during the third week of February that they had to turn away guests. This is going to mean new construction here, as the coming of jet aircraft later this year is expected to boost tourist travel to Hawaii.

**EXTRA DIVIDEND** — An upcoming Federal-Territorial land deal apparently is going to bring an estimated \$8,500,000 to \$10,000,000 worth of work for local contracting firms. Governor William Quinn has announced the Army will turn over to the Territory 20 acres of land which is now part of its Ft. DeRussy in high-priced Waikiki. The construction angle is this: The Territory would get the land, construct street lights, sewers and other improvements, then auction off the land for an expected \$8,500,000 to \$10,000,000. Then the money would be used by the Army for new construction on the remaining 52.8 ac. of Ft. DeRussy. First project would be a beach reconstruction job at the fort which would cost millions. New transient housing facilities would come next. The Army is thinking about eight or nine-story hotel construction that would meas-

ure up to the luxury hotels in the area. Then a service club, chapel, and theater would be built, followed by other building as long as the money holds out.

**JETS AWAY** — Hawaii's long-delayed \$24,000,000 jet aircraft facility construction at Honolulu International Airport finally has begun to approach the reality stage with ground breaking ceremonies that opened the first part of the project. The first phase, to be done by the Hood Construction Co., is \$1,079,150 worth of site construction. Next will be construction of part of a new terminal. This will be followed by paving and finishing of the site. Then completion of the \$6,000,000 terminal is scheduled by the spring of 1961.

**BIG IDEAS** — The Territory's first proposed six-year public works program calls for spending \$205,000,000, of which \$122,000,000 would be budgeted for the two years starting in July. The details undoubtedly will be changed by the presently sitting Territorial Legislature, but this is part of what the administration proposes: \$9,600,000 worth of water resource development; \$7,800,000 worth of land development, mostly on Oahu; \$4,300,000 in locally financed road construction; \$2,500,000 to set up a Territorial parks system; \$2,300,000 worth of Neighbor Island school construction; \$21,100,000 worth of harbor development; \$10,000,000 for a new Territorial (or state) capitol, and a host of other projects.

**NEW DEPUTY** — One of the men who'll have a lot to say about public works spending here will be Sam O. Hirota, new Territorial assistant superintendent of public works. He was appointed by Tim Ho, new superintendent. Smiling Sam, formerly the quietly capable head of the Honolulu Bureau of Plans major projects section, replaced Melvin E. Lepine, who has returned to his former job as advance highway planning engineer for the Territory. Sam is a local product, born in Oahu in 1912 and graduated from the University of Hawaii with a degree in civil engineering. He previously had worked for the Territory and a private contractor as

well as for the City-County of Honolulu.

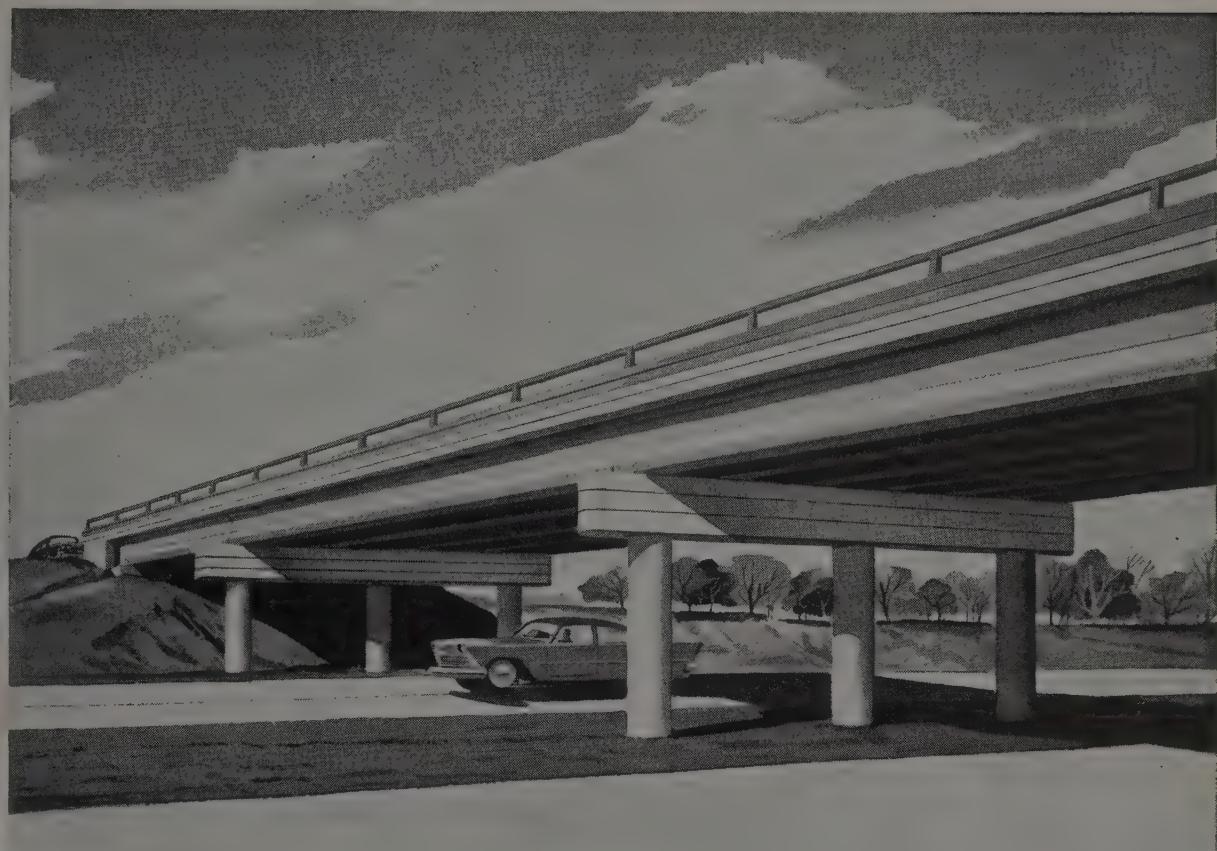
**PAY BOOSTS GIVEN** — Hourly employees of members of the General Contractors Association of Hawaii have received a 10-cents-an-hour pay increase recommended by the association's labor and industrial committee. The raise sets the following hourly pay rates: common laborer, \$1.95; construction laborer, \$2.15; cement finisher, \$2.85; carpenter, \$2.85, and operators of cranes and shovels with capacity of 1 yd. or more, \$3.15.

**CONTRACTORS INSTALL** — About 450 members and guests of the General Contractors Association attended recent installation ceremonies here that seated Albert C. Chock of A. C. Chock, Ltd., as the association's new president. He replaced A. A. Craswell of Hawaiian Dredging & Construction Co., Ltd. Other new officers are: Frank Rothwell of South Pacific Contracting Co., Ltd., first vice president; Marvin G. Elton of Nordic Construction Co., second vice president, and Clark J. Hastert of E. E. Black, Ltd., treasurer.

**WORK IN PROGRESS** — Among larger construction jobs started recently are: Black Raber-Kief & Associates, \$579,000 contract for 1,050 units of Air Force housing on Guam; Paul Morihara, \$152,426 contract for additions and alterations to the Kailua Super Market on Oahu; Richard Hidano, \$115,000 contract to construct a new restaurant; S. Kitajima, \$160,000 new official residence for the Japanese consul general here; Samson & Smock, Ltd., \$41,952 contract to drill four 16-in. wells at Ewa, Oahu, for the Honolulu Board of Water Supply.

**BUSINESS SHIFTS** — Charles W. Vincent, former general manager of Clarke-Halawa Rock Co., Transit Mix, and Construction Service Co., has formed his own contracting firm, C. W. Vincent, Inc. Timothy D. Smythe, former Construction Service assistant manager, is vice president of the firm. . . C. Robert Clarke is slated to become vice president of a new Hawaiian division of Pacific Cement & Aggregate, which is buying out Clarke-Halawa, Construction Service and Transit Mix. . . Murray-Saunders Co., which bought Western Rock last year from C. T. Loo, is dissolving. Other Saunders combines here will not be affected.

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*Beverly Road test bridge. Tests proved value of prestressed concrete for economical highway bridges.*

*... for more details, circle No. 40 on Reader Service Postcard*

## PCA opens Phoenix district office

THE PORTLAND Cement Association announces opening of a new district office in Phoenix, Ariz., with George M. Petzar, formerly of the Los Angeles Office, as district engineer. Located initially at 213 North First Ave., the new office



George M.  
Petzar

will permit better service to cement users in the State of Arizona, which has been served from the Los Angeles district office.

Establishment of the Phoenix district office marks the third major expansion this year of the association's field activities in its Western region. On Jan. 1, following support provided by Ideal Cement Co., field services were extended to Oregon, and on the same date a San Francisco office was established to inaugurate activities in northern California, and northern Nevada. Other association offices in its Western region are located in Los Angeles, Seattle and Vancouver, B.C.

George M. Petzar, the new Phoenix district engineer, is a civil engineering graduate of the California Institute of Technology. He joined the PCA in 1954 as a general field engineer, working in concrete and soil-cement paving, conservation and other fields of cement use. Since 1956, he has specialized in technical service in the field of housing. Before joining the association, he had been a structural designer for C. F. Braun & Co., and an assistant plant engineer for American Smelting and Refining Co. From 1942 to 1945, he served as a pilot in the U. S. Navy Air Corps. Petzar is a member of the American Society of Civil Engineers, the American Concrete Institute and is a registered professional engineer in Utah and California.

Gene R. Morris, general field engineer in the Tucson area, will continue in that capacity. Morris is a

civil engineering graduate of the University of Arizona and a registered professional engineer in Arizona. Before joining PCA, he worked for the Arizona State Highway Department. A second field engineer will be added to the Phoenix office staff.

The Portland Cement Association now has six regional and 33 district offices throughout the United States and in British Columbia, Canada. It is a principal source of information and technical service to cement users, and conducts extensive scientific research and development aimed at improving and extending uses of cement and concrete. The broad program of the association is made possible by the voluntary financial support of its more than 70 members which manufacture a very large proportion of all portland cement used in the United States and Canada.

## Contract slated for Stanaker Dam

STANAKER DAM is the first feature of the Vernal Unit to be built by the Bureau of Reclamation. Bids for construction of the dam were opened April 1 at the Uintah County Courthouse in Vernal. Construction of Stanaker Dam will be well under way this summer. About two years will be required to build the dam.

Alton H. Peterson has been appointed construction engineer for the Vernal Unit of the Central Utah Project with offices located in Vernal, according to Regional Director E. O. Larson.

The newly established Vernal Field Division office is under the administrative supervision of the Spanish Fork Projects Office, but on technical matters reports to the Assistant Commissioner and Chief Engineer in Denver. Peterson has recently served as resident engineer in charge of the construction of Wanship Dam, and related facilities on the Weber Basin Project.

## Giant pipe cast for largest undersea line

CONCRETE PIPE 24 ft. long, 14 ft. in diameter, and weighing 85 tons, is being cast by United Concrete Pipe Corp. for the Los Angeles Hyperion Treatment Plant's ocean effluent outfall now under construction. More than 6 mi. of pipe will be laid in the Pacific Ocean in depths up to 200 ft., straight out to sea near El Segundo, Calif. It will be the longest under-

ocean pipeline of such large diameter ever installed.

United will use approximately 109,000 tons of cement and aggregate and enough heavy steel reinforcement rod to stretch from New York to the Rocky Mountains, to manufacture the pipe at its Baldwin Park and Long Beach, Calif. plants.

Pipe walls are 10 in., 12 in., or 15 in. thick, depending upon the location in the line. United Concrete Pipe is manufacturing the pipe in 12, 14, and 24-ft. lengths, with all but 3,500 ft. in 24-ft. lengths. All of the pipe will be 144-in. inside diameter except near the end of the line where it will divide into two legs, each approximately one-half mile long, made up of 72 and 102-in. diameter. The pipe has concrete joints with rubber gaskets.

The pipeline was designed by Hyperion Engineers, a joint venture of Daniel, Mann, Johnson & Mendenhall; Holmes & Narver, Inc.; and Koebig & Koebig. Hyperion Constructors, a joint venture of DeLong Corp.; Healy Tibbitts Construction Co.; Macco Corp.; Peter Kiewit Sons' Co.; Raymond International; and Tavares Construction Co. are installing the pipe.





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#### LITTLE TIRES HELP MOVE THE BIG ONES

The "shorties" on this Mobilift do their share in moving this 2700x33, 30-ply tubeless in the B. F. Goodrich warehouse for the Pacific Northwest in Portland. The big tire goes into storage to wait its turn for service on a piece of heavy equipment.

#### Monterey breakwater extension approved

THE Board of Engineers for Rivers and Harbors has approved the views and recommendations of the reporting officers on the existing project for Monterey Harbor, Calif., to provide for extension of the existing breakwater and construction of an L-shaped companion breakwater to form an inclosed harbor. The existing breakwater is to be extended 1,600 ft. along its present seaward axis, the companion breakwater to extend seaward approximately normal to the shore at a point about 2,700 ft. east of Municipal Wharf No. 2 for about 1,750 ft., thence 400 ft. northwesterly along the same axis as the 1,600-ft. extension. This will leave a navigation entrance between the breakwaters 400 ft. wide; all generally in accordance with the plans of the district engineer and with such modifications as may be advisable; at an estimated total cost of \$5,866,000 for breakwater construction work and \$30,000 annually for maintenance in addition to that now required; provided that, prior to construction, local interests agree to: (a) contribute in cash 32% of the cost of construction; (b) provide without cost to the United States, all lands, easements, and rights-of-way for construction and subsequent maintenance of the project.

#### Pelton low bidder on Oregon turbines

PELTON, Division of Baldwin-Lima-Hamilton Corp. was low of four bidders with an offer of \$388,482 to the Portland District, Corps of Engineers, for furnishing two 21,000-hp. hydraulic turbines for the Hills Creek Dam powerhouse on the Middle Fork Willamette River. Other bidders were: The James Leffel Co., Springfield, Ohio, \$437,151; Allis-Chalmers, York, Pa., \$501,125; Newport News Shipbuilding & Drydock Co., Newport News, Va., \$674,435.

The invitation called for design, manufacture, test and delivery of the turbines at Oakridge, Ore. They are to be complete with draft tube liners, pit liners, pier nosings and appurtenant parts. Delivery must be made by Nov. 1, 1960. Each of the two generating units will have an installed capacity of 30,000 kw.

Hills Creek Dam and Reservoir, a \$40,000,000 project, is one of the units of the multiple-purpose development ultimately planned for the Middle Fork Basin. The ultimate plan includes three power generating units totaling 120,000 kw. at Lookout Point Dam, a flood control reservoir on Fall Creek; a storage reservoir and power plant on the Middle Fork at Hills Creek; and a re-regulating dam with power facilities at Dexter site about 3 mi. below Lookout Point Dam.

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# Edison Outlay tops \$250,000,000

THE Southern California Edison Co. will have expenditures for construction and plant expansion during the two years (1958-59) exceeding \$250,000,000, according to an announcement by Harold Quinton, chairman of the board. Edison spent \$150,000,000 in new generating facilities, substations, offices, transmission and distribution pow-

er lines in 1958, and the amount budgeted for continuing the company's record expansion program this year is about \$107,000,000.

An estimated 4,800,000 people lived in Edison's service territory at the end of 1958. According to latest estimates available the population of the area served will increase to 5,000,000 in 1960 and to

7,500,000 by 1975.

Two new generating units with a combined capacity of 435,000 kw. were completed and placed in operation at the new Huntington Beach Steam Station last year. Application has been made to start a fourth and final unit there. Huntington Beach Steam Station now represents an investment of \$58,000,000, and addition of the third and fourth units will bring the cost to about \$110,000,000.

Initial testing and breaking-in is now under way on the first 220,000-kw. generating unit at Mandalay Steam Station, near Oxnard.

Construction started in January of last year on the Mammoth Pool Project, a major addition to the company's famed Big Creek-San Joaquin River hydroelectric development in the High Sierra, northeast of Fresno. This project will consist of a large earth-fill dam and reservoir capable of storing 123,000 ac. ft. of San Joaquin River water, a 20-ft. diameter, 8-mi. tunnel and a powerhouse equipped with two generating units of 75,000-kw. capacity each. Mammoth Pool will cost about \$50,000,000, bringing the total Edison investment in its Big Creek network of dams and powerhouses to more than \$200,000,000.

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## Puyallup plans street work

THE CITY of Puyallup, Wash., will undertake a street construction program of about \$420,000 this summer, according to a resolution of intention passed by the city council last month.

## Cut heat damage in concreting

THE AMERICAN Concrete Institute adopted as a Standard, a recommended practice for hot weather concreting at its 55th annual convention in Los Angeles. The proposed standard now goes to the Institute membership for ratification by letter ballot. The Standard provides information useful in minimizing detrimental effects of hot weather on concrete. Means are described for reducing concrete temperature by proper attention to ingredients; methods of production and delivery; and care in placement, protection, and curing. Information is given on the use of admixtures to reduce mixing water requirements and to retard setting. Emphasis is given to the importance of careful attention to the use of standard procedures in testing concrete made in hot weather.

Problems of concreting in hot weather have been increased in recent years by a number of factors, including more finely ground and more rapidly hardening cements, handling of larger batches of con-

crete, use of thinner sections, and increased speeds in all construction operations.

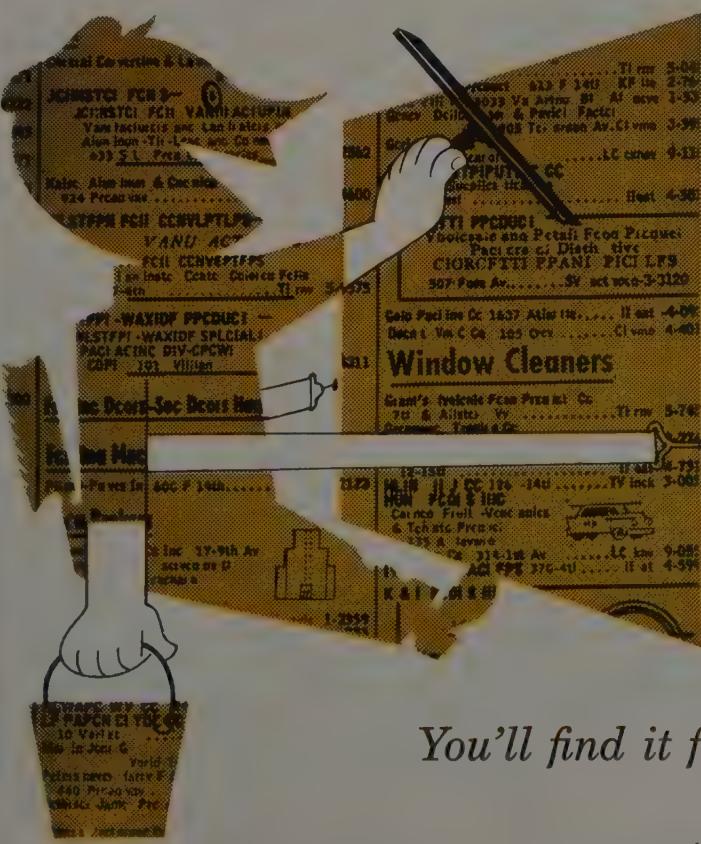
The harmful effects of hot weather on concrete may be minimized by a number of practical procedures. One or more of the ingredients may be cooled to keep the temperature of the concrete from being excessive at time of placement. Cement content, because of heat of hydration, should be maintained at the minimum permitted by the work. Forms and reinforcing steel may be protected from direct rays of the sun and cooled by sprinkling. Suitable attention to scheduling of delivery and placement to avoid excessive mixing or delays contributing to stiffening will be beneficial.

The most direct approach to keeping concrete temperature down is by controlling the temperature of its ingredients. In warm weather, the actual temperature is likely to be slightly higher than the calculated temperature because the computations do not take into account

heat of wetting and hydration of cement, nor that generated by the mechanical work of mixing.

Pound for pound, the mixing water has the greatest effect of any of the ingredients on temperature of concrete, since it has a specific heat about  $4\frac{1}{2}$  to 5 times that of cement or aggregate. Under certain circumstances, reduction in water temperature may be most economically accomplished by mechanical refrigeration or mixing with crushed ice. Use of ice as a part of the mixing water is highly effective in reducing concrete temperature since, on melting alone, it takes up heat at the rate of 144 Btu. per lb. To take advantage of the heat of fusion, the ice must be incorporated directly into the concrete as a part of the mixing water. Conditions must be such that the ice is completely melted by the time mixing is completed.

Other elements of importance in controlling temperatures of concrete involve cooling of cement, use of admixtures to retard hardening, production and delivery, placement and finishing, protection and curing, and temperature records.



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## Dredge remodels Colorado River

THE Bureau of Reclamation's hydraulic cutter dredge—working its way up the Colorado River from Needles, Calif., to the Big Bend area below Davis Dam—is nearing the site of old Fort Mohave. W. H. Taylor, Director of Reclamation's Region 3, reports that the dredge, appropriately named The Colorado, will cut a new channel past ruins of the old army fort which lie on an Arizona bluff overlooking the river. The fort was established in 1855 and abandoned as a military post in 1884.

The dredge, now operating about 16 mi. by river below Davis Dam and 14 mi. above Needles, is

cutting a 400-ft. new channel through the badly aggraded and meandering sections of the river. It will dredge to the Big Bend area 11 mi. below Davis Dam and from that point Reclamation crews will build bankline structures to within 8 mi. of the dam. The new channel through the Big Bend area has been redesigned to protect river bank property and permit its maximum use by local land owners and at the same time provide a stable river.

Channelization of the river above and below Needles, initiated early in 1949, will be completed in mid-1960. The river is now flowing



The Colorado River snakes its way southward through a new man-made channel below Davis Dam. This aerial photograph shows the Bureau of Reclamation's dredge "The Colorado" cutting a 400-ft. new channel through the meandering sections of the Colorado River downstream from Fort Mohave.

through the new channel section between Needles and Topock, completed in 1953, and through the new sections between Needles and the dredge. A small dredge and other equipment will be kept in the Big Bend to Topock stretch of the river to maintain the new channel sections until the Colorado stabilizes itself.

When the big dredge completes its work, some 31 mi. of new channel between Topock and Big Bend will have been cut. During calendar year 1958, the machine completed 3 mi. of new channel and sucked out 4,000,000 cu. yd. of river bed material.

"The newly dredged sections confine the Colorado River to a well-defined channel and prevent the unlimited movement of sediment from the upper reaches of the valley where the river has meandered over the alluvial valley," Taylor said. "The Needles to Topock dredging has been successful in lowering the water surface elevation of the Colorado River below Needles which had been menacing the town and the main line tracks of the Santa Fe Railway."

When this project is completed next year, it will provide a stabilized channel the full reach of the Mohave Valley. Incidental benefits resulting from the project will include flood protection of water previously lost in evaporation and transpiration from the shallow, overly wide river.

## Columbia Gorge road gets freeway look

INTERSTATE Highway 30 between Portland and The Dalles is rapidly taking on the freeway look. About 38 mi. of the water-level route are under construction by eleven firms as part of the program designed to convert the famous Columbia Gorge Highway to a four-lane freeway, according to a report by W. C. Williams, State Highway Engineer.

Present construction is being carried out under eleven separate contracts with an additional nine contracts to be let by summer of this year.

Twin 12-ft. traffic lanes bordered by 10-ft. outside paved shoulders are being constructed alongside the existing highway. When construction is completed, westbound traffic will be carried on the two lanes nearest the river; and eastbound traffic on the other two lanes.

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Penstocks for Mountain Home—CB&I built three, 22-ft. diam. penstocks for the Idaho Power Co.



Wye at Blakely Mountain Dam connects CB&I built power conduit, two penstocks and 149-foot high surge tank.



Six Surge tanks at Garrison Dam were fabricated and erected by CB&I to help control turbulence of the "Mighty Missouri" River. They are 65 ft. in dia. by 135 ft. high.



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## Low bids and contract awards

### ALASKA

A low bid of \$8,682,451 submitted by B-E-C-K - McLaughlin and Associates of Seattle, has been accepted for construction work for the overall project for the U. S. Air Force at Shemya in the Aleutian Islands. The work includes communications and operations facility building, composite building, maintenance and installation engineers shop building. This includes rehabilitation of other buildings in area. Peter Kiewit Sons' Co. of Seattle, submitted a low bid of \$2,246,320 for construction of composite buildings and over-all work at Indian Mountain. Reed & Martin, Inc., of Fairbanks was the low bidder, \$2,192,715, for the reduced schedule at Indian Mountain. Raber & Kief, Inc., Seattle, was low bidder at \$1,591,395 for construction of composite buildings for the U. S. Air Force at Sparrevohn.

### ARIZONA

San Xavier Rock & Sand Co. of Tucson submitted a low bid of \$765,422 for construction of a divided highway and interchange structures on 1.1 mi. on S. R. 84 in Pima County. A low bid of \$745,855 was submitted by Copper State Construction Co. of Mesa, for 2.5 mi. of grading and surfacing on Cordes Junction-Flagstaff highway, south of Flagstaff in Coconino County. Western Constructors, Inc. of Phoenix, submitted a low bid of \$101,431 for 1 mi. of grading and surfacing on the Picacho-Florence highway in Pinal County. Paul & McGowan, Contractors, of Coto-paxi, Colo., submitted a low bid of \$121,145 for earthwork, pipelines and structures, South Gila Drain No. 2, Colorado River Front Levee System.

### CALIFORNIA

B. J. Ukropina, T. P. Polich, Steve Kral & John R. Ukropina, of San Gabriel, received a \$8,324,381 contract for grading and paving to construct 4.1 mi. of 8-lane freeway, 14 structures and extensive flood control facilities on the Golden State Freeway in Burbank and Los Angeles, Los Angeles County. A \$6,272,689 contract was received by Webb & White, R. B. Potashnick and W. J. Disteli, Los Angeles,

for grading and paving to construct 3.7 mi. of 6-lane freeway and 13 structures on the Long Beach Freeway, including interchange facilities, Los Angeles County. Guy F. Atkinson Co., South San Francisco, received a \$6,117,307 contract to construct 7.8 mi. of 4 and 6-lane freeway and 11 separation structures and related work on the San Diego Freeway, Route 101, in Orange County. R. E. Hazard Contracting Co. and W. F. Maxwell Co. of San Diego, submitted a low bid of \$4,559,652 for grading, paving, construction of 4 bridges and related work in city and county of San Diego. Granite Construction Co., Watsonville, submitted a low bid of \$2,410,766 for 4.9 mi. of grading, surfacing and construction of 4 bridges on U. S. 101, Redwood Highway, in Mendocino County. A \$2,323,296 contract was received by Fredericksen & Kasler of Sacramento for 3.4 mi. of grading and paving on 4-lane freeway and 4 structures in city and county of Riverside. E. L. Yeager Co. of Riverside received a \$1,043,306 contract for construction of 1.9 mi. of 4-lane expressway on U. S. Highway 70-79 east of Redlands, including frontage roads, ramps and one bridge in San Bernardino County. L. B. Wells Construction Co. of Visalia submitted a low bid of \$284,883 for 8.4 mi. of grading and surfacing in Tipton, Tulare County. Phil Calabrese Construction Co., Monterey, received a \$196,617 contract to construct and widen 2.2 mi. of U. S. Highway 101, 7 mi. north of Salinas and Strawberry Road in Monterey County.

