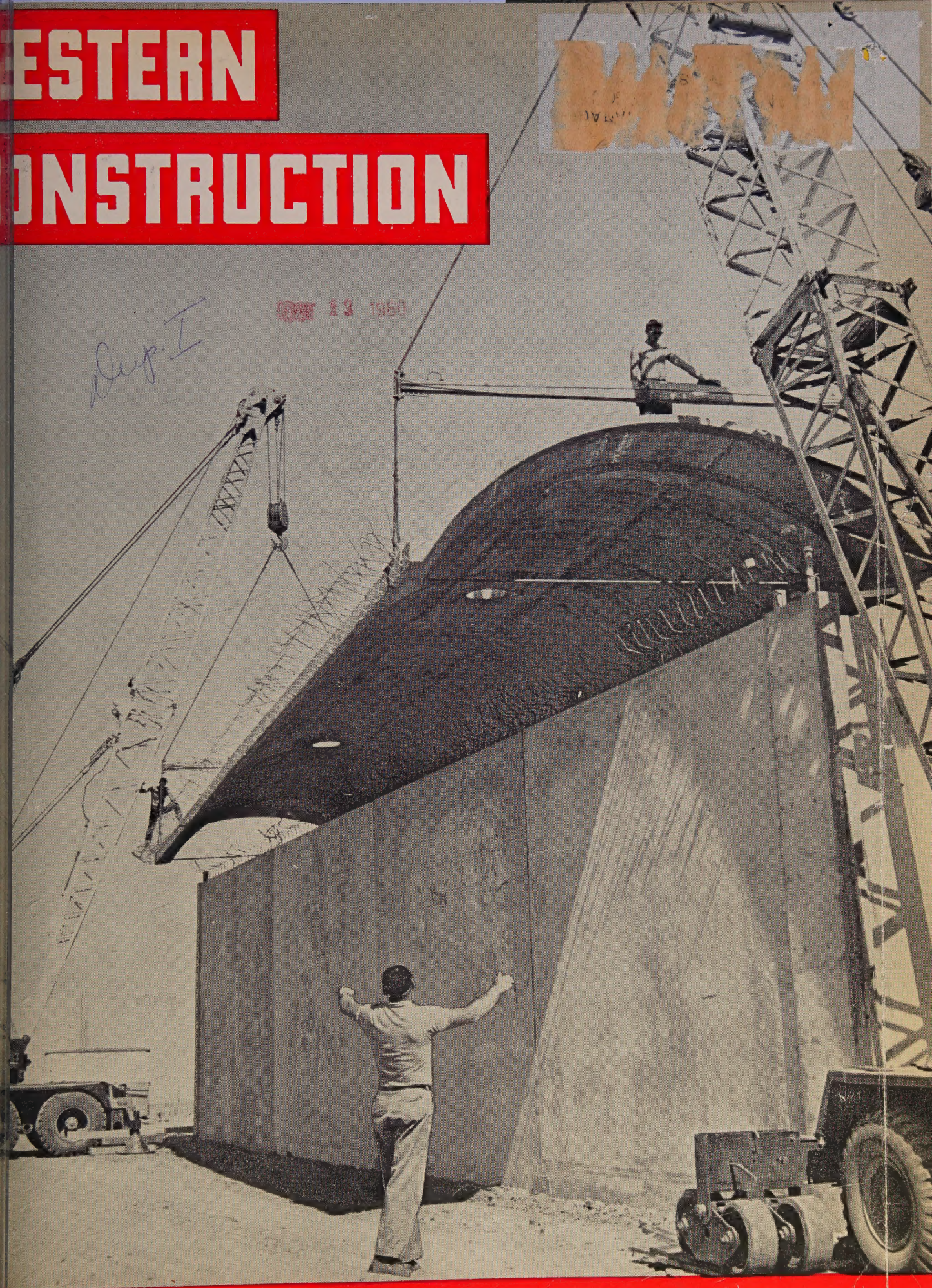
ESTERN
ONSTRUCTION



Forty-ton roof section . . . . p. 42

OCTOBER 1960

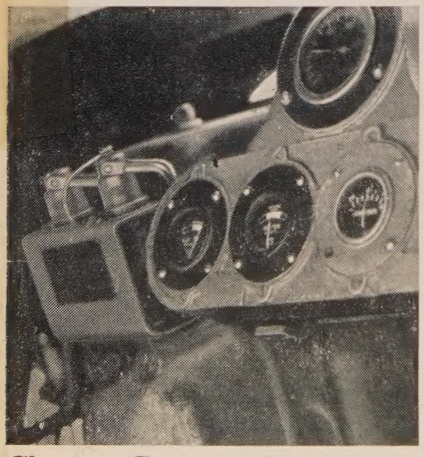
ENGINEER'S FIELD REPORT

PRODUCT: CHEVRON PRESSURE PRIMER SYSTEM

FIRM: JONES-TOMKINS CO. Cougar, Washington

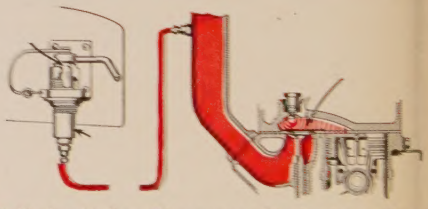
Special cartridge fires giant diesel in seconds

At world's highest earth-filled dam construction site near Woodland, Washington, three giant diesel shovels get immediate starts from Chevron Pressure Primer System, reports Jones-Tomkins, general contractors. System helps speed shovel's fill-borrowing operations for this $51,000,000 project. Five-year-old 4500 Manitowoc Speed Crane (above), powered by Caterpillar 350 h.p. V-12 D397 engine, operates 18 hours a day, six days a week, loading 21-yard dump trucks in just 70 seconds. Jones-Tomkins uses Standard fuels and lubricants exclusively on this job.



Chevron Pressure Primer Discharger mounted on instrument panel (left) operates satisfactorily despite heavy vibration, reports shovel foreman Henry Watson (right). "We've had absolutely no trouble with this system. The Chevron Pressure Primer System eliminates dust clogging and allows fluid to reach the cylinders quickly. It's the practical way we've found to get these rigs going."

Why Chevron Pressure Primer System assures fast starts



- Volatile Chevron Priming Fuel atomizes in induction system at all temperatures even at -65°F, no hand-pumping required.
- Pressure or weakest spark from engine fires mixture.
- Simple rugged air-tight discharger prevents Priming Fuel leakage.
- Small, fireproof, pressurized steel cartridges protect Priming Fuel from water and dirt.

For More Information or the name of your nearest distributor, write or call any of the companies listed.

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THE CALIFORNIA COMPANY
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STANDARD OIL COMPANY OF TEXAS
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o other piece of equipment must meet the wide range of problems that Truck Crane is called upon to meet! See a Northwest at work. Com- re its easy handling—its accuracy—its smooth control—its stability der load.

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The Northwest Standard Worm Boom Hoist and the Northwest High peed Boom Hoist give you a combination that meets any booming oblem. The Northwest High Speed Boom Hoist operates without sac- ficing either main drum, independently of all other operations. Both om hoists operate under power—both up and down.

Northwest Truck Cranes bring you every advantage you require for ane work. Sectional Boom Hoist Rigging and Pendant Lines, Telescopic oom Struts, Folding Gantries, Adjustable Jibs, Removable Counter- eight, 3rd Drums, Open Throat Booms and a host of advanced carrier atures combine to get your job done quickly and profitably.

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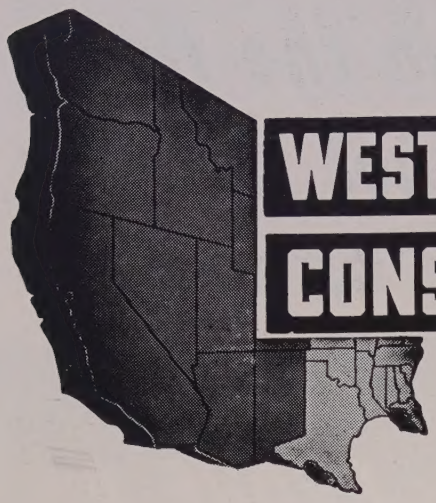

WESTERN CONSTRUCTION

OCTOBER
1960
Vol. 35 No. 10

CONTENTS

FRONT COVER—Setting 40-ton roof sections in place takes power, precision and patience. The thin shell barrel vaults are the largest of their kind. Page 42.

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Subscription $10.00 per year, $12.50 foreign, single copy $1.00. Cost per single copy of Construction Equipment Directory, published each January, is $5.00. Every regular qualified recipient of Western Construction receives a copy of the Construction Equipment Directory bound in the January issue.

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For 34 years serving the construction industry of the Western States

Left: Close-up of Amsco Chute Plates used on each discharge Hi-G screen.

Right: General view of Hi-G screen in screen house of large New England quarry.

Left: General view of excavation at Conduit #2 South. Dipper on Bucyrus Erie 88B shovel is equipped with Amsco 2-Part Reversible Teeth.

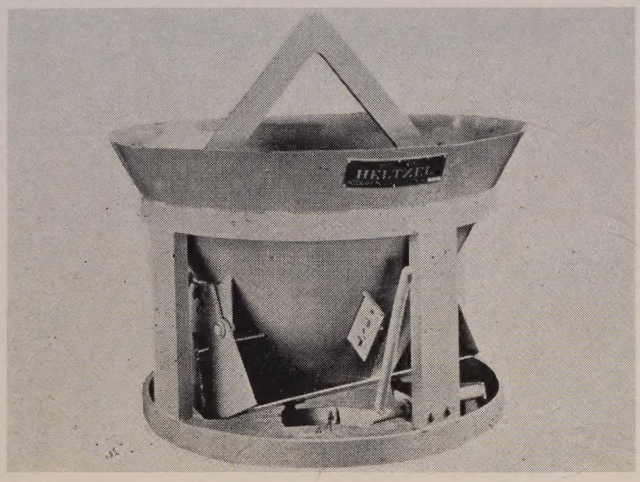
Right: Close-up of Amsco 2-Part Reversible Teeth, showing special pin lock which assures positive locking of the reversible tip.

NEW EQUIPMENT

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

Compact concrete bucket

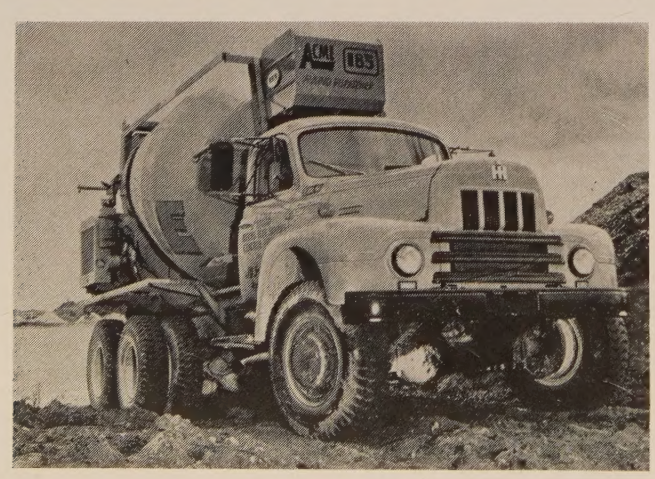
A versatile concrete bucket of all-steel welded construction is announced by **Heltzel Steel Forms Co.** The "Econo-Bucket" is 4 ft. 4 in. in overall height



and available in ½, ¾, and 1-cu. yd. sizes. It features gear controlled, double arc clamshell gates with over center self-locking mechanism and adjustable discharge control. The unit handles all types of material from grout to dry mix. It has steep hopper slopes and self-cleaning gates for clean discharge. Low over-all height gives maximum clearance for all charging operations. *. . . Write No. 150*

All-wheel drive IH trucks

A wide variety of optional equipment and wheelbase sizes are available on two new all-wheel-drive



trucks announced by **International Harvester Co.** The new units are the R-210 (4x4) rated at 39,000 lb. gross vehicle weight, and RF-210 (6x6) at 49,000 lb. With optional front axles, the weight ratings of these units can be increased to 42,000 and 52,000 lb. respectively. The powerful trucks are designed for heavy construction transit-mix concrete and other severe service trucking applications. Features include outrigger type front spring mounting for stability, a larger steering gear for easier manual steering, and a new IH bogie with air-operated power divider differential lock. Standard engine for both models is the 6-cylinder International RD-450 rated at 182 hp. Wheel bases available include 148, 160, 178, and 196 in. on the smaller truck and 168, 178, 196, and 214 in. on the larger RF-210. Power steering is available with the optional heavy-duty front axles. A full power-take-off mounted on the transfer case is available as an option.

. . . Write No. 151

Weight saving body adds capacity

More than 4,000-lb. capacity has been added to the new **KW-Dart** end-dump truck through a new corrugated design light-weight body. Use of the corrugated

body on the new model 35SL reduces the truck weight by 2 tons and increases its capacity by corresponding amount. Truck is equipped with a 450-hp. diesel engine and a 3-speed transmission and 3-stage torque converter.

. . . Write No. 152

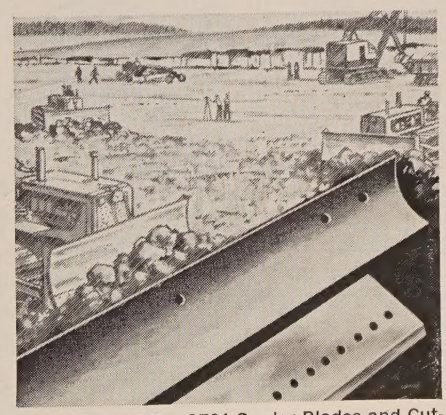
Two new asphalt plants

Addition of 3,000 and 5,000-lb. models to its asphalt batch-mixing plant line is announced by **Barber-Greene Co.** The new plants are available in both the fully automatic "BatchOmatic" lines, as well as the company's "Power Control" line. Barber-Greene's range of plants now include 12 models from 1,000-lb. to 6,000-lb. capacity, as well as a complete continuous mix plant line with capacity ranges up to 200 tons per hr. and more. "BatchOmatic" plants are entirely automatic and feature simultaneous weighing of all aggregate sizes and asphalt to pre-set proportions.

. . . Write No. 153

(More New Equipment on page 98)

WELDED WIRE FABRIC: CF&I-Clinton Welded Wire Fabric gives concrete a thousand defense lines against the spreading of cracks, assuring smooth, trouble-free road surfaces. Installation is easy. Clinton Welded Wire Fabric is also ideal for reinforcing concrete pipes used for sewers, culverts and drains.



GRADER BLADES: CF&I Grader Blades and Cutting Edges are made for all types of earth moving and snow removal equipment. They are hot-rolled from special analysis, new billet open hearth steel . . . assuring extra toughness and abrasion resistance. This means longer blade life and less downtime for you.

WIRE ROPE: CF&I-Wickwire has now developed a superior, premium wire rope—Double Gray®-X. Advanced steelmaking and wire drawing techniques provide Double Gray-X with longer life for all types of construction equipment. In addition, this new rope has a 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC. Double Gray-X is available in a wide choice of constructions and sizes. CF&I-Wickwire also manufactures a complete line of slings.