### COLORADO

H. E. Lowdermilk Co. of Englewood submitted a low bid of \$1,297,661 for grading, structures and surfacing on State Highway 2 in Clear Creek County. A low bid of \$1,279,492 was submitted by Shore-Bailey Construction Co. of Littleton, for 5 mi. of grading, structures and concrete pavement east and west of Roggen in Weld County. James B. Kenney, Inc. of Denver, submitted a low bid of \$497,461 for 14.5 mi. of grading and surfacing north and south of Aguilar on S. H. 1 in Huerfano and Las Animas counties. Peter Kiewit Sons' Co. of Denver submitted a low bid of \$299,730 for 1.1 mi. of grading, surfacing, and structures on S. H.

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382 in Adams County. A low bid of \$271,336 was submitted by **Pioneer Construction Co.** of Pueblo for 3.4 mi. of grading, surfacing and structures on S. H. 392, west of Windsor in Weld and Larimer counties. **Brannan Sand & Gravel Co.**, Denver, submitted a low bid of \$226,954 for 1 mi. of grading, drainage, and surfacing on Colorado Boulevard in city and county of Denver. **Latimer Construction Co.**, Denver, submitted a low bid of \$143,517 for bridge widening and construction of culverts on Highway 121, Jefferson County.

## NEVADA

**Wells-Stewart Construction Co., Inc.** of Las Vegas received a \$240,473 contract for construction of a portion of the State Highway System, Route 3, west of Lida in Esmeralda County.

## NEW MEXICO

**J. W. Jones Construction Co.** of Albuquerque received two bids for roadwork in Dona Ana and McKinley counties: \$1,057,741 for 8.3 mi. of grading, surfacing and structures on U. S. Highway 70, east of Las Cruces to Organ in Dona Ana

County, and \$939,236 for 3.5 mi. of grading, surfacing and structures west of Thoreau-East and signing in McKinley County. An \$803,136 contract was received by **Broce Construction Co.** of Woodward, Okla. for grading, surfacing and structures on 10.4 mi. of U. S. 64-87, Greenville-Mt. Dora road in Union County. **Trotz Construction Co.** of Albuquerque received a \$186,744 contract for 3.9 mi. of grading, surfacing and structures on S. R. 112, Regina-North road in Sandoval and Rio Arriba counties. **Allison & Haney, Inc.** of Albuquerque received a \$89,972 contract for grading, surfacing and structure on S. R. 352 in Bernalillo County. **Allison & Haney, Inc.** of Albuquerque submitted three low bids for work in McKinley, Colfax and Bernalillo counties: \$2,318,235 for grading, surfacing and structures in Raton, McKinley County; \$941,925 for grading, surfacing and structures at Sandia Loop, Bernalillo County; and \$574,051 for grading, surfacing and structures on 2 mi. of streets in city of Raton, Colfax County. **Daniels Construction Co.** of Albuquerque submitted a low bid of \$180,148 for grading, surfacing and structures on U. S. 60, Ft. Sumner, Vaughn and vicin-

ity, DeBaca County. A low bid of \$185,679 was submitted by **James P. Johnson** of Santa Fe for grading, surfacing and structures near Buelveros in Union County. **Armstrong Construction Co.** of Roswell submitted a low bid of \$521,182 for grading, surfacing, structures and related work near Capitan in Lincoln County.

## OREGON

**George E. Berry**, Beaverton, submitted a low bid of \$135,754 for alterations and repairs at The Dalles Dam on the Columbia River.

## UTAH

**Gibbons & Reed Co.**, Salt Lake City, submitted a low bid of \$1,452,948 for 4.9 mi. of grading, surfacing, structures and related work on Highway 15, in Orem, Utah County.

## WASHINGTON

**Goodfellow Bros., Inc.**, of Wenatchee submitted a low bid of \$2,024,332 for Section III of the relocation of highway and railroad on the Chelan County shore of the reservoir to be created by Rocky Reach Dam in Chelan County. A \$366,151 contract was received by **S. S. Mullen, Inc.** of Seattle for construction of 4 bridges between Milton and Federal Way in King County. **Dorman Construction Co.**, Vancouver, received a \$807,943 contract for 6.4 mi. of grading and surfacing, Ritzville to Coker road in Adams County. A \$648,278 contract was received by **Cherf Brothers, Inc.** & **Sandkey Contractors, Inc.**, Ephrata, for 2.6 mi. of grading, surfacing and related work near Wheeler road in Grant County. **Woodworth & Co.**, Tacoma, received a \$828,439 contract for construction of overcrossing, city of Tacoma, Pierce County. **C. E. Oneal, Inc.** of Ellensburg received a \$695,627 contract for 3 mi. of grading, surfacing and structures, Satus Pass to Satus Creek in Klickitat County. **Erickson Paving Co.**, Bellevue, received a \$865,793 contract for 12.9 mi. of grading, surfacing and related work, Koren to Junction with P. S. H. 11 in Adams County. A \$1,838,402 contract was received by **MacRae Bros.**, Seattle, for bridge, north approach on Seattle Freeway, Lake Washington Ship Canal, King County. **N. A. Degerstrom Co.**, Spokane, received a \$440,411 contract for 11 mi. of grad-

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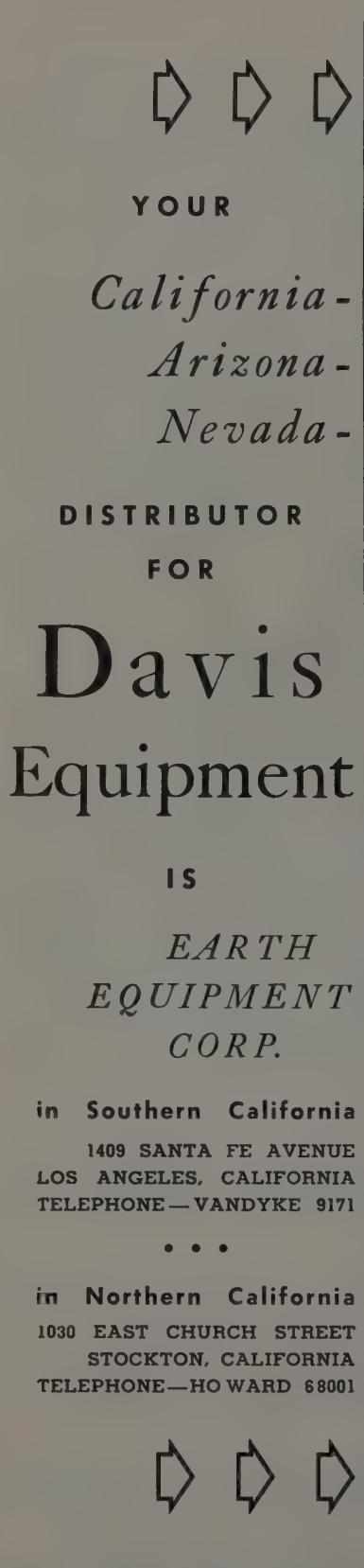
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ing, surfacing and structure from Franklin County line to Hedrick-Coleman road in Adams County. A low bid of \$478,811 was submitted by Otis Williams & Co., Kennewick, for earthwork and structures, Block 83, Royal Branch Canal Laterals, Columbia Basin Project.

## WYOMING

Read Construction Co., Cheyenne, submitted a low bid of \$1,281,063 for grading, surfacing and structures on 6.2 mi. of 4-lane highway, Rock Springs-Rawlins road in Carbon County. A low bid of \$1,103,753 was submitted by Rissler & McMurry Co., Casper, for 5.1 mi. of grading, surfacing and related work on the Wheatland- Glendo road in Platte County. Knisely-Moore Co., Douglas, received a \$463,017 contract for grading, structures and surfacing on 4.7 mi. of interstate highway southeast of

Buffalo-East in Johnson County. Husman Bros., Inc. of Sheridan received two contracts for work in Sheridan County: \$297,320 for bridge construction and miscellaneous work on 3.1 mi. of the Sheridan-Ranchester road near Monarch, and \$247,132 for construction of a grade separation structure and miscellaneous work on 4-lane divided highway on the Sheridan-Ranches- ter road. Roth Construction Co., Rapid City, South Dakota, received a \$320,000 contract for 3.6 mi. of grading and surfacing on the Buffalo-Gillette road in Campbell County. Lamb Construction Co., Lusk, received a \$277,550 contract for 6.8 mi. of grading and surfacing on the Torrington-Cheyenne road in Goshen County. A \$210,285 contract was received by Summit Construction Co., Rapid City, S. D. for grading, surfacing and miscellaneous work on 5.5 mi. of the Newcastle-Clarendon road in Weston County.

## Long Beach to flood shoreline oil field

HARBOR officials at Long Beach, Calif., have launched a crash program to stop the gradual subsidence that has continued for the past 18 years. M. A. Nishkian, head of M. A. Nishkian & Co., consulting engineers of Long Beach, has been named consulting engineer.

The \$60,000,000 program is under the direction of Sam Roberts, subsidence control and re-pressurization administrator for Long Beach Harbor.

Plans call for flooding the city's rich shoreline oil field with sea water which is expected to halt the area from further sinking. Money will be spent for a system of 259 water wells and a network of miles and miles of pipes leading through much of the 20-sq. mi. egg-shaped field. Currently the harbor has been sinking at the rate of 1 ft. a year at the center of the oil field. There are 37 water wells in operation now producing 200,000 bbl. of sea water a day from underground and being injected into a test field. Ultimate goal to completely stabilize the field and eliminate subsidence is estimated at 1,000,000 bbl. of water a day.

It's a critical program advanced in the light of a recent injunction by the Federal government demanding the oil field be shut down and the Navy's announced plan to abandon its \$175,000,000 shipyard

that lies in the heart of the subsidence area. Since Dec., 1936, when the first wells were sunk at Wilmington and Terminal Island, some 800,000,000 bbl. of oil have been pumped from this, the nation's second-richest oil field. It wasn't until 1941 that the roof of the oil field was discovered to be sinking, and then only slightly.

But the flat-arched, highly-faulted field differs from most. Instead of having thick layers of shale separating each successive oil pool as the earth is penetrated deeper, thin layers of shale, gravel and sand have been encountered.

There is nothing to support the overburden.

Present oil production is 80,000 bbl. a day from 2,930 wells owned by 121 operators.

The water is injected 2,000 to 5,750 ft. deep into layers of the ground from which oil is removed. The water is pumped, not directly from the ocean, but actually from depths of 200 to 300 ft. in the field. This water seeps in from the sea. It's naturally filtered by sand beds, water that's oxygen free, clear water matching perfectly water found in the oil pools deep in the ground.

It's a twofold program, for injected water not only stops subsidence, it also greatly increases oil recovery.

... for more details, circle No. 51

# NEW Hydra-Slide Positioning on the DAVIS 220 BACKHOE



## GETS READY TO FLUSH DIG IN LESS THAN 5 MINUTES

To slide the Davis 220 into any one of five digging positions, you simply loosen four cap screws, then move the mast assembly on the slide rail by actuating the boom cylinder. Seat moves so you're directly in line with your work.

## NEW ECONOMY DAVIS MODEL "99" LOADER

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## Keeps You in Line All the Time... WITH YOUR WORK

The Davis Backhoe — complimented by being copied by competition, and the **FIRST** machine ever to dig flush, has many new features that give you more profit-making advantages than with any other backhoe.

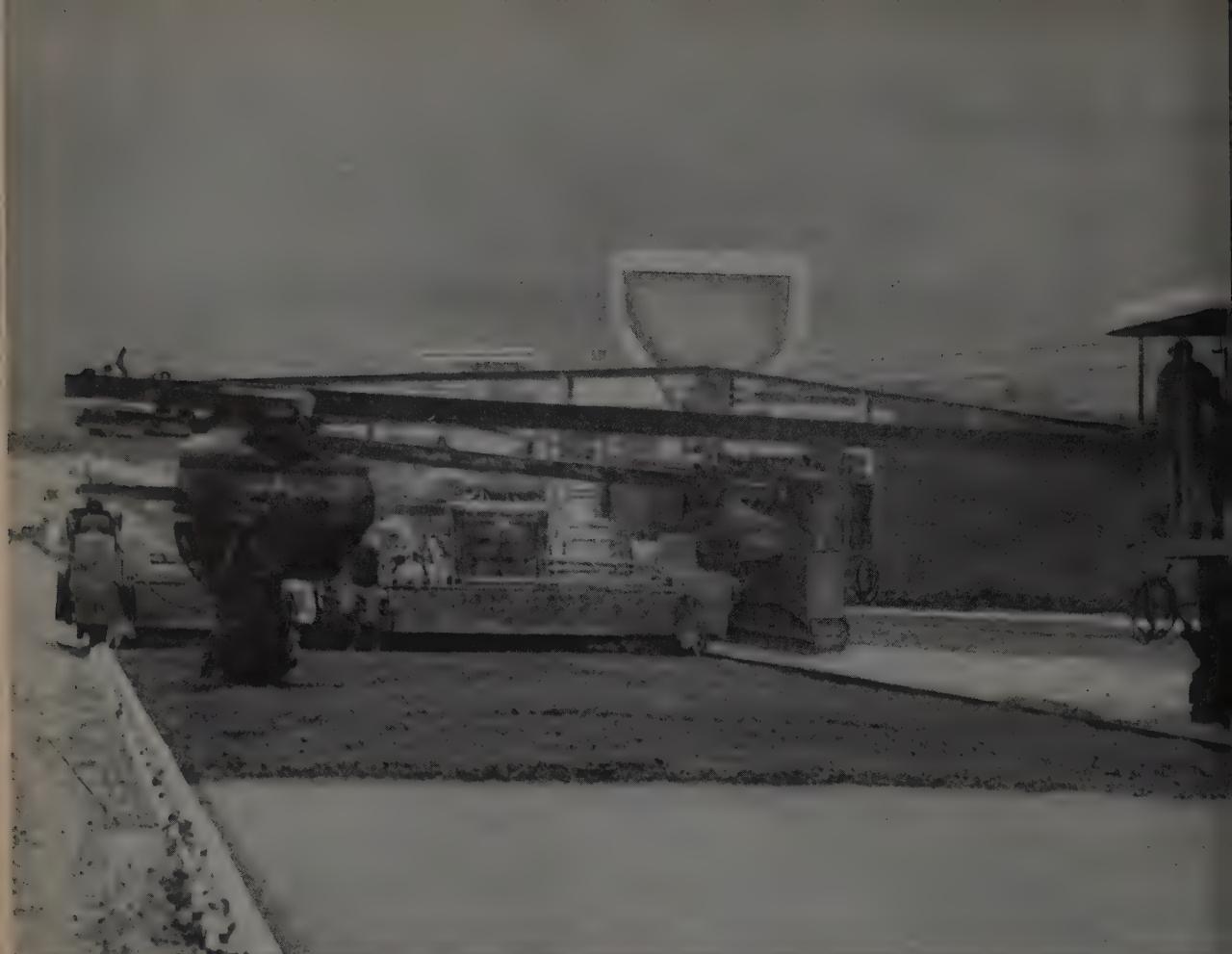
The new Davis 220 now has "Hydra-Slide" that lets you move the entire digging assembly to any one of five positions. The operator's seat moves right with it, too, so you sit directly in line with your work — instead of being offset from the trench. Since the seat revolves with the boom, you're always facing the bucket instead of "neck-stretching" to see what you're doing.

With 14,000 pounds breakaway, 2,150 psi, and larger bucket cylinder shaft, this new Davis 220 remains the fastest, most powerful backhoe on the market. Write today for name of dealer nearest you.

Fits Ford, International, Oliver, and Allis-Chalmers tractors when equipped with a Model 101 or 102 Davis Loader.

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## Record-holding Denton Construction Co. says: "Shooting for paving records"

An efficient batch plant...plus Macks to carry the mix, means that Denton's pavers are always supplied for capacity operation. Says Denton: "We shoot for high-speed productivity, through a balanced use of the most efficient equipment. For important, heavy-duty jobs like hauling dry mix—that meant Macks."

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**6,029 feet of 9" x 24" concrete slab in a single day**—a national record—was poured and paved last summer by Denton Construction Company in Michigan. Heading up the

impressive array of equipment during this remarkable feat is one of the 5 Mack B-42S and 11 B-421S dumpers that Denton used to keep the paving machines going full blast.

## better use Macks"

"Naturally," says Ed Denton, vice president of Denton Construction Company, Grosse Pointe Woods, Michigan, "Macks were part of the team when we made our record pour. But we didn't put Macks on merely to break records.

"Steady, flawless, high-speed paving on all jobs is our key to profits. This places a premium on an *uninterrupted* flow of dry mix to the pavers—our main reason for using Macks. But there are other advantages, too.

"Economy, for instance. Macks cost us less to own and operate. For one thing, their steady performance and perfect availability have allowed us to get along with fewer batch trucks—a big saving. And Macks stay in top condition for years with only routine attention again we save money."

In short—Denton finds that Macks have what it takes in work capacity, in performance, and in economy. So whether you're going after paving records, or whether you're anxious to improve your general profit picture,

Macks will give you the best kind of start. Want definite proof? Ask your Mack branch or distributor for the names of local Mack users. Mack Trucks, Inc., Los Angeles, Denver, San Francisco, Seattle, Portland, Salt Lake City, Albuquerque.



**A minimum number of Macks is needed** to handle a big job... even when Denton is operating full speed ahead. According to Denton, "Two Macks, properly used, can outwork three other-make trucks of equal rating during the course of a season's operation."

# ENGINEERS and CONTRACTORS



**COL. W. C. GRIBBLE, JR.**, Alaska District Engineer, (center, front row) is shown with resident engineers of eight new resident offices being established by the U. S. Army Engineer District, to supervise defense and civil works construction throughout Alaska. The new offices are: Anchorage, Fairbanks, Juneau, Nome, Fort Greely, Clear, Shemya and Western Alaska. Above, from left, front row are: Lt. Col. Joseph A. Bacci, Clear; Colonel Gribble; Lt. Col. William H. H. Mullin, Fairbanks. Back row: Carl Eilerston, Fort Greely; Major Edwin R. Decker, Anchorage; Edward A. Smith, acting resident, Western Alaska; and Major Alfred A. Victor, Jr., Shemya. Not shown are Clifford C. Fenn and William Brown, Juneau and Nome resident engineers respectively.

Yuba Consolidated Industries, Inc. announces the addition of a new division, Yuba Consolidated Erectors, Inc., which will perform on a national basis all field erection work for Yuba's heavy steel fabricating divisions. President of this new division is **J. Philip Murphy**; vice president and general manager, **Francis J. Murphy**. Both men, nationally known in the fields of steel fabrication and erection, headed the important erection of such Western steel structures as the Colorado River Bridge at Glen Canyon, Ariz., (*Western Construction* — Dec. 1958, pp. 32-36, 50); Richmond-San Rafael Bridge, Calif.; Interstate Bridge at Portland, Ore.; giant gantry cranes for McNary Dam, Wash., and many others.

The headquarters staff of Yuba Consolidated Erectors, Inc., 351 California St., San Francisco, also includes **Robert O. Valentine**, assistant to Francis Murphy; **Clayton**

**L. Parkhill**, director of sales, **Al Tokola**, chief engineer, and **George Merriman**, office manager.

**Col. Walter L. Winegar**, Portland District Engineer, Corps of Engineers, is the recently installed president of the Portland Post of the Society of American Military Engineers. Portland City Engineer **Gordon L. Burt**, and **Paul F. Winkelmann** of the Bonneville Power Administration were named vice presidents. Other new officers are **Frank C. Linton**, secretary; **Phil F. Moon**; and **Lewis E. Knepp**, treasurer, all of the Portland District.

**Karl M. MacDuffee**, Portland, civil engineer with the Army Corps of Engineers, retired following 25 years in various branches of Government service during the period when most of the Federal dams now

operating in the Columbia Basin were built. From the time he transferred from the Forest Service to the Corps in 1937 until his retirement his service with the Engineers has been continuous.

\* \* \*

**John A. Donley** has been named vice president of Ken R. White Consulting Engineers, Inc., according to **Ken White**, head of the Denver based firm. He resigned as consultant with the Southwestern Portland Cement Co. in El Paso to accept the position with White.

\* \* \*

**Carl H. Wittenberg**, partner and general manager of Twain-Wittenberg Co., Los Angeles contractors and engineers, has been reelected as representative of the construction industry on the Board of Directors of the Merchants & Manufacturers Association.

\* \* \*

**James F. Vallandingham** represents the State as resident on a 150-day project in Salt Lake City under construction by Enoch Smith Sons Co., contractor. The job covers widening of the Seventh East extension to a 6-lane highway for a length of 1.3 mi.

On another project for the Utah State Road Commission **Arland F. Esklund** is acting as resident engi-

## CALENDAR

April 11—Equipment Maintenance Supervisors Association, annual dinner and initiation of officers, California Country Club, Whittier, Calif.

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

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

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



**Pass after Pass—**



**—Yard after Yard**



**Hour after Hour—Save with JOHN DEERE  
840 DIESEL and Hancock "Piggyback" Scraper**

A most economical unit to operate. Heap-load its 7-1/2-yard bowl in a hurry—without a pusher. Make working turns in about a 22-foot radius. Drive it from job to job on most highways—without a special permit. That's the kind of performance that's earning this road-building unit a reputation as a real money-maker.

Ladder-type elevator driven by "live" constant-speed independent powershaft loads bowl from the top—pulverizes earth for speedy hydraulic ejection and uniform spreading.

For firsthand facts and a demonstration—see your John Deere Industrial Dealer. For detailed literature, write Dept. 524.



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651 Brannan St. — San Francisco 19, Calif.

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neer. This 125-day job is being done by L. C. Stevenson Construction Co. and is located near Blanding. It consists of 2-in. road-mixed bituminous surfacing and one concrete and steel 83-ft. long structure. The project is undertaken to provide additional access in the Aneth oil fields of San Juan County.

\* \* \*

Clair A. Hill has been appointed to the California State Board of Registration for Civil and Professional Engineers for the unexpired term of Asa G. Proctor, deceased. A member of the American Society of Civil Engineers and the Structural Engineers Association of Central California, Hill conducts a general civil engineering practice from his headquarters at Redding.

\* \* \*

At the reorganization meeting held annually by the Arizona State Highway Commission, L. F. Quinn, Miami, was chosen chairman of the Commission, while Frank L. Christensen, Flagstaff, became vice chairman. Wilbur F. Asbury, Phoenix, was installed as a new member. State Highway Engineer Wm. E. Willey was reappointed, as was Secretary Justin Herman.



Pine

Wright

Announcement is made by Nevada State Highway Engineer Edward L. Pine of the appointment of G. B. Brockway to replace W. O. Wright as head of Division I in Las Vegas. After four years as division engineer at Tonopah, Brockway is returning to Las Vegas where he had served from 1947 to 1955 as assistant to Otis Wright, who was recently appointed assistant state highway engineer.

\* \* \*

Abbot A. Hanks, Inc. has established a branch office and laboratory for inspection and tests of construction materials at 1086 Martin Ave., Santa Clara, Calif. Headquarters of the organization in San

Francisco are now located at 1300 Sansome St., a new address.

\* \* \*

Lauren W. Grayson, chief engineer and general manager of the Public Service Department of Glendale, Calif. has been elected 1959 president of the American Water Works Association.

\* \* \*

Berger Associates, Inc. has opened an engineering consulting office at 200 S. Main St., Salt Lake City. Hugh McKellar of Provo, Utah, has been appointed as managing engineer.

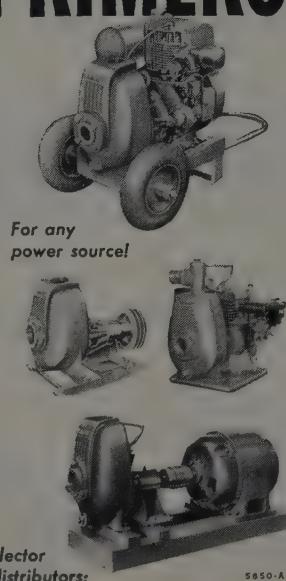
\* \* \*

James R. McDonald has been appointed as executive secretary of Arizona Chapter, Associated General Contractors, as announced by M. R. Tanner, Chapter president. McDonald succeeds Joseph P. Condrey who first retired in 1957 after holding the position for 23 years, but returned shortly after to serve an additional two years. McDonald has been associated with AGC for the past two years and has been Condrey's assistant.

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without fail!

27 self-priming centrifugal models meet most construction needs—designed for any power source—deliver 2500 to 90,000 g.p.h.—all available from one source of supply nearby! All proved in our Blue Ribbon Quality Test Booth. All Barnes Blue Ribbon quality!



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preceding month of publication, or the 10th  
without proofs).

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## "This 2-yd Loader Gives Us the REACH We Need at \$2,000 to \$3,000 Savings on Purchase Price"

"With our crushed stone and lime loading specifications running in excess of 1,000 tons per day," asserted Mr. Walter Van Gorden, treasurer-manager, Cave Stone Company, Cave Indiana, "our requirements on loading equipment are as critical as on any of our manufacturing units. All of the efficiency and production engineered into our excavation and processing equipment is of little value if we cannot maintain like values on the delivery end."

"Because of this, we investigated every available loader on the market before buying our TL-20 TRACTO-LOADER\* in September, 1957. This decision was made on the basis of actual tests with each piece of equipment which indicated that the TL-20 consistently operated faster, reached far-

ther, lifted higher and gave us more pounds per bucket than anything else in its class. *We would have had to spend \$2,000 to \$3,000 more for a machine which would equal its production potential.*

"Our two primary requirements for a loader are height and reach. If bucket capacity were our only concern, we could have approached the load of our present unit by simply buying a larger machine of the same make as our previous one. The TL-20 was the only one available in this price class with a two-yard capacity, but, *more important, was the height of the lift and the length of the reach.* With competitive machines, we would have to load the 8 to 14-ton trucks from both sides to get maximum load and balance. The TL-20,

on the other hand, has a dumping height of 9 ft with a reach of 34 in. at this height. This increase means that we can easily load from one side without damaging the truck or holding up the driver over 4 minutes.

"Now, with this one machine, we are handling 80% of our loading, and have not yet extended it to its limits. We have yet to become involved with any type of maintenance other than the normal routine upkeep required on any piece of mechanical equipment. In spite of the rugged nature of the application, we expect a minimum of 5 years' service from the unit, and in all probability will replace it with an identical loader." Let your Allis-Chalmers dealer show you how TRACTOLOADERS can increase your production.

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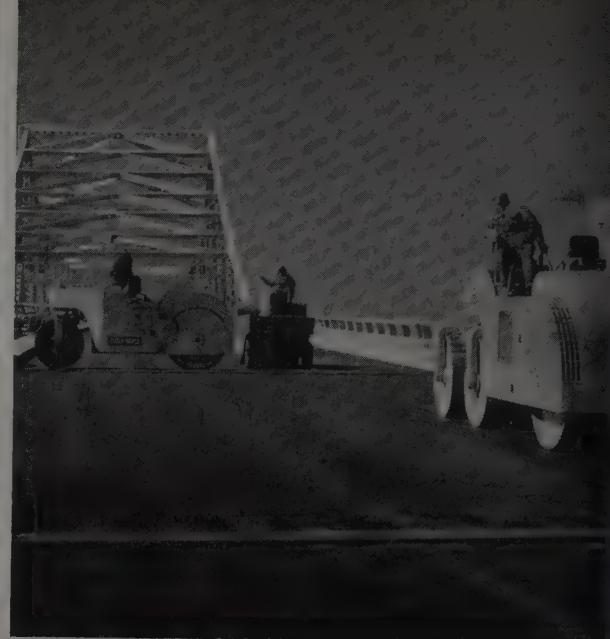
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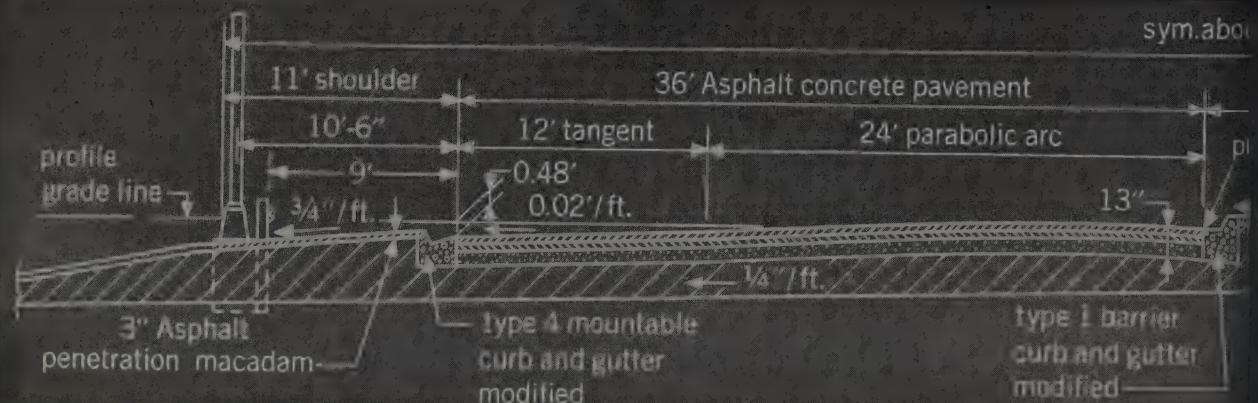
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To lay Asphalt concrete on bridge decks in winter the contractor used three, 12-foot finishing machines. By paving simultaneously cold, longitudinal joints were prevented. Finishers were followed immediately by 2-and-3-axle tandems.



One-inch binder course is compacted by tandems. Self-propelled pneumatic-tired roller ballasted with ten tons of sand complete compaction. Ordinary household detergent in water prevented Asphalt pick-up by rubber tires of the heavy equipment.



*Chicago's Calumet Skyway proves it!*

## Modern, durable, Asphalt paving

Paving of the Windy City's 7.7 mile Calumet Skyway; an elevated, twin-36-foot-lane toll facility; started in October 1957. By April 16, 1958...just six months later...it was opened for traffic.

Mind you, the job was done in midwinter and had to be paced to the completion schedules of fill and bridge sections.

It is safe to say that when laid down in midwinter at this speed only modern Asphalt concrete construction could have satisfied the engineering standards for this pavement structure. Competitive bidding established that Asphalt concrete was also the least expensive material.

To the direct construction savings, resulting from the speed and low cost of Asphalt paving, must be added extra revenue realized by the ability to open this toll facility in time for 1958 summer traffic.

The road's designers point out that modern Asphalt construction also provides the desired durability, minimum maintenance, minimum traffic noise, fast melting of snow and ice with no trouble from deicing salts.

Asphalt concrete is easily the most versatile paving material.

In this example Asphalt concrete proves out on 18-1



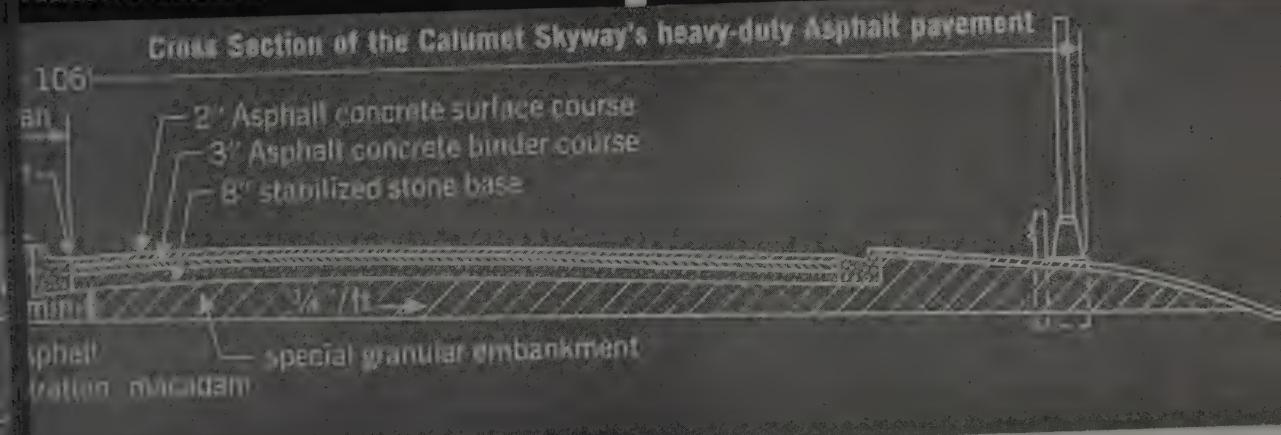
pecially-equipped trucks bring mix to finishers. Insulated truck beds and tarpaulin covers protect mix, bring it to job at best laying temperature. Canvas aprons on spray bars of distributors keep prime from blowing on curbs and sidewalks.



Before and after rolling, luteman, raker and straight-edge man check the mat. Despite 2-inch high expansion and contraction plates every 100 feet, mat goes down true to grade. A 13-20 ton roller irons wearing surface to final smoothness.

#### Cross Section of the Calumet Skyway's heavy-duty Asphalt pavement

- 106 ft. overall height
- 2" Asphalt concrete surface course
- 3" Asphalt concrete binder course
- 8" stabilized stone base



## It's done at record, tax-saving speeds

and on bridge decking. In Louisiana it is performing over virtual quagmires. In Ohio, it proves ideal on till. In New England, it has taken years of alternate zing and thawing in its stride. Along Oregon's rainy st Asphalt concrete is the only paving that lasts. In the thwestern desert regions, where eggs can be fried on surfaces, Asphalt concrete is by far the preferred ement. In mountainous terrain, Asphalt concrete is the stest material to lay and it conforms to foundation settle- st without fracturing. In New Jersey, it was selected to dle the world's heaviest turnpike traffic loads ... 2,815 vehicles in July 1958 alone.

Under all these conditions and more, modern Asphalt concrete has proved itself the least costly pavement to build and to maintain. When you specify it, you make your state road-building tax funds go much further.

Ribbons of velvet smoothness...  
**ASPHALT**-paved Interstate Highways



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

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

# SUPERVISING the jobs

**L. Kay Waldron**, project manager, and **Eddie E. Kunde**, superintendent, for Theo. Wood Construction Co., are key men in the construction of a 6-ft. 3-in. diameter horseshoe, concrete-lined tunnel to carry irrigation water to Mesa, Ariz., from the newly constructed Vega Dam. Work on the 2,400-ft. long tunnel started in December, and according to Waldron the \$344,468 contract should be finished about February next year.

\* \* \*

**Joe Roth**, superintendent, aided by **Fred Brewer**, labor foreman, **Bob Briggs**, crusher foreman, and

**Lee Adams**, truck foreman, is in charge of a project which recently went to Siegrist Construction Co. on a low bid of \$222,417. Soon to start, work consists of grading and surfacing (road-mix asphalt) on State Highway 92 in Montrose County, Colo. Job will be finished about October.

\* \* \*

**D. A. Wagner** is supervising a \$159,858 award to Woodward Construction Co. for 7.9 mi. of grading, surfacing and related work on Hiawatha road, Sweetwater County, Wyo. Foremen are **L. Vosika** and **Don Boom**. **J. Macy** is head

mechanic. Work is starting now and will be finished in June.

\* \* \*

**K. N. Baird** is the superintendent on another job in Sweetwater County, Wyo., for Woodward Construction Co. Costing \$579,795, work covers grading, structure, and surfacing 4.1 mi. of 4-lane divided highway on the Rock Springs-Rawlins road, Interstate Highway 80. Foreman is **Fred Kossick**. **Bob O'Brien** is head mechanic, and **John Hoffer**, mechanic. Just starting, the job will run till July.

\* \* \*

**Joe Kubich**, project manager and superintendent, with **Stan Kister**, grading superintendent, is in charge of a contract for grading, surfacing and one bridge across the Sacramento River in Broderick, Calif. **Stolte, Inc.**, received the award on a bid of \$344,451, started work in January, and expects to have it finished about August.

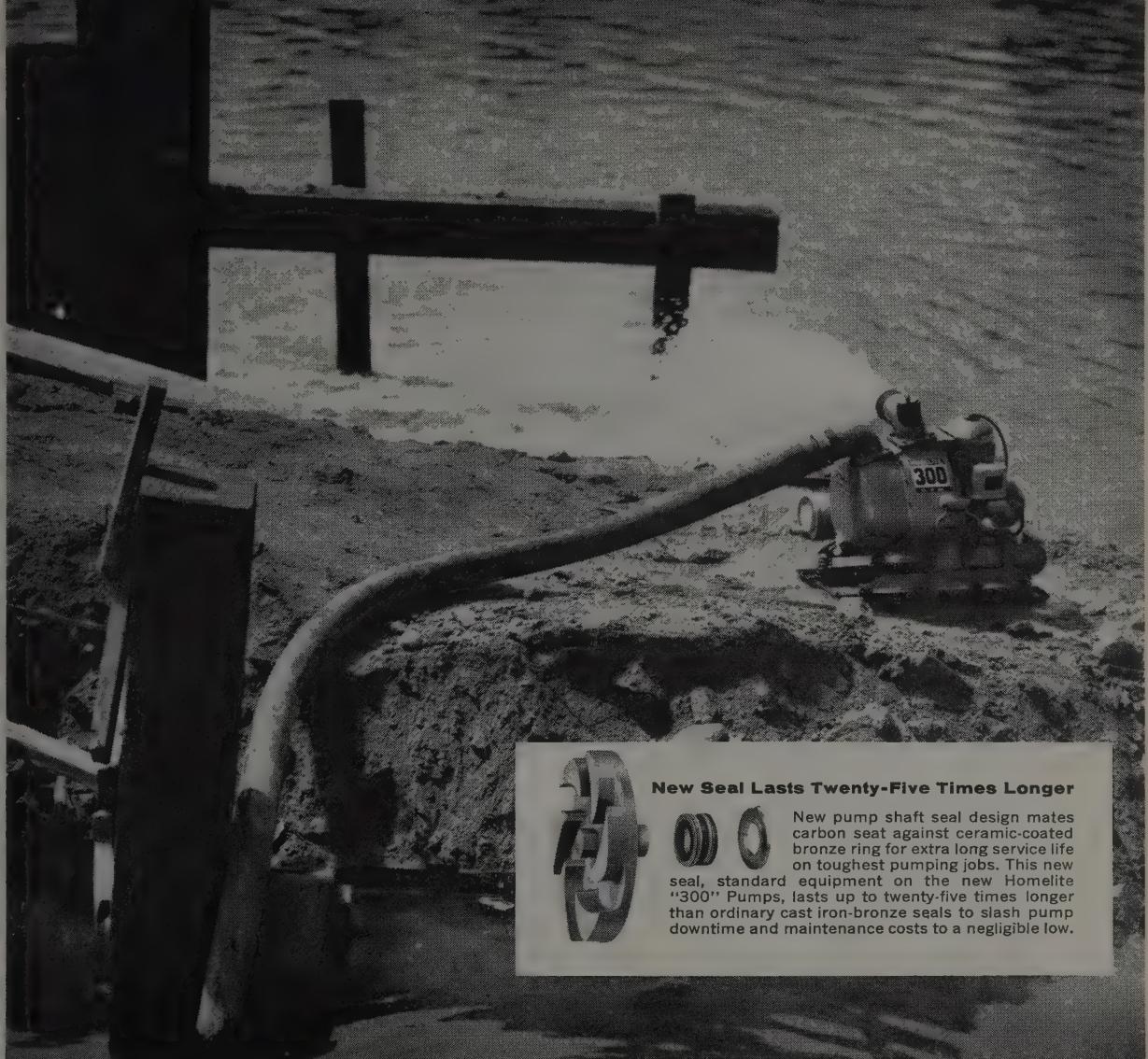
\* \* \*

**Don McGuire** is supervising a large road job which went to



**CONSTRUCTION** of the Howard A. Hanson Dam in Washington is now under way by Henry J. Kaiser Co. and Raymond International, Inc. On the Green River southeast of Seattle, the \$8,840,000 Corps of Engineers project covers a rock, sand and gravel dam with crest length of 730 ft. and a maximum height of 230 ft.; and a 900-ft. long concrete-lined tunnel, 19 ft. in diameter. **H. E. "Curly" Christman** is general superintendent. Shown above are some of the principal personnel. Front row, l. to r.: **Mickey Robbins**, day superintendent; **"Chuck" Peterson**,

works manager; **Jim Grafton**, resident engineer; **Jack Monarch**, assistant resident; **Jack Richards**, all of the C. of E.; and **Keightley**, Tacoma Water. Back row, l. to r.: **Jim Sipe**, carpenter superintendent; **John Franklin**, purchasing agent; **Dick Feger**, night superintendent; **Lowell Britton**, project accountant; **Jack Linn**, master mechanic; **Chris Eberhardt**, assistant day superintendent; **Jim Margeson**, safety engineer; **Andy McDermott**, field engineer; **Roger Sheridan**, job engineer; and **Ior Davies**, a local Willys Jeep salesman. Work will be completed in late 1962.



#### New Seal Lasts Twenty-Five Times Longer



New pump shaft seal design mates carbon seat against ceramic-coated bronze ring for extra long service life on toughest pumping jobs. This new seal, standard equipment on the new Homelite "300" Pumps, lasts up to twenty-five times longer than ordinary cast iron-bronze seals to slash pump downtime and maintenance costs to a negligible low.

USED BY MEN WHO BUY EQUIPMENT FOR WHAT IT SAVES

## Get Better Pumping Longer with the NEW HOMELITE "300" PUMPS

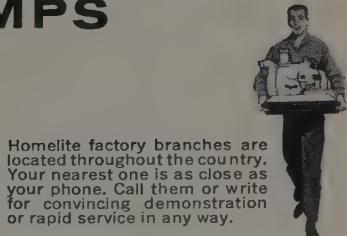
Here's the newest and best investment in lightweight, rugged and practical pumping equipment. You get 18,000 gallons per hour capacity. That's 300 gallons per minute. You pump water from ditches, trenches, and other excavations in minutes. Your men get to work faster. And they can stay on the job. Variable throttle control on the new Homelite "300" Pumps keeps excavations workable. Gives you economical seepage control. And their self-cleaning design handles muddy water without clogging.

Light in weight, only 103 pounds, these "300" Pumps are easy to truck and can be carried by one man. They're fast

to get to the job . . . fast to do the job . . . in any location. All are guaranteed to self prime at 28 ft. above water level. They're air-cooled, weatherproof . . . can't freeze or overheat.

Three models are available. The quiet, slow-speed model for economical, high-capacity pumping jobs. The standard-speed model for general use on jobs requiring higher discharge pressures. And the high-volume pressure pump model for jetting, pumping through long discharge hose or piping and other jobs requiring high discharge pressures.

See them in action. Ask for a free on-your-job demonstration.



Homelite factory branches are located throughout the country. Your nearest one is as close as your phone. Call them or write for convincing demonstration or rapid service in any way.

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Wayne A. Lowdermilk, Inc., and Gardner Construction Co. on a low bid of \$1,408,170. In Colfax County, N. Mex., the 275-day job covers 3.2 mi. of grading, structures, surfacing and related work on Raton Bypass-South End road. Other key men are Lloyd C. Smith, office manager, Thomas F. Dean, grade foreman, Melvin L. Demoney, labor foreman, and F. W. Schooley, master mechanic. Job has been under way since November, and will be finished in September.

\* \* \*

Don Fiorito, partner in Northwest Construction Co., is supervising a large contract recently awarded to his firm covering 5 mi. of grading and surfacing in the city of Tacoma, Wash. Foremen on the \$1,797,426 project are L. Tomaso, D. Vizzare and Mike Fiorito, with Leon Judy, master mechanic. Work started the first of January and will be finished about Oct. 1.

\* \* \*

Arne Gulbranson and Jess Dockrey, base and surfacing superintendents respectively, are key men for Summit Construction Co. working on 12.9 mi. of soil-cement base and bituminous surfacing on the Grass Range-Malta highway, Fergus County, Mont. Summit is doing the work at a cost of \$447,646.

\* \* \*

George Friesen, superintendent, Alan C. Crosby, project engineer, and Arnold Pontius, partner and concrete superintendent, are key men on a \$1,215,273 project recently awarded to the joint venture of Cherf Brothers, Inc., and Sandkay Contractors, Inc., and Pfeiffer & Pontius, Inc. The year-long job is for earthwork, structures, laterals, wastewater and related work, Royal Branch Canal Laterals, Columbia Basin Project in Washington. Work will be finished in November.

\* \* \*

Ralph "Tuffy" Jones is project manager for Morrison-Knudsen Co., Inc., which is doing 2.2 mi. of grading and surfacing south of Ash Creek in Washington County, Utah. Job office manager is John Cotner. The \$1,132,717 project will be finished about October.

\* \* \*

F. Huntley, supervisor-manager, and P. H. Burns, general superintendent, are top men of Huntley Construction Co., recently awarded

contract for \$177,943 worth of highway work starting this spring. The job is 3.3 mi. of grading and surfacing on the Mountainview-Lone Tree road in Uinta County, Wyo.

\* \* \*

Carl Jacobson and Arthur W. Rogers, general superintendents for Tanner Bros. Contracting Co., are in charge of a \$799,657 job west of Bisbee, Ariz. Here Tanner started 1.1 mi. of grading and surfacing between Benson and Douglas, with Lyle Fish superintending the job. Office manager is Donald Norris, and G. S. Tanner is in charge of purchasing. The project is expected to be finished in September.

\* \* \*

Harry R. Merrick is supervising a \$274,824 job for Idaho Rock Co., consisting of reconditioning and road-mix bituminous surfacing on 19.1 mi. on U. S. 93, in Custer County, Idaho. Oiling is subcontracted to Winn & Co., Inc., with Ivan H. Winn, supervising.

\* \* \*

C. W. "Bud" Real is the superintendent on a 949.25-ft. steel and concrete bridge over the Clark Fork River, Sanders County, Mont., for Peter Kiewit Sons' Co. Drilling foreman is Al Hamann, while carpenter foreman is Joe Spurek. Office manager is Ken H. Cormie. Real estimates the \$554,931 job will be finished this coming November.

\* \* \*

Al Reid, general superintendent for Riedesel Construction Co. and Schye & Sullivan, is in charge of construction of two steel and concrete bridges on the Superior east and west road in Mineral County, Mont. Earmarked for completion November 1960, work preliminaries on the \$846,797 contract started last December.

\* \* \*

Frank A. Silva, partner in the firm of Silva & Hill Construction Co., acting as project manager, is in overall charge of the \$1,086,311 contract covering widening of U. S. 60 between Riverside and Beaumont, one bridge and a railroad overpass. Work has been under way since October and consists of 4-laning of a 4.8-mi. stretch. Contractor's engineer is Bill Leaverton. Pete Young as foreman is in charge of grading operations. Field office manager is John Roinen. E. A. Bannister is resident representing

the State. The job is earmarked for June completion.

\* \* \*

Paul Cross, superintendent, assisted by Earl Shannon, is handling construction amounting to \$437,759 for Henry Thygesen & Co. The project involves grading, structures and surfacing on 7.3 mi. of highway in Sandoval and Santa Fe counties, New Mex. Started in December, the work will probably end in May.

\* \* \*

Ken Johnston is superintending Cox Bros. Construction Co.'s \$232,500 award for construction of Bear Creek Canyon road and utilities at the Naval Missile Facility, Point Arguello, Lompoc, Calif. Under way since January, work will be finished in April.

\* \* \*

Ron Jones, project manager, Lee Bryner, general superintendent, and Grant Collett, grade superintendent, are Gibbons & Reed Co.'s top men for construction of Interstate Highway 15 in city and county of Salt Lake, Utah. The \$1,642,480 project is described as a fill and sand drain job.

\* \* \*

Bill Greetan has been named top man by The H. K. Ferguson Co. on a \$1,000,000 contract awarded recently to this firm for additions to existing utilities, at the Engineering Test Reactor Area at Arco, Idaho.

\* \* \*

H. A. Sturkey, general superintendent, and Gordon Lindsey, superintendent, head the job personnel of Johnson, Drake & Piper, recently awarded contract for reinforced concrete buildings and general work at the new California Men's Colony near San Luis Obispo. B. C. Comer is office manager. This \$7,844,000 construction got under way in January and will require 520 working days.

\* \* \*

Fred A. Harrington, superintendent, together with L. M. Hartsock, equipment superintendent, C. V. McBride, grade foreman, Rolla Markland, drilling and blasting superintendent, and S. K. Shaffer, bridge superintendent, are key men working for Allison & Haney, Inc., and Daniels Construction Co., successful bidder for structures, grading and surfacing on 10.3 mi. of highway in Chaves County, N. Mex. According to Harrington the job

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will be finished in May. It has been under way since December.

\* \* \*

Charles Foster has been selected job superintendent by Morrison-Knudsen Co., Inc., and Duffy Reed for their recent \$1,279,274 award for a 4-lane divided highway, one concrete overpass and two underpasses on U. S. 30 and 95 in Payette County, Idaho. This grading-paving work started in December and will probably end in October.

\* \* \*

Donald Christianson and Darrell Maret, superintendents for Charles M. Smith, Contractor, are handling construction of two concrete and steel bridges across Clark's Fork River in Wyoming. A \$247,286 job which has been going since December, it will be finished this June.

\* \* \*

Roy Rippe is superintending a \$370,579 recent award to Asbell Bros. Construction Co. for grading and surfacing the Sheridan-Rochester road in Wyoming. Foremen are Donald Teetors, Orville Swan, Mahlen Coulter, Joe George. Mechanical superintendent on the 6-month project is Renous Johnson.

\* \* \*

Arthur W. Rogers is acting as general superintendent, and Lyle Fish is superintending the job of grading and surfacing the Benson-Douglas highway for 1.1 mi. into the city of Bisbee, Ariz. Other key personnel on this job for the contractor, Tanner Bros. Contracting Co., are Donald Norris, field office manager, John H. Tanner, engineer, and G. S. Tanner, in charge of purchasing. Awarded at a cost of \$799,657, the project has been under way since December, and scheduled for September finish.

\* \* \*

Ferris Ray is project superintendent, Russ Winters, concrete superintendent, and Earl Morgan, earth-work foreman for M. M. Sundt Construction Co., recently awarded a contract at \$1,031,798 for grading, surfacing and four bridges southeast of Tucson, Ariz. Ear-marked for December completion, job started in January.

\* \* \*

Bill Rathburn is supervising a \$243,913 job for Hussman Bros., Inc. Contract calls for construction of a bridge and approaches over Big Goose Creek in Sheridan County, Wyo. It is scheduled for completion about Oct. 1.

\* \* \*

Darrell Logeman, superintendent, assisted by Warren Garde, is

in charge of construction at the San Francisco State College consisting of two 6-story reinforced concrete structures containing 157,000 cu. ft. of floor area. Concrete foreman is Michael Collins. Engstrum & Nourse is doing the work at a cost of \$1,631,700 and expects to finish the job in April 1960. It started in February.

\* \* \*

Marc Latham, Vic Franks, H. Raun, and Ed Lehr, general superintendent, steel superintendent, engineer, and purchasing agent, respectively, are key men on grading, surfacing and seven separation structures, and pumping plant in Riverside, Calif. W. F. Maxwell Co. was awarded the contract on a low bid of \$1,038,550, started the job in January, and has it earmarked for December completion.

\* \* \*

Bill Pankovich, superintendent, assisted by Bill Thomas in the job foreman spot, is in charge of a street widening award in the amount of \$253,348 won by Brannan Sand & Gravel Co. recently. The job, which started March 1, is for 1.2 mi. of grading, draining, and surfacing in Denver, Colo. Work is expected to be finished by the end of May.

\* \* \*

M. C. Beach, superintendent, with Lewis Watkins and Jake Jarnillo, foremen, is handling a \$303,441 job for Herren-Strong Co., successful bidder for 5.6 mi. of grading, surfacing and structures on Highway 141 in Mesa County, Colo. With June as the target date, work has been under way since January.

\* \* \*

E. M. Tidmore is supervising grading, draining, select material, aggregate base and bituminous surface treatment on 6 mi. of Hassayampa-Salome highway in Maricopa County, Ariz. George M. Heiskell, head of Heiskell Construction Co., is in over-all charge of the job, which has been going since the first of January and will be finished June 1.

\* \* \*

W. R. Brown is superintendent for E. J. Rippy & Sons which has the \$559,908 contract for 4.8 mi. of grading, structures, and surfacing on State Highway 4, between De Beque and Palisade, Mesa County, Colo. Foremen on the job are Floyd Nobles, Jr., grade; Harold Wilson, shovel, and Frank Groblebe, master mechanic. Under construction since January, this highway work will be finished in July.

See These

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Casper, Wyoming

... for more details, circle No. 60

WESTERN CONSTRUCTION—April 1959



aw-Knox slip form Widener at work on DuPont highway outside New Castle, Delaware. The contract, let by Delaware State Highway Department, calls for widening a 6 1/4 mile stretch of roadway from 20 to 24 feet. Bituminous Mix will be used for resurfacing.

## Blaw-Knox slip form Road Widener places 72 yards of low slump concrete per hour on Delaware job

*New slip form attachment eliminates setting of forms*

This Blaw-Knox Road Widener made it possible for our 14-man crew to complete this project in seven days. Without it we would have used the conventional method of widening — the setting of forms — which would have greatly increased the man-hour requirements. As it was, we finished the 6 1/4 mile stretch in seven days," says Webb Blevins, Job Superintendent, Wilson Contracting Company, New Castle, Delaware.

Plenty of power was demonstrated when the Blaw-Knox Road Widener pushed a 16-ton load up a considerable grade with "absolutely no loss of

speed," Mr. Blevins adds. "Using the Blaw-Knox Road Widener, we placed 15 feet of 4 feet wide — 8 inch thick concrete every minute."

Engineered Blaw-Knox equipment such as the Road Widener, built for heavy duty performance is helping contractors everywhere to slash costs and build profits on construction jobs. Your Blaw-Knox distributor can give you all the details on the Model 95 Widener. If you would like a technical report on Wilson Contracting's experience, ask your Blaw-Knox distributor for a copy, or write the factory. No obligation of course.

### BLAW-KNOX COMPANY

Construction Equipment, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania

**BLAW-KNOX**

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# CONSTRUCTION BRIEFS



## Old gold dredge rescues contractor

AN ALMOST FORGOTTEN gold dredge saved the day for Montag-Halvorson-Austin, first phase contractors at Ice Harbor Dam, a Corps of Engineers project on the Snake River in eastern Washington. One item in the specifications concerned an estimated 72,000 cu. yd. of channel excavation. But because of an unanticipated sedimentation pattern which occurred during the high runoff in May 1957, when the river was confined to one-third its normal channel past the first-stage cofferdam, the contractor found that about 200,000 cu. yd. had to be removed from the channel, much of it boulders and broken rock.

The entire first construction step contract of MHA originally called for the work to be completed by mid March of 1959. The fact that a part of the north shore or second construction step cofferdam was already completed and the second construction step contract scheduled for award in March made any time extension on the dredging be-

yond June high water impossible. The north shore cofferdam will inclose the work area, behind which will be built the navigation lock, the north shore fish ladder, north shore abutment and the remaining 2½ spillway bays. The 9-ft. depth navigation channel is one of the transportation facilities listed in the navigation lock specifications in the north shore work.

With only an estimated 72,000 cu. yd. of common excavation, as originally specified in the MHA contract to create the channel, a small barge, with a dragline and 1-yd. bucket, seemed ample. However, with the constant current past the cofferdam, it soon became apparent that a dragline operation was not only too slow, but impractical. Constant sluffing from the north shore bank below the dam, caused by the current sweep into the slack water downstream, acted as a sedimentation bed and augmented the situation.