. . . for more details, write No. 11 on Reader Service Postcard

The WEST from WASHINGTON

By E. E. HALMOS, JR., Washington, D. C.

With Congress finally adjourned and back home tending to its political knitting, you can now take a look at the record of what turned out to be—as predicted by *Western Construction*—a bitterly political session.

Despite the fact that only some 1,300 (out of nearly 20,000) major bills got through the Congressional mill in nearly two years, the record is neither as bad nor as good as politicians and others will try to paint it, depending on their political leanings.

But there's this to be said: For construction men, there is more that will affect them in Congress' failure to act on many items, than in actual passage of specific legislation. Of the bills that did get through, only a relative handful had much to do with the construction industry, and only a couple had direct bearing on Western activities.

These last included the annual appropriations for civil works of the Corps of Engineers and the Bureau of Reclamation; for ABC highway expenditures, and approval and funds for the federal share of California's key San Luis project.

But things not done will have vast effect on construction in general—some of it good, some not. Taking what wasn't done in order:

Gains: Flat failure in efforts of construction unions to get legal sanction for so-called "common situs" picketing (which would have made it possible to strike an entire construction job over a dispute with a single contractor or sub); failure of bills that would have increased the minimum wage floor (they would have brought the construction industry under new controls by virtue of extremely broad and confusing definitions of "commerce," forced stepped-up wage demands); failure of attempts to change import laws that would have permitted nearly unrestricted imports of foreign surplus machinery; failure of a sudden move to stick an "emergency" $100 million into the ABC highway program without provisions for added revenues to the highway trust fund; failure of various "wilderness" bills that would inhibit any development in national forest and other lands.

Losses: Death of a measure that would have raised pay of engineering consultants (to $100 per day); failure of a bill to expand the saline water program (to $17.5 million per year); failure of measures to extend time payments on Columbia River drainage costs (up to 50 years), and defeat of a proposal to set up a "basin account" for the Columbia area.

In-betweens: On some other matters, it depends on your point of view as to whether failure was a loss or a gain.

Three of these involve big construction money: Federal aid for school construction, various proposals to aid housing construction, and urban renewal legislation. As you know, all three failed of passage (except for a stop-gap bill that will permit continuation of FHA Title I home repair; college housing loan programs, and public facility loan programs). Between them, they carried something like $1.5 billion worth of construction funds. All three foundered on a combination of politics and real Congressional concern for financial soundness.

Also out of the running were a number of more general bills, such as those seeking establishment of a federal "Department of Urban Affairs"; some seeking to enforce "state's rights" in water distribution and control; still others that would have cut off the right of states to tax out-of-state business operations; proposals to give individual businessmen some tax relief via exemptions for self-financed retirement plans; numerous tax relief proposals having to do with depreciation charges on machinery and equipment; and a bill that would have provided federal registration for civil engineers.

* * *

Of specific interest to Western construction men, of course, are the amounts appropriated for construction and planning under the $3.9 billion public works bill that Congress approved on almost the final day of its extra session.

Special significance attaches to the fact that House-Senate conferees approved a total of 26 "new starts" under the Corps of Engineers programs (the Senate had recommended a total of 34). And all six "new starts" under the Bureau of Reclamation program (recommended by the President) were approved, one for planning work only.

The Western projects included in the "new starts" for the Corps are: $1.9 million for Juneau Harbor, Alaska; $150,000 for Gila River-Camelsback reservoirs in Arizona; $405,000 for Bodega Bay, Calif.; $808,000 for work on Kahului Harbor, Hawaii; $3.5 million for Lower Monumental lock and dam in Washington; $150,000 for Siuslaw River south jetty, Oregon; and $150,000 for work on the Umpqua River in Oregon.

For BuRec, Congress agreed to appropriate a total of $6.3 million to start work on the LaFeria division of the Lower Rio Grande Rehabilitation Project in Texas; the Almena Unit of the Missouri Basin project in Kansas; Yellowtail dam in Montana and Wyoming; the Curecanti Division of the Colorado River Storage Project in Colorado and the Florida Participating Project in Colorado. It also included $121,000 in planning money for the Bully Creek extension to the Vale project in Oregon.

As the session ended, there seemed little doubt that the President would approve the money bills.

* * *

There was one sobering note—to Western proponents of future Army water control work—in the appropriations bill: A cut of about $1 million in the fund (a total of $12.023 million was approved) for "General Investigations."

A good bit of that cut came out of investigations for Western projects: $100,000 was subtracted from investigations of San Francisco Bay; $125,000 from funds for Rampart Canyon, Alaska. About $100,000 was subtracted from general flood control studies, about $200,000 from general navigation studies.

* * *

A Western state—New Mexico this time—will figure in the next series of hearings conducted by that special House Public Works Subcommittee on Public Roads (Blatnik committee).

Poor Taste in Government Disposal

DISPOSAL of Government surplus equipment is a necessary evil to the construction industry. Tax money deserves sound management, and there would be just complaint from the public if such salvage value were not recovered. However, the manner of the disposal can be as irritating as the purpose is necessary.

The Armed Services find it necessary to sell equipment, machinery, and supplies after they have served their purpose. This equipment may have reached a point of economic retirement, based on military need for top performance, or the machine may become outdated, without having any field service.

Such disposal of surplus must observe certain basic rules if it is to create a minimum of disturbance in the industry (manufacturing and distributing) represented by the equipment. Disposal in an orderly fashion, without dumping in large quantities, is a first essential. If possible, disposal should be made at points well distributed throughout the country, and not restricted to cities on the coasts where it can be most disturbing to local areas. Lastly, it should be sold in such quantities as to get it directly into the hands of the ultimate user without passing through one or more new avenues of distribution. This objective may not be completely practical, but it tends to provide for the return of public property directly to the public.

One procedure that is particularly distressing is the selling of surplus in foreign countries where it can be purchased and accumulated by dealers, possibly working through foreign agents, and returned to this country for dumping in large concentrations. In general, the attitude toward, and the rules governing the handling of surplus should reflect a recognition of established private enterprise.

Pertinent information on these sales must be made available to the public. This is probably a legal requirement, and certainly is in the interest of fairness. Such announcements, coming from the Federal government should be dignified, adequate, and in good taste. Promotion that suggests getting into business for quick profit, and the "fire-sale" type of slogan do not belong.

This cartoon promotes a sale of Government surplus from a branch of the Armed Services in a Western city. It exceeds all reasonable bounds. It emphasizes the idea of re-sale rather than availability for an actual and deserving user. The impact of this surplus on existing business, particularly at the distribution level, is distressing enough, if unavoidable. The Government shows poor taste in cartoon promotion that might add another layer of distribution on an industry already well and adequately served.

Jim Ballard

Curtain walls of precast concrete achieve dramatic interplay of light, color and texture

The unbroken whiteness of the end wall is in striking contrast to bright, blue-green spandrel panels of the sidewalls. And on the broad base wall below, light and shadow form bold patterns across the sculptured facing. 42 stories, and the tallest office building in the West, the Southland Life Tower is part of a $35,000,000 project in downtown Dallas, Texas.

It's all done with concrete panels. For the end walls and base, exposed quartz aggregate and white portland cement give surface roughness and brilliance. The smooth-faced spandrels are vitreous tile cast in concrete. The total effect is one more example of the unlimited design possibilities in today's new forms of concrete.

Architects and Engineers: Welton Becket, FAIA, and Associates, Los Angeles and Dallas. Consulting Architect: Mark Lemmon, AIA, Dallas, Texas. Structural Engineers: Murray Erick Associates, Los Angeles.

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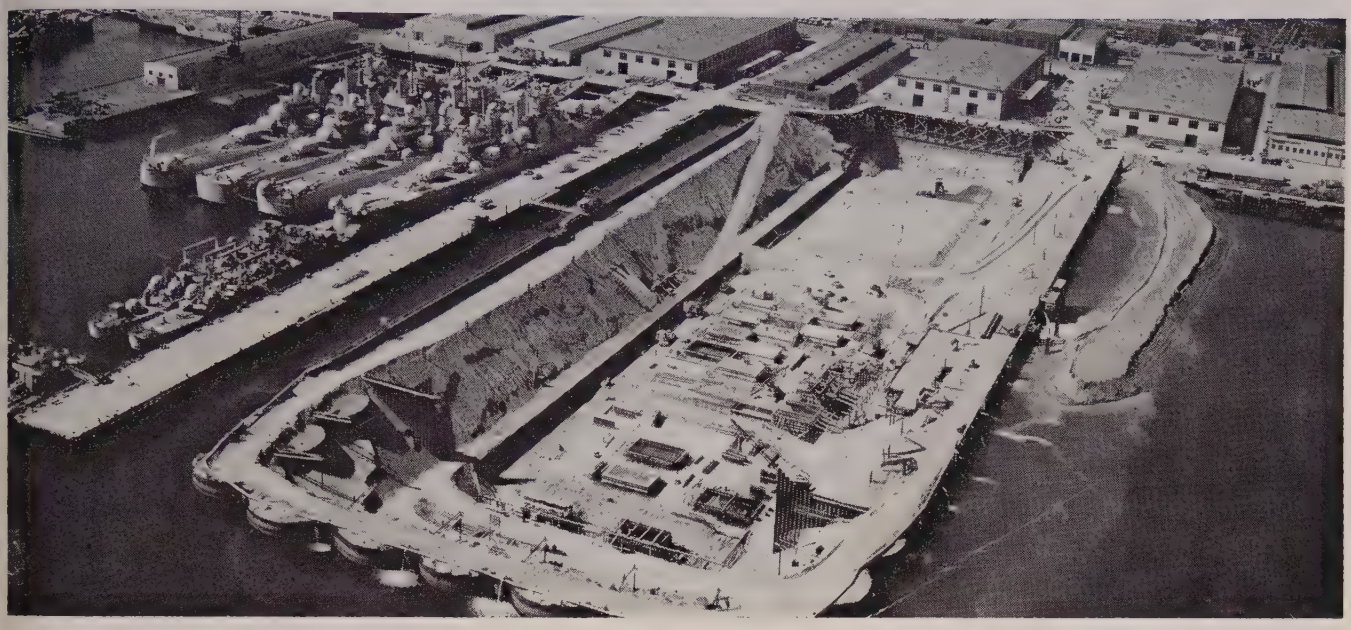
KING PUBLICATION

WESTERN CONSTRUCTION

OCTOBER, 1960



DOCK SITE is formed by parallel earthfill cofferdams 500 ft. apart which protrude 1,300 ft. into water from shore. Ends are joined by 11 sheet steel cells. Cofferdams will remain in place to become part of permanent back-fill at sides of dock. Dewatering is big problem.

Building the world's largest drydock

Keeping water out of enormous excavation requires record-breaking dewatering system—66 submersible electric pumps and 300 wellpoints. Vibroflotation solves compaction problem. Concrete work now under way.

ONE OF THE MOST extensive dewatering systems ever constructed is in round-the-clock use at Puget Sound Naval Shipyard in Bremerton, Wash., where the U. S. Navy is building the world's largest drydock. The excavation measures 500 x 1,300 ft. At high tide the floor of the excavation is 65 ft. below water level. The drydock structure itself when finished will be 1,180 ft. long, 180 ft. wide, and 61 ft. high. The outboard end of the box-like structure will have a floating caisson gate.

Keeping the work in the dry requires 66 submersible electric pumps set in drilled holes 60 to 100 ft. deep, and about 300 wellpoints 28 ft. deep. At the present time excavation is nearing completion and concrete work has started. The cofferdam consists of two 1,300-ft. long parallel moles made of earth fill, each with a central curtain of sheet piles. The outboard ends of the cofferdam are connected by eleven 60-ft. diameter pile cells.

The project was awarded in December 1958 to Manson-Jones-Perini-Osberg, a joint venture, on a low bid of $21,654,000. Completion is scheduled for March 1962.

The structure is of the relieved type, that is, it will be provided with underdrains and side drains which will constantly dispose of ground-water to keep the hydrostatic load to an acceptable level. A gravity-type dock was ruled out because the mass of concrete needed to resist uplift would result in a 43-ft. thick floor slab, with the bottom of the slab 85 ft. below average low tide.

Pressure relief will be accomplished by having a drainage course beneath the dock floor and outside the dock walls, a fine-grained filter placed between the drainage course and earthfill moles, and sheet pile cut-off walls to minimize inflow. The moles and cut-off walls are already in place and serving as the contractor's cofferdam.

The 2-ft. 8-in. thick drainage course of select material under the floor will contain a network of 8-in. diameter perforated vitrified clay pipes with headers terminating in the sidewall drainage tunnels. The contractor is nearly finished placing the drainage course and is well advanced in trenching with a small backhoe and placing the pipes. Transverse headers are being placed on 48-ft. centers except in the heavy infiltration area near the drydock entrance where the spacing is 24 ft. on centers. Longitudinal runs are spaced 15 ft. and 65½ ft. each side of center line. At alternate intersections of the longitudinal and transverse lines, vertical risers are being installed which will end at the surface of the floor so that water level may be checked and the drainage system flushed.

Specifications require the con-

NETWORK of drainage pipes will underlie floor of dock to constantly remove ground-water, thus keeping uplift forces small. Permanent pumps will be electric, with diesel standing by.

tractor to protect the drainage course during construction of the concrete floor because it is of such critical importance to the project. As soon as the pipe is placed and the trenches are backfilled, the drainage course is covered with polyethylene plastic on which a 4-in. thick concrete working mat is placed. The contractor is placing the mat in 22-ft. wide strips with finishing done by a Master vibrating screed which runs on pipe rails. On the mat the 7-ft. thick floor slab is being cast in blocks measuring 24 x 40 ft.

The material quantities involved in the project indicate its size:

Dredging: 550,000 cu. yd.

Fill and back-fill: 1,110,250 cu. yd.

Sheet pile: 5,440 tons.

Concrete: 153,255 cu. yd.

Prestressed concrete pile: 12,700 lin. ft.

Reinforcing steel: 8,510 tons.

Structural steel: 866 tons.

Earthwork

The contractor's first task was to bring in floating equipment to remove unsuitable foundation material from the site. A hydraulic dredge with a 7,000-ft. discharge line leading to a deep water area of Sinclair Inlet was used to remove about 300,000 cu. yd. Another 300,000 yd. was removed by three large barge-mounted clamshell derricks working with bottom-dump scows.

The cofferdam was built in three major steps. First, 451,000 cu. yd. of fill was placed, next the sheet pile cutoff walls were driven, and finally another 600,500 yd. of fill was placed. In this way the sheet piles could be driven into a solid footing without having to pass through the entire embankment.

Most of the fill material was provided by Sound Sand & Gravel Co., from a pit located at Port Orchard, about 3 mi. by water from the site. Sound used a ½-mi. long conveyor belt to load the material on flat-deck steel barges.

About 100,000 cu. yd. of fill was provided by Pioneer Sand & Gravel Co., located at Steilacoom.