MHA engineers began burning the midnight oil. Then an old-time

construction hand came up with a hopeful solution.

On the Palouse River some 20 mi. above Potlatch, Idaho, a bucket-ladder type gold dredge had operated for a number of years before World War II.

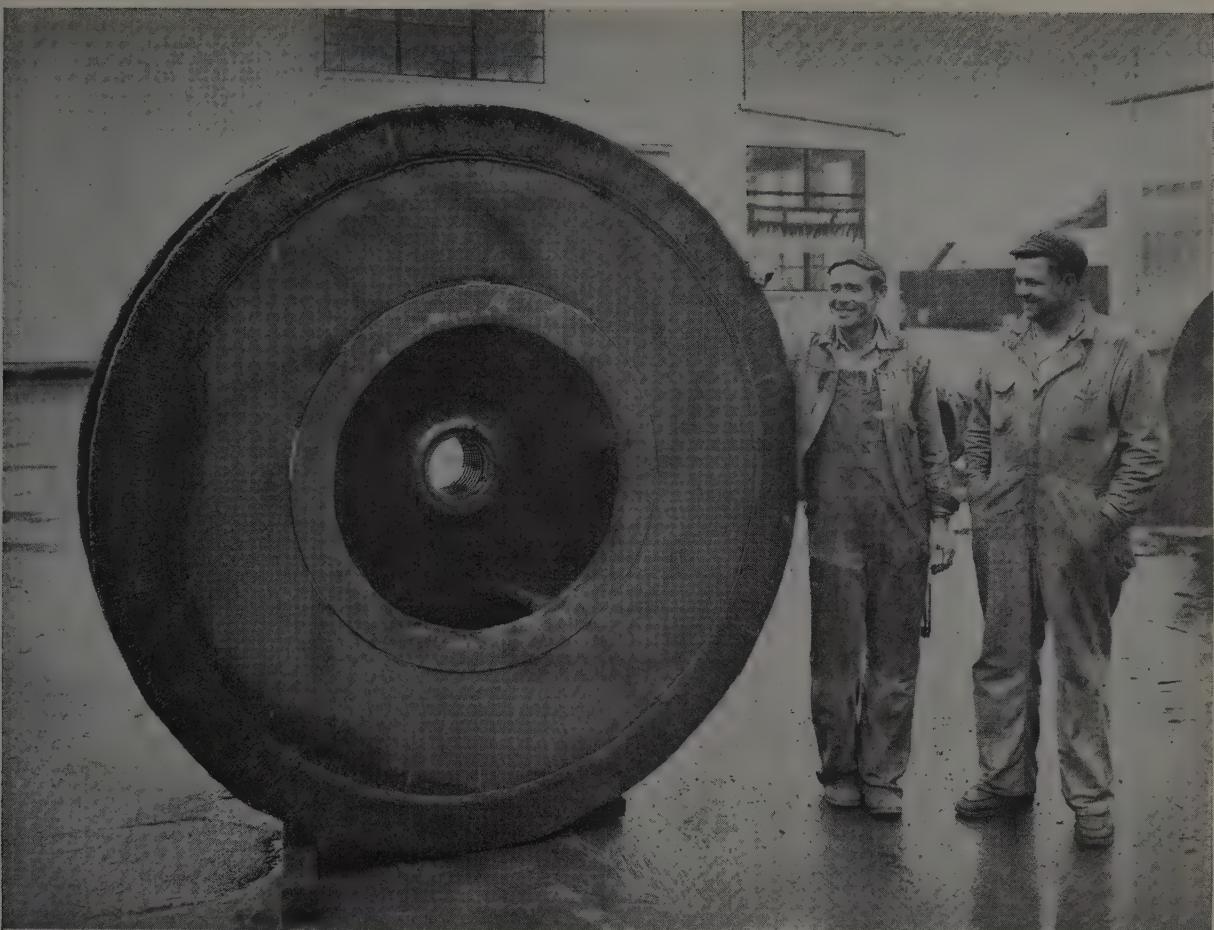
MHA engineers quickly confirmed the rumors of the dredge's existence and arranged an inspection. The gold dredge proved ideal and up to expectation in every form. With a weight of 425 tons and a center anchoring mechanism, she was ideal for the work in the current existing below Ice Harbor. Her 42-ft. width and 86-ft. length, with a depth, deck to keel, of 7 ft. and a draft of 4½ ft. gave her digging ladder bucket chain a potential excavation depth of 22 ft. below the water surface.

### Moved by truck

Negotiations were quick and profitable for all concerned. The huge dredge was dismantled. Her 8-ft. wide pontoons were knocked down and the entire plant stripped and transported via truck to the Ice Harbor project site for reassembly. At Ice Harbor a new aluminum superstructure facing was attached to her deck house and her rusty rigging was cleaned and reset. Her digging ladder, chain and bucket were overhauled. Early in 1959 she floated spick-and-span in the slack water below Ice Harbor Dam, ready to take on her task.

The mechanical design of the dredge's dirt-handling mechanism made it ideal for the job. The chain bucket ladder was adjustable to any specified depth up to 22 ft. and the bucket chain carried the excavated material to an upper endless belt mechanism that formerly dumped into the gold-recovery vats. This belt conveyor was shunted around the gold-recovery mechanism so the excavated material could be carried direct from the chain ladder buckets to the tailing chute on the dredge's stern. This tailing chute is a movable crane type, making possible the loading of the excavated material direct from the digging chain bucket onto a waiting barge for transportation downstream to the disposal area.

With a dredging capacity of 120,000 cu. yd. a month, MHA's problem at the Snake River navigation channel site below Ice Harbor seems solved and the completion deadline no longer a headache, thanks to the memory of an old-time construction hand.



## **Cuts hardfacing time in 1/2 with Victor semi-automatic Wire**

When this 84" dredge pump impeller's action became sloppy from 250,000 cu. yds. of abrasive river material, The Corps of Engineers at Portland, Oregon, built it back to proper size and shape with Victor semi-automatic hardfacing wire.

For the multiple build-up required, welder Maynard Berry (left in photo) used Victor VA-4X 7/16" wire. Then he deposited a top pass with VA-# 7/16" wire, especially resistant to abrasion. Photos here show how neatly he and Victor semi-automatic wire did the job.

Reports welding foreman D. L. Brumbaugh:

"One-half the hard-facing time was saved. We have had exceptionally good quality weld deposit with Victor and we like its running quality."

You, too, will find it pays to renew worn equipment with Victor hardfacing alloys. Complete range of types and sizes for both acetylene and electric AC and DC applications, either automatic or hand. Order from your Victor dealer TODAY.

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## CONTRACTORS' EQUIPMENT & SUPPLY COMPANY

Albuquerque, New Mexico

... for more details, circle No. 64



## Form supports for 15-story building moved up in leap-frog sequence

FOR the first time on the West Coast, the Spanall system of shoring for reinforced concrete slab construction is being used on a major skyscraper-type office building. The John Hancock Life Insurance Co. office building, in San Francisco, will use the system for floor slabs for all except the core of the building, on all stories above the third.

The Spanall method of horizontal shoring was selected for the project because it is suited to the dimensions of the building and the type of construction, according to John E. Cahill, president, Cahill Brothers, Inc., of San Francisco, the general contractor on the job. The horizontal system of supports will be used on eleven floors in a leap-frog sequence.

"We use Spanall on only two stories at any one time. For example, we installed the horizontal supporting system on the fourth floor, set the pans, and poured concrete. Then we set the shores, Spanall, and pans for the fifth floor, and poured this slab. While this was setting we removed the Spanall from the fourth floor and set it up for the sixth floor. The sequence works out well, and we will continue to use this sequence all the way to the top."

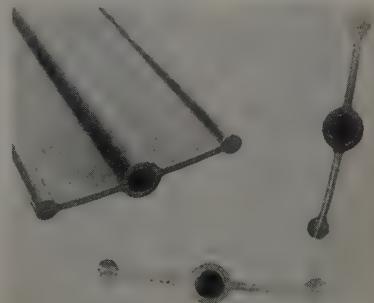
The contractor declared that this supporting system has proved to be particularly suitable for a structure such as the John Hancock building, which requires large work areas for a sizable clerical staff. During construction the crew of the sub-trades craftsmen, such as plumbers and electricians, could work efficiently and without delays, since they were not hampered

by a forest of vertical shorings.

Each floor of the building has an area of 10,000 sq. ft., and the structure will be 15 stories tall. A total of 1,088 Spanall members will be used. The building was designed by the San Francisco office of Skidmore, Owings & Merrill.

Spanall members were supplied by W. J. Burke & Co.

... Circle No. 155



## Durable rubber waterstop

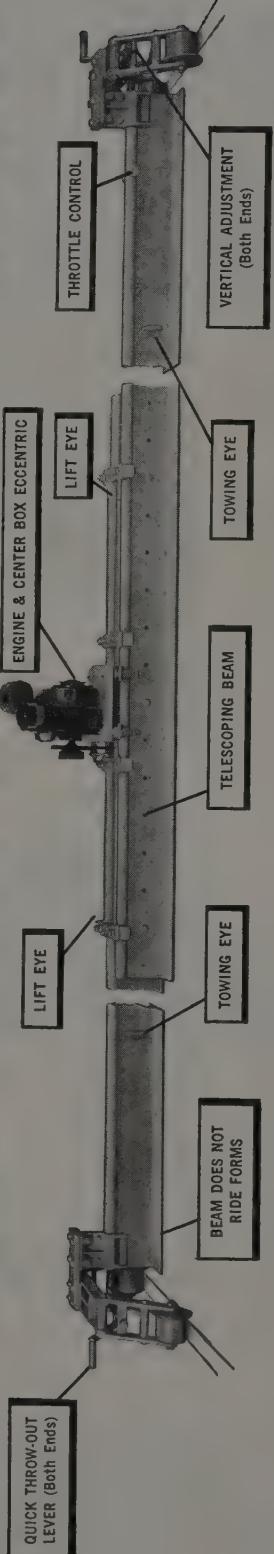
A new rubber waterstop for concrete joints can take up to 5 in. of stretch or bending from joint shrink or shear action and remain watertight even under hydrostatic pressure. Made by Presstite-Keystone Engineering Products Co., division of American Marietta Co., the new material is known as Aquastop. It is manufactured in various grades of natural rubber standard G. R. S. rubber, and Neoprene, and is available in several sizes and shapes including flat dumb-bell, split dumb-bell, centerbulb and split centerbulb types. Material meets specifications of Bureau of Reclamation; Corps of Engineers, U. S. Army; and federal and state highway departments.

... Circle No. 156

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# TELESCOPING VIBRATORY SCREED



## FEATURES:

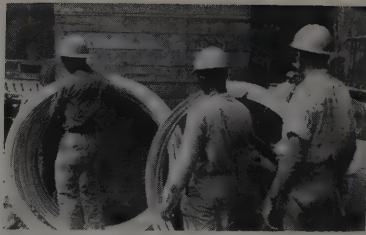
- \* **EASY WIDTH ADJUSTMENT** — Telescoping span eliminates investment in different length beams, saves time changing beams, permits quick adjustment for variable curb widths.
- \* **NO FORM DAMAGE** — Beam does not overhang forms; practically no vibration is transmitted to form.
- \* **SLOPE CORRECTION WITHOUT RESETTING FORMS** — Shoe plate can be adjusted from  $1\frac{1}{2}$ " below to 1" above top of form, independently of either end, without stopping the screed!

- \* **RE-TRANSMITTED WAVE PATTERN PRODUCES DEEP, UNIFORM COMPACTION** — Centerbox eccentric produces 8,700 vibrations per minute transmitted through double beam in an overlapping wave pattern that eliminates dead spots, spreads pile-up evenly, provides deeper compaction.

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## Aluminum tubing cools Colorado concrete dam

ALUMINUM TUBING for concrete cooling coils was used for the first time at Williams Fork Dam near Parshall, Colo. Each of the 50-ft. blocks has two coils of 1-in. diameter tubing on each 5-ft. lift. About 33,000 ft. of the tubing, obtained from Aluminum Co. of America, was required for the job. The use of aluminum saved an estimated 30¢ per ft., according to the contractor, Mountain States Construction Co. (The entire Williams Fork project was reviewed in the Oct. 1958 *Western Construction*.) The \$4,500,000 structure is being built for the Denver Water Board.

Aluminum was chosen mainly because of the simplified handling. No mechanical benders were needed, and there were far fewer couplings (one man can handle a coil 275-ft. long). Wire "hairpins" were embedded in the top of every lift at 3-ft. centers in the desired pattern. The aluminum tubing was rolled out on the block by one or two men as easily as rolling a wheel and tied down with the hairpins. Coupling of the loops was accomplished by banding a short length of 1-in. rubber hose to the ends of the pipe. The whole operation usually took only 15 min. and did not require any equipment. Two men carried all the tubing necessary in one trip.

For additional information on this aluminum tubing (Alcoa Type 2) use the Readers' Service Card.

... Circle No. 157

## Tucson bonds approved

TUCSON, Ariz., has approved a \$14,000,000 bond issue to finance construction of municipal improvements. Work will include a \$10,000,000 expansion of the water system, about \$1,000,000 for street work, \$900,000 for public buildings, \$1,250,000 for sewage disposal facilities and \$800,000 for recreation facilities.

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- 3 double wardrobes and gas wall heater
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- Six double electric outlets, telephone jacks

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From 30 to 50 ft.—8' to 10' wide.

Bunk houses, designed to sleep 8 to 10 people. Write or call us collect for more information about this outstanding offer!

• COMPLETE LINE OF MOBILE HOMES & TRAVEL TRAILERS

Photo of interior illustrates spaciousness as contractor works at large drafting board.



Engineer at work . . . with blue print rack in background.

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USED**

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# MASTER MECHANIC



## All-welded railroad bridge

MORE THAN A MILE of welds were a feature of the fabrication of California's first all-welded railroad bridge, the second of its kind in the United States.

The bridge was erected for the Mojave Northern Railroad—owned and operated by the Southwestern Portland Cement Company—and passes over the new state freeway, nine miles north of Victorville.

Basically the bridge is a through-girder floorbeam type structure with a ballast deck carrying a single track. It crosses the highway on a 55-deg. angle, supported on concrete abutments and cylindrical concrete piers. A 128-in. high corrugated metal guard rail has been installed on the girders on both sides of the bridge in order to prevent falling material from reaching the roadway below.

Engineers from California's State Division of Highways, who designed the structure, estimate that the all-welded bridge weighs about 20% less than a riveted bridge of equal strength. Despite the emphasis on welding, however, actual welding costs were only 2.5% of the total cost of the bridge. "Unionmelt" welding was used throughout, with equipment made by Linde Co., Division of Union Carbide Corp.

The bridge consists of four 35-ton girders, each 10 ft. high and 103 ft. long, which were fabricated at the Irwindale plant of Vinnell Steel

Company and hauled to the job site on special trucks.

Each girder was fabricated from standard-rolled ASTM A-373 steel plate. In fabricating the web, two 5-ft. wide plates were welded to form the 10-ft. height. Then, three of these 10-ft. wide sections, each of which measures 34 ft. 4 in. long, were welded to form the 103-ft. length.

Flanges, welded from different thicknesses of plate in order to form a natural taper, were then tack-welded in position on the web and joined to the web, by a Unionmelt DSH welding head mounted on a CM-37 carriage. The assembly was tilted in order to make the fillet welds in the flat position.

Two longitudinal stiffeners were added to the outside surface of each girder with a UWM-2 flexible welder—a manually-guided semi-automatic machine especially suited for welding long straight seams. These stiffeners were designed to improve appearance and reduce the web thickness. Vertical stiffeners, spaced 12 ft. apart, were welded on the inside of the girders to stiffen the compression flanges.

All welding on the bridge girders and related parts was performed in the Irwindale plant, and required over 6,000 ft. of welds. The 1/2-in. thick, high-strength alloy-steel deck plates were welded in place in the field and required over 4,000 ft. of welds.

For making the long fillet welds

joining the webs to the flanges Vinnell used 3/16-in. diameter Oxweld wire, grade 50 Unionmelt, composition mesh size 12 x 150. Amperage was 800 to 900, voltage 32 to 34. Welding speed averaged about 21 in. per min.

## Truck diesel repair tips

(This article and one last month on the same subject were provided by the General Petroleum Corp.)

A USUAL recommendation is that if the radiator water is not clean enough to drink, it should be changed. According to Cummins, a 4% soluble oil solution is not too effective in controlling liner pitting for most water in the West. A chromate such as Mobil Hydro-tone is helpful in reducing rusting.

The Perry water filter is recommended by Cummins. They claim the following advantages: (a) has a reservoir to catch foreign material; (b) chromates to control rust and corrosion; (c) element easily replaced; (d) magnesium plate to minimize electrolysis. (This plate should be removed, cleaned or replaced at regular intervals.)

Fuse plugs in the Cummins heads are set to melt at 270°F.

Liner pitting is greatly accelerated by an air leak on the suction side of the pump. This leakage is difficult to detect because water may not leak out. The NH Series has a single bearing and seal on the water pump shaft while the old HB had two bearings and two seals.

When thermostats fail, they usually stick open allowing poor temperature control. 180-deg. thermostats are recommended. Do not remove thermostats in summer.

Shutterstats (Kysor) require periodic attention. Keep linkage free. Open drain cock frequently to remove deposits. Wash filter felts or replace at least once per year.

Use only neoprene hose to resist heat and action of soluble oil. Rubber hose will swell inside and restrict water flow causing engine overheating. Such deterioration is generally not visible from the outside. Keep hose connections tight, particularly on the suction side of the pump.

Frequently two fan belts are used. If one fails, all load will be put on the other belt. If one belt fails, replace both as the other belt will have stretched. Generator

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RADCO CONSTRUCTION INCORPORATED, ALTADENA STORM DRAIN PROJECT, ALTADENA, CALIFORNIA

*Re-fill And Compacting Over Concrete Drain Pipe System*

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With the tremendous compaction of 580 tons of kinetic energy developed each second, the Essick 72" vibrating compactor has proven it can cut more than 50% from spreading and rolling time required by any other methods now used for compacting earth fills.

High frequency vibrations, (*in contrast to low frequency vibration of other makes*), together with the 580 tons of kinetic energy per second move an extra large pool of earth particles, keying them together into a dense mass... meeting the most rigid compaction requirements in record time.

The Essick Model VR-72-T has successfully compacted lifts up to 7 feet of granular material and lifts from 2 to 5 feet of heavy soils having a clay content of more than 45%.

The VR-72-T produces maximum compaction through *high frequency vibrations* utilizing a scientifically engineered power transmission system. Where other equipment has failed, Essick vibrating rollers provide continuous production year after year.

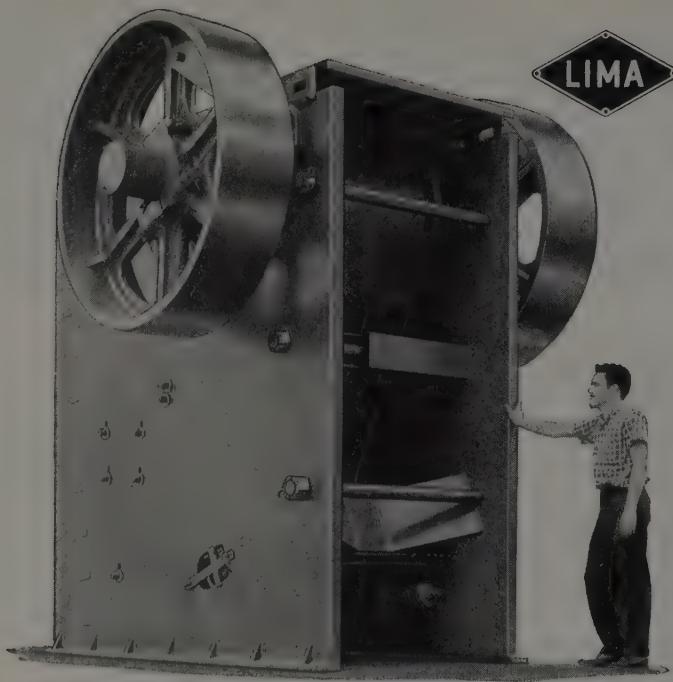
The Model VR-72-T is designed for the contractor whose present equipment cannot achieve required densities... whose compaction costs are too high... whose equipment investment, operation, maintenance, haulage, and storage costs are excessive—anywhere in the compaction field where present equipment and methods are costing precious dollars, the Essick Model VR-72-T vibrating roller will do the job better at a greater profit.

OTHER VIBRATING ROLLERS 13", 28", 32" AND 54" WIDE. ALSO A COMPLETE LINE OF STATIC WEIGHT ROLLERS.

*(Many Engineers are writing new specifications calling for more stringent compaction requirements. ESSICK Vibrating Rollers are consistently exceeding these requirements with fewer passes and higher lifts.)*

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Lima Austin-Western Model 4248 overhead eccentric roller bearing Jaw Crusher

## Lima A-W 42x48-in. Jaw Crusher produces more rock for less

Speed up crusher output with giant Lima Austin-Western 42 by 48-in. overhead eccentric roller bearing Jaw Crusher. Quality built to outperform! Oversized shafts and roller bearings for extra strength and durability. Extra-deep jaws of tough manganese steel form smaller, sharper and more efficient crushing angle.

**main frame** is practically unbreakable. Low alloy, high strength 3-in. steel plate gives frame tremendous strength in proportion to its weight.

**flywheels** are heavy castings, precision machined to proper balance. Split-type hubs simplify flywheel removal. Flywheels are key-locked into place, can't back off in operation.

**pitman and shaft assembly** can be easily removed through crusher frame top. Cartridge-type housing holds assembly in place, eliminates possibility of loose bearings.

**bearings**—Both main and pitman bearings are oversized and self-aligning to permit some shaft deflection, and devia-

tion is minimized by locating the bearings close together. Frame absorbs part of shock load as main bearing center lines are within sides of main frame. Bearings are protected by a simple-type steel labyrinth seal which resists entrance of dirt and seals in lubricant. Bearings may be easily removed by use of a hydraulic system furnished with this model.

**capacity**—What the Model 4248 can do for you may be seen from the fact that it handles 240-360 tons an hour when set at 5-in. discharge opening; estimate based on 2700 lb. per cu. yd. Lima Austin-Western also produces a complete line of crushing and screening equipment and portable and stationary plants. Other smaller sizes of roller bearing jaw crushers are also available.

Profit from our 73 years' experience manufacturing jaw crushers and equipment for pit and quarry. Engineered and built to produce more rock at less cost! See your Lima Austin-Western distributor now or write us for free bulletin.

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CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO



5931

... for more details, circle No. 68 on Reader Service Postcard

bearing failures are frequently caused by overtightening of fan belt.

Dirt on outside of engine acts as insulation and should be removed by steam cleaning at regular intervals.

### Stop and start

After a long run, idle engine at about 1,000 rpm. for some 5 min. to allow gradual cooling, otherwise, heat retained in the block will flow into the water, causing boiling and unequal expansion. Run cold engine for 3 to 10 min. at 1,000 rpm. before applying load. If a truck has been standing for some time and battery will not start it, do not roll downhill to start as there will be no air for brakes and an accident may occur.

Ether ignites at lower temperature than diesel fuel but burns explosively. Extreme care should be exercised to not use too much. Never pour ether in an air cleaner bowl. Put some ether on a rag and hold near air cleaner intake. Capsule dispensers are sometimes provided. Caution—do not get plastic capsules wet, as plastic is soluble in water and may release ether. Use aluminum capsules instead. Every spring a flood of ring breakage complaints is heard by every repair shop and almost everyone can be traced to misuse of ether in starting.

### Other notes

Chemical degreased parts must be thoroughly washed to remove all trace of chemicals. Cresylic, phenolic and carbolic acids are all used in some cleaning baths. Trichloroethylene, propylene dichloride and other chlorinated hydrocarbons are also used for cleaning parts. If any left on parts, it will hydrolyze to hydrochloric acid which is very corrosive.

An engine knock may not be a bearing out, but a loose engine support or mounting, or a non-functioning vibration dampener.

If pistons or liners are scored and oil being blamed, inspect top of piston for indication of valve hitting it. If so, you have positive proof the engine has been overspeeded. Smell part or crankcase oil to determine if overheating has occurred.

Truckers generally figure one dollar per year saved for each pound of weight reduced from equipment, hence aluminum wheels, frames, cabs, etc.

## Rust inhibitors

ARE RUST INHIBITORS for heavy equipment cooling systems worth using? You've probably asked yourself this same question more than once when your equipment dealer suggested a can of this soluble oil-type engine protector.

The protection provided by rust inhibitor was recently demonstrated dramatically for one motor grader owner when the engine was reconditioned for the first time after more than seven years and 11,000 service hours had passed. This machine had been protected with rust inhibitor since its purchase.

Removal of the six precombustion chambers was an eye-opener. The rust inhibitor had prevented formation of the mineral deposits which are commonly found encrusting these and other parts which come in contact with the coolant in an unprotected cooling system.

The real value of the rust inhibitor doesn't lie in the fact that the precombustion chambers appeared as good as new and that the appearance of these parts indicated a "like new" condition throughout the entire cooling system. The real value of rust inhibitor cannot be measured in appearance alone; it must be measured in terms of protection to an important and vital part of the engine. This soluble oil-type additive imparts a protective oil film or lining over the entire inner surface of the cooling system which excludes rust from these surfaces, insuring a more efficient system with full, unrestricted flow of coolant and maximum heat transfer. Even when the engine is drained for storage, the oil film remains on the surface to protect against the formation of rust.

Are rust inhibitors worth using? Are they worth the money you spend for them? Yes, they're worth the money and worth using, both from the standpoint of machine protection and operating efficiency. (Caterpillar Tractor Co.)

## EMSA plans dinner dance

The Equipment Maintenance Supervisors Assn. will hold its annual dinner dance and election of new officers at the California Country Club in Whittier, April 11. For information contact Bob Moodie, J. A. Thompson & Son, Inc., 8330 Hindry Ave., Los Angeles 45, Calif.



Lima Type 44 Dragline drops 1 1/4-yd. load of fill into Michigan swamp to speed development of new resort area.

## Wet digging LIMA Dragline team handles 3000 yd. per shift on year-round job

Excavating contractor La Vern Rice, of Hartford, Mich., owns two Lima Draglines—a Type 44 and a 34. Mr. Rice says, "The year round, these two Limas of mine can move nearly 3000 yd. per 10-hr. shift."

### Lima always dependable

"Michigan is the water wonderland, alright. We do a lot of work clearing and filling swampy areas. Under all working conditions, we can depend on the Limas to do a lot more work without costly downtime or excessive maintenance!"

The Lima Type 44 is a versatile piece of equipment that can be used interchangeably as a 25-ton crane, 1-yd. shovel, pullshovel or dragline. It can be crawler, truck or wagon mounted, with either gas or diesel engine. Torque converter optional.

### Designed for long life

Limas are quality built! Designed for long life and easy maintenance. Com-

pare quality when you buy and you'll choose Lima.

What's your toughest job? No matter what, there's a Lima to do it exactly right for you. Cranes to 110 tons, shovels  $\frac{1}{2}$  to 6 cu. yd., draglines variable. Learn why Limas are famous for high output and low maintenance. Get in touch with your local Lima distributor or write to us. Begin now to profit with Lima!



Truck-mounted Lima Type 44-T sets concrete forms for highway interchange near Philadelphia.