The barges were emptied by flushing the material off the decks with water jets. Three monitors were used. After the sheet pile curtain wall was placed, the embankment on each side was kept approximately even in order not to subject the piling to undue stresses.

Dewatering

The general contractor subcontracted the dewatering operation to the American Dewatering Corp. of Hackensack, N. J., a subsidiary of the Moretrench Corp.

The method of removing the water was left up to the contractor. The main specifications required that free water trapped inside the cofferdam had to be removed at about the same rate as the ground-water in the embankments. Temporary piezometers were installed so that the ground-water levels could be determined. If the free water level had been lowered too quickly, sloughing of the banks or boiling at the bottom might have resulted. There was about 135,000,000 gal. of free water in the pool in addition to about 6,000,000 gal. of drainable pore water in the embankments.

American decided on a two-part dewatering system. Sixty-six deep well submersible electric pumps were spaced around the site adjacent to the sheet pile cut-off walls, to drain the embankments. The free water was removed with 12-in. electric pumps. When the water level had been lowered to below the excavation and the final excavation completed, 300 wellpoints were placed from 5 to 10 ft. apart around the bottom of the cofferdam slopes.

In case of an unexpected electric failure, the pumps can be switched over in five minutes to stand-by diesel-electric sets.

Forty-five of the submersible pumps are made by the Layne-Bowler Pump Co. and are powered by U. S. Electric Motors, 10 and 20 hp. There are also twenty-one 3-hp. pumps made by Reda Pump Co.

The wellpoints are handled by an 18-in. electric pump.

There are twenty-three 12-in. submersible pumps, twenty-two 8-in. and about twenty-one 4-in. The suction headers on the wellpoint line are 12 in., 18 in. and 24 in.

After initial dewatering, the rate of water removal has settled down to a fairly steady 8,000-8,500 gpm.

When the site was dry, the contractor moved in with draglines and trucks to remove excess material. Two construction roads with 15% grades were built to the bottom, one on each side.

To speed earth-moving, the contractor installed a 250-ft. long conveyor belt which rose 60 ft., terminating over the water outside the cofferdam. When the spoil pile reached the surface, a Caterpillar D6 tractor was used for spreading. A total of 360,000 cu. yd. were removed by truck and by conveyor during April-June, 1960. More material was removed than originally anticipated due to over-filling and because of sloughing which occurred outside design slopes during underwater placement.

Compaction

A 50-ton pneumatic roller was used to compact much of the bottom but was found to be ineffective on the deep fill material at the seaward end. In order to bring this area up to required density, the special methods of the Vibroflotation Foundation Co. of Pittsburgh, Pa., were used. Vibroflotation is a way of compacting sandy or gravelly soil by using water and internal vibration. The machine used is called a Vibroflot and consists of a vibrating tip and a fol-

low-up pipe. The vibrator is 15 in. in diameter and 6 ft. long. It has two separate compartments and water passageways in the wall. The upper compartment houses a 30-hp., 440-volt, a.c., water-cooled, electric motor. The motor drives a 200-lb. eccentric shaft in the lower compartment at a rate of 1,800 rpm. A centrifugal force of 10 tons is developed with a side motion of ¾ in. While the vibrator is in motion a universal connection leaves the follow-up pipe stationary.

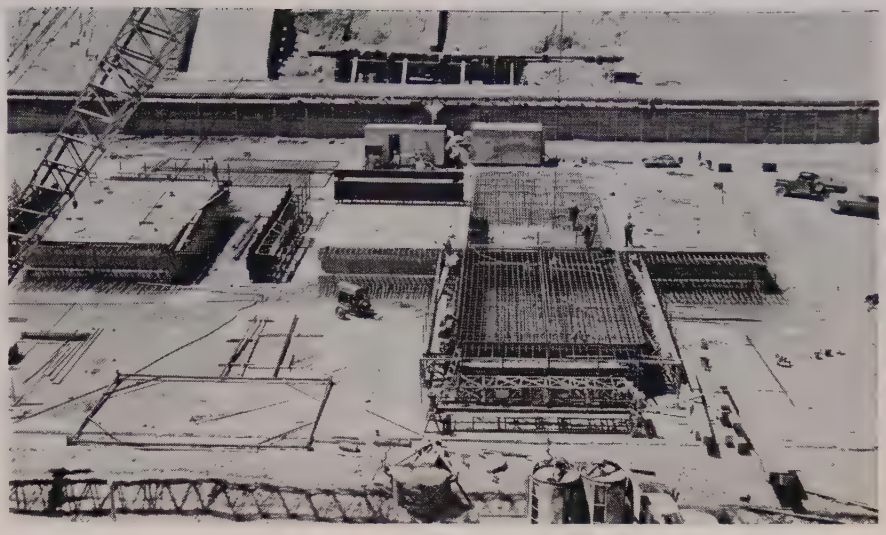
In operation the Vibroflot and follow-up pipe are suspended on a crane boom over the spot to be consolidated. The unit sinks into the soil under its own weight with the aid of water jets at the tip. Water is introduced faster than it can drain away, creating a momentary "quick" condition which facilitates the lowering of the unit. When the desired depth is reached, the water from the bottom jets is transferred to the top jets and the pressure and volume is reduced just enough to carry sand to the bottom of the hole. The vibrator is allowed to operate until the proper density is achieved around the lower part of the machine, then it is raised to the surface in 1-ft. steps, with pauses at each step for vibration. Material is added continuously at the surface during the withdrawal phase. The final result is a cylinder of compacted material about 8 or 10 ft. in diameter.

For the drydock the holes were spaced 10 ft. apart in both directions. There were 733 holes ranging from 6 to 17 ft. deep, with 117 compactions still to be done. A gravel back-fill was used which will improve drainage characteristics; normally, native material is satisfactory for use in Vibroflotation. About 1,900 cu. yd. of material was added. One machine worked two 8-hr. shifts per day, averaging 350 lin. ft. of compaction per shift. During the two weeks of this operation about 10,000 lin. ft. of compaction was accomplished.

The 2-ft. 8-in. gravel drainage course is being placed in 8-in. layers and compacted by a Jackson self-propelled sled-type vibrator, plus 6 hand-operated Jackson vibrators.

Concrete work

The 7-ft. thick concrete blocks which will make up the floor slab are being built in a checkerboard pattern. The steel forms for the 24 x 40 ft. blocks were supplied by the Dixie Form Co. There are enough forms for three inside and two outside blocks. Reinforcing in the blocks consists of a triple layer of #9 to #11 bars at the top and bottom. The forms are loosened in 12 hr. and stripped in 36. Finishing the surface of the blocks is done with the same Master vibrating screed used on the 4-in. working mats.



INTERLOCKING CONCRETE BLOCKS for dock floor are 7 ft. thick, 24 ft. wide and 40 ft. long. Placement is in checkerboard pattern. Floor area was first covered with 4-in. working mat to protect drainage course and underdrains, extremely important in relieved-type structure.

The concrete plant is a C. S. Johnson, with two 2-yd. Koehring mixers. The plant has a total storage of 300 cu. yd. in a bin with 4 compartments, one each for 1-2 in., 1 minus, ¾ minus, and sand. There is a separate weighing apparatus for each aggregate, and the plant automatically records every batch.

Steel forms for the 48-ft. high walls will also be supplied by Dixie. The contractor plans to use a rolling gantry which will straddle the wall for moving the forms.

To simplify planning the project, the contractor had a $5,500 scale model built. Each concrete pour is represented by an individual wooden block which can be put in place as the job advances.

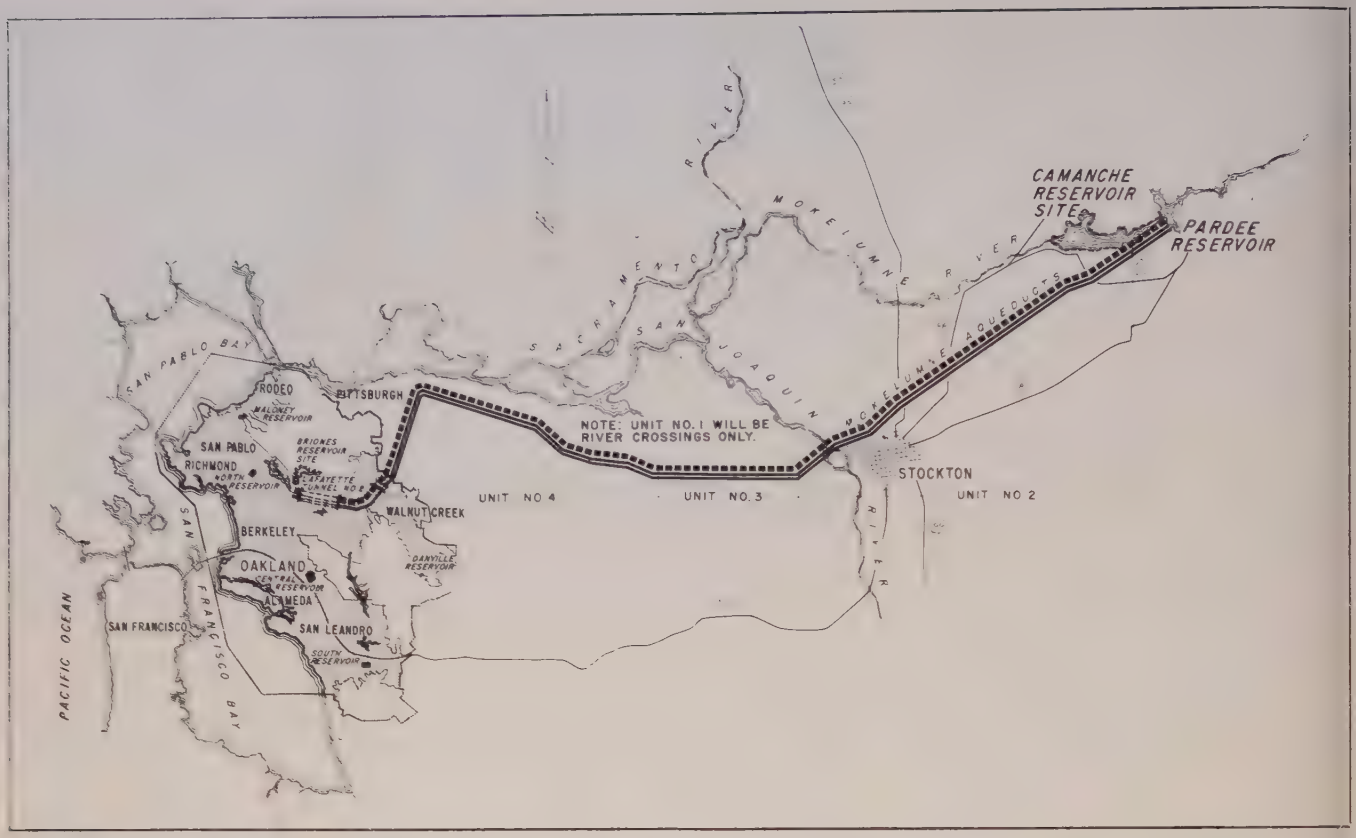
Equipment on the project at this writing consists of two 3-yd. and one 2½-yd. Manitowoc cranes, one Link-Belt 1½-yd. truck crane, one 1½-yd. Koehring crane, two 25-ton and one 30-ton American truck cranes, four Euclid 15-yd. rear-dump trucks, three 10-yd. Ford dump-trucks, two Caterpillar D9 tractors, three Caterpillar D8 tractors, one Adams grader, and one Jackson self-propelled vibrating compactor.

Personnel

Designed by Moran, Proctor, Mueser & Rutledge, of New York City, and Carey & Kramer, of Seattle, Wash., construction of the facility is under the authority of the Bureau of Yards and Docks, United States Navy. Rear Admiral E. J. Peltier, CEC, USN, Chief of the Bureau, is contracting officer.

During the early stages of construction, Captain Stanley P. Zola, CEC, USN, was officer in charge of construction, Captain P. N. Boothe, CEC, USN, was resident officer in charge of construction, and he was assisted by Commander R. W. Smith, CEC, USN, and Ltjg. F. N. Newcomb, CEC, USN. At the present time Captain M. B. Orr, CEC, USNR, 13th Naval District Public Works Officer, is officer in charge of construction. Captain J. J. Albers, CEC, USN, is presently resident officer in charge of construction. The assistant resident officers in charge of construction are Captain E. I. Mosher, CEC, USNR, and Lieutenant T. N. Tate, CEC, USN.

For Manson-Jones-Perini-Osberg, Walter F. Petersen is project manager, Clyde Sherman, project engineer, and Arnold Malley, field superintendent. L. R. Reynolds is office manager, Jack Sowle, office engineer, and Richard Corey, field engineer. John Peabody is materials testing engineer, Warren Brown is cost engineer, Jack Hale, coordinator, and Oliver Malley, safety engineer. Superintendents are Paul Amundsen, pile driving, Richard Cain, excavation, and John Diev, concrete mixing plant superintendent.



MAJOR projects of the EBMUD expansion program are shown on this map. Heavy dotted line shows route of new Mokelumne aqueduct, now under construction. Shaded area is current district service area, dotted line will be ultimate boundary. Existing Pardee Reservoir and Camanche Reservoir, planned for later construction, will be main water sources. System is designed for demand 40 years hence.

Water for the next century

East Bay Municipal Utility District is doubling its water supply capacity in a 10-year construction program featuring a giant 87-in. aqueduct 82 mi. long, two new dams, and numerous additions to storage and distribution facilities. Total cost will be $283,000,000.

THE CITIZEN of the twenty-first century living on the eastern side of San Francisco Bay may employ some electronic push-button device in place of the familiar water tap, but when he actuates the device, there will flow forth old-fashioned, pure mountain water, provided by the East Bay Municipal Utility District. EBMUD is spending $283,000,000 to more than double its total capacity in a 10-year construction program which will insure that it can deliver water in sufficient quantity to whatever exotic fixtures are used by its customers 40 years hence.

The gigantic expansion program covers:

An enormous new dam on the Mokelumne River.

An 82-mile aqueduct of 87-inches diameter, the largest and longest of its kind.

A big terminal storage reservoir behind an earthfill dam.

Construction or expansion of four filter plants.

Increased distribution storage covering construction or remodeling of two dozen local reservoirs.

Addition of new service connections, fire hydrants and auxiliary hardware, and nearly 1,000 miles of water main.

When completed in 1967, the expanded facilities of EBMUD will have a daily delivery capacity of about 340,000,000 gal. per day, plus an 18-month supply at the source. This is expected to keep up with the expanding consumption of water into the next century.

The East Bay domestic water supply system, second largest west of the Mississippi, now serves nearly 1,000,000 customers through 274,000 meters. Its service area covers 245 sq. mi. from Castro Valley and San Leandro northward along the Bay Shore to the Carquinez Strait, and inland to Walnut Creek, about 30 miles east of Oakland. Looking into the future, EBMUD directors have marked off additional territory they may be called on to serve and have drawn ultimate boundaries around a rectangular chunk of real estate of about 400 sq. mi.

Present customers consume an average of 154,000,000 gal. per day (representing a 24,000,000 gal. increase during the last two years). By 1967, consumption will be up to 200 mgd., according to careful projections of population and industry growth, and at the turn of the century it should hit 340 mgd. Population at this point is expected to be 2,500,000.

EBMUD's water comes from Pardee Reservoir on the Mokelumne River northeast of Stockton in the Sierra foothills. It travels through two steel pipe aqueducts of 65 and 67-in. diameter (completed in 1929 and 1949, respectively) a distance of 82 mi. to Walnut Creek pumping plant. From there, through a series of tunnels and Lafayette Aqueduct No. 1, the water enters the complex of terminal reservoirs, filter plants, distribution reservoirs and water mains.

Construction Projects

The expansion plan calls for more, much more, of the same. Starting on the Mokelumne, EBMUD will build Camanche Reservoir, the key to the entire project, 10 mi. downstream from Pardee Dam. It will create a lake of 430,000 acre-feet capacity, more than twice the size of Pardee. The dam will include flood control features recommended by the U. S. Army Corps of Engineers. Congress and President Eisenhower have authorized expenditure of up to $10,000,000 in Federal funds for this purpose.

Site of the dam was recommended by Bechtel Corp. after an engineering study. Bechtel has been authorized to proceed on designs of the earthfill dam which will be 155 ft. high and 2,540 ft. long. Earth dikes will extend south and east of the dam for about 3½ mi. filling in saddles around the perimeter of the reservoir. Contracts for the dam will be awarded on completion of the design, with project completion scheduled for 1964. Estimated cost is in excess of $38,000,000.

Since Camanche Dam will inundate many of the natural salmon spawning areas on the Mokelumne, EBMUD has agreed with the California State Department of Fish and Game to construct an experimental artificial spawning area below Pardee Dam. If the gravel-bed structure proves efficient in hatching salmon eggs, a permanent spawning channel will be built later below Camanche as an alternative to the more-expensive construction of a salmon hatchery.

"Giant M" Aqueduct

Another major item in the 10-year plan is Mokelumne Aqueduct No. 3— called the "Giant M" by EBMUD engineers. It will have an inside diameter of 87 in. and will extend 82 mi. from Pardee Reservoir to Walnut Creek over the same right-of-way and parallel to the two existing lines. Constructed of welded steel pipe, mortar lined and mortar coated, the line will use 120,000 tons of steel—equivalent to all the steel in the Bay Bridge. When the big line is placed in service, it will raise the district's aqueduct capacity of 175,000,000 gal. per day to 338,000,000.

ROOF girders for reservoir form geometric pattern. Laminated wood beams and concrete columns will support plywood sheathing covered by asbestos cement panels.

"Giant M" contracts currently in progress are:

Unit 4, the 33-mi. first stage between Bixler and Walnut Creek, under construction by Young and Anderson Co. of Brea, Calif., on a contract of $14,975,491. The pipe is being fabricated by Consolidated Western Steel Co., South San Francisco, and coating is applied at American Pipe Construction's plant in Fremont. The job started from the Bixler end and is about 57% completed. It includes a complicated relocation of existing aqueducts at Concord on a new alignment to make room for a freeway. Work commenced in the fall of 1959 and is scheduled for completion in Jan. 1962.

Unit 2—a 32.5-mi. section which starts about 4 mi. west of Pardee Dam and extends to Holt (San Joaquin County). Contract was awarded in July to a joint venture composed of Contracting & Materials Co., Kenny Construction Co. of Illinois, and Foster-Marsch of San Diego (all known as C, K, F-M), together with the Graver Tank & Mfg. Division of Union Tank Car Co. The bid price was $14,028,292. The Graver Division plans to set up its own plant in the Stockton area to manufacture pipe for this contract.

Unit 2 takes in some of the most difficult and varied terrain along the aqueduct route. It includes a 4-mi. section between Holt and the San Joaquin River where the land is barely at sea level. In contrast the major portion of the route will be in the rugged Sierra Nevada foothills interlaced with steep hills and deep canyons. The soil varies from clay to solid rock, which will make necessary use of a wide variety of equipment and methods, including some blasting. Contracts

for the remaining Units 1 and 3 will be awarded in 1961.

The tunneling section west of Walnut Creek includes:

Lafayette Tunnel No. 2, the westernmost and longest of seven tunnels which will bring water from the Walnut Creek terminus of the "Giant M" to the Orinda filter plant and a new terminal storage reservoir. The job is under contract to Stolte, Inc., of Oakland and Fred J. Early, Jr. for about $5,000,000. The tunnel is 9½ ft. in diameter and 3 mi. long. The tunnel is about 30% complete and will be finished in 1962. Its location in a suburban area engendered some unusual public relations problems which are described in another article appearing in this issue.

Contracts will be awarded later this year for six tunnels between Walnut Creek and Lafayette, and for construction of Lafayette Aqueduct No. 2.

Reservoir

Briones Reservoir, to be located about 2 mi. from the mouth of Lafayette Tunnel, will be created by an earthfill dam across the mouth of Briones Valley. The reservoir will cover an area of 725 acres and have a capacity of 22 billion gallons. Water from the aqueducts will be fed into the reservoir through a Briones aqueduct and pumping plant which will be included in the contract. The project also covers relocation of a county road around the shore of the lake.

The preliminary engineering study, as well as final design, was handled by Kaiser Engineers. Contract for construction of the dam and pipe line is expected to be awarded this month.

Reservoir roofs

EBMUD is adding roofs to several existing local distribution reservoirs and building several others which will be covered. Outstanding feature of the roofing projects is use of colored panels of corrugated asbestos cement in abstract design to simulate reflection of sunlight on water, and create a pleasing vista for surrounding residents—and customers.

To create the color patterns which will replace the blue-green water surface, the district hired Cornelius Sampson & Associates, San Francisco industrial design firm. First hurdle in the colored roof project was the fact that none of the manufacturers of asbestos-cement panels made them in color. The manufacturers were glad to cooperate on the project, however, and ultimately developed five color-impregnated panels, designed to last through the expected 50 to 75-year life of the roof.

Major roofing projects in progress include:

Central Reservoir, Oakland—800,000-sq. ft. roof plus reshaping and remodeling under $2,278,882 contract to Williams and Burrows Contractors, Inc., of Belmont. Completion in 1961.

North Reservoir, Richmond—roof over recently completed concrete-lined facility under $764,709 contract to Williams and Burrows. Completion in November of this year.

Danville Reservoir, Danville—construction of 15,600,000-gal. storage facility plus 113,000-sq. ft. roof under $571,000 contract to Williams and Burrows. Complete in 1961.

Maloney Reservoir, Pinole—23,000,000-gal. open cut distribution reservoir with roof under $553,715 contract to Elmer J. Freethy, El Cerrito. Completion in September 1961.

The current construction program also covers several tank-type reservoirs ranging from 1,000,000 to 5,000,000-gal. capacity, enlargement of two existing filter plants (one of which was completed in May), and construction of numerous pumping plants, water mains and distribution lines.

Contracts now in progress or completed total $68,867,000, with another $56,000,000 scheduled for award during the 1960-61 fiscal year. Funds for the expansion program derive from a $252,000,000 bond issue authorized in 1958, plus $31,000,000 of revenue funds.

Personnel

General manager of EBMUD is John W. McFarland. Chief engineer is Joseph D. DeCosta. Other members of the engineering staff include:

W. R. McLean, field engineering division; Donald G. Larkin, water production and distribution; J. W. Trahern, design engineering; and Francis B. Blanchard, water resources and planning.

E. L. Macdonald heads the special projects construction division.

SECTION of "Giant M" pipe line is lowered into trench. Steel pipe is mortar lined and coated, linked with bell and spigot joint.

MODEL of reservoir cover design using colored asbestos panels examined by Bill Ransay, left, of EBMUD, and Neil Sampson, industrial artist

WINCHESTER HOUSE, the plywood building erected to enclose compressors and fan line. On left is noise suppression chamber.

Tiptoe through the foothills

Driving a 3-mi. tunnel under a suburban residential area presents problems not usually found in tunnel work. Here is what the contractor did to calm the nerves of nearby residents whose complaints were almost as loud and nearly as frequent as the powder blasts which reverberated through the Orinda Hills.

TAKE A TYPICAL tunnel driving crew—60 men on 3 shifts—using typical drill-and-shoot technique with typical equipment—a 24-in. gauge diesel railroad mounting, a 4-drill jumbo, two 600-cfm. compressors and a 22-in. fan line—and set them to work in a peaceful, oak-studded residential area dotted with $50,000 homes, and what happens?

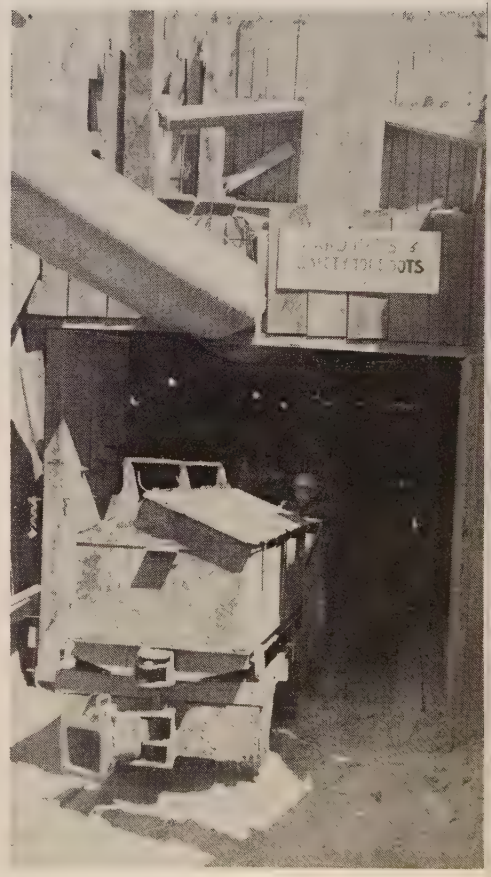
The egg hits the fan!

This, roughly, was the situation when early this year the forces of Stolte Inc., and Fred J. Early Construction Co., under Project Manager C. C. "Bill" Harris, shot the first round of Lafayette Tunnel No. 2 at its west portal just off San Pablo Dam Road in Orinda.

The blast broke out some 6 ft. of hole. It was the last trouble-free footage made by the miners for the next two months. During that interval, the contractor became an expert on noise suppression by necessity, while his crew learned tongue holding, cheek turning and practical psychology at the same school.

Lafayette Tunnel No. 2 is a major item in the giant East Bay Municipal Utility District expansion program covering construction of new dams and reservoirs and an 82-mi. aqueduct of 87-in. diameter which will double its water supply facilities (see page 28).

The tunnel is part of the third Mokelumne aqueduct system, now under construction. It will link the Lafayette Filter Plant on the east with the Orinda Filter Plant near the tunnel's west portal. The 16,716-ft. tunnel will pass beneath Charles Hill in the Lafayette-Orinda area some 20 miles inland from Oakland. The contract, which in-



PORTAL with thick reefer doors to reduce noise. Blast chute emerges from roof.

MINERS tamp powder in 5-ft. drill holes. Typical round consists of 40 holes in pyramid pattern using 50 lb. of powder fired on eight delays with 1 primer per hole.

cludes the concrete-lined bore, 11.5 ft. rough and 9.5 ft. lined diameter, together with a pumping plant and miscellaneous appurtenances, was awarded to a combine of Stolte, Inc., and Fred J. Early Construction Co., on a low bid of just under $5,000,000.

The terrain made it necessary to conduct the tunnel work almost entirely from the Orinda (west) portal. Here the foresighted water district had retained a good-sized area which could be used for the contractor's office and auxiliary buildings. Across a creek flowing below the portal was an additional parcel of EBMUD land, the only convenient area where muck from the tunnel could be wasted.

The contractor moved into the area in November 1959. He built a 300-ft. timber trestle across the creek from the portal to the spoil area, laid a track for his railroad with the main line crossing the trestle and a spur to the left of the portal leading to storage yard and shops. Two stationary Gardner-Denver 600-cfm. compressors were installed at the left side of the portal along with the motor and fan of the ventilation line.

On Jan. 6, Superintendent Bill Harris and his crew prepared to make a hole in Charles Hill.

It should be noted that any tunnel in the Oakland foothills is a construction adventure. These handsome hills, clothed in green and gold, are composed of an unpredictable mixture of sandstone, shale, schist, clay and mud, interlaced with underground stream beds and occasional pockets of methane gas. They have taken the shirts off some of the most distinguished backs in the construction field in previous tunneling jobs.

The first shot served to alert householders on the opposite hill to what was coming. Succeeding rounds sent the tunnel face back into the hill and created a short gun barrel, channeling the noise so that it bounced off the opposite hill and alerted residents on the tunnel side.

Nights are generally still and peaceful in suburban Orinda, and local residents did not appreciate the snuffling of an air-operated mucking machine, the clatter of the muck train crossing the trestle, the bellow of a diesel bulldozer on the spoil area, the hammering of the drill jumbo and, over all, the penetrating whine of the compressors and the fan line. At three-hour intervals, came a series of jarring thuds as 50 pounds of 25% powder fired on several delays.

There also were human sounds. Two specifically mentioned in subsequent petitions were shifters' signals to the muck train (incorrectly described as police whistles) and "loud talk," such as might occur when the mucking machine runs over its air line.

Adding to the welter of sounds, the telephone rang—often. It rang at the contractor's field offices and it rang at the various offices of EBMUD. The callers, employing varying degrees of eloquence and passion, all said the same thing: "Knock it off!"

But it was easier said than done.

Some remedies were obvious. The bulldozer spreading fill in the spoil area was limited to daylight operation. For a time the graveyard shift was shut down entirely, and when it was resumed signaling was done with flashlights and loud talk was strictly forbidden.

The contractor hired a noise consultant from a jet air base to survey his operation and recommend ways to cut down the din. The tunnel had by this time advanced a few hundred feet into the hill. Blast and machinery noise in the tunnel was quelled by installing refrigerator-type doors at the portal. These were made with plywood faces and filled with a blanket of insulation 6 in. thick.

Directly above the portal a square wooden blast chute was installed. The vertical trunk of this chute extended down through the roof, making a right angle bend just below the roof. This structure served as a diffuser to direct the noise of the blast upwards into the air.

The compressors and fan line posed a more difficult problem. The contractor literally tried everything to quiet them. The exhaust-intake end of the fan line was hooked into job-made baffles and mufflers, even led through a water bath without audible success. The line and fan case were coated with insulating plaster. Insulation caused the fan to heat up and part of it had to be removed. The noise was never suppressed completely.

Neighbors continued to complain. Both the contractor and EBMUD personnel handled the complaints with patience and understanding. Reports of damage were promptly investigated (and usually proved to be groundless). Specific complaints were run down and adjusted, and residents were assured by letters and by personal contacts of the earnest desire of all concerned to eliminate the noise.