Our Seattle Office: 1932 First Avenue South, Seattle 4, Washington; Our La Mirada Office: 14120 E. Rosecrans Ave., La Mirada, California; Feeney Machinery Co., 112 S.E. Belmont Street, Portland 14, Oregon; Feeney Machinery Co., 600 Front Street, Boise, Idaho; Smith Booth Usher Company, 2001 Santa Fe Avenue, Los Angeles 54, California; Modern Machinery Co., 4412 Trent Avenue, Spokane 10, Washington; Acme Iron Works, 540 Culbre Avenue, San Antonio, Texas; M. C. Ribble Co., 1304 North Fourth Street, Albuquerque, New Mexico; Bay Cities Equipment, Inc., 2792 Cypress Street, Oakland 7, California; Bay Cities Equipment, Inc., 1178 West San Carlos Street, San Jose, California; McGaraghan Supply Company, 529 Broadway, Eureka, California; Evans Engine & Equipment Company, 4300 - 11th Avenue, Northwest, Seattle, Washington; Evans Engine & Equipment Co., Inc., Post Road - Box 894, Anchorage, Alaska; Faris-Moritz Equipment Co., 5790 Colorado Blvd., Denver, Colorado; Shasta Truck & Equipment Sales, South 99 Highway, Redding, California; Rem Equipment Sales Company, 1510 West Fourth Street, Reno, Nevada; Western Machinery Company, 820 North 17th Avenue, Phoenix, Arizona; Western Machinery Company, 1111 West St. Mary's Road, Tucson, Arizona; Western Machinery Company, 2300 South Main Street, Salt Lake City 15, Utah.

**LIMA** Construction Equipment Division, Lima, Ohio  
BALDWIN · LIMA · HAMILTON



5924

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# New industrial films cover many subjects

Two films are available on a free-loan basis through all Portland Cement Association district offices as well as from its headquarters at 33 West Grand Ave., Chicago 10, Ill. "Low Cost Concrete Highways With the Slip-form Paver", a 16-mm film, in sound and color, shows how concrete pavement is placed with the latest model of slip-form paver. Twelve minutes in length, it includes the various methods of fine grading operations, as well as mixer operations for shoulders and roadbeds where shoulder width will not permit use of the mixer. "People and Movement" is a 17-min. sound-color film aimed at increasing the public's understanding of the planning behind the great highways being constructed across the country as part of the National system of interstate and defense highways.

These recent additions to its many 16-mm motion picture titles are offered by the Ford Motor Co. A 25-min. documentary film entitled "One Road" shows the free world's highway routes as seen by two test drivers on an unprecedented automobile trip around the world. Filmed in the company's engineering and research center, "An Equation for Progress", a 28-min. picture, traces the progress resulting from automotive research and illustrates that its benefits are not confined to the motorist. Both films are sound-color. Write **Ford Film Library**, 4303 Telegraph Ave., Oakland 9, Calif.

Seven 20-min. color sound-slide films produced by the Construction Machinery Division of Clark Equipment Co. teach the care and maintenance of "Michigan" tractor shovels. The strip films are pitched to the semi-skilled mechanic, someone familiar with basic material handling machinery and servicing tools, but unfamiliar with torque converters or power-shift transmissions. They instruct through the eye and ear. For more information on viewing these films, call your local Michigan distributor, or write

to **Clark Equipment Co., Construction Machinery Division**, Pipestone Road, Benton Harbor, Mich.

"Introduction to Manual Hiliarc Welding", a new 8-min. sound and color, 16-mm motion picture by **Linde Company, Division of Union Carbide Corp.**, New York City, gives the beginner an orientation in Hiliarc welding, how it works and what it can do. The movie shows the basic piece of equipment and their relationship to each other, how to make a simple weld, and the excellent results that can be expected after practice. The film is available at no charge from any Linde office.

A 16-mm sound film tracing the evolution of a 190-ft. diameter steel sphere, built to house an atomic reactor, has been produced in color by **Chicago Bridge & Iron Co.** Interested organizations may arrange for a showing of the 25-min. film by writing to **Chicago Bridge & Iron Co.**, Public Relations Dept., 332 So. Michigan Ave., Chicago 4, Ill.

Entitled "Progress in Industrial Rubber Products", a new 16-mm. color and sound movie describing the operation of a modern rubber plant has been put out by the **Quaker Rubber Division, H. K. Porter Co., Inc.** The 25-min. film reveals how raw materials are used to produce quality rubber products and describes the process of making conveyor belts, hose, etc. Arrangements for showing the film may be made by contacting the Advertising Department, **Quaker Rubber Division, H. K. Porter Co., Inc.**, Tacony & Comly Sts., Philadelphia 24, Pa.

A trip through a modern wire mill is described in a new color-sound movie, "The Red-Strand", announced by **Leschen Wire Rope Division, H. K. Porter Co., Inc.** The 22-min. film shows the producing of finished wire from rod. Scenes showing the manufacture of prestressing strand and wire rope

are also included. Arrangements for showing may be made by writing the Advertising Department, **Leschen Wire Rope Division, H. K. Porter Co., Inc.**, 2727 Hamilton Ave., St. Louis 12, Mo.

**Permanente Cement Co.**'s documentary film, "Cement—Stone of the Ages" is available to interested groups in the West. The 25-min. color movie follows the development, role, and products of the cement industry from the stone age to the age of powered missiles. Shown are some of the great construction projects in the West, and their spectacular use of the various types of portland and special cements. Available on request to **Permanente** sales offices or head office in Oakland, Calif.

"New Concept For Paving" is the title of a **Cedarapids** movie which presents a new approach to the problem of laying acceptable bituminous mat at high speeds. The 24-min., color-sound film was recently released by **Iowa Manufacturing Co.**, and is designed to be shown to contractors, highway engineers and departments, and other groups interested in road construction. Information on securing the film on a loan basis may be had from the **Iowa Manufacturing Co.**, Cedar Rapids, Ia.

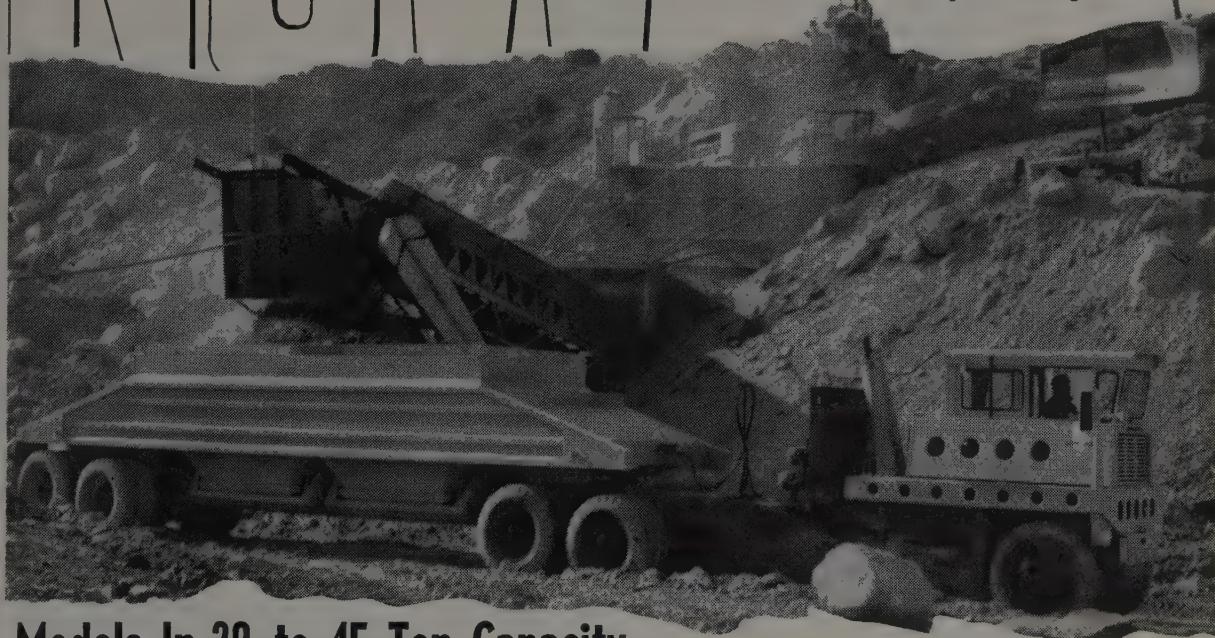
Two new sound slide filmstrips on butt-weld pipe have been prepared by **U. S. Steel's Columbia-Geneva Division**, and are available for showings at meetings of distributors and plumbing contractors. With running time about 20 min. each, the full-color filmstrips are part of a series to familiarize interested persons with methods and background information for the efficient application of butt-weld pipe. Films can be obtained without charge through **Columbia-Geneva** district sales offices in the West.

"Building for Professional Growth", a 16-mm film covering the activities of the **National Society of Professional Engineers**, has been released by this engineering group. The film is centered around an explanation of the values and benefits of National Society membership to the individual and the engineering profession. Inquiries concerning reservations should be made to the headquarters office, 2029 K St., N.W., Washington 6, D.C.

THE COOK BROS.

# NO "EarthKing"

An entirely NEW concept  
in fast, heavy Hauling



## Models In 30 to 45 Ton Capacity Built Exclusively for Construction Service

The New "EarthKing" Power and Trailer Unit is the first of its kind, designed "from the road up" for specialized construction service. On off-the-road work, in rugged terrain, the "EarthKing" really shines. The power unit is built high-off-the-road, with all vital components fully protected.

The "EarthKing" is made to haul more payload — and haul it faster than other type units of similar capacity. Loading and unloading operation takes only seconds. This fact plus speed range of 1.7 to 52 MPH, add up to fast profitable trip cycles.

Call or write today for full particulars on the fast, heavy hauling "EarthKings".

### CONSTRUCTION FEATURES

- Heavy duty construction
- Full protected, under truck parts
- High, off the road mounting of fuel tank, power steering, axle beams, engine pan, transmission cases, etc.
- Safety designed cab

### PERFORMANCE FEATURES

- 30 to 45 Ton Payload, off-road hauls — up to 20 tons legal, over highway
- Load — unload in seconds
- Speed range, 1.7 to 52 MPH



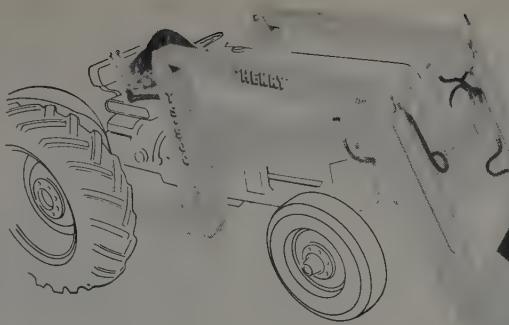
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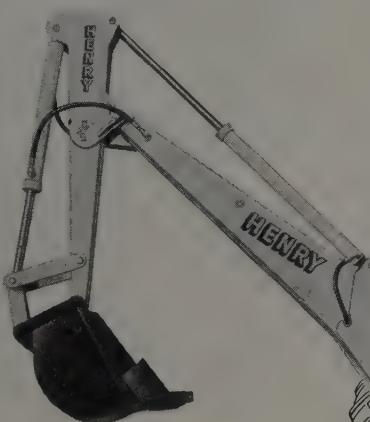




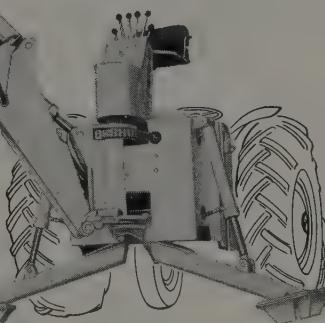
TS-500  
TRACTOR SHOVEL



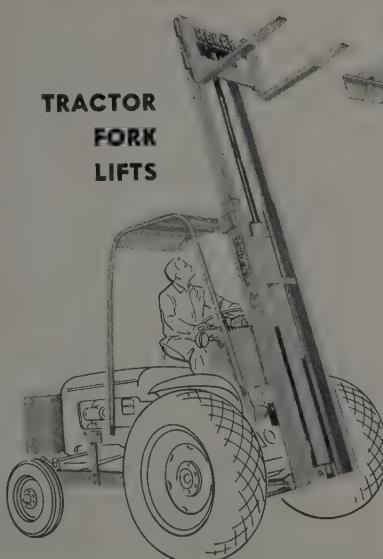
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TRACTOR  
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THE LINE  
DESIGNED WITH  
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Today all construction jobs . . . large or small . . . are based on contractors doing more work faster at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

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## STRICT INSPECTION

Strict inspection is maintained at every stage of HyPower construction. Quality material is used to insure customers of ruggedness for efficient operation.

14 types to choose from — over 350 strokes and diameters! HyPower gives industry and agriculture the variety of cylinders necessary to meet practically all needs.



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## "BERG"

### HIWAY SURFACERS



"BERG" Hiway Surfacers are extensively used for removing high spots and surface variations from concrete roads, streets, floors, airport runways and many other applications.

Also "BERG" Concrete Surfacers for surfacing buildings, bridges, dams, walls, etc. Many models to select from.

Contact Your "BERG" Distributor

**THE CONCRETE SURFACING  
MACHINERY COMPANY**  
4665-69 Spring Grove Ave.  
Cincinnati 32, Ohio

... for more details, circle No. 74

## New clutch on backfiller

A water-cooled throw-out clutch is one of the new features of the Cleveland 190 Pipeline Backfiller described in a 6-page folder issued by The Cleveland Trencher Co. Throwout clutch is cooled by continuous circulation of water from



the engine's cooling system, preventing overheating and adding substantially to the working life of the clutch. Other improvements are described in the profusely-illustrated folder which lists all the machine's components as well as dimensions and specifications.

... Circle No. 164

## Stran-Steel catalog

New load-bearing punched channel studs, rigid frames, acoustical ceiling deck, and wide rib deck have been added to the line of steel architectural products manufactured by Stran-Steel Corporation. The products are presented in a 24-page catalog published by the corporation. Complete technical information for the new item, as well as the entire Stran-Steel line of joists, studs, channels, beams, C-sections, roof deck, and curtain walls, is contained in the catalog. Descriptions, illustrations and photographs show how each product can be best used in a variety of applications. ... Circle No. 165

## Highway equipment line

An informative 3-color, 24-page catalog covering the highway and road maintenance and construction equipment manufactured by Littleford Bros., Inc., is now available. The catalog, JJ-1, describes and illustrates one of the most complete lines of black top equipment manufactured. Items which are illustrated and described are asphalt plants, bituminous distributors, brooms, asphalt pavers, kettles, supply tanks, rollers and accessory paving tools. Full specifications are given for each major unit. The last

page of the catalog gives brief reviews and photographs of 33 pieces of literature which are available from the company.

... Circle No. 166

## Torque converter booklet

A cleverly-written booklet titled "How to get the most out of shovelfrancs with torque converters," has been prepared especially for operators by Link-Belt Speeder Corp. The 16-page two-color booklet is illustrated in cartoon style, and includes diagrams of a torque converter showing how it works. A number of operating tips are given, as well as check list for proper performance of converter unit, and maintenance instructions.

... Circle No. 167

## Cableways and slack lines

Detailed descriptions of slack line cableway installations using torque converter diesel power are contained in a new 12-page booklet published by Sauerman Bros. Inc. With the use of easily-understood line drawings and photographs the booklet describes 8 installations where this equipment was used. An explanation is given of the Sauerman Drag Scraper method of excavating material. The system works well on spans up to 800 ft., and is especially suited for non-caving material and shallow excavations. Torque converter-equipped slackline cableways, according to the booklet, can haul material from pit to stockpile for as little as 8 cents per cu. yd., including labor, fuel, and maintenance.

... Circle No. 168

## Allis-Chalmers attachments

Special equipment for AC crawler and grader units, ranging from power take-offs to hydraulic moldboard shifts, is listed in a 12-page, two-color manual published by Allis-Chalmers Construction Machinery Division. Equipment listed includes cabs, seats and canopies; hour meters and gages; air cleaners, heaters and caps; guards, grills and screens; special moldboards for both graders and tractors, and a number of other special items.

... Circle No. 169

## Trenchliner described

The economy model 130 "Trenchliner", wheel-type trenching machine is described in a new 4-page bulletin issued by Parsons Co., division of Koehring Co. Booklet includes two pages of photos and feature-by-feature explanations



of the 130 which digs trenches 12 to 24 inches wide at depths to 5 1/4 ft. Digging speeds of 1 to 18 ft. per min. are possible. Also listed in the publication are pictures and brief explanations of four other wheel type units manufactured by Parsons.

... Circle No. 170

## Concrete handling equipment

A pocket-size catalog describing 21 different items of concrete and asphalt placement equipment has been issued by H. S. Watson Co. The Watson Cmetco line includes pavers, concrete buggies and buckets, vibrators, hoppers, floats, spouting and other equipment.

... Circle No. 171

## New folders on crane line

Special 3-color descriptive folders and new 8-page specification brochure have been prepared for each of its five crane models by Little Giant Crane & Shovel, Inc. Folders include exploded and cut-away views of essential mechanisms and several photos of job-site applications, along with detailed descriptions of each machine, its accessories, and exclusive features such as ball-bearing turn-table. All material is color keyed, with a special color for each size and model. Company price lists as well as brochures and specifications follow this color code for fast reference.

... Circle No. 172



## *The CF&I giant protects "Right-of-Ways"* —with Realock Fence

The CF&I giant stands for many dependable steel products used in the construction industry. One of them—Realock Fence—is the proven way to assure positive highway "Right-of-Way."

The steel wire and chain-link fabric of Realock Fence makes it attractive and durable. Sturdy posts are anchored in concrete. And the steel fabric is galvanized *after* weaving for maximum resistance to corrosion. Also available in aluminum.

Choose the Realock Fence that best meets your needs . . . in light or heavy construction . . . with barbed or knuckled selvages . . . with or without barbed wire tops. Realock's professional crews will erect your fence, or you can easily install it yourself.

Ask for a free estimate today. Consult your classified telephone directory or the nearest CF&I office listed below.

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland  
WICKWIRE SPENCER STEEL DIVISION—Buffalo, New York



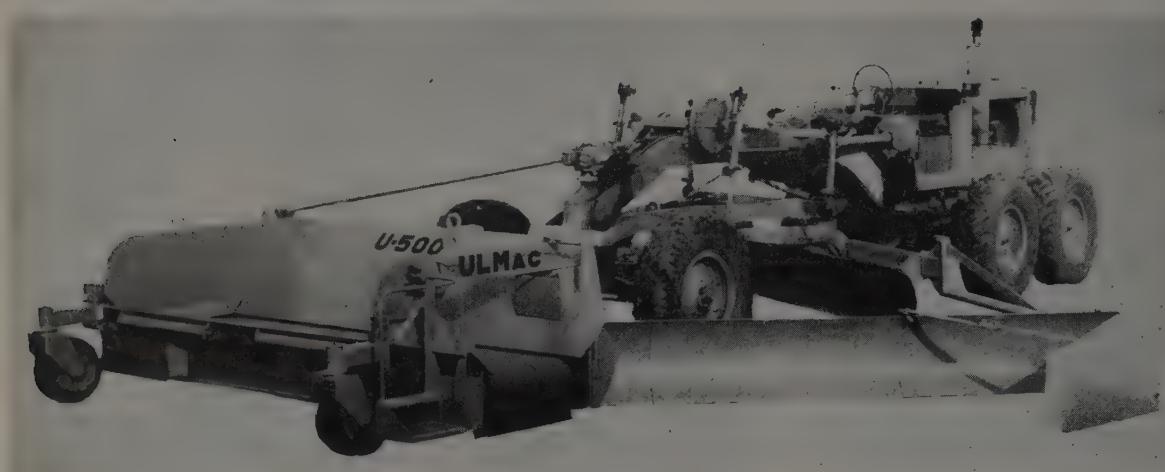
**REALOCK FENCE**  
THE COLORADO FUEL AND IRON CORPORATION  
BRANCHES IN ALL KEY CITIES

6609

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# NEW EQUIPMENT

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



## Shoulder spreader can handle hot mix

Spreads of 12 ft. in a wide range of depths can be made by **ULMac Equipment Co., Inc.** U-500 shoulder spreader, designed for quick attachment to any Caterpillar 12 or 112 motor grader. New scientifically curved blade for "live rolling action" is made up of three sections for variations in spreading width. Depth can be adjusted from 6 in. above to 18 in. below pavement, with positive control which eliminates creeping. Blade edge is replaceable. Spreader has four-wheel suspension with solid rubber tires. All wheels are adjustable. New 9-ft. dump hoppers can accommodate largest truck. Material drops directly on high speed conveyor 36 in. wide, driven by 50-hp. air cooled engine through twin disc clutch and reduction unit. Simplified controls grouped at "walk-on" platform enable operator to guide hauling units as well as operate spreader.

... Circle No. 173

## Vibratory compactor for Payloader

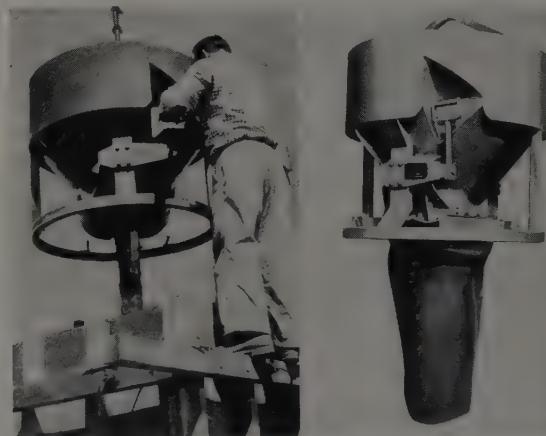
Recommended for granular soils and materials in highway construction, a vibratory compactor attachment is now available for all of the 4-wheel drive Payloader models. **Frank G. Hough Co.** announces this self contained and self powered attachment which

uses the well known Jackson Electric System. It can be interchanged with the bucket in a matter of minutes. An air-cooled motor and generator unit drives the electric motors to vibrate the four compactor pads. Each of these pads delivers up to 4,200, 3-ton blows per minute. Width of the compacting unit is 10 ft., extending beyond the Payloader treads enabling the machine to compact close to side walls and borders. Any of the four shoes can be detached for manual use. All operating controls of the compactor are handled from the driver's seat.

... Circle No. 174

## Concrete bucket has light weight

With a new design featuring a light, all-welded steel frame, **C. S. Johnson Co.** announces a new concrete bucket available in sizes from  $\frac{1}{2}$  yd. to 2 yd. Net weight of the buckets ranges from 355 lb. for the



$\frac{1}{2}$ -yd. size to 1,075 lb. for the 2-yd. bucket. The improved design places all working parts above the discharge point and well within the bucket outline, to protect them from falling materials and accidental





**Rear-Dump "Eucs"** have payload capacities of 10 to 50 tons—are powered by engines of 128 to 670 total h.p....have loaded speeds up to 41 mph.

## Check Euclid Performance for Lower Hauling Costs

Leading contractors, mines, quarries and industrial users of heavy earthmoving equipment the world over have standardized on Euclids for tough off-highway hauls. They know from years of experience on their own operations that "Eucs" get more work done every shift—that production cost is lower than with other types and makes of equipment.

Euclid has a complete range of sizes and models to fit every job requirement—rear dump and bottom dump haulers, self-powered scrapers and the world's most powerful crawler tractor. Your Euclid dealer will be glad to provide a production-cost estimate on your present or planned operations—be sure to see him before you replace or add to your equipment fleet—and have him show you why Euclids are your best investment.



**Bottom-Dumps** carry payloads of 13, 17 and 25 cu. yds. struck...are powered by 218 to 335 h.p. engines...have top speeds up to 34 mph. Full length, unobstructed door openings make these "Eucs" ideal for dumping free-flowing material into drive-over hoppers.



**TC-12 Crawler** has 2 engines and independent track-drive...402 net h.p....full power shift...top speed of 7.8 mph. This "Euc" tractor has unequalled work-ability for heavy dozing, ripping and similar work in construction, mining and logging.



**"Twin" Scraper** has 2 engines with Torqmatic Drive...all wheel drive permits self-loading...struck capacity is 24 cu. yds. There are six other Euclid Scrapers, overhung engine and six wheel types, with struck capacities ranging from 7 to 24 yds.—9 to 32 yds. heaped.

**EUCLID** Division of General Motors Corporation  
Cleveland 17, Ohio



# E U C L I D E Q U I P M E N T

FOR MOVING EARTH, ROCK, COAL AND ORE

impact. The 50-deg. slope of the cone assures complete discharge of medium slump concrete. The short stroke operating handle permits one-hand gate operation, and when in closed position this handle fits within the bucket outline for protection. All shafts are of stainless steel and turn in nylon bearings. A rubber discharge spout, 36 in. long, is available for all bucket sizes.

... Circle No. 175

## Compacting and dozing at one time

Featuring air cushioned compaction wheels a new compactor-dozer has been added to the line of 4-wheel drive tractors manufactured by the **Wagner Tractor, Inc.** The air-cushioning of the steel compaction wheels



practically eliminates shock and vibration to the tractor itself, reducing maintenance costs and adding to the comfort of the operator. Interchangeable rubber tired wheels are available which convert the tractor into an all purpose prime mover. This unit has dual controls and reversible seat permitting it to be worked

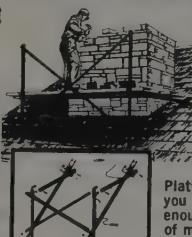
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**COMPLETE SET-UP!**

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All-steel. Folds for easy  
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Weighs only 39 pounds.



Adjusts to any roof pitch, goes on wherever the chimney comes through the roof line. Can be nailed directly to roof or to planks that hook over roof ridge.

Platform sizes up to 5' x 10' give you a working area that's large enough to hold an ample supply of materials with plenty of room to work on all sides.

**CALL YOUR WACO DISTRIBUTOR TODAY**

FOR THIS CONTRACTORS' SPECIAL  
OR ANY EQUIPMENT REQUIREMENT

- STEEL SCAFFOLDING and all accessories
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Bakersfield — B. B. CO., PH: 4-3145

San Jose City — OSCAR E. CHYTRAS CO., PH: DA 8-8646

Phoenix — WACO SCAFFOLDING & EQUIP. CO., INC., PH: BR 5-5721

Albuquerque — FRANK'S SUPPLY, PH: CH 7-1010

Oregon: Portland — THE BEEFEE SCAFFOLD & EQUIP. CO., PH: 4-8844

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Nevada: Las Vegas — INLAND SERVICE & SUPPLY CORP., PH: DU 4-1600

**PRODUCTS OF TUBULAR STRUCTURES CORP. OF AMERICA**  
2960 Main Street, Los Angeles 39, California

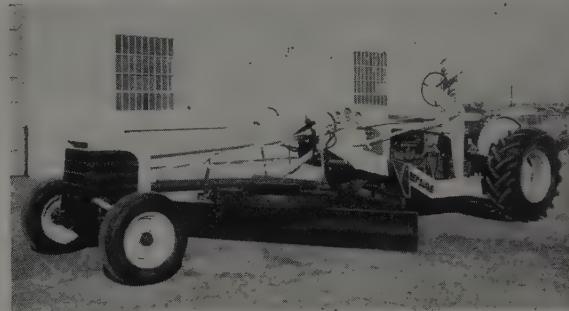
... for more details, circle No. 77 on Reader Service Postcard

in either direction at equal speeds. Like all Wagner tractors, the unit has 4-wheel drive and 4-wheel hydraulic steering, permitting free oscillation of both axles through one active drive shaft. Both tilt and pitch of the heavy-duty dozer blade are controlled hydraulically from the operating cab. The unit is powered by Cummins diesel.

... Circle No. 176

## Motor grader on Ford tractor

The Lev-L-All is a new attachment by **White Star Enterprises, Inc.**, making a motor grader that can be mounted on Ford 600, 800 and 1800 series tractors. The unit is designed as a low cost machine for contractors, municipalities and government units. It can be installed quickly and requires only minutes to detach and convert the power unit back into a regular Ford tractor. Tests indicate a performance that matches the work output of 50-hp. motor graders in its weight class. Designed for good stability and



equipped with convenient hydraulic controls, the operator has full visibility of the blade and the weight distribution provides good traction for using full engine horsepower. Other attachments that are available include a power circle, power shift moldboard, scrapper, moldboard extensions, either left or right, and a windrow eliminator.

... Circle No. 177

## New series by Schield Bantam

A completely redesigned line of carrier mounted, crawler-mounted and self-propelled,  $\frac{3}{8}$ -yd. excavators has been announced by **Schield Bantam Co.** Known as Series 350 Bantams, the units represent 3 years of



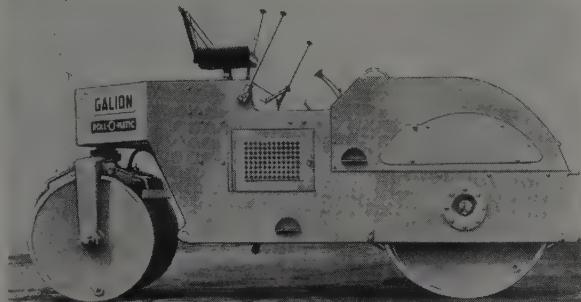
redesign and testing. Engineering changes include a new turntable design for less wear and greater strength. Continental F-209 gasoline engines are standard power units, adding about 14% more horsepower. Model T-350 is a carrier mounted unit with a 11-ton lifting

capacity. This unit works with any of Bantam's many front-end attachments. The C 350 crawler mounted Bantam (illustrated) is available with either standard side frames or long frames for extra stability to handle crane work up to 8 tons. Working with the long backhoe attachment as shown, this model will dig to depths of 18 ft. 10 in.

... Circle No. 178

### Galion re-designs its 3-5 ton roller

Equipping it with Roll-O-Matic drive, **Galion Iron Works & Manufacturing Co.**, has completely re-designed its 3-5 ton variable weight, tandem roller. This

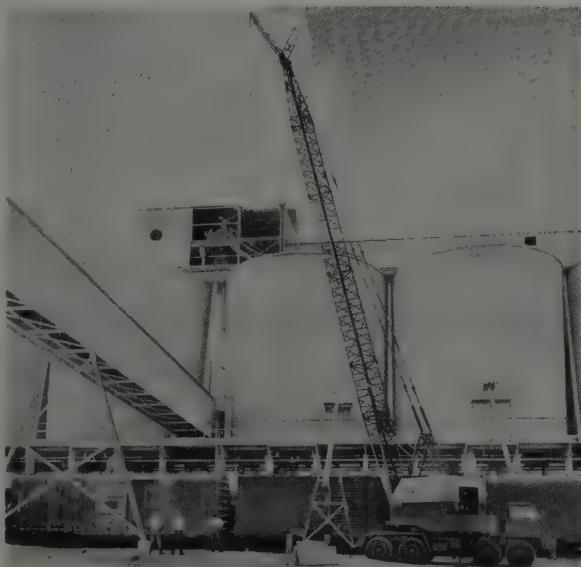


places the advantages of the Roll-O-Matic drive on the smallest roller in the Galion line, increasing its performance and ease of handling. The unit has all of the features, appearance and design of the larger models including hydraulic steering mechanism.

... Circle No. 179

### 45-ton transit crane

An improved model 30-B transit crane with 45-ton capacity on a 40-ft. boom in a 15-ft. radius is announced by **Bucyrus-Erie Co.** New crane will reach 140 ft. with jib, can also be used as a hoe, dragline,



clamshell and up to 1 1/4-yd. shovel. Features include air-operated boom hoist and engine master clutch to complement air control system, adjustable cone rollers, and 6 x 4 or 8 x 4 carrier with gas or diesel engine.

... Circle No. 180



### STANG LOWERS THE WATER TABLE 20 FT. IN -15° WEATHER

Sub-zero weather, yet business as usual—thanks to the reliability of a Stang Wellpoint System. In any weather, under all conditions, you can depend on Stang engineered dewatering systems. Call on the John W. Stang Corporation next time you have a dewatering problem. They're first in engineering, first in equipment, and first in service.

PROJECT: STORM DRAINS FOR MINNESOTA STATE HIGHWAY DEPT., BLOOMINGTON, MINNESOTA. CONTRACTOR: BARBAROSSA & SONS, INC., ST. CLOUD, MINN.

### JOHN W. STANG CORPORATION

8221 ATLANTIC AVENUE, BELL, CALIFORNIA

Engineers and Manufacturers of Dewatering Equipment,  
Wellpoint and Pumping Systems, Dewatering  
Planning—Equipment—Service



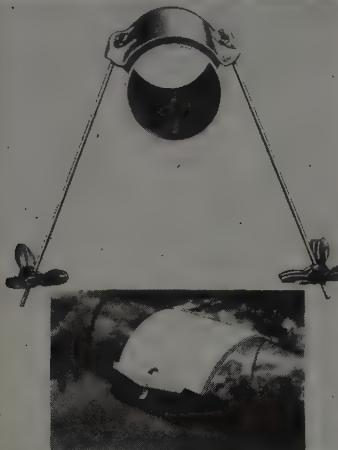
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TACOMA, WASHINGTON  
SO. MINNEAPOLIS 17, MINN.  
ST. PETERSBURG, FLORIDA

... for more details, circle No. 78 on Reader Service Postcard

## Anchors for holding pipelines

For holding down pipelines in crossing rivers and marsh land, the Grip-Tite expanding anchor and pipe saddle has been developed by the company with the same name.



A feature of the unit is the design which avoids damage to any protective coating on the pipe. Announcement of the availability of these anchors follows five years of research and testing. Cost is much less than the usual concrete or cast iron weights and no heavy equip-

ment is required for installation. The assembly is made of malleable iron and the saddle is made of 10-gauge sheet steel hot dip galvanized after stamping.

... Circle No. 181

## Foot decelerator for Cats

A new attachment announced by Caterpillar Tractor Co., enables an operator to slow his engine down without using the hand throttle. This is a foot-operated decelerator for the Caterpillar D8 tractor. It is optional equipment for both direct drive and torque converter tractors. When the decelerator is released by the operator, the engine returns automatically to the hand throttle setting. The connection is to the diesel engine governor, and is entirely independent of the hand throttle setting. The principal advantage of the attachment is to free the operator's hands for other control levers and is designed to permit the operator to pick up loads slowly when pushing, ripping, etc. Use of the decelerator will make tractor control easier and should reduce maintenance costs.

... Circle No. 182

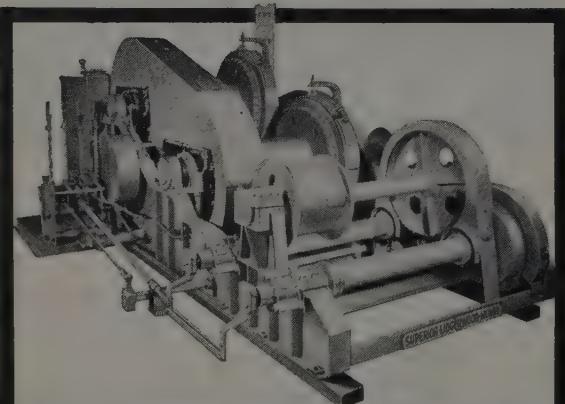
## Rip-rap bucket of 2-yd. size

Adding to its line of materials handling buckets, Yaun Manufacturing Co. Inc. has a new rip-rap bucket built for sizes from  $\frac{1}{2}$  to 2 yd. Buckets larger than this size will be built at customer request to handle special applications. This



field tested rip-rap handler is designed to pick up stones easily and is adapted specially to the unloading of gondola cars. In the  $\frac{1}{2}$ -yd. size the bucket weighs about 2,000 lb. and the large size 2-yd. bucket weighs 12,000 lb.

... Circle No. 183



## ELECTRIC DERRICK HOISTS

S-L-M serves the St. Lawrence Seaway by supplying Electric Derrick Hoists as shown.

Your derrick hoist requirements can also be met with hard working, durable Hoists and Swingers arranged, designed and built to your requirements.

Flexibility of design is a feature of these hoists as each is arranged to suit exact requirements, yet consist of a combination of standard parts.

Write for Bulletins and Catalogs

## SUPERIOR-LIDGERWOOD-MUNDY CORPORATION

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

... for more details, circle No. 79 on Reader Service Postcard

## Fast, expert service on SWEEPER REFILLING!



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



PACIFIC COAST BRUSH CO.  
2030 E. 7th Street, Los Angeles 21, Calif.

... for more details, circle No. 80 on Reader Service Postcard

## Square and Rectangular Tubing

For COLUMNS AND BEAMS . . . in special sizes . . . not available from tube mills.

Fabricated to your exact length . . . . . avoid costly tubing remnants

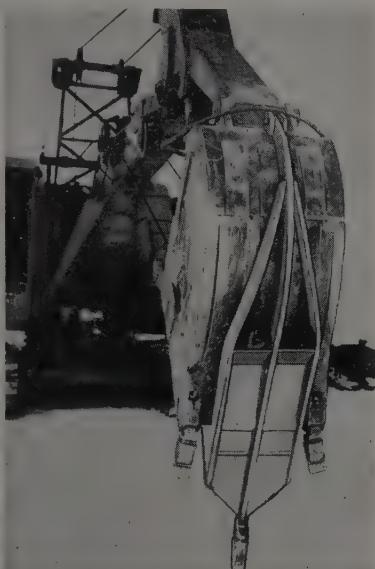
## FABRICATED STEEL SERVICE, INC.

7400 Laurel Canyon Blvd. No. Hollywood  
ST 7-1508 — PO 5-9406

... for more details, circle No. 81 on Reader Service Postcard

## Ripper for tough going

Designed specially for ripping in hard or frozen ground the unit of Rapid Ripper Manufacturing Co. is designed for digging at half throttle with no damage to the boom or bucket of the backhoe. The attachment is designed to



make possible digging in the type of material where additional machinery would normally be required. Tests indicate that the ripper can handle 30 in. of solidly frozen ground. The bucket teeth and lip are protected during this operation. Attachment requires only 15 min. after the initial installation of two supporting ears by welding. The device can be removed in one minute and does not interfere in any way with normal digging operations, after the tough ground has been pierced.

... Circle No. 184

## New mobile utility drill

Particularly suited for the installation of highway guard rails, a new light-weight drill has been announced by Mobile Drilling, Inc. The digger is fully hydraulic, powered by a 36-hp. gasoline engine, and features a fast, full 72-in. stroke for boring 24-in. diameter holes 6 ft. deep, and 4½-in. holes to a total depth of 75 ft. Mounted on any ¾-ton truck the digger can be readied in seconds. The unit will bore angle holes 45 deg. left or right and 90 deg. to the rear of the vehicle. Overall weight is 2,600 lb. and the height aboard vehicle is only 55 in. Skid-mounted models are also available.

... Circle No. 185



Schramm 125 cfm Heavy Pneumatractor is an air compressor with tractor features, including front end loader and backhoe. Pictured here is one-yard loader being used for rough grading. With Pneumatractor, you get a unit that replaces many special machines. Available: gasoline or diesel.

## HERE'S AN AIR COMPRESSOR THAT'S DIFFERENT!

**Schramm Heavy Pneumatractor is a 125 cfm compressor—with heavy-tractor features—does all kinds of construction work.**

Look closely at competitive air compressors today. You'll find designs are similar, engines are similar, ratings are similar, costs are similar. Now, at last, there's an air compressor that's different—Schramm Pneumatractor—self-propelled 125 cfm compressor with tractor accessories. It's the "do-all" on any construction job because it not only operates air tools, but also loads, breaks-out concrete, trenches, grades. There's no end to the jobs it can do—yet its cost is much lower than the cost of a tractor, loader, backhoe and air compressor.

**Always ready for work.** No delays, no crews tied up; Pneumatractors go where needed—start work at once.

**Eliminate a truck.** The operator simply climbs into the seat and drives a complete 125 cfm compressor from job to job. Pneumatractors go where ordinary towed portables can't—do the work of an extra tractor.

See your local Schramm Dealer, or write for your free copy of Catalog 5740.



Pneumatractor guard rail driving is one example of its versatility. It also plows snow, sweeps sand or gravel, operates 3-gang tamper or four single tampers, powers a host of air tools.



Universal movement of backhoe lifts, carries and places equipment and materials, as well as digs.

... for more details, circle No. 82 on Reader Service Postcard

## Curing tape for concrete joints

To cure concrete in newly sawed joints, Presstite-Keystone Engineering Products Co. has developed a new tape. By using the tape all of the original moisture in the green



concrete along the joint is retained, infiltration of foreign matter is prevented until the joints are sealed, and blowing out of the joints is eliminated prior to placing the seal. ConSeal consists of two parallel ribbons of mastic set about 1½ in.

apart applied to a plastic tape. This unit is protected by a glassine backing which is snapped off and the mastic ribbons applied on either side of the joint by pressing down. This seal can be applied about 30 minutes after the joint has been sawed.

... Circle No. 186

## Side-boom for wheel tractors

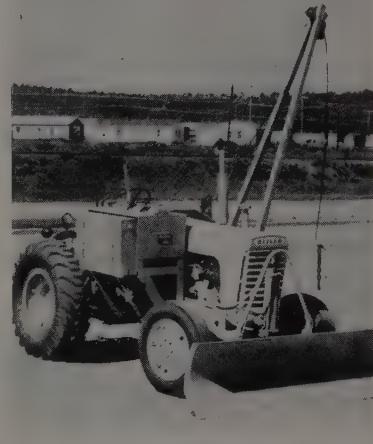
A sideboom has been designed for use on rubber tired tractors and

is marketed by Midwest Manufacturing Co. The boom has a lifting capacity of 7,000 lb. with all hydraulic operations. A counterweight can be extended to increase stability in handling heavy loads. The unit has been designed primarily for use on the Oliver 770 industrial wheel tractor which is equipped with power steering. Modifications are under way to adapt the sideboom for use on other models of rubber tired tractors.

... Circle No. 187

## Flasher lights with transistors

Using transistors, the new 7-in. flasher light developed by Traffic Equipment Co. is designed especially for construction jobs and includes high impact plastic lenses and longer and slower flash. The lens has an exclusive reflector ring that provides additional brilliance when struck by lights of the approaching car. The self contained unit is virtually indestructible and is unconditionally guaranteed against failure of any component parts. The entire unit is water proof, vapor proof and will operate continuously on its 6-volt battery for 2,200 hours. ... Circle No. 188



## Maximum SAFETY

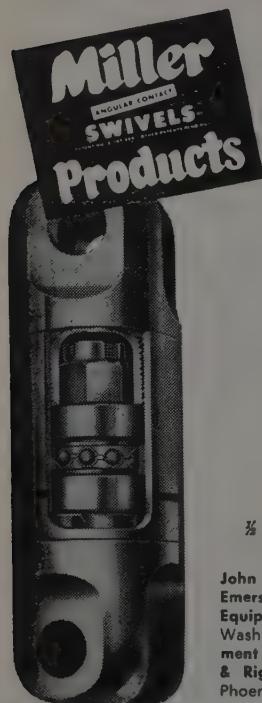
## plus SAVINGS

- 1. Matched set of angular contact bearings.
- 2. Practically friction free.
- 3. Seal keeps grease in, foreign matter out.
- 4. Faster hoisting due to non-spinning loads.
- 5. Faster load placement due to easy load turning.
- 6. Faster rigging due to elimination of cranky wire rope performance.
- 7. Elimination of twists and kinks means longer wire rope life.
- 8. Safer load placements due to non-spinning loads.

21 standard types available from  $\frac{1}{2}$  ton to 250 ton working load

### Distributors

John Batchelor, Los Angeles, Calif.; Weeks Howe Emerson, San Francisco, Calif.; Mallory Logging Equipment, Portland, Ore.; B & J Equipment, Seattle, Wash.; Power Rental, Denver, Colo.; Holland Equipment Co., Salt Lake City, Utah; Fresno Wire Rope & Rigging, Fresno, Calif.; Western Machinery Co., Phoenix, Ariz.; Mine Supply Co., Albuquerque, N.M.



## Miller Swivel Products Inc.

P. O. BOX 9381 • POMONA, CALIF.



## MILLER HIGH LIFT BLOCK

Welded Construction, Large Diameter Pin; Shortest Headroom, Moveable Swivel Hook, Individual Sheave Lubrication, Bronze spacers between Sheaves. Available with MILLER SWIVEL HOOK or TIMKEN BEARING HOOK. 5-75 Ton Capacity.

... for more details, circle No. 83 on Reader Service Postcard

WESTERN CONSTRUCTION—APRIL 1959

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• APRIL 1959

(Mail before June 30, 1959)

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6 26 46 66 86 106	126 148 170 192 214	236 243 250 257 264 271 278 285 293 2
7 27 47 67 87 107	127 149 171 193 215	237 244 251 258 265 272 279 286 294 2
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10 30 50 70 90 110	130 152 174 196 218	
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4 24 44 64 84 104	124 146 168 190 212	234 241 248 255 262 269 276 283 291 2
5 25 45 65 85 105	125 147 169 191 213	235 242 249 256 263 270 277 284 292 2
6 26 46 66 86 106	126 148 170 192 214	236 243 250 257 264 271 278 285 293 2
7 27 47 67 87 107	127 149 171 193 215	237 244 251 258 265 272 279 286 294 2
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9 29 49 69 89 109	129 151 173 195 217	
10 30 50 70 90 110	130 152 174 196 218	
11 31 51 71 91 111	131 153 175 197 219	
12 32 52 72 92 112	132 154 176 198 220	
13 33 53 73 93 113	133 155 177 199 221	
14 34 54 74 94 114	134 156 178 200 222	
15 35 55 75 95 115	135 157 179 201 223	
16 36 56 76 96 116	136 158 180 202 224	
17 37 57 77 97 117	137 159 181 203 225	
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# READER SERVICE CARDS

Get the additional facts  
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See other side for  
details.

## Trencher fast coupled to tractor

The "Laster" trencher of Deltec, Inc. has been designed to free any wheel type tractor quickly for other use. The attachment of the trencher does not interfere with front mounted equipment. One of the chief drawbacks to tractor mounted trenchers has been the tying up of the tractor for a single function. Any wheel type tractor with live



power takeoff and a 3-point hitch can operate this trencher. A special device moves the tractor forward at the correct rate of speed digging trenches from 6 to 14 in. wide. With a forward speed up to 500 ft. per hour, the unit digs a clean trench to a maximum depth of 4 ft. with a boom extension available for deeper trenching. Material is conveyed to the side of the cut with a screw type earth mover. The unit weighs about 700 lb.

... Circle No. 189

## Leveling mount

A leveling mount designed for light machinery in plants and offices which will absorb up to 85% of transmitted vibration, and eliminate damage to tile floors is announced by Unisorb Division of



Felters Co. Called Level-Rite 200 series, the unit consists of a screw post, lug and lock nut, and padded foot in steel housing. Screw post is inserted under leg or bearing point, rotated to leveling point, and lock nut tightened.

... Circle No. 190



**Quaker**  
**Thermoid**

# VERSICON

the all-purpose hose  
with truck-tire durability



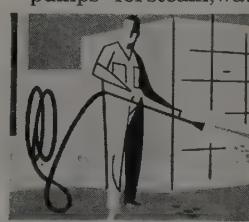
FOR COMPRESSED AIR

VERSICON hose do even more jobs for you.

VERSICON hose is good for compressed air—especially for use with air-operated drills and pumps—for steam, water, oil, grease, gasoline, welding gases, and many dilute acids. Truly versatile!

In specified lengths up to 500 feet, sizes  $\frac{3}{16}$ " to 1"; to 250 feet in sizes  $1\frac{1}{4}$ " and  $1\frac{1}{2}$ ". Ask the Thermoid industrial distributor about VERSICON hose, or write

Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Philadelphia 24, Pa.



FOR WATER AND STEAM

**THERMOID**

**PORTER**

**DIVISION**

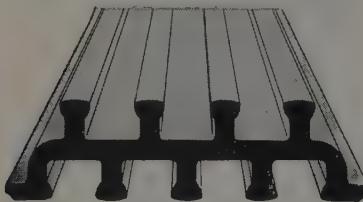
**H.K. PORTER COMPANY, INC.**

Divisions: Connors Steel, Delta-Star Electric, Disston, Forge and Fittings, Leschen Wire Rope, Mouldings, National Electric, Refractories, Riverside-Alloy Metal, Thermoid, Vulcan-Kidd Steel, H. K. Porter Company (Canada) Ltd.

... for more details, circle No. 84 on Reader Service Postcard

# LABYRINTH® WATERSTOP

A SOUND INVESTMENT  
FOR CONCRETE CONSTRUCTION!



LABYRINTH AVAILABLE IN 2, 3 or 4 rib.

## ON YOUR CONSTRUCTION:

1. Consider the investment in design, materials and labor (to mention a few).
2. Then consider how important safe, secure watertight concrete joints are.
3. Thorough watertightness can be secured by installing Labyrinth Waterstops—a dividend that makes the low initial cost of the product insignificant when compared to your total investment—and one that insures watertight concrete joints for years!

- Corrugated ribs grip concrete, insure an everlasting bond between joints.
- Finest polyvinyl plastic resists chemical action, aging, severe weather.
- Takes just seconds to nail to form ... easy to cut and splice on location (prefabricated fittings available).
- There's a Water Seal product for every type of concrete work!

If your aim is to stop water seepage, stop it effectively with Water Seals' Waterstops!

### WATER SEALS, INC.

Chicago 6, Illinois by:

THOMAS CONCRETE ACCESSORY CO.  
5341 Sheila St.  
Los Angeles 23, Calif.

HYDRO PRODUCTS CO.  
1350 Old County Road  
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CHAS. R. WATTS CO.  
4121 Sixth Ave., N.W.  
Seattle, Wash.

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BAKER-THOMAS-WOOLSEY  
300 S. Twelfth St.  
Phoenix, Ariz.

E. W. ZUCK  
1238 N.W. Glisan St.  
Portland 9, Ore.

... for more details, circle No. 85

## Vibrator has no bearings

Utilizing the principle of low-amplitude and high-frequency, the Construction Equipment Division of Pacific Mercury has a new con-



crete vibrator. The 1-man operated machine has no bearings in the vibrating device, thus eliminating a costly service and maintenance problem. The vibrating device is a patent that achieves dynamic imbalance by a mechanically tapered finger that keeps the counterweight in tract. The motor is in the head of the vibrator. The load on the shaft is torsional, and no eccentric load is applied to the motor, nor is a flexible shaft used in the unit. Units are available in either 1 1/2-in. or 2 1/2-in. diameter heads.

... Circle No. 191

## Splice conveyor belts without vulcanizing

Using a high tension type of mechanical fastener, Manhattan Rubber Division of Raybestos-Manhattan, Inc., has a new method of splicing conveyor and elevator belts without field vulcan-

izing. The splice is rated as equal to a vulcanized splice for operating tensions up to 700 lb. per inch width of belt of 5 or more plies. The system is designed to reduce labor, materials and shut-down costs. As shown in the illustration the 2 rows of Flexco bolt and plate fasteners are installed along a V-shaped cut. The tip and tail fasteners are of special design to insure the joint can provide a permanent seal under operating tensions.

... Circle No. 192

## Portable maintenance shop

A low-cost all steel portable maintenance building designed for erection by unskilled crews with-



out use of cranes or heavy equipment has been developed by Stran-Steel Corp., division of National Steel Corp. All framing connections of the Stran-Master building are made through factory-drilled holes for bolting. Building is available in widths from 12 to 120 ft.

... Circle No. 193

## IF YOU HANDLE EXPLOSIVES the MODEL 'C' is worth your life and money

Millions of pounds of explosives have been loaded by the MODEL 'C' Loading and Tamping Machine without one single accident.

Sprung holes, including all cracks and crevices, are completely filled through use of the 'Model C', giving full breakage power to any powder or ammonium nitrate used.

The Model 'C' loads 25 pounds of explosives in less than one minute, saving from 55 to 72% in labor over hand loading and backfilling.

for complete details write:

**PNEUMATIC LOADING MACHINE CO.**  
806 Central Tower Bldg., San Francisco, Calif.

or fill in reader service card



... for more details, circle No. 86 on Reader Service Postcard

WESTERN CONSTRUCTION—April 1959



**NEW POWER SHOVEL, Type 64, recently introduced by Baldwin-Lima-Hamilton Corp., has a 1 1/4-yd. dipper on 17-ft. handle and 20-ft. boom. Equipped as a crane it has a capacity of 40 tons. New model offers two sizes of crawlers, both demountable for highway transport. Special heavy-duty version, Type 64 SC, has 50-ton capacity and power features for special jobs.**

... Circle No. 194

### Package cement-aggregate batching

A one-package, automatic batch plant designed by C. S. Johnson, "Automaster-CA" incorporates cement and aggregate batching at high capacity. No shipping piece is wider than 8 ft. providing easy transportation of the plant. The bin is divided into three equal aggregate compartments and one cement container. Aggregate capacity is 100 cu. yd. and the cement compartment has a capacity of 145 bbl. The three batchers for the aggregate and the 14-cu. ft. batcher for cement have a capacity adequate for 1 1/2-cu. yd. paver batches. These units come delivered with all wiring and piping included. The batch cycle is only 15 sec. and provisions are made for releasing cement either into the aggregates

or in a separate cement can as specified. Aggregate scales are equipped with moisture compensating beam, and the electrical controls actuate air rams which operate the batcher gates.

... Circle No. 195

### Check your tire pressure accurately

Accurate checking of air pressure in large off-the-road tires is essen-



tial to their long life and proper service. Dill Manufacturing Co. has available three new pressure gauges designed for such accurate testing. The gauges are precision made, accurately tested and consist of a standard bore dual foot gauge. Other models have oversize and standard pushon arrangements. All models are available in either high or low pressure ranges. The manufacturer recommends for maximum efficiency from tire gauges to have a master gauge for checking the service equipment. These master gauges are also available in the Dill line.

... Circle No. 196



## WHERE TO BUY GORMAN-RUPP CONTRACTORS PUMPS

These distributors offer the full line of Gorman-Rupp Contractors' Pumps. Most have rental service, too.

**Andrews and Andrews Equip.**

Portland

**Andrews Equipment Service of  
Washington**

Spokane

**Bay Cities Equipment Co.**

Oakland and San Jose

**Brown-Bevis Industrial Equip. Co.**

Bakersfield

**The Harry Cornelius Co.**

Albuquerque

**Delta Tractor Co.**

Stockton

**Paul Droscher Sales**

Redding

**Faris-Moritz Equip. Co.**

Denver

**Flaherty Manufacturing Co.**

Pocatello

**Industrial Tractor Sales**

N. Sacramento

**The Lang Co.**

Salt Lake City

**Mid-State Truck & Mach. Co.**

Wenatchee

**Northern Commercial Co.**

Seattle

**Pacific Hoist & Derrick Co.**

Seattle

**Reno Equipment Sales Co.**

Reno

**Shasta Truck & Equip. Sales**

Redding

**Standard Machinery Co.**

San Francisco

**Starline Equipment Co.**

Boise

**Studer Tractor & Equip. Co.**

Casper, Wyoming

**Western Construction Equip. Co.**

Billings and Great Falls

**Western Equipment Co.**

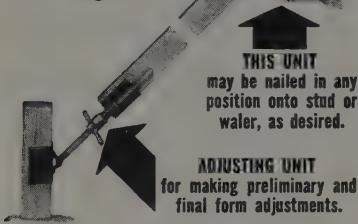
Portland and Eugene

... for more details, circle No. 87

## FOR QUICK AND POSITIVE FORM ALIGNMENT

# New! SUPERIOR Adjusta-Brace

Permits maximum adjustment in ANY direction at ANY angle.