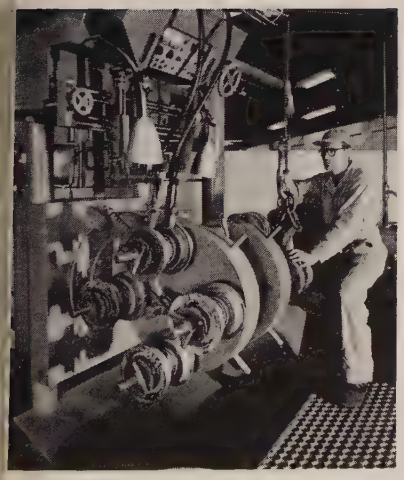
The contractor built a house of plywood panels over conventional wood framing which completely enclosed both the compressors and the fan line. Plywood sheets around the sides were hinged at the top so they could be propped open during the daytime for ventilation.

(Continued on page 34)

REBUILDS TRACKS TH VICTOR REBUILDER

for 1/3 the cost of new ones...

Victor TLM-2 track link rebuilder automatically hardfaces both sides of track simultaneously.



Victor DEMS roller and idler rebuilder mounts 8 rollers, advances from one roller to next between passes, thus preventing excessive heat build-up.

"New rails for a TD-24 cost about $2200.00, but with our Victor track link rebuilder we can recondition a worn set to 90% as good as new for $750.00," reports Allied Equipment Company, International Harvester dealer, Fresno, Calif. Speed helps to make these savings possible. "With our Victor, one man can rebuild a TD-14 track in 6 hours, floor-to-floor time—that's 5 times faster than non-automatic equipment."

Allied Equipment Company also uses Victor roller and idler rebuilder, roller and idler grinder, and flux grinder—all manufactured by L & B Welding Equipment, Inc., a wholly-owned Victor subsidiary, and sold only under the Victor name.

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MFRS. OF HIGH PRESSURE AND LARGE VOLUME GAS REGULATORS; WELDING & CUTTING EQUIPMENT; HARDFACING RODS; BLASTING NOZZLES; COBALT & TUNGSTEN CASTINGS; STRAIGHT-LINE AND SHAPE CUTTING MACHINES; ROLLER AND IDLER REBUILDING MACHINES

This was only partially successful and further modifications were ordered. A few of the more vociferous and witty householders dubbed this structure "Winchester House" and referred to it publicly as the "Palace of Plywood and Promises."

This unmollified group finally presented a petition to the county board of supervisors asking that the tunnel operation be halted. The supervisors delayed taking such a drastic step and asked the contractor to do everything possible to cut down the noise.

The final solution was to build a "noise suppression chamber" on the end of the plywood house to contain the noise of the fan line. The chamber is a room about the size of a garage, about 12 ft. high. Originally, the inside walls were draped with burlap and metal baffles hung from the ceiling. These were replaced later with celotex insulation panels on the walls and wooden louvre-type baffles. The baffles were re-arranged several times.

In the end they did the job, and both the supervisors and residents expressed satisfaction. Old tunnel hands contend privately that some of the success of the noise abatement efforts was due simply to the fact that the residents got used to the noise. However, the point is academic (except possibly to the contractor who spent some $30,000 on noise suppression). The end result has been that the neighbors are now happy and complaints have dwindled to occasional calls from two or three residents who still aren't completely satisfied.

Meanwhile, back at the tunnel, a $5,000,000 project was proceeding under difficult conditions which had nothing to do with noise or neighbors. The contractor encountered soft ground a short way in from the portal, which required spacing of 4-in. steel arch supports on 3-ft. centers. The ground in some short stretches was cut with a spade and breast boarded.

Faced with these geologic conditions, as well as the noise factor, the contractor decided to experiment with a giant boring machine similar to that used to cut personnel tunnels at missile installations at Vandenberg AFB. The unit, built by Badger Tunnel, Inc., of Whittier, Calif., consisted of a long cylindrical shield 8 ft. in diameter, with a rotating head made up of cutting arms working against the face and a ring of buckets linked to the arms around the circumference of the cut. The buckets picked up the muck as it was sliced off by the cutters and carried it around a belt conveyor mounted just under the roof of the shield. The belt, extending back about 100 ft., carried spoil to a string of conventional muck cars. Drive motor and huge reduction gear case for the cutting head were mounted on a frame inside the cylinder. The unit was equipped with big hydraulically-powered shoes pressed against the tunnel wall through openings in the shield to "steer" the machine and hold it on line and grade.

However, intermittent strata of harder rock proved too tough for the machine. Its 60-hp. motor burned out and was replaced by a 100-hp. unit. Even with this added power it made only a few feet per day. It tended to drift along the face when hard formations were encountered and was unable to hold line and grade. After a two-week trial it was withdrawn and conventional drilling and blasting was resumed.

Drilling is done from a jumbo built by Moran Engineering. It mounts four automatic booms with Gardner-Denver drills.

A typical round consists of 40 holes, 1 in. in diameter and 5 ft. deep, placed in a pyramid pattern. Holes are loaded with 50 lb. of Atlas 25% powder with one primer per hole, and fired on 8 delays.

Mucking is done with an Eimco 40-H overshot mucking machine with a capacity of 100 cfm. which loads a string of 4-yd. muck cars also built by Moran Engineering. There are four to eight cars per train.

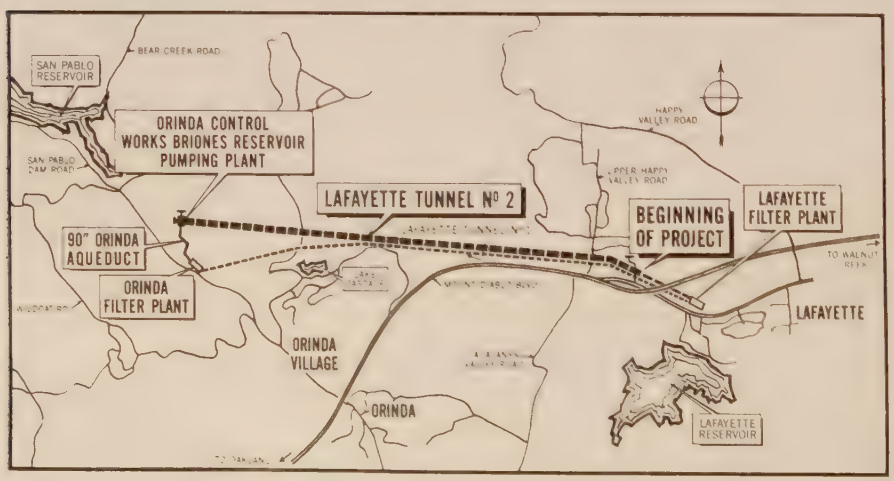
Cars are passed with a sliding carriage which fits over the top of the track and pulls a single car into a shallow alcove at the side.

Rolling stock includes three Plymouth diesel locomotives equipped with scrubbers, 12 muck cars and numerous special-purpose cars, including low-bed types to carry the arch supports. These supports are fabricated in halves by Commercial Shearing & Stamping, Salt Lake City. The two legs are bolted together at the top to form a complete arch.

About 700 ft. from the Lafayette portal the tunnel makes a shallow curve, which presents a difficult survey problem. Engineers plan to locate this curve on the surface by triangulation and drill a hole through the hill to the tunnel elevation (about 50 ft. below) to establish the alignment.

Tunnel crews have advanced about 5,000 ft. on the single heading. They are shooting an average of 3 rounds per shift and making

(Continued on page 49)



MAP of tunnel area in Oakland suburbs. Tunnel is being driven from the west portal to eastern terminus at Lafayette filter plant. It will bring water to Briones Reservoir.

BILL HARRIS, left, project manager, and Joe New, EBMUD field supervisor.

FIRST PASS of Trav-L-Plant mixes caliche and salt with water injected from the truck. The process moistens the entire lift. The 7-ft. swath may take up to 300 gpm. into the mixing chamber measured by the machine's metering system.

Salt stabilizes New Mexico roads

Lea County, faced with serious losses of gravel surfacing, turns to stabilization program. Caliche and soil mixed with salt and water in traveling plant is topped with road-mix asphalt mat.

How To Make Things Work Better

No teacher is better than experience. There's bound to be trial and error when any new program is adopted. But here are a few things which Lea County's Road Superintendent Raymond Dalmont recommends you do, if you use this method on your job:

1. Make sure the grading is right, drainage established, and compaction of subgrade is good before even thinking of anything else.

2. Keep the extra-big oversize material out of the sub-base. It just slows things down. If you do use a Pulvi-Breaker, get the 6-cylinder model, with power to spare.

3. Make sure, before the first stabilization begins, that every piece of equipment is in top mechanical shape, that salt or cement or asphalt will arrive on schedule dependably, and that the base shaping and blading are all completed. Base material should be where it's supposed to be, before stabilizing.

4. If the material is dry, make sure to get enough water trucks. Waiting on water trucks is one of the surest ways to tie up all other equipment; skyrocket costs. Don't let a million dollars' worth of roadbuilding wait on a dime's worth of water.

5. Organize the operation right from the start; make sure that each man knows the process, and what his job is in it. It's not difficult.

6. Keep each operation closed up tight against the next, and finish the road to perfection as you go along.

DRAWING FROM the experience of neighboring Colorado counties, a low-cost system of upgrading its own roads has been adopted by Lea County, New Mexico. Salt stabilization is showing up well for the county manager and commissioners who dared to be the first county roadbuilders to try it in their state.

And, because of the versatility of the method, the same equipment can be used economically later on, when soil-cement and asphalt-stabilized bases are put in. Even the road-mixed surfaces will be easy for the equipment spread to handle.

"Our problem is familiar . . . too much so," County Manager Ray Howell said. "We reached the point where traffic got so heavy we just had to start this program. It was the only way to keep from ruining the whole highway system."

Lea County's 1,115-mi. road system crosses 6,200 sq. mi. of territory; serves 53,000 residents and considerable transient traffic. This is oil country. Axle loadings on some of the service rigs run heavy. So do weights on produce trucks from the farms and ranches. This type of traffic, coupled with blowing wind, was taking ¾-in. of gravel surfacing off the roads a year, and tearing up bases.

(Continued on next page)

REDUCTION of pit-run caliche in place to a 3-in. maximum. This run of the Pulvi-Breaker, drawn by a Cat DW-10, precedes spreading the salt.

SALT being spread at a rate of .75 lb. per sq. yd. per inch of compacted thickness. Salt is loaded into truck by front-end loader from stockpiles along the road.

SHAPING up the stabilized base followed by pneumatic rolling. The roller is ballasted to 17 tons. As material tightens up more water is added to the surface.

The biggest problem to be faced, even though $1,000,000 a year was available for the roads, was how to whip costs. How could better roads be secured, and still hold per-mile costs within reasonable limits? County residents want hard-surfaced highways, but they object when costs begin to rise to the $20,000-a-mile mark such construction represents.

Obviously, a step in the right direction would be to use some of the lessons of the past, and update them. Traditionally, Lea County's sandy soils had always been good for highway roadbeds. Drainage wasn't a problem. Over the subgrade, an 8-in. base course of pit-run caliche was placed and compacted. That, until recently, was a "typical" Lea County road.

What's been substituted is a modification. Less caliche can be used now; costs of that valuable material and its hauling have been cut in half. Less caliche, rotary mixed with an equal amount of native sandy soil, is being stabilized with salt. Later, this year, other stabilizing agents are expected to enter the picture: soil-cement and asphalt. Over all of these types of stabilized base, road-mixed bituminous surfacing is planned, with shoulders being asphalt treated too. These fast roads will have good bearing strength for truck traffic, and are being aligned for high-speed automobile traffic.

The first jobs are proving up nicely. About 2 mi. south of Eunice, 8 mi. of new construction 36 ft. wide is being pushed rapidly, using salt-stabilized caliche base and a road-mixed asphalt surface. On salt stabilization, ½-mi. days, full width, are common, and 1-mi. runs have been made.

Lea County has standardized on equipment. Of 17 motor graders, 4 scrapers and 3 tractors for earth-moving, all are Caterpillar.

One of the newest motor graders has a Preco electronic automatic blade control, which permits more precise blading, more surface covered; 50% less survey stakes..

The same idea of standardization went into the selection of stabilization equipment. Units from the American-Marietta line include a Trav-L-Plant for rotary mixing, a PB6 diesel-powered Pulvi-Breaker for reducing caliche oversize in place, a Century spreader for tail-gating commercial salt, an Ampac 5620 pneumatic roller for compacting earth and caliche, and an Amrol 8-12-ton steel-wheel roller for compaction of asphalt pavement.

Field procedure

Scrapers, motor graders and a grid roller shape up the section and put down the caliche before stabilization equipment arrives. In fact the road was left open to traffic for some time before stabilization began. Because of heavier-than-usual oilfield traffic over this route, the county installed the usual 8 in. of caliche base, which will compact to 6 in. when salt and water are added, and the lift is rolled. Where traffic isn't extreme on other roads, caliche can be reduced to 4 in. to develop the fullest possible economies of the stabilization method.

Stabilization steps are simple, closely timed, and will be similar later on when soil-cement and asphalt is used. On hard-caked subgrade materials, a motor-grader scarifier rips into the material, and rolls it out loose. Where the caliche is fresher and has less compaction, the scarifier teeth on the rotary mixer do a good job.

Either at this time or before scarifying, the salt is applied. Bulk hauled from U. S. Borax & Chemical Co. at Carlsbad, it's dumped on a flat spot by the side of the road, then loaded into the spreading truck by a front-end loader. The screen out any oversize pieces which might interfere with the precise work of the Century spreader, a shop-made frame with No.

wire cloth was put over the truck bed. Salt is applied at the rate of ¾ lb. per sq. yd. per inch of compacted thickness.

Then, 7-ft. Trav-L-Plant mixing swaths are made, with the machine hooked to water tankers. In the powder-dry caliche, up to 300 gpm. roar into the mixing chamber through spray nozzles, metered by the machine's measuring system. The water pours at high velocity into the material while it's being mixed and turned, so that moisture permeates the entire lift. It's been proved beyond doubt that evaporative losses are less when moisture is put in through the machine, because it goes in immediately to the bottom of the lift. The sun can only get to that portion on the surface, which can be replenished by sprinkling if necessary.

Sections ½ mi. long have proved to be a good balance between good production and good work. For one thing, a ¼-mi. section is just right here for emptying two 5,500-gal. truckloads of water. It's also right for preparation, blading, and rolling.

After the water is put in, the second mixing pass is made by the Trav-L-Plant, working without a water truck. When this mix is finished, the water, salt, sand and caliche have been completely mixed. Initial breakdown is done by the pneumatic roller, ballasted to about 17 tons. As the lift tightens up under more rolling, surface moisture is added, and motor graders begin to shape the material to its final grade.

One of the secrets of strength in a stabilized base is the degree of "tightening up" between operations. In other words, the faster the base is finished and compacted after it's mixed, the higher a degree of strength and compaction can be secured. Three prompt passes by the roller just behind mixing are better, and deliver higher compaction and bearing value, than half a dozen passes made later on.

Smoother than usual surfaces are being developed over the base by using the Preco automatic blade control to its fullest advantage, and by slush rolling the caliche surface. This is done by keeping the pneumatic compactor just behind the water sprinkling truck. A slurry, or paste, develops to cover the road surface and make it smooth and tight.