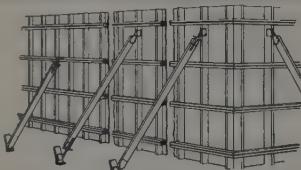


Providing a swivel action for quick positioning and adjustment, the Superior Adjusta-Brace consists of two units, connected by a 2 x 4, 2 x 6 or a 1" i.d. pipe. Either unit may be attached to the wall form, or to the stake, but it is usually more convenient to use the Adjusting Unit at the stake.

The Adjusting Unit has a patented double-wing nut, working on a 1" diameter rod, with an adjustment of 12". The design of this bracket and the method of attachment are such that it works as a universal joint to take any required position. The companion non-adjusting unit is also designed to take any position that field conditions may impose.

The Superior Adjusta-Brace is light in weight, durable, and inexpensive. Contractors report substantial savings in time and labor compared to the conventional method of bracing.

Write for prices & Bulletin AB-1.



VARIOUS METHODS OF USING SUPERIOR  
ADJUSTA-BRACE  
Nailing brackets may be fastened to stud or  
wale, and stake.

## SUPERIOR

### CONCRETE ACCESSORIES, INC.

9301 King St., Franklin Park, Ill.

New York Office

1775 Broadway, New York 19, N. Y.

Houston Office

4101 San Jacinto, Houston 4, Tex.

West Coast Plant

2100 Williams St., San Leandro, Calif.

... for more details, circle No. 88

## Backup warning horn

"Dynalarm", a backup warning horn system that provides positive automatic warning action whenever rearward motion of the vehicle exists, for any reason, has



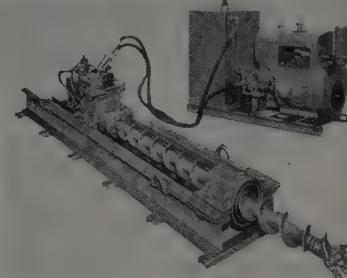
been introduced by **Atkinson Dynamics Co.** Features include transistor circuitry for added life and low power usage, foolproof actuating switch good for at least 50,000 miles in reverse, and direct sound engineered for maximum penetration rearward to warning area. Maintenance-free construction includes nylon and stainless steel in actuating switch, and permanent sealing of horn circuits in plastic. Unit is applicable to any equipment, and is available in 6, 12, and 24 volt systems.

... Circle No. 197

## New trench drills

A new line of trench drills which drill a hole for pipe, advance the pipe casing into the hole, and re-

move drilled earth through the inside of the pipe—all simultaneously—is announced by **Salem Tool Co.** Drills are built for laying pipe beneath pavement or other places where surface cannot be disturbed. They have laid pipe as far as 250 feet, and distance is limited only by pipe weight and earth or rock formations to be drilled. The four drill models will handle augers 4 to 36 inches in diameter, and pipe lengths of 2 to 6 feet. All drills have variable hydraulic feed in-

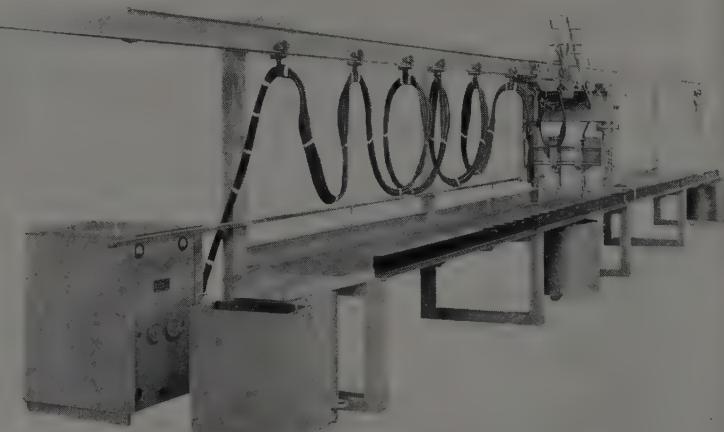


stalled in a rigid frame for accuracy. Smaller units have separate gasoline engines connected to drill by hoses.

... Circle No. 198

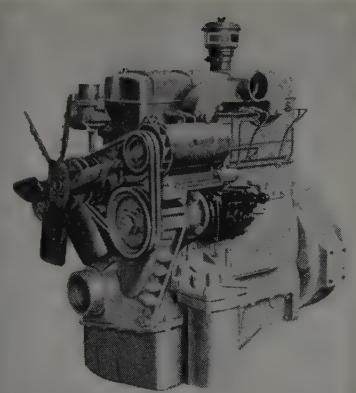
## Broader applications for Cummins

With two new diesels of 70 and 80 hp., **Cummins Engine Co., Inc.**, has two units designed particularly for applications in all types of tractors, irrigation and pumping systems, shovels, cranes, graders and rollers. These engines at 70 hp. for



**TRACK LINK** rebuilding machine introduced by **Welding Equipment, Inc.**, includes two welding wire feed units, an electric eye and accompanying patterns which materially reduce set-up time and produce positive intermittent welds. Single welding console encloses two 500-amp. units.

... Circle No. 199



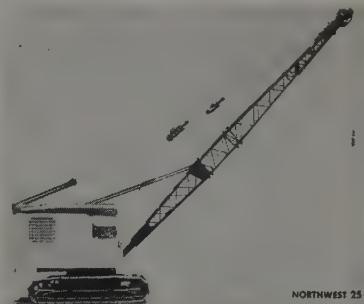
### "Power takeoff" compressor

A compact power takeoff unit that is jeep mounted represents a compressor installation that provides more air than the conventional machines. This setup is particularly convenient for curb removal using the Worthington rotary compressor. The unit weighs only 950 lb., is 38 in. long, 28 in. wide and 39 in. high. Controls include air pressure, ammeter, oil

pressure, temperature and compressor oil pressure. The unit is V-belt driven through the jeep power takeoff. . . . *Circle No. 201*

### Northwest crane redesigned

Extensive changes and improvements in its  $\frac{3}{4}$ -yd. models are an-



NORTHWEST 25-D

the J-70 and for the 80 hp. J-80 are designed primarily to bring the benefits of diesel engine economy to equipment which previously was powered primarily by gasoline engines. Field tests conducted by Cummins during the past several years indicate that fuel costs can be reduced from 65 to 70¢ per hour as compared to gasoline operation. Other advantages, according to Cummins, include lower maintenance costs and longer engine life. These engines produce 6-cylinder smoothness with 4-cylinder economy. . . . *Circle No. 200*



nounced by Northwest Engineering Co. Changes include a new independent worm boom hoist, power load lowering, bigger crawlers, cable drums, brakes and clutches, improved controls and grouped lubrication. The new model is designated 25-D, and will be available as a  $\frac{3}{4}$ -yd. shovel, standard crane, dragline and pullshovel.

. . . *Circle No. 202*



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# News of DISTRIBUTORS

## Rasmussen Equipment adds two

Rasmussen Equipment Co., Salt Lake City, has taken on a new sales representative: Pat Preston, who will make his headquarters at Ogden, and cover that area. Mike Brown also has joined Rasmussen in parts and service.

## Cal-Ore Machinery expansion

Added shop facilities and the addition of two men are part of recent expansion by Cal-Ore Machinery Co., Medford, Ore. The company has also taken on some new lines: Trac Machinery Co., pavers; Scales, Inc., portable scales; J. I. Case, Industrial Division, tractors and loaders; Koehring Company of California, Ruby batch plants and silos, Ko-Cal and Clark equipment; and Brown Manufacturing Co., 9-wheel self-propelled pneumatic rollers and sheepfoot tampers.

## Brose takes on new line

The Brose Company was recently appointed distributor for Clayton Manufacturing Co. in the sale of steam generators used in the construction industry. Headed by George Brose as president, the distributorship's headquarters are located in Oakland.

## Buran distributes Saber rippers

Ripper shanks and teeth, and Weldon repair tips, products of Saber Tooth Co., are being marketed through Buran Equipment Co., California distributor with headquarters in Oakland, and branches in Santa Clara and Norwalk. Saber, a division of Buran Equipment, recently added two new sales representatives: Boyd Oliver for the Southern California territory, and Don Jones to cover Northern California.

## Wayne Ford joins Montana distributorship

Wayne Ford has joined the staff of Seitz Machinery Co. as representative for the Billings, Mont., and northern Wyoming territory. For the past several years, Ford has been road superintendent for Gal-

latin County at Bozeman, Mont. Prior to that his experience includes construction work with several major contracting firms.

## Miller Machinery adds to personnel and lines

Miller Machinery Co., Missoula, Mont., reports that Art Doherty has joined their organization as office and parts supervisor at the Great Falls branch. Miller Machinery was recently appointed Montana distributor by Marion Power Shovel Co. to cover its line through the 4-*yd.* size, and by Huber-Warco Co. for its entire line of grader, maintainer and roller equipment.

## Carrington takes on new line

The tractor cab line manufactured by Medford Steel Co. has been taken on by The Carrington Co., Seattle.

## Electric Tool acquires several new equipment accounts

Several additional accounts were recently acquired by Electric Tool & Equipment Co., Los Angeles. They are Pacific Mercury generators, Carter pumps, J. I. Case utility tractors, Miller Welder generators, Kelco sand blasting machines, Canoga concrete mixers, and Allis-Chalmers fork lift trucks. Philip Krasnow is sales manager of the firm, which was formerly known as Electric Tool & Supply Co.

## Additional accounts for Portland distributor

Three new equipment lines have been taken on by George M. Philipott Co., Portland: McKiernan-Terry Corp., Stanco Mfgs. & Sales, Inc., and Wincharger Corp.

## Jim Cowan retires from A. H. Cox & Co.

Announced by E. E. Dionne, president of A. H. Cox & Co., Seattle, is the retirement of James D. Cowan from the machinery business. Cowan joined the Cox sales force in 1935. Shortly thereafter he was made manager of the construction and industrial machinery department, a position he held until his retirement. Cowan was one of the first men in the Northwest area to market truck mixers. Because of his background in concrete know-how, both building and equipment, the majority of those in Cox sales today are products of his fine training.

## Hatten new Universal Form Clamp distributor

Hatten Machinery Co. of Seattle, Wash., has been appointed an exclusive distributor for the Universal Form Clamp Co., manufacturer of concrete forms (Uni-Form panels), form ties and concrete accessories. Hatten will maintain a complete stock of Universal products for prompt shipment and service to contractors in the western half of the state of Washington.

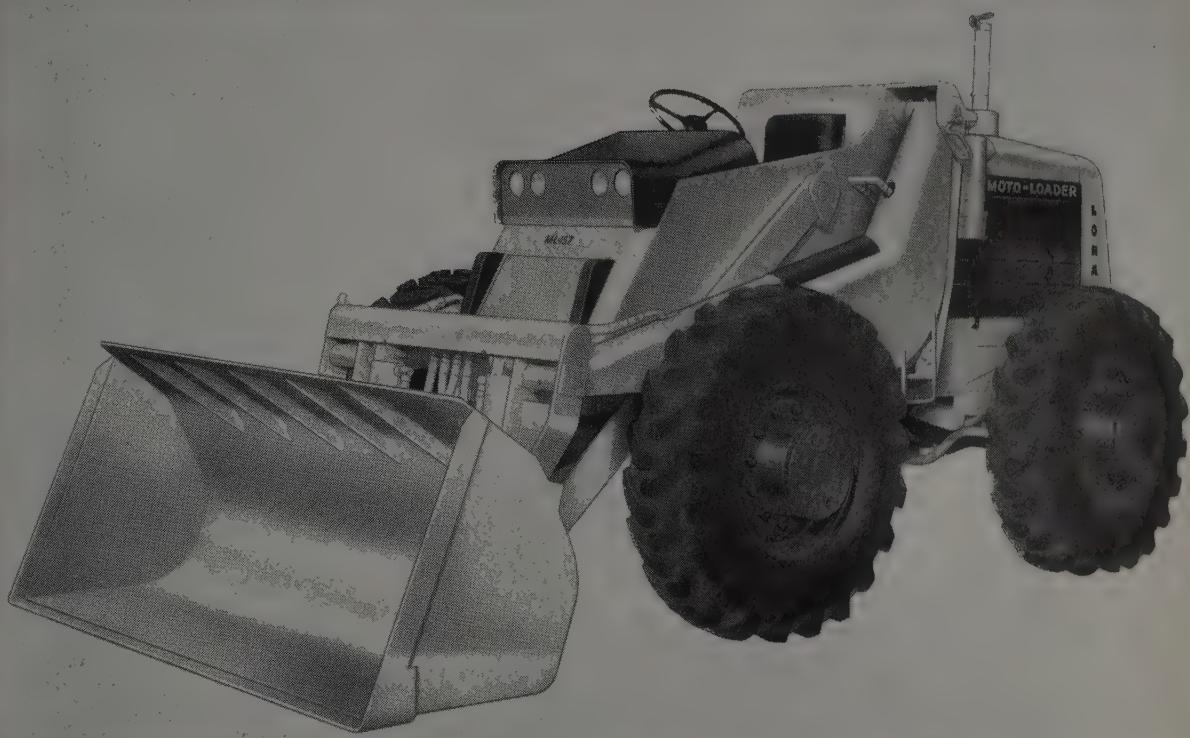
## Pacific Mercury names distributors

Diamond Gardner Corp., Chico, Calif., was recently appointed a stocking distributor for Pacific Mercury electric plants, designed specifically for use by the construction industry. According to Mana-



NEW HOME of Howard-Cooper Corp. at 85th and Killingsworth, Portland. Occupying 40,000 sq. ft. on a 3½-ac. industrial site, the new office building, parts department, and shop, are headquarters for seven branches located in Seattle, and in Oregon and Northern California. The company has been a road machinery and heavy logging distributor for 53 years, and a distributor of International Harvester Co. for 25 years. It also distributes construction equipment manufactured by Link-Belt Speeder Corp., Frank G. Hough Co., Galion Iron Works & Mfg. Co., E. T. Etnyre Co., and many others.

# 3 NEW LORAIN® MOTO-LOADER DISTRIBUTORS



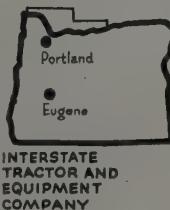
ML-157 2-yd. capacity—ML-153 1 3/4-yd. capacity also available

Since introducing the new Lorain Moto-Loader, ML-157, sales have been booming. The Thew Shovel Company has added three new Motor-Loader distributors in the west: Interstate Tractor and Equipment Co., Atlas Equipment Co., and Coast Equipment Co. Ready for your inspection at their headquarters is the Moto-Loader you helped design.

It has the features voted most important by contractors. • One foot control of travel-direction and speed • New dumping height for higher trucks and hoppers • New forward reach that lets you dump farther out • Bucket tilt-back that really gets and carries a payload • 7000 lbs. capacity and balanced weight distribution. See this Lorain Motor-Loader now at:

## INTERSTATE TRACTOR AND EQUIPMENT CO.

2855 N. W. Front Avenue  
Portland 10, Oregon



With headquarters in Portland, Interstate Equipment serves the entire state of Oregon plus the counties of Wahkiakum, Cowlitz, Skamania, Clark and Klickitat in Washington.

## ATLAS EQUIPMENT CO.

1595 S. 2nd Street  
Salt Lake City 4, Utah

With headquarters in Salt Lake City, Atlas Equipment serves the entire state of Utah, plus the counties of Lincoln and Uinta in Wyoming.



## COAST EQUIPMENT CO.

444 8th Street  
San Francisco 1, California

With headquarters in San Francisco, Coast Equipment serves the territory north of the county lines of San Luis Obispo, Kings, Tulare and Inyo counties. Including bordering counties of Monterey, Fresno, and that portion of Eldorado, Placer and Nevada counties lying west of the Sierra Range.



THE THEW SHOVEL CO., LORAIN, OHIO

... for more details, circle No. 90 on Reader Service Postcard

ger Howard Underwood, the company will maintain a complete parts and service department.

Also announced is that Constructors Supply Co., 7109 S. Alameda, Los Angeles, has been appointed distributor for Pacific Mercury flasher lights. Besides the stocking of a complete line of flasher lights including the newly introduced transistorized neon type, the company will maintain a parts and service department according to Charles Chase, manager of Constructors Supply.

#### Nor Cal Euclid moves

Located on Highway 40 and Harbor Blvd., two miles west of Sacramento, Calif., is the new home of Euclid equipment. Northern California Euclid, Inc. recently acquired the property and moved in "lock, stock and barrel." One of the largest service and parts departments in California has been installed in the modern 16,000-sq. ft. building. Under the direction of Howard Counts, the department is well staffed by trained mechanics. Every item required to keep the Euclids on the job is immediately available in the stock department headed by Howard Smith.

Responsible for putting the Northern California Euclid plant in this second-to-none operating capacity are Steve Collins, general manager, Paul Hayden, sales manager, and Gordon Simpson, office manager.

This dealership also maintains an office at 717 Market St., San Francisco, where Jim Gerlach is available to fulfill customer needs.

#### Heiner takes on another line

The Marion shovel line was recently added to the many accounts handled by Heiner Equipment & Supply Co., Salt Lake City. Also reported is a new Heiner salesman covering southern Utah, Dale Reese.

#### Washington distributor appointment

The Prime-Mover Co. has appointed A. H. Cox Co. exclusive distributor for the western half of the state of Washington. Headquarters and service facilities are maintained at 1757 First Ave. South, Seattle. Prime-Mover manufactures powered carts and a fork lift for handling concrete, masonry materials and building supplies.

# MANUFACTURERS

#### M-F 1959 line unveiled

Highlighting the "Show of Progress," dealer exposition put on by Massey-Ferguson Industrial Division, Wichita, Kan., was the display of its 1959 line of machines and equipment to 4,500 M-F dealers and company officials. The exposition was held at Detroit, where the company's full list of U. S. distributed tractors is manufactured.

#### Campbell Chain opens West Coast plant

Opening of a new modern chain plant at Alvarado, Calif., is announced by George J. Campbell, Jr., president of Campbell Chain Co., York, Pa. According to the announcement, the plant provides complete chain making facilities for the first time on the West Coast. The new plant will produce every type of welded and weldless chain and assemblies.

#### Sales executive appointments

Appointments of four sales executives to positions in The General Tire & Rubber Co.'s new truck and trailer branch department are announced by Paul E. Shobert, manager of manufacturers' sales. The men and the areas they cover are: C. L. Howes, Dallas, Houston and Kansas City divisions; Richard Graybill, Philadelphia, New York and Boston divisions; H. W. McAllister, Akron, Detroit and Cincinnati divisions, and William Boyd, Chicago, Twin City, and St. Louis.

#### Aeroquip opens Portland facility

Establishment of a new warehouse facility in Portland, Ore., to serve customers in the Northwest is announced by the Western Division of Aeroquip Corporation, Burbank, Calif. Peter S. Naimo, formerly of the customer service department at the Western Division, is appointed manager. The warehouse is at 635 N. W. 16th Ave., Portland.

#### Sales appointments by Worthington

Three appointments are announced by Worthington Corporation. Jack B. Larmy has been named manager of sales. For the past three years he served as assistant manager of the Marketing Division and Eastern regional sales manager, a post now taken over by Patrick L. McManus. McManus,

## OUR DRILLING REVEALED A DIFFERENCE OF 320 ft.



BORING SETUP—NEW YORK HARBOR

On the site of a proposed tunnel requiring sub-aqueous borings we proved the presence of bedrock at depths of only 180 ft., whereas a different method by others had indicated that the overburden extended to depths of over 500 ft. Thus, again it was proved that the cost of an adequate and reliable foundation investigation program is essential in the design of a tunnel, building, bridge, or other structure.

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who has been manager of the San Francisco district office since 1952, will move to the corporation's headquarters in Harrison, N. J. William M. Fine, manager of the Minneapolis district office is moving West to head the San Francisco office.

#### Lester Kuzmick advances at Felker

Lester F. Kuzmick, vice president of Felker Diamond Drills, Inc., has been appointed vice president of Felker Manufacturing Co., Torrance, Calif. Kuzmick's activities in diamond tool research and development extend over the past 18 years. During the past year he has been engaged in producing a full line of Felker Core-Lock surface-set diamond core drills as well as developing core drilling machines, both of which products are used extensively in the construction industry. Kuzmick will also continue in his present capacity with Felker Diamond Core Drills, Inc.

#### Don Blasius named distribution manager for McCulloch saws

Don Blasius has been appointed distribution manager for McCulloch chain saws. In his new position he will coordinate the sales activities of all McCulloch distributors in the United States, and will also supervise the field sales force, consisting of district managers for chain saws and "Pintail" saw chain representatives. Headquarters of the McCulloch Corporation are in Los Angeles, Calif.

#### Harry White retires; Walter Mason succeeds him

The retirement of Harry L. White, prominent trucking industry sales executive, and the selection of Walter S. Mason to succeed him as sales manager of the Autocar Division of The White Motor Co. is announced by Karl A.

Roesch, general manager of Autocar. White is a pioneer in the industry, having joined Autocar in 1918 when the company was in its infancy. Mason started his automotive career in 1925 and has been with Autocar since 1944. In the interim he has held a series of executive sales positions.

#### Weldon Thalacker is new sales engineer for Eagle

C. B. Laird, sales manager of Eagle Iron Works, Des Moines, Ia., announces the appointment of Weldon Thalacker as sales engineer for the company. Lately, as a member of the engineering department he was responsible for the supervision of construction and erection of Eagle heavy media separation plants.

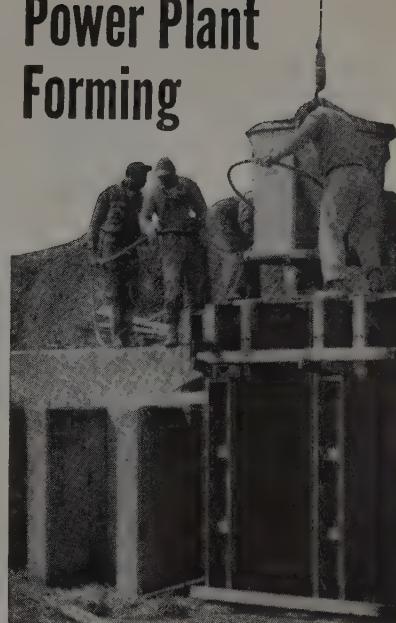
#### Wisconsin Motor Corp. celebrates 50th anniversary

Wisconsin Motor Corp. of Milwaukee, Wis. is celebrating its Golden Anniversary this year. Said to be the world's largest builder of heavy-duty air-cooled engines in terms of total annual horsepower produced, Wisconsin begins its second half-century of progress with plans for the construction of a new engineering building and testing laboratory as a unit of the company's No. 1 plant in Milwaukee.

#### Unit Crane personnel changes

A. R. Corbett, vice president of sales and engineering of Unit Crane & Shovel Corp., Milwaukee, Wis., announces the following appointments relating to sales, service and engineering: Vernon S. Barnes, director of marketing; J. W. Lenahan, sales manager; Troy Cook, assistant sales manager; LeRoy Schaefer, parts sales manager; Gene Glisch, service manager, and Carl

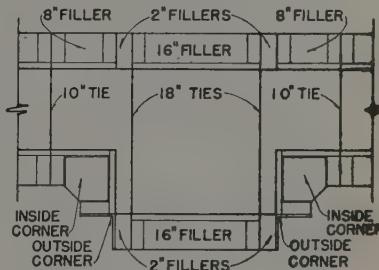
## Power Plant Forming



## Symons Forms Help Contractor Race Clock

### Pour 530 Yards of Concrete in 5½ Hours

Racing a siege of wet, windy weather, workmen on the new \$10 million Blue Valley Station of the Independence, Mo. power plant, teamed up to pour 530 yards of concrete during one 5½ hour period.



Pilasters similar to the ones shown are easy to erect with Symons Fillers and Corners.

Sharp Bros. Contracting Co., Kansas City, the contractor, is using 8,000 square feet of Symons Standard High Strength Forms to pour 40,000 square feet of concrete. Much of the concrete is in thick slabs and pedestal bases with wall thicknesses varying from six to 84 inches. Symons 84-inch washer ties are being used in pouring pedestals for the turbines.

You can rent Symons Forms, Shores and Column Clamps with purchase option. Information on Symons products upon request.

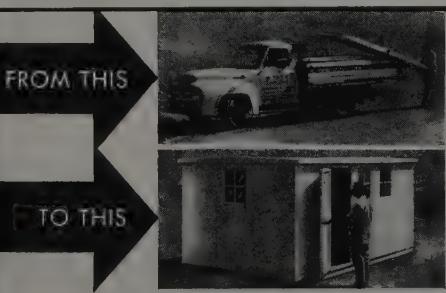
**Symons**

### SYMONS CLAMP & MFG. CO.

634 Williams Street, San Leandro, California

Phone: LOckhaven 9-9159

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You can move a Porta House on a pickup truck. Prefabricated, bolted, waterproof plywood panels. Quickly assembled and disassembled by unskilled labor.

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Sizes: 9'x6', 9'x9', 9'x12',  
etc.—to any length  
12'x12', 12'x15', 12'x18',  
etc.—to any length



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Catalog featuring Economy  
Steel Forms available on  
a rental basis.



Catalog featuring EFCO  
Steel Forms, Economy  
Steel Forms and Special  
Economy Steel Forms.



Folder featuring Economy  
Steel Forms for precast,  
prestressed concrete.



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Des Moines, Iowa

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Firm name \_\_\_\_\_  
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Fairbanks, assistant chief engineer.

Barnes was formerly employed by Reliance Electric & Engineering Co. Lenahan moves up from assistant sales manager, while Cook was formerly the assistant. The appointments in service result from a division of responsibilities which separates parts sales management from field service management.

### Blaw-Knox adds facility for faster service

Blaw-Knox Co., Pittsburgh, Pa., has opened new West Coast sales and warehouse facilities for construction equipment at 305 Adrian Road, Millbrae, Calif., 16 miles south of San Francisco. Inventories of certain repair parts and complete machines will be stocked at the Millbrae warehouse to provide faster deliveries for construction equipment distributors and West Coast contractors. William J. Conway, West Coast sales manager, is in charge.

### Seaman-Andwall appoints general sales manager

Announcement is made of the appointment of William C. Cornell as general sales manager of Seaman-Andwall Corp., Milwaukee, a subsidiary of American Marietta Co. Formerly with Pettibone Mulliken Co., he was its director of sales training. Prior to this he was manager of national accounts for Frank G. Hough Co.

### Sabin of CF&I is honored by ad club

Gerould A. Sabin, advertising director of the Colorado Fuel & Iron Co., was presented with the award, "Advertising Man of the Year" at a recent meeting of the Advertising Club of Denver. The award was made for "ethical performance of advertising" during a lifetime career in advertising.

### R. G. Margett receives promotion

R. G. Margett is appointed assistant construction machinery sales manager of the Allis-Chalmers branch in Oakland, Calif. He joined the company in 1956 as construction machinery salesman at this branch.

### W. W. Greenway joins United Concrete Pipe Corp.

William W. Greenway has been elected a vice president in charge of all operations of United Concrete Pipe Corp. He was formerly vice president of U. S. Industries, Inc., and general manager of its

Axelson Manufacturing Co. United Concrete operates plants in California, Utah, Washington, and Texas, producing all types of concrete pipe as well as fabricated steel products, with headquarters in Baldwin Park, Calif.

### FWD changes name on 50th birthday

Four Wheel Drive Auto Co., Clintonville, Wis., celebrated its fiftieth birthday by changing its name to FWD Corporation. The name was changed in order to avoid the misleading connotations of the old name, FWD president Maurice E. Ash said. "FWD has not made an auto since 1912, and now makes many types of vehicles in addition to four-wheel drive," Ash said, including heavy-duty trucks and other specialized vehicles.

### Executive moves by Keasbey & Mattison Co.

Executive changes in the sales division are announced by Robert R. Porter, president of Keasbey & Mattison Co., Ambler, Pa., manufacturer of asbestos, asphalt and heat insulating products. D. W. Widmayer, vice president, moves from director of sales to marketing consultant. Norman L. Barr, formerly general sales manager of the Asbestos-Cement Pipe Division, becomes the firm's general sales manager. James R. Reichel, who has been serving as district sales manager of K&M's San Francisco District office, is the new general sales manager of this division. John L. Prechek moved up to Reichel's post in San Francisco.

### Frank Miller retires from Sisalkraft

After 28 years with American Sisalkraft Corp., of San Francisco, Frank S. Miller, Southern California manager has retired. His entire business career has been spent in the California-Arizona industrial market handling sale of Sisalkraft papers and plastics.

### Towmotor announces executive change

A top management appointment is announced by Towmotor Corporation, Cleveland, Ohio. C. E. Smith, president of Towmotor, has been elected president of Gerlinger Carrier Co., a subsidiary, at Dallas, Ore. He succeeds V. O. Williams, who resigned the office, but continues as a director of both companies.

# UNIT PRICES

## Selected abstracts for Western projects

### HIGHWAY—Grading section of Old Oregon Trail

Oregon—Umatilla County—State. Rogers Construction Co. of Portland was low of 14 bidders at \$1,658,362 for grading the Deadmans Pass—Meacham section of the Old Oregon Trail.

(1) Rogers Construction Co. ....	\$1,658,362
(2) Miller Hutchins Contr., Inc. ....	1,757,855
Peter Kiewit Sons' Co. ....	1,823,065
S. S. Mullen, Inc. ....	1,950,794
Max J. Kuney Co. ....	2,005,231

	(1)	(2)
12 only	Clearing and grubbing....	\$200,000.00
1 only	Drainage excav., unclass. ....	4.00
6 only	General excav., unclass. ....	.47
1,200 cu. yd.	Short overhaul ....	.005
251,000 lb.	Long overhaul ....	.30
1,350 lin. ft.	Finish roadbed & slopes....	3,000.00
6,200 rods	Rounding cutbanks ....	.10
240 rods	24 in. concrete pipe....	4.00
2 only	15 in. corr. metal pipe....	3.25
2 only	18 in. corr. metal pipe....	3.75
30,700 ton	24 in. corr. metal pipe....	5.50
5,600 ton	36 in. corr. metal pipe....	11.00
2,800 M gal.	36 in. corr. mtl. pipe, 8 gage	16.00
1 lump sum	36 in. corr. mtl. pipe, 10 gage	13.00
2,130 ton	72 in. corr. mtl. pipe....	34.00
140 ton	15 in. culvert end sections....	22.00
40 ton	18 in. culvert end sections....	25.00
1 lump sum	24 in. elliptical inlets....	60.00
9,000 cu. yd.	36 in. elliptical inlets....	90.00
2,115,000 cu. yd.	72 in. elliptical inlets....	325.00
6,640,000 yd. sta.	Concrete inlets Type D....	75.00
158,600 cu. yd. sta.	Class A concrete	60.00
1 lump sum	Metal reinforcement ....	.135
100,000 lin. ft.	Metal guard rail ....	3.00
40 lin. ft.	Type 1 fence ....	5.25
5,600 lin. ft.	Type 2 fence ....	7.00
5,330 lin. ft.	16 ft. 48 in metal gates....	100.00
900 lin. ft.	16 ft. cattle guard ....	900.00
1,900 lin. ft.	Coarse crushed mat. in base	1.75
780 lin. ft.	3 4 in 0 material in base....	1.75
		1.95

### CANAL—Earthwork and structures in Washington

Washington—Columbia Basin Project—Bureau of Reclamation. A joint venture of Cheri Brothers, Inc., and Sandkay Contractors, Inc., and Pfeiffer & Pontius was low bidder for Earthwork and Structures, Block 82 laterals, wastewater, and drains, Royal Branch Canal laterals. Five bids were opened in the office of Project Manager in Ephrata, Wash.

	(1)	(2)
810,000 cu. yd.	Excavation, common, for laterals, wastewater, and drains ....	\$.237
78,000 cu. yd.	Excavation, intermediate, for laterals, wastewater, and drains ....	.56
38,000 cu. yd.	Excavation, rock, for laterals, wastewater, and drains ....	1.79
85,000 cu. yd.	Excavation from borrow ....	.40
190,000 cu. yd.	Overhaul ....	.195
20,000 cu. yd.	Compacting embankments ....	.36
1,900 M gal.	Water for embankment mat, first 1,900 M gallons ....	5.75
5,600 M gal.	Water for embankment mat, over 1,900 M gallons ....	3.90
140,000 cu. yd.	Placing earth lining for laterals....	.37
140,000 cu. yd.	Comp. earth lining for laterals....	.37
12,000 cu. yd.	Refill above earth lining ....	.44
180 cu. yd.	Excav. & refill of inspec. trenches....	7.00
57,000 cu. yd.	Excavation, common, for structures....	1.08
5,000 cu. yd.	Excav., intermediate for structures....	1.08
3,000 cu. yd.	Excav., rock, for structures....	1.08
40,000 cu. yd.	Backfill about structures ....	.80
5,000 cu. yd.	Comp. backfill about structures....	1.50
8,000 cu. yd.	Pudding backfill about structures....	1.25
750 cu. yd.	Riprap ....	5.00
300 cu. yd.	Sand and gravel bedding for riprap ....	5.00
1,300 cu. yd.	Coarse gravel protection ....	5.00
470 acres	Furn. and sowing grass seed....	40.00
2,300 cu. yd.	Concrete in structures ....	89.00
3,400 bbls.	Furn. and handling cement....	6.50
240,000 lb.	Furn. & placing reinforcement bars....	.20
180 lin. ft.	Furn. and placing 9-inch type A rubber waterstop....	6.00

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65 Mbm	Furn. and erecting untreated timber in structures .....	280.00	300.00	170 cu. yd.	Compacting backfill .....	5.00	5.00
50 Mbm	Furn. and erecting treated timber in structures .....	300.00	350.00	4,900 cu. yd.	Excavation in tunnel .....	22.00	26.00
25 assemblies	Furn. and installing baffle assemblies for weep boxes....	45.00	60.00	100 cu. yd.	Excavation for tunnel enlargement .....	25.00	30.00
410 lin. ft.	Furn. & laying 12-in. diameter, No. 16-gage, corr.-metal pipe...	4.25	3.00	230 lin. ft.	Drilling feeder or pilot holes ahead of tunnel excavation .....	1.00	2.00
200 lin. ft.	Furn. & laying 15-in. diameter, No. 16-gage, corr.-metal pipe...	5.05	3.50	96,000 lb.	Furn. and installing permanent struc.-steel tunnel supports .....	.32	.30
230 lin. ft.	Furn. & laying 18-in. diameter, No. 16-gage, corr.-metal pipe...	5.85	5.00	700 lin. ft.	Furn. and erecting permanent timbering in tunnel .....	300.00	250.00
310 lin. ft.	Furn. & laying 24-in. diameter, No. 14-gage, corr.-metal pipe...	8.30	7.00	135 cu. yd.	Furn. and installing tunnel rock bolts .....	3.75	4.00
120 lin. ft.	Furn. & laying 54-in. diameter, No. 12-gage, corr.-metal pipe...	29.20	20.00	1,930 cu. yd.	Concrete in structures .....	70.00	100.00
220 lin. ft.	Furn. & laying 60-in. diameter, No. 10-gage, corr.-metal pipe...	37.50	25.00	3,080 bbls.	Concrete in tunnel lining .....	60.00	52.00
2,700 lin. ft.	Furn. & laying 15-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	5.10	4.40	19,000 lb.	Furn. and handling cement .....	7.00	8.00
910 lin. ft.	Furn. & laying 18-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	6.20	5.50	125 lin. ft.	Furn. & placing reinf. bars .....	.18	.20
1,600 lin. ft.	Furn. & laying 21-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	7.60	7.00	300 lb.	Furn. and placing 9-in. type A rubber waterstop .....	4.10	6.00
1,700 lin. ft.	Furn. & laying 24-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	9.25	8.80	Lump sum	Furn. and installing weep pipes .....	1.00	1.00
870 lin. ft.	Furn. & laying 27-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	11.30	11.00		Furn. and installing closure-plank guides .....	500.00	500.00
1,400 lin. ft.	Furn. & laying 30-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	13.20	13.00				
640 lin. ft.	Furn. & laying 36-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	16.40	16.00				
150 lin. ft.	Furn. & laying 42-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	26.30	20.00				
220 lin. ft.	Furn. & laying 60-in. diameter stand.-strength reinforced-concrete culvert pipe with type B joints..	39.00	40.00				
2,300 lin. ft.	Furn. & laying 18-in. diameter HC50 concrete pressure pipe with type R joints .....	10.30	7.00				
210 lin. ft.	Furn. & laying 24-in. diameter HC50 concrete pressure pipe with type R joints .....	14.10	10.00				
50 lin. ft.	Furn. & laying 30-in. diameter HC50 concrete pressure pipe with type R joints .....	21.60	13.00				
210 lin. ft.	Furn. & laying 36-in. diameter HC50 concrete pressure pipe with type R joints .....	24.70	17.00				
1,200 lin. ft.	Furn. & laying 42-in. diameter HC50 concrete pressure pipe with type R joints .....	28.70	27.00				
230 lin. ft.	Furn. & erecting 6-in. diameter conc. irrigation pipe for air vents	2.20	3.00				
50 lin. ft.	Furn. & erecting 15-in. diameter stand.-strength reinforced-concrete culvert pipe for air vents.....	5.10	6.00				
22 gates	Furnishing and installing 18- by 12-in. steel slide gates...	102.00	100.00				
37 gates	Furnishing and installing 24- by 18-in. steel slide gates...	114.00	110.00				
11 gates	Furnishing and installing 30- by 24-in. steel slide gates...	134.00	130.00				
1 gate	Furnishing and installing 42- by 30-in. steel slide gates...	206.00	200.00				
1 gate	Furnishing and installing 48- by 36-in. steel slide gates...	276.00	250.00				
1 gate	Furnishing and installing 48- by 42-in. steel slide gates...	309.00	300.00				
2 gates	Furnishing and installing 42- by 36-in. steel slide gates...	245.00	220.00				
1 gate	Furnishing and installing 24- by 36-in. cast-iron slide gate	310.00	250.00				
77 gates	Furnishing and installing 15-in. diam. cast-iron slide gates	80.00	70.00				
10 gates	Furnishing and installing 18-in. diam. cast-iron slide gates	109.00	90.00				
6 gates	Furnishing and installing 21-in. diam. cast-iron slide gates	117.00	110.00				
5 gates	Furnishing and installing 24-in. diam. cast-iron slide gates	144.00	140.00				
3 gates	Furnishing and installing 30-in. diam. cast-iron slide gates	246.00	200.00				
1 gate	Furnishing and installing 36-in. diam. cast-iron slide gate	325.00	300.00				
17 weirs	Furnishing and installing 2-ft. adjustable weirs.....	102.00	70.00				
8 weirs	Furnishing and installing 3-ft. adjustable weirs.....	128.00	100.00				

## TUNNEL—Collbran Project in Colorado

Colorado—Bureau of Reclamation, Theo Wood Construction Co. of Salt Lake City was low of 13 bidders for the Southside Tunnel of Collbran Project in Colorado. Unit prices given below are for Schedule 1.

(1) Theo Wood Construction Co.	\$344,467	(1)	(2)
(2) James F. Richards Co.	348,410		
A. S. Horner	352,385		
Winslow Construction Co.	369,827		
Hinman Bros.	371,470		
4,500 cu. yd.	Open-cut excavation .....	\$ 5.00	\$ 4.50
2,500 cu. yd.	Backfill .....	5.00	4.00

## B R I D G E — Ramps to Alaskan Way viaduct in Seattle

Washington—King County—State. Alton V. Phillips Co. of Seattle was low of five bidders for construction ramps to carry traffic from the Alaskan Way viaduct to the Spokane Street viaduct. Plans call for a prestressed concrete and timber bridge, a reinforced concrete deck-girder bridge, and widening the Spokane Street viaduct where the ramps connect.

(1) Alton V. Phillips	.....	\$550,711
(2) Manson Construction	.....	556,923
MacRae Bros.	.....	561,034
Troy T. Burnham Co.	.....	600,440
S. S. Mullen Inc.	.....	609,945
Morrison-Knudsen and Rumsey	.....	612,485

		Bridge	(1)	(2)
1,400 cu. yd.	Structure excavation .....	\$ 2.50	\$ 4.00	
2,580 cu. yd.	Concrete class A .....	83.00	77.00	
526 cu. yd.	Concrete class A (in plinths and footings) .....	51.00	40.00	
3,799 lin. ft.	Stand. bridge railing type No. 1	5.80	7.00	
634,900 lb.	Steel reinforcing bars .....	.12	.14	
Lump sum	Structural carbon steel .....	23,227.00	20,000.00	
	Structural metal .....	5,651.00	7,500.00	
Lump sum	High strength steel bolts .....	2,761.00	2,000.00	
28 ea.	Bridge drains .....	87.00	65.00	
8 ea.	Relocating exist. bridge drains .....	27.00	55.00	
1,303 lin. ft.	Downspouts .....	5.50	8.00	
241 lin. ft.	Relocating exist. downspouts .....	2.00	6.00	
5 Mbm	Reclaimed timber and lumber .....	48.00	170.00	
80 Mbm	Tbr. & lbr. (creosote treated) .....	288.00	300.00	
3,332 lin. ft.	Furn. thr. piles (creosote treated)	1.90	1.60	
65 ea.	Driving timber piles (creosote treated) first 10-ft... ..	30.00	28.00	
2,682 lin. ft.	Driving timber piles (creosote treated) over 10-ft... ..	.07	.10	
2,455 lin. ft.	Furn. conc. piling 13-in. diam. ..	4.20	4.75	
15,350 lin. ft.	Furn. timber piling (untreated) ..	.64	.60	
307 ea.	Driving comp. piles first 10-ft.. ..	37.50	25.00	
14,740 lin. ft.	Driving comp. piles over 10-ft.. ..	.07	.01	
307 ea.	Pile splices (timber) .....	.01	1.00	
Lump sum	Remov. port. of exist. structures .....	300.00	300.00	
171 lin. ft.	Illumination system complete .....			
560 lin. ft.	Prestressed concrete girders (57-ft. series) .....	26.75	27.00	
1,004 lin. ft.	Prestressed concrete girders (70-ft. series) .....	26.80	25.00	
505 lin. ft.	Prestressed concrete girders (84-ft. series) .....	26.75	26.00	
56 ea.	Prestressed concrete girders (101-ft. series) .....	26.70	30.00	
Lump sum	Neoprene rubber bearings .....	17.00	15.00	
	Resetting exist. transit poles .....	336.00	300.00	
		Surface Work		
Lump sum	Clearing and grubbing .....	2,363.00	2,000.00	
230 cu. yd.	Sand borrow including haul .....	2.00	1.50	
740 cu. yd.	Struc. excav. (in sewer trenches) ..	1.00	2.00	
1 M gal.	Water .....	14.00	10.00	
325 hr.	Mechanical tamper .....	6.00	9.00	
21.6 sta.	Finishing roadway .....	25.00	25.00	
50 cu. yd.	Crushed surfacing top course .....	6.66	4.00	
10 ton	Asph. conc. pavement class B .....	20.00	15.00	
267 sq. yd.	Cement Concrete Pavement 14 day 6 sack mix 7-in. section .....	7.00	6.00	
12 sq. yd.	Unfinished 14 day 6 sack mix 6-in. section .....	5.00	5.00	
		Other Items		
283 lin. ft.	Cement concrete curb .....	1.50	1.00	
21 sq. yd.	Cement concrete sidewalk .....	2.00	4.00	
78 sq. yd.	Special cement concrete sidewalk .....	2.00	5.00	
25 lin. ft.	Integral cement concrete curb .....	2.00	2.00	
90 lin. ft.	Dowelled cement concrete curb .....	2.00	2.00	
10 lin. ft.	Special integral cem. concrete curb .....	2.00	2.00	
178-lin. ft.	Extruded traffic curb .....	2.00	1.00	
15 cu. yd.	Concrete class B .....	82.50	40.00	
11 cu. yd.	Concrete class E .....	88.00	50.00	
4,740 lb.	Steel reinforcing bars .....	.12	.14	
6 ea.	Shallow manholes type A (City of Seattle standard) .....	155.00	250.00	
2 ea.	Shallow manholes type B (City of Seattle standard) .....	75.00	250.00	
2 ea.	Small catch basins (City of Seattle standard) .....	100.00	200.00	
18 ea.	Catch basins (City of Seattle standard) .....	100.00	275.00	
1 ea.	Adjust. catch basin to grade .....	50.00	30.00	
183 lin. ft.	Beam guard rail .....	3.50	5.00	

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### Canal safety booklet published

A NEW BOOKLET, "Canal Safety", has been published by the Bureau of Reclamation as a measure to protect the public, operating personnel, and animal life from the hazards of canals and other water-carrying structures. Various means of providing this essential protection are covered in the booklet, including fencing, escape devices, and other safety measures. The booklet also urges public education as a principal measure in any canal safety effort.

To build up the safety program, the Bureau of Reclamation is now cooperating with the American Red Cross in sponsoring an educational program designed to bring about greater public awareness of the increasing need for water safety measures throughout the West.

"The use of irrigation canals and waterways for recreation has caused far more fatalities than have occupational accidents," said Commissioner Dexheimer. "People must learn that serious hazards are in-

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volved and that water safety practices must be observed on more than a part-time basis."

"From an economic and practical point of view, it would be impossible to place complete protective devices on all structures or works used for irrigation in the Western States," the Commissioner stated. "We are making every reasonable effort to prevent access to hazardous areas on Federally con-

structed projects, to provide means of self-escape from canals and waterways, and to provide safety devices."

Copies of the booklet may be obtained by writing to any Bureau of Reclamation field office. Regional offices are located in Boise, Idaho; Sacramento, Calif.; Boulder City, Nev.; Salt Lake City, Utah; Billings, Mont.; and Denver, Colo.

# **TWO AUCTIONS** **VERY GOOD HEAVY EQUIPMENT**

**MONDAY, MAY 4th, 10 A.M., DENVER, COLORADO,** East 64th Avenue & Kearney. The Monaghan and Smith Construction Co., is quitting business completely and selling all equipment, large and small. Each piece positively sells regardless of price to the highest bidder. **WRITE-WIRE AUCTIONEERS FOR COMPLETE DESCRIPTIVE SALE LISTS.**

**ASPHALT PLANT:** Cedarapids Model G-60, 6,000# complete asphalt plant bought new and put on the job in 1957, has been used only 1½ seasons. This is a portable plant all complete in every respect including automatic batching and control equipment all electronic for automatic weighing and fully automatic mixing.

**CRUSHING EQUIPMENT:** CEDARAPIDS COMMANDER portable crusher, put on job in 1957, with 1036 jaw, 3025 crusher, 48"x10' Cedarapids 2½ vib screen, all complete & very good. IHC UD-1091 power unit on trailer. CEDARAPIDS MASTER TANDEM Crushing Plant, has 1036 jaw, 4022 crusher, 48"x12' double deck vib screen, feed conveyor, Very good condition. IHC UD-1091 Turbo charged power unit on truck. 24"x40' & 30"x40' conveyors.

**ASPHALT EQUIPMENT:** CEDARAPIDS BSF-2 FINISHER, new in 1957, like new. BARBER GREENE finisher, 879B, new in 1957, like new. GALION CHIEF 3 wheel 10 ton roller, torque, used 1½ seasons. 2 GALION TANDEM 8-10½ ton rollers, torque, used 1½ seasons both like new. ROSCO SR-9-0 self prop 9 wheel pneu roller—like new. ROSCO RQE 1250 gal Distributor New in '56 on '47 IHC truck. Other equipment.

**DRAGLINES-TRACTORS-GRADERS-LOADERS:** NORTHWEST 6 DRAG, 60' boom, Cat D13000; LIMA 44 DRAG, 70' boom Cat D318, NEW 1957, 1607 hours; LIMA 34 DRAG, 70' boom, Cat D318, 4224 hours; LS 75 DRAG, 40' boom, UD14. 2 Cat D8's w/dozers, 14A-4869 & 2U-21257; CAT D-6, 8U w/hyd dozer; 2 CAT #12 MOTOR GRADERS, OIL CLUTCH 8T's. 2 HOUGH HR & HM.

**CONCRETE BATCH PLANT-TRANSIT TRUCKS:** HELTZEL BATCH PLANT, all complete w/285 barrel cement silo—good. CMC BATCH PLANT, all complete w/150 bbl cement silo—good. 3 Rex & 1 CMC 3 yard transit mixers on trucks. Other cement equipment.

**TANDEM DUMP TRUCKS-LOWBOYS:** 10 IHC VF-190A 175'—1957 tandem dump trucks w/Anthony 8-10 bodies, all very good. 2 '52 IHC LF195, 1953 RF211 tandem dump trucks. 10 other trucks & dump trucks; Water Trucks; 3 '57 Ford Cars; '54 IHC tandem truck-Tractor, RDF-405, Cummins diesel, Tulsa 15 ton winch—good. Other truck-Tractors.

There are many, many other pieces both large and small. This is an exceptional sale of late equipment in very good condition. Write-Wire for full sale list.

**MONAGHAN & SMITH CONSTRUCTION CO., Owner.**  
**Phone Atlas 82694, DERBY, COLORADO.**

**WEDNESDAY, MAY 6th, 10 A.M., PUEBLO, COLORADO,** 2 miles North of Pueblo on US HIways 85 & 87. The Nowers Construction Company is quitting the contracting business completely and selling all equipment. Each Piece Positively Sells regardless of price. **WRITE-WIRE AUCTIONEERS FOR FULL SALE LIST.**

**MOTOR SCRAPERS-SCRAPERS:** 2 EUCLID 23TDT Motor Scrapers, S/Nos 18831 & 17981, GMC 300 hp 6094 engines, are good w/very good tires. EUCLID 12TDT Motor Scraper, S/N 15887 w/GMC 6-110 300 hp engine, good w/very good tires. EUCLID 8TDT & 7TDT Motor Scrapers, have Cummins 275 hp engines, w/good tires. CAT 80 Scraper. LeT-Westinghouse BT Scraper new '56, 15-18 yard.

**TRACTORS-LOADER:** IHC TD24, S/N TDC-241-1247, torque, turbo charger, front & rear C frames—Tractor New in Sept '57—Very good; 5 CAT D-8's, 2 15A torques w/push blocks, 2 13A's w/8A & 8S dozers, 2 2U's, 1 w/dozer & an 8R. LeT-WESTINGHOUSE Tournadozer, CW, MACHINE USE ONLY 60 DAYS; AC HD6G loader tractor; Wheel tractors.

**GRADERS-ROLLERS-MISC:** 3 CAT #12 Motor Graders, S/Nos 70D1618 & 8T-17146 both w/oil clutch, 8T3439. GRACE & FERGUSON 50 TON Pneu compactors. Rosco SR-90 self prop pneu roller; Terra Pac Vib steel roller; LeT K-30 ripper; 2 McCoy 5x5 dd sheepfoots; I-R 125 cfm rotary compressor. Many many other small items.

**TRUCKS-TRAILERS:** IHC WEST COAST TANDEM TRUCK TRACTOR, Model 4564-OH, Braden winch—good; TIMPTE 50 Ton Tandem lowboy; Fuel trucks; tank trucks; welder trucks; pickups; other trucks.

This, also, is a sale of very good late model and very well maintained equipment. Write-Wire auctioneers for complete descriptive list.

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## Sad facts about specifications

Occasionally a contractor, especially a new contractor not familiar with recent trends in specification writing, feels he should read the specifications before starting work on a project. This can be an unbalancing and shattering experience and is a practice which must be discouraged. The dangers to good health and peace of mind can be appreciated by an examination of the typical excerpts from contract specifications assembled below.

In an effort to reduce the number of construction men who have glanced at the specifications and are now wearing Napoleon hats and fishing in rain barrels, we have formed an organization called Specification Readers Anonymous. Whenever a member of this group feels the urge to look at the specifications, he can call his local chapter which will send a friend to sit and drink with him until the feeling passes. If the membership card on this page is carried in your wallet or next to your heart it will serve as a reminder and save you from a lot of heart-ache later on.

For the morbidly curious who insist on reading job specifications in spite of our admonishments, we suggest sitting in a comfortable chair with a notebook handy for writing farewell notes.

### Selected specifications

**PAYMENT** — Payment for completed work will be made in stamps or coin at the end of the calendar month, the calendar month to be

selected by the Engineer. It is herein implied, stated, and agreed the Engineer's personal checks shall be cashed by the Contractor in a gracious spirit.

**ARBITRATION**—Disputes which cannot be settled to the satisfaction of the Engineer and his staff shall be submitted to a Board of Arbitration consisting of the Engineer and his staff.

**OBJECTIONS**—Objections by the Contractor, hereafter aforesaid, are inadmissible by the terms of this contract and shall be considered ipso facto, quid pro quo, and hic haec hoc. The Contractor must swear, and in fact does hereby so swear, that he has no lawyers or lawyer-like people in his employ, and that he will hire none until the Statute of Limitations can be applied to the project herein described.

**ACTS OF GOD**—Acts of God shall be considered Acts of the Engineer and will not be questioned.

**PLANS AND SPECIFICATIONS**—The plans and specifications are without error and agree in every detail. Any apparent contradiction between them claimed by the Contractor shall be taken as evidence of bad faith on the part of the Contractor. In case of continued disagreement as to the designer's intent due to an alleged difference between the plans and specifications, the project shall be built both

ways, with the additional cost to be borne by the Contractor.

**CATASTROPHES**—Any and all catastrophes which befall the Contractor during the prosecution of the work shall be satisfactory to the Engineer.

**CHANGED CONDITIONS**—Subsurface conditions differing from those shown in the contract, or any change in the nature of the work, shall be viewed as examples of bad management on the part of the Contractor, and appropriate penalties shall be assessed.

**INSPECTION**—Armed inspectors will be present at all times to enforce the wishes of the Engineer. Two inspectors will be assigned to each of the Contractor's employees to watch their behavior both on and off the project. Inspectors will inform the Contractor within 90 days of the completion of any phase of the work whether it is unsatisfactory and must be replaced.

**VISITORS**—All visitors will be given access to the project and will be allowed to participate fully in the supervision of the Contractor's forces and the operation of his equipment.

**ABSENTEEISM**—Should the Engineer or any of his staff be absent from the job site because of overeating or lack of interest, the Contractor shall send flowers and inspirational messages, at the rates shown on the bid schedule. At such times as the Engineer or any of his staff returns to the job site, a ceremony appropriate to the occasion shall be arranged by the Contractor. Should, however, the Contractor be absent from the project through malnutrition, exhaustion, or nervous disintegration, the project shall proceed without hesitation.

**DEFINITION OF TERMS**—Terms shall be defined by the Engineer to suit the Engineer. Exhibition by the Contractor of dictionaries designed to refute the Engineer will be considered flagrant violations of proper deportment, punishable by 30 days confinement in a chemical water closet.

... The Editors

### Certification of Membership Specification Readers Anonymous

Established by Western Construction Rehabilitation Foundation

*I, the undersigned, being of sound wind and limb, wishing to protect myself, my family, and my friends from the powerful emotions locked within me, do hereby swear never to read the job specifications for any project in which I am engaged. This also applies to letters and memos from the Engineer.*



Sign your name or make your mark