This process is continued until a salty surface glaze develops. Then, after about 10 days, a 0.2-gal. per sq. yd. shot of MC-1 prime is put on. Following this, crushed caliche aggregate will be hauled in and windrowed, and then mixed in place with MC-4 oil to form a 2½-in. mat 24 ft. wide. It may well be on these higher type roads that the road-mixed surface may be carried out to the shoulder line, instead of using a penetration treatment. This will tend to reduce maintenance costs, and give a better riding pavement without a shoulder break.

"SLUSH ROLLING" is a process of the Texas Highway Department and consists of pneumatic rolling to work the caliche surface to a paste-like consistency.

Western Equipment, Inc., of Albuquerque supplied all the American-Marietta machinery on a lease-purchase arrangement. So confident were Western's managers, Herb Powers and George Blewer, that they recommended this course so that the county could try the method and establish its satisfaction before making the outright purchase.

Costs went down. For this type of construction, $20,000 a mile by force account or by contract wouldn't be out of line. The following cost breakdown shows that increasing cost savings are about to be realized as the program gets under full speed:

ITEM	COST (per shift)
Trav-L-Plant, includes labor and depreciation	$125
Ampac 5620 pneumatic compactor, with operator	75
3 water trucks, with operators	150
Pulvi-Breaker, with operator	60
Salt truck and loader	48
2 motor graders, without operators	200
Operators for motor graders	40
36 tons salt for ¾ mi. of road per shift	380

Reducing these costs in relation to square yards treated per shift, it's easy to arrive at a 6¢ per sq. yd. stabilization figure, or $1,200 per mi. Machines and labor for priming, and for road-mixing the pavement surface, will add another $5,500 per mi. Even with a $1.50 per ton cost of caliche material added, the method should easily hold Lea County's costs at $15,000 per mile or below, for first-grade construction capable of standing up, when done right, under modern traffic.

ON THE JOB (from left) George Blewer, Western Equipment Inc., Albuquerque; John Easley and Bob McPhery, county commissioners; Ray Howell, county manager, Lea County.

. . . for more details, adv. pgs. 40 and 41, write No. 18 on Reader Service Postcard

LOOK WHAT THEY'RE DOING WITH DEEP STRENGTH ASPHALT PAVEMENTS IN WESTERN KANSA

To withstand heavy traffic, sizzling heat, numbing cold...

11-inch sand-Asphalt base is chosen for Kansas Interstate 70

Traffic will soon be rolling on a new DEEP STRENGTH Asphalt pavement section of Interstate 70 in Trego County, Western Kansas. In this part of the country, temperatures range from a numbing 20 below zero in winter, to sizzling 115°F in summer; winds sometimes reach hurricane force.

To meet the demands of expected heavy traffic and extreme weather, Kansas Highway Commission Engineers chose DEEP STRENGTH Asphalt pavement. Notice construction and cross-section (below). See how precepts of the new DEEP STRENGTH Asphalt design are incorporated . . . heavy-duty, **full width** Asphalt Concrete surface . . . **11-inch heavy-duty, sand-Asphalt base** . . . heavy compaction . . . good drainage. Here is strength and durability!

Minimum Maintenance

When built like this—for DEEP STRENGTH—Kansas experience has shown that Asphalt pavement will carry the heaviest traffic loads *without* distress and *with minimum maintenance.*

Make Best Use of Road-building Dollars

Like many other states, Kansas is finding that when Int state highways are built with Advanced Design DE STRENGTH Asphalt pavements, the best use is made road-building funds. For the Advanced Design Criteria Asphalt pavements often save money over the cost Asphalt pavement designed to other standards. The rea is the Advanced Design Criteria permit inexpensive Asph base to be substituted, within limits, for more expens Asphalt concrete surfacing, and allow reduction in to structure thickness when used in place of untreated ba

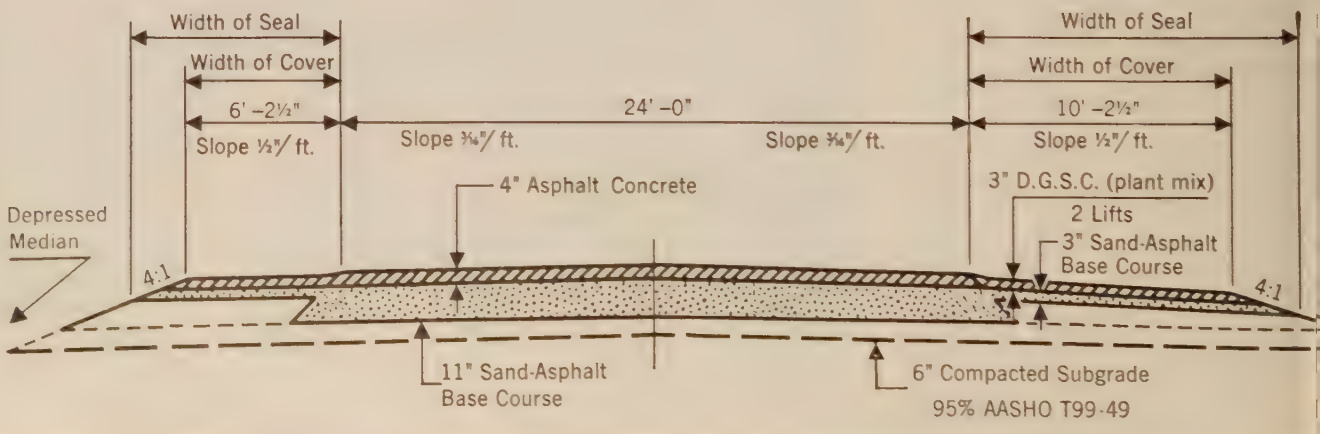
New Handbook

A new edition of the *Asphalt Handbook* incorporating the Advanced Design Criteria implied by the term DE STRENGTH Asphalt pavement is now available at Asphalt Institute office serving your area.

THE ASPHALT INSTITUTE

ASPHALT INSTITUTE BUILDING, COLLEGE PARK, MARYLAND

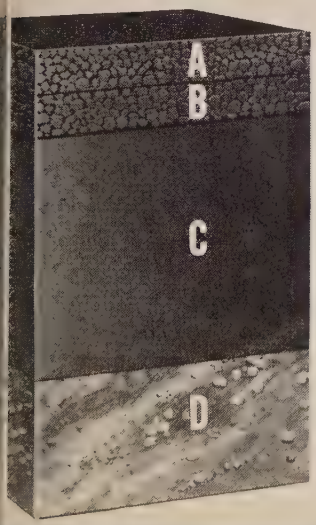
TYPICAL PAVING SECTION



Subgrade was compacted and fine graded before road-mixing of sand-Asphalt base.

Local sand shaped in windrow, bladed to reduce moisture to less than 1%, reshaped into windrow, mixed with Asphalt through traveling mixer—aerated and compacted.

Supporting courses are compacted with high contact pressure pneumatic roller to assure smoother riding under all traffic weights to come. Contractor's equipment was permitted on base course during construction of successive layers, which assisted in obtaining maximum density and reducing haul costs.



THIS IS DEEP STRENGTH CONSTRUCTION

A
2-inch surface course

B
2-inch binder course

C
11-inch
sand-Asphalt base

D
Subgrade

LIFTING SHELLS from form is done with two truck cranes after concrete has cured for seven days. As shells are lifted, steel tie rods at each end rip through light Masonite section of forms. Note concrete weights to hold form in place.

40-ton roof shells for county fair

Contractor solves the problems of forming, moving, and placing the world's largest precast concrete barrel vaults.

AN outstanding exhibit at California's San Mateo County Fair and Fiesta, Aug. 5-13, was the new exhibit hall itself. Called the Industry Building, it's composed of 80 pieces of precast concrete, including ornamental columns, tilt-up walls, and the largest roof barrel vaults in the world. The contractor, W. A. Moroney, Inc. of Burlingame, worked fast to finish the job before the crowds arrived.

Despite the unusual nature of the building, the public bidding in January 1960 attracted 11 contractors. Moroney's lump sum bid of $351,200 was low, edging Mid-States Construction Co. by a mere $7,000. Highest bid was not far away at $393,000.

The contractor's biggest problem, aside from the impossibly wet weather which plagued the project for the first month, was the construction of the gigantic roof elements. Having them made in the central yards of Basalt Rock or Ben C. Gerwick, the San Francisco Bay Area's two major precasting contractors, was ruled out because of the immense size of the sections. Each one is 18 ft. wide, 100 ft. long, and weighs 40 tons, too big for highway travel. So, it was necessary for the contractor to make them himself in a casting yard set up adjacent to the building. The fair grounds provided the essential storage space.

Planning the operation was difficult because of the lack of local precedent. One other building using barrel vaults for the roof had been built in the Bay Area, but the size of the elements was much smaller.

First step was to decide how many forms were needed to make the 22 shells. The more forms, the fewer times rented cranes would have to be called to the job to place the finished shells in the storage area. But forms cost money. Estimating the cost of forms and cost of crane rental as closely as possible, calculations showed four forms to be the most economical number.

Next was design of the forms. What is the cheapest way to hold forms to the ground when the hardened concrete is lifted off? Some contractors in Southern California have tried mounds of earth, but Moroney felt that would be more trouble than it's worth. Instead, he successfully used 1x1x6-ft. concrete weights spaced out under the forms on the cross braces, as shown in the photo. In addition, each casting bed had two 100-ft. long concrete footings to which the edges of the wooden forms were bolted. The footings conformed to the slight camber in the shells. Forms were liberally coated with form sealer before concreting in order to ease separation.

First idea for building the ribs of the forms involved use of 1x4-in. laminated boards bent to the 10-ft. radius, but this was rejected because the curve was too sharp for the lumber and caused some breakage. Final design uses ⅜-in. plywood supported on 2x4-in. stringers spaced 1 ft. on centers. Stringers are carried on 2x10-in. ribs out to the proper curve and spaced 4 ft. on centers. Interior bracing is of 2x4 lumber.

The shells are 3½ in. thick except for a thickened section near each end where they rest on bearing walls. A steel tie rod runs from edge to edge of the shells at each end at the bearing points. The tie rods made it necessary to divide the

STOCKPILE OF SHELLS is located adjacent to casting yard and building. Availability of storage space made precasting feasible, as units are too large to be transported by highway. Each of the 22 shells is 18 ft. wide, 100 ft. long, weighs 40 tons.

surface of the forms into three sections by two 6-in. slots to accommodate the rods when the shells were removed from the forms. Before concrete placement, the slots were covered with Masonite lightly tacked in place. When the shells were lifted from the forms the tie rods easily ripped through the Masonite. Without this trick, the form work would have been much more complicated and costly.

Permanente cement concrete was brought to the project as needed in transit-mix trucks by the H. E. Casey Co. Lightweight Haydite aggregate was used, resulting in a weight of 110 lb. per cu. ft. Concrete was placed in the forms with the aid of a steel hopper carried in a framework mounted on the forks of a lift-truck. By using a carefully controlled mix with a 3-in. slump, it was possible to place and screed the concrete to the desired thickness without the use of top forms. Manufacture of the shells was done in a 14-day cycle—seven days to clean and prepare the forms, set the steel and place the concrete and seven days for curing.

Finding a sub-contractor to move and place the shells wasn't easy. The first firm contacted took one look at the huge shells and turned the job down. It was finally taken by Independent Iron Works of Oakland. The pick-up inserts were designed by Superior Concrete Accessories and consisted of double holes at each of the four corners of the shells. The 1¼-in. holes were formed by casting into the concrete a piece of hardware formed of .340 wire.

The shells were moved the 200 yd. from the casting area to the building by two truck tractors and dollies. (Two cranes wouldn't be stable enough.) The truck led the way, carrying the shell on a steel beam which was mounted to turn in the horizontal plane as well as roll on its own axis. The universal mounting compensated for irregularities in the haul road. The shells were lifted into place by the two cranes, each with a simple one-part line and a spreader beam.

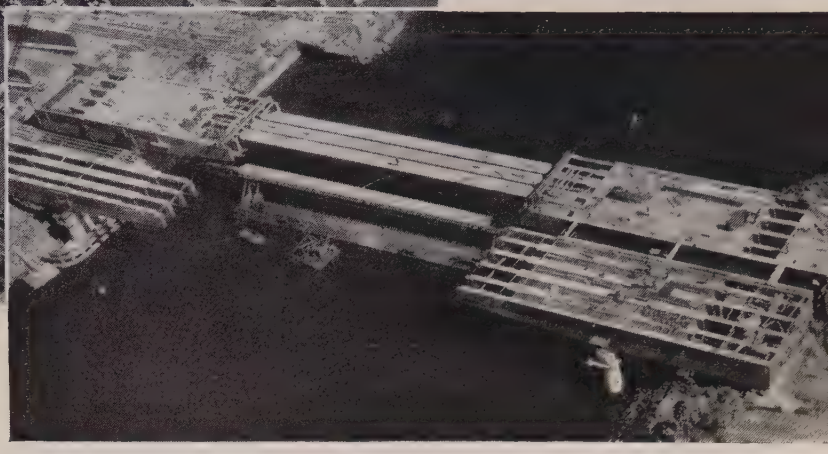
MOVING SHELLS was done with truck tractor in front and truck crane in back. Trick was horizontal beam on truck (background), compensating for haul road uneveness.

Architects are Janssen, Daseking and Keller of Menlo Park. Structural Engineer is Isadore Thompson. Superintendent for W. A. Moroney is "Corky" Vis.

William M. Wilson is manager of the San Mateo County Fair.

Indiana's largest shopping center. Among the unique features of the new 55-acre Glendale Shopping Center in Indianapolis is a service tunnel—running the entire length of the center. Its 15″ concrete retaining walls are reinforced by re-bars from Ryerson—as is the center's largest building. Total re-bars from Ryerson: 840 tons.

General contractor—Glendale Center, Inc. Construction agent—Inland Construction, Inc. Developers—Landau & Heiman, Inc. Planning and design—Victor Gruen Associates.

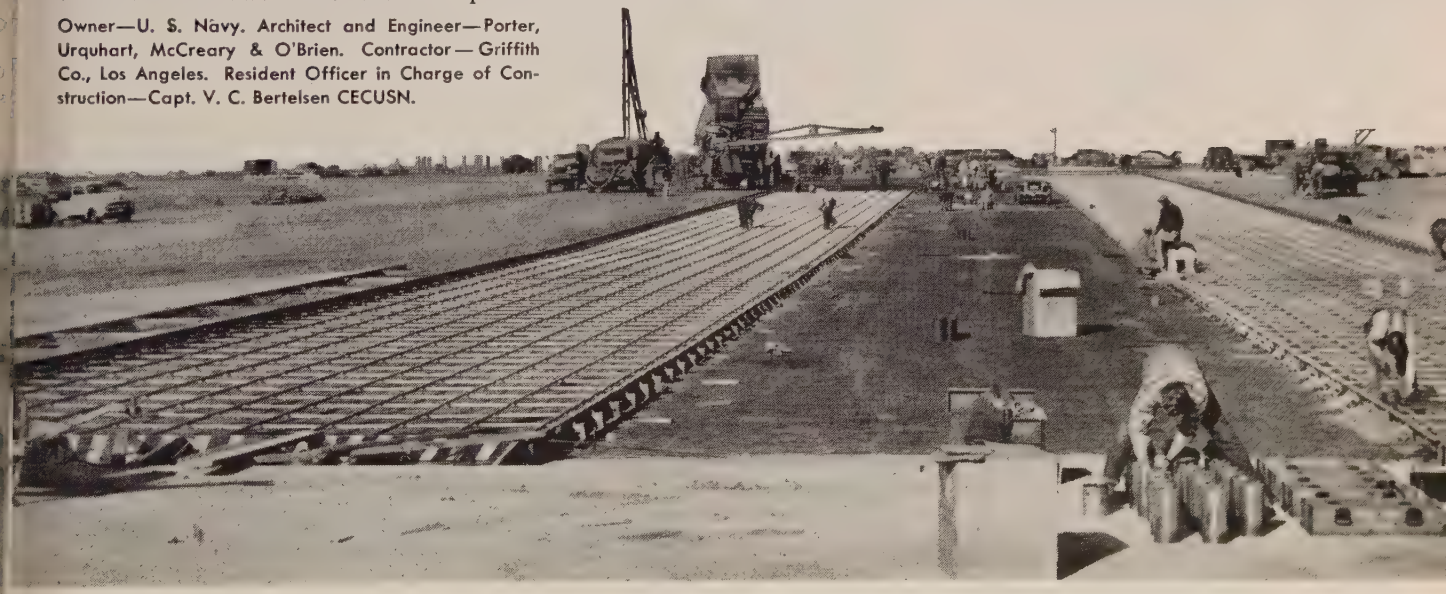


One of the longest post-tensioned projects. The new Naval Air Station, Taxiway at Lemoore, California, is a 512′ x 75′ *continuous ribbon* of prestressed concrete. The complete post-tensioning service from Ryerson includes 30 tendons that span the entire 512′ length and 205 tendons that run the width. Concrete is 6″ deep at the 312′ x 25′ center section—tapers to 9″ at edges. If concrete had not been prestressed, uniform thickness of 12″ would have been required.

Owner—U. S. Navy. Architect and Engineer—Porter, Urquhart, McCreary & O'Brien. Contractor—Griffith Co., Los Angeles. Resident Officer in Charge of Construction—Capt. V. C. Bertelsen CECUSN.

Nation's longest post-tensioned concrete span is the 320′ center span of the Oneida Lake Bridge near Brewerton, New York. The post-tensioning "package" supplied by Ryerson included more than 1000 tendon and anchorage assemblies.

Owner—State of New York Department of Public Works (C. F. Blanchared, deputy chief engineer, bridges). Engineers—Summers, Munninger & Molke, Albany, N. Y. General contractor—all construction work performed by Terry Contracting, Inc., Long Island City, N.Y.



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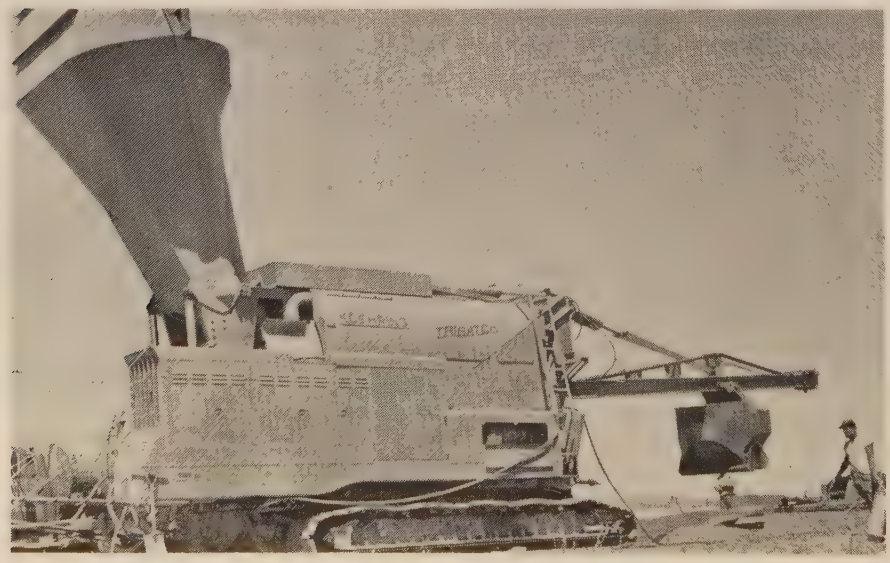
. . . for more details, write No. 21 on Reader Service Postcard

Colorado paving job goes all-modern

ON THE THIRD largest contract ever awarded by the Colorado Department of Highways, the Gardner Construction Co. has assembled a group of modern machines for mixing and placing of Portland cement concrete pavement. Work is on Interstate Highway 25, north of Denver and the contract was won on a bid of $2,091,300. The contractor had planned to use the slip-form type of paver and a Koehring Tribatch mixer as major units in his equipment set-up. This is the first time in the history of Colorado highway work where this combination has been used, although Colorado was the first Western state where the department and contractors pioneered the use of the slip-form paver.

To provide an adequate base for the concrete pavement, the subgrade was ripped to a depth of 1 to 2 ft. and then recompacted with careful regard for uniformity in moisture and compacting procedure. Project engineer Preston J. Skitt, of the Colorado State Highway Department, declared the project represents the latest techniques in highway engineering and the use of modern equipment.



FIRST appearance of the Tribatch mixer on a Colorado highway job, and first combined use of this mixer and a slip-form paver in the state. The five-compartment truck (top of page) feeds the paver, with batches that move through the three drums in succession. Concrete is deposited on the base at a rate of about a batch every 29 sec.

Batch trucks were of the five-compartment type, and the Tribatch paver can be visualized as handling the entire five batches simultaneously. In other words, while the first batch of the truckload is being deposited on the base, there are three actually being mixed in the drums, and the fifth would be loading in the hopper.

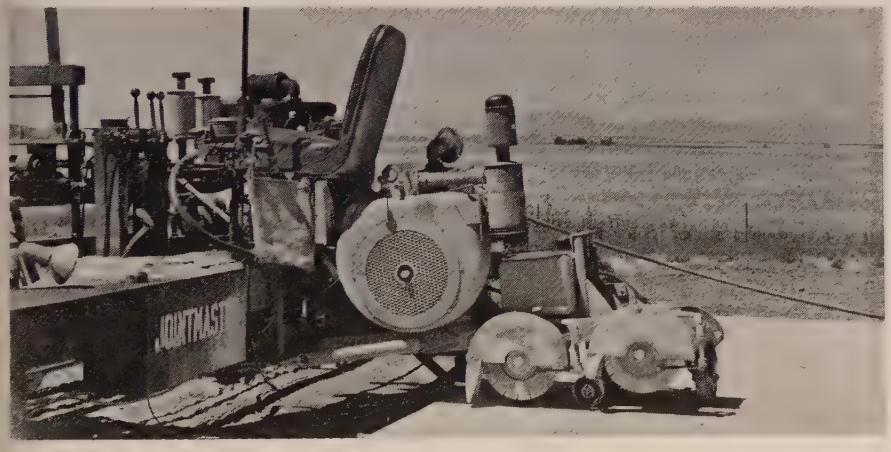
The Tribatch paver has been previously described in *Western Construction* in some detail in articles that appeared in the issues of May and July, 1960. The slip-form paver is the product of Chain Belt Co.

Following passage of the slip-form paver the concrete was sprayed with a curing compound (see illustration). As soon as its strength had developed sufficiently to take a clean cut an automatic saw made transverse cuts at 20-ft. intervals. The sawing was done by a self-propelled unit for both longitudinal and transverse cutting. The Jointmaster is made by Concut Sales, Inc.

The contractor's operations on the job were headed by W. S. Hasse, general superintendent of Gardner Construction Co. Foremen on paving operations were Virgil Kiser and Lawrence "Spud" Rovedo. Master mechanic is Lloyd Thompson.

MOVING FORWARD on its crawlers the slip-form spreads and finishes the batches.

CURING COMPOUND placed with a self-propelled rig. Note the clean, sharp side of the slab.



CUTTING both longitudinal and transverse (20-ft.) joints with a self-propelled Jointmaster saw.

CONTRACTOR-BUILT thump-o-meter by men of Gardner Construction Co. to be sure that the slab had the smoothness required by the highway department.

TUNNEL

(Continued from page 34)

an average of 45 ft. per day. Ground has firmed up, permitting the gradual extensions of arch support spacing to 5 ft. centers.

The contractor is not yet out of the public relations woods.

There is the problem of sleeping dogs, specifically those sleeping in houses above the tunnel alignment. Blasting in the tunnel is not normally audible to sleeping humans, but it easily wakens the family pooch who sometimes decides to arouse the household. Citizens thus awakened at 2 a.m. naturally become alarmed at the distant sound of blasting and reach for the telephone.

This situation was anticipated by the contractor, who made advance preparations. At the start of the job, all houses within 100 ft. of the center line of the tunnel were inspected and detailed reports were made on their existing condition, with special reference to cracks in the plaster. In addition, the contractor retained Dr. Don Tosher, University of California seismologist, to test the effect of the blasting.

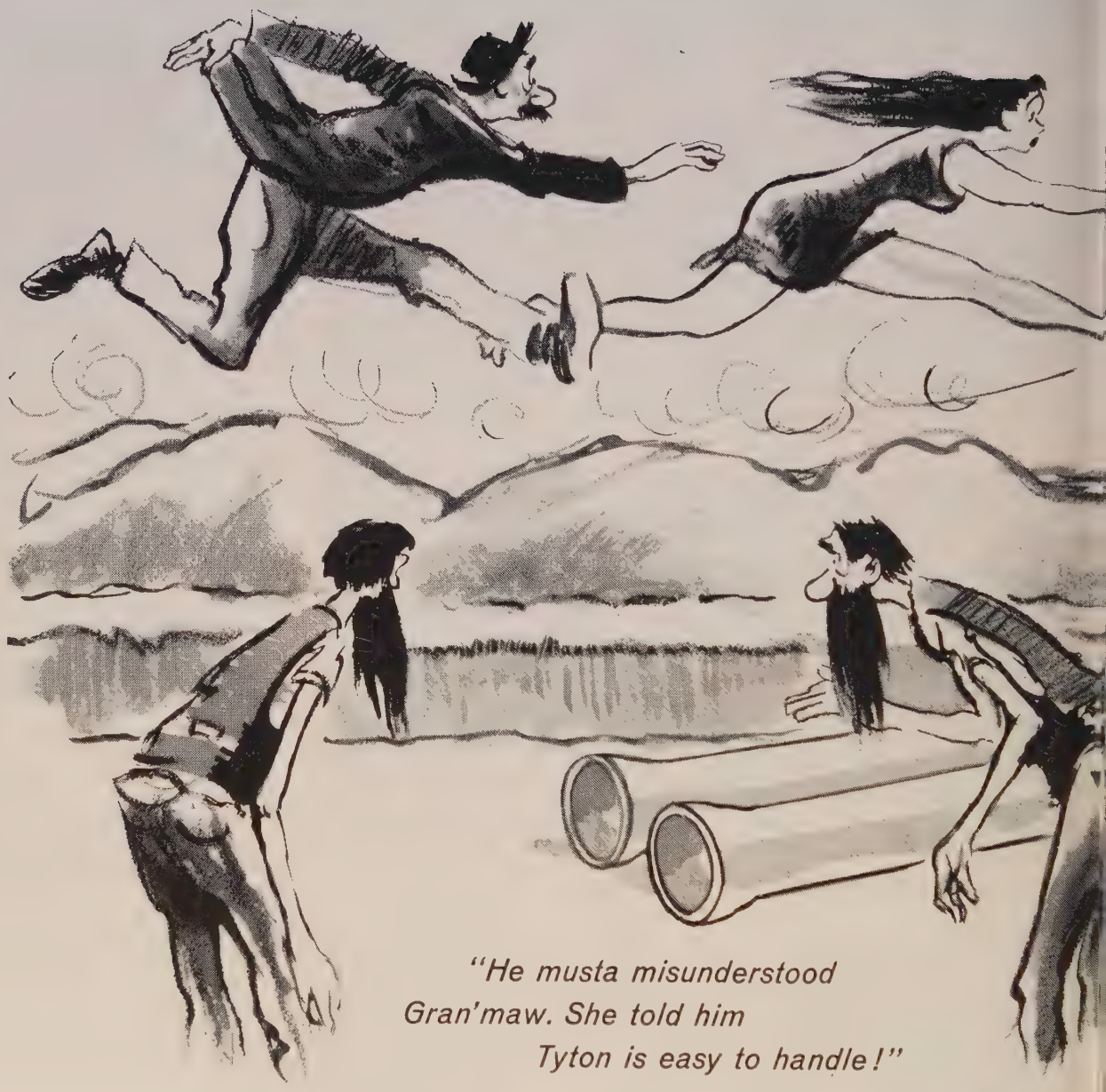
In several cases there were complaints from homeowners. In each instance Dr. Tosher set up a portable seismograph in the owner's bedroom and made a graphic record of the shots. These charts, which showed virtually no shaking, convinced the complainants.

Armed with prior inspection records, seismograph charts and an inexhaustible good nature, the contractor is winning his public relations battle.

He is now able to turn his attention more fully to the tunnel and its little problems: the lengthening hauls to the spoil area, the open cut section at the east portal, realignment of supports and lagging pushed around by shifting ground, and lastly, placement of the 2-ft. thick concrete lining.

For the contractor, Stolte, Inc., and Fred J. Early Construction Co., Project Manager Bill Harris' staff includes Don Hughes, office manager; "Blackie" Harmon, master mechanic, and Carl Harris, head of Stolte's utility department.

EBMUD's engineering staff includes E. L. Macdonald, head of the District's Special Projects Construction Division; his assistant, Bill Worden, and Joe New, field supervisor. Joseph D. DeCosta is EBMUD chief engineer.



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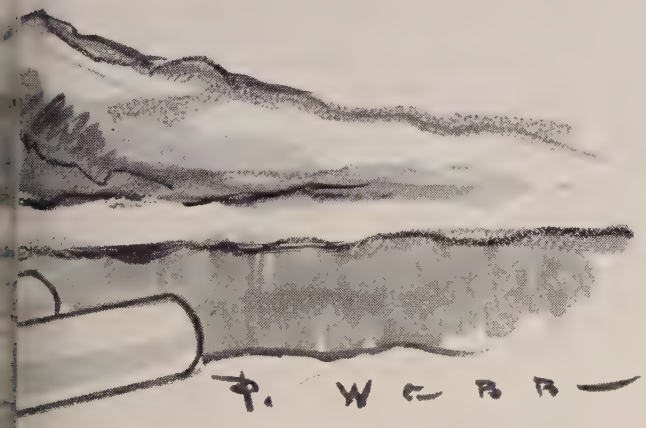

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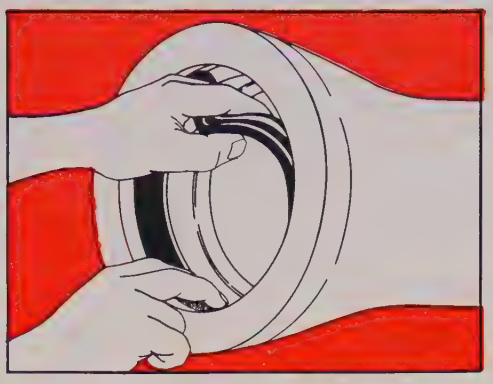
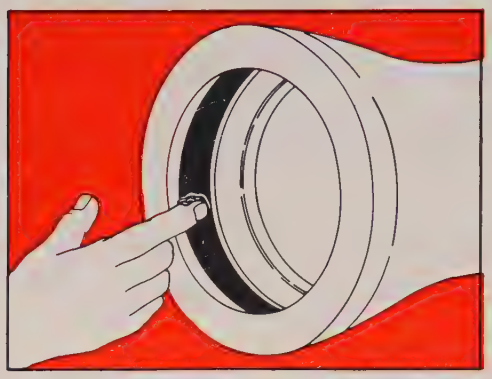
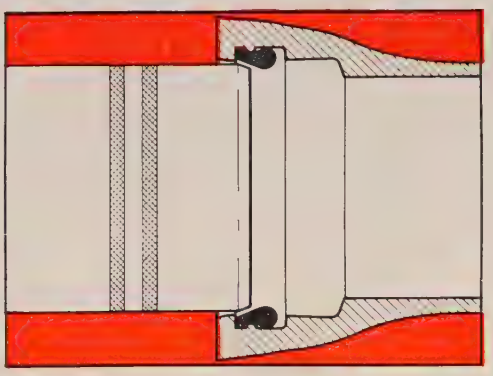


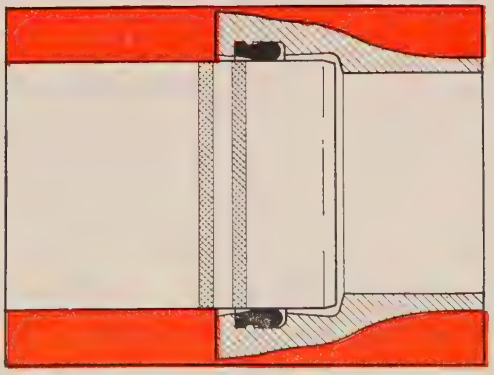
Insert gasket with groove over bead in gasket seat . . . a simple hand operation.



Wipe film of Tyton Joint® lubricant over inside of gasket. Your receiving pipe is ready.



Insert plain end of entering pipe until it touches gasket. Note two painted stripes on end.



Push entering pipe until the first painted stripe disappears and the second stripe is approximately flush with bell face. The joint is sealed . . . bottle-tight, permanently! The job's done . . . . fast, efficiently, economically. Could anything be simpler?

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

LINING over this 10,000-sq. ft. area will catch 6,000 gal. per inch of rainfall. Note slope and discharge into storage tank. The asphalt sheets, ¼ in. thick, are butt-jointed with cemented gusset strips.

Building catchment basins for livestock watering

Development of prefabricated panels has made their use practicable in remote areas of the Southwest.

By JEWELL R. BENSON
Consulting Bituminous Engineer
Denver, Colorado

MOST ENGINEERS are familiar with the problems of water supply in the populated sections of the arid Southwest. Few are familiar with the peculiar problems facing the Bureau of Indian Affairs, Department of the Interior, in providing water for livestock under the especially severe conditions that exist in the "Indian Country" of Arizona, New Mexico, and other areas of the Southwest. In solving the problems of livestock water, many lessons have been learned which are in themselves most interesting and which, furthermore, provide possible solutions to similar problems, acutely present in many other areas of the world.

In a country blessed with only a minimum amount of precipitation, frequently averaging less than 3½ in. per year, and most of this in the form of light snow or sudden showers, the subsistence of the Indian groups inhabiting this area poses a major problem. This limited amount of moisture is only enough to grow sparse vegetation. It limits the grazing of livestock and is insufficient to create wells, natural springs or sub-surface water in sufficient quantities to permit the watering of the livestock.

With the limited vegetation available, the cattle and sheep-growing industry can be maintained to provide wool for clothes and blankets, meat for food, and some cash income, provided two important factors are considered. One of these factors is to provide sufficient water in a given area to permit adequate grazing on the existing vegetation. The second is to provide *controlled* amounts of water so that over-grazing, with subsequent severe permanent damage to the grazing area, may be prevented.

These objectives must be met with the calculated precipitation available, by using a relatively simple means capable of being constructed in large part by Indian labor itself, with a minimum actual dollar outlay. The success of the Bureau of Indian Affairs, working from the Phoenix office of that Bureau, in solving these problems, provides a most interesting story.

While making use of such subsurface water supplies that are available, a major source of water is now being provided through a system of catch-basins and storage tanks carefully designed as to capacity and carefully spaced over the range lands to permit controlled grazing.

The idea of catch basins is not new, dating back, in some instances, to prehistoric times in both the old and new worlds. (The system at Gibraltar is perhaps most famous). However, practical use of catch-basins in the Southwest awaited the development and commercial availability of a prefabricated lining material.

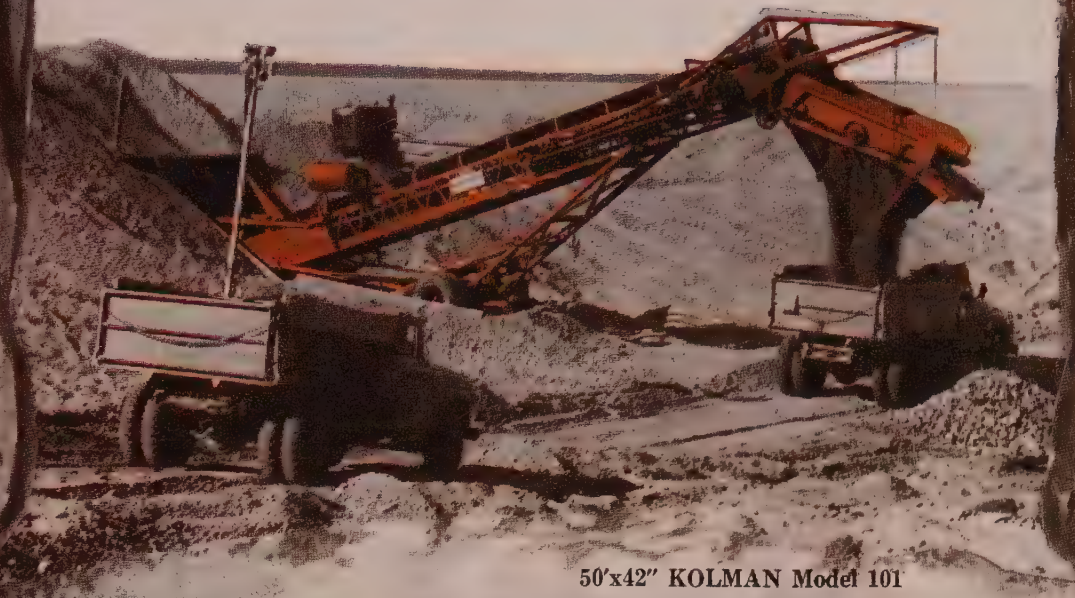
Mixtures of asphalt and sand, various types of membranes and other materials were unsuccessful due primarily to lack of equipment and skilled labor, poor performance or cost. However, asphalt mats, prefabricated in plants that turn out strong, durable sheets of the material at low cost, provided the practical answer.

These sheets are made up in 3 or 4-ft. widths, 12 to 15-ft. lengths, and in thicknesses from ¼ to ½ in. They are lapped or gusseted and sealed with asphalt to form durable, water-tight surfaces that catch all precipitation and drain this water into storage tanks for future use. While care must be used to obtain surfaces that will give long and proper service, unskilled labor, when carefully supervised, is capable of doing excellent work. The cost, when local labor can be employed, is generally very moderate.

General requirements

The first requisite in constructing a catch-basin is a gentle slope in the area to be served, permitting the asphalt lining to be placed on the smoothed ground without major earthwork or other preparation. The grade of these slopes usually does not exceed 10% and the site is selected at the crest of a small hill for best results.

'Man, That KOLMAN Sure Puts It Out!'



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EMPLOYEES of the Bureau of Indian Affairs, Phoenix, under direction of Joe Chiarella, Range Supervisor, Hualapie Indian Reservation, assemble a floating cover on a 30-ft. diameter stock tank near Peach Springs, Ariz.

Shape of the individual catch basin is conventionally a square of about 100 ft. on a side, giving about 10,000 sq. ft. of catchment area, although some basins may exceed 50,000 sq. ft. in area. These areas are sufficient to collect from 6,000 to 30,000 gal. of water per inch of precipitation. The area is usually laid out with one corner of the square forming an apex to which the water is diverted, and thence into a pipe leading to the storage tank. Edges of the catchment basin are raised and the lining brought over the top of the berm and anchored by burying, to prevent damage from outside surface water and wind. The entire catchment area is fenced to prevent damage and pollution.

The surface of the asphalt mats is normally black and so far no benefit has been considered in using light-colored surfaces. The dark surfaces assist in quickly melting snow cover, permitting storage of the water before capricious dry winds have an opportunity to evaporate the snow. In this arid region, winds of low temperature (below freezing) but of very low humidity, may easily steal an entire previous snowfall, without one drop of water becoming available to the surface. Quick melting and flow of water into the storage tank must therefore be attained. The naturally dark surface does this. Summer losses due to the dark surface are indicated negligible.

Storage in tanks

The storage tanks themselves have presented problems in type, simplicity of erection in remote areas, maintenance cost, and in certain problems associated with evaporation, pollution and algae growths. These problems have been overcome to a remarkable degree. Although tank reservoirs lined with prefabricated asphalt mats similar to those used for the catchment are being seriously considered, the type in common use at this time is usually a bolted or welded plate steel tank having a steel bottom and sides. They are about 30 ft. in diameter and capable of storing about 45,000 gal. when filled. These tanks discharge by valves into watering troughs for use of livestock.

The low-humidity winds that prevail in this area are capable of evaporating as much as 3 to 6 in. of water per day from the surface of these tanks. Furthermore, when the tank is full, the wind is frequently sufficiently severe to cause enough sloshing or wave action to lose an additional 1 or 2 ft. of water by this action alone.

Fouling of the water (by drowning and excrement) by birds, rabbits, rats and other fauna of the region is common. In addition, sunlight pouring into the stored water incites rapid growth of algae and similar water vegetation, this vegetation frequently imparting such taste to the water that livestock will refuse to drink it.

In some previous experimental work, surface and underground tanks were filled with coarse gravel, greatly decreasing storage capacity, in efforts to minimize evaporation and pollution. Roofs of steel or wood would seem to present a logical answer to evaporation and pollution control, but such roofs present serious problems in cost and maintenance. In work performed during the past year, an answer to the problem of covering storage water appears to have been found in a prefabricated cover which floats directly on the surface of the water in the tank.

The new floating cover, manufactured under the trade name of Hydroflote by W. R. Meadows Co., Elgin, Ill., is a uniquely formed sheet of an asphaltic combination having an improved core of lightweight material, impervious to water and completely rot-proof. The material is formed in rigid sheets having a specific gravity of between 0.6 and 0.9.

This construction permits a very tough and rugged cover to be formed, the strength of the sheets permitting convenient handling and placing, while the relatively high specific gravity gives a high resistance to any action of wind, a serious difficulty found with plastic foams and other materials which might normally be considered for this purpose. The sturdy cover prevents pollution of the water from wild-life, and the opacity to sunlight actively prevents formation of algae. Cost of the new floating cover is less than one-third the cost of any covers previously used.

The floating cover sheets are usually laid out beside the tank and cut to fit the tank surface. These sheets are then assembled either on the dry bottom of the tank, or on the surface of the water in the tank, both of which are easily accomplished. The sheets are held together by clips or batten strips. The bottom of the steel tank which is usually coated with rust-preventive asphalt, is covered with a thin layer of fine sand to prevent sticking of the cover to the tank bottom during periods when the tank is dry.

Spacing of catchment basins over the countryside depends on vegetative cover, natural water sources, and the livestock groups involved. At present, catch-basins are being located at distances of between 2 to 5 mi. apart.

The Hydromat floating cover has been developed by the Meadows Company, with the cooperation of the Bureau of Indian Affairs and Owen Clayberg and Associates, Phoenix.

The catchment basin work, and particularly the work on floating covers for stock tanks, has been under the direction of the Bureau of Indian Affairs, Phoenix, and especially under the direction of Range Supervisor Joseph Chiarella on the Hualapie Indian Reservation, assisted by Charles Bandy, Robert Robinson, James Jackson and William Schroeder.

V8·350 HP

VT8·430 HP

NVH·450 HP

V12·525 HP

VT·600 HP

VT12·700 HP

ROAD to the summit of a mountain in Southeastern Alaska near Petersburg at Duncan Canal follows the torturous course shown. Capt. Richard A. Kitts, Assistant Resident Engineer, Southeastern Alaska Residency, U. S. Army Engineer District, Alaska, points out the summit terminal of the peak's pike.

Alaska road to cost $3.30 an inch

TWO steep crooked roads are being built on nearly impassable mountains in Southeastern Alaska this summer. Each road climbs directly from sea level to mountain summits, each will serve as an access road to a Rearward Communications Station to be built on the mountaintops, each is slightly more than 6 mi. long.

The curves and kinks (see picture) are necessary to maintain a maximum 10% grade suitable for supply and maintenance vehicles that will use the roads.

The Rearward Stations are being built at Hoonah and Duncan Canal and 30 other sites in Alaska, to provide a dependable instantaneous link between Early Warning Stations of northern Alaska with defense nerve centers in the southern 48 States. The vast construction project is under the U. S. Army Engineer District, Alaska, which has construction and design control.

S. S. Mullen, Inc. of Seattle, has a $2,914,147 contract to do the work at Hoonah, and 35% of the cost is earmarked for road construction. This averages out at about $2.71 an inch. Manson-Osberg Co., Seattle, has a $3,216,420 contract for site and roadwork at Duncan Canal. The road will cost an estimated $1,300,000 or $3.30 an inch.

Costs are low considering the terrain and remote locations. Hoonah Station will be built on a summit rising 1,538 ft. above sea level near a small fishing village of the same name and about 40 mi. west of Juneau. Duncan Canal is south of Hoonah in a previously undeveloped area about 10 impassable miles west of the town of Petersburg.

All materials and supplies needed must be barged from Seattle. except for those needed in an emergency that can be flown to the sites. When the material is unloaded at the shore near either site, it is hauled to the top over these little Burma Roads. Workmen started clearing the heavy timbered right-of-ways early this Spring.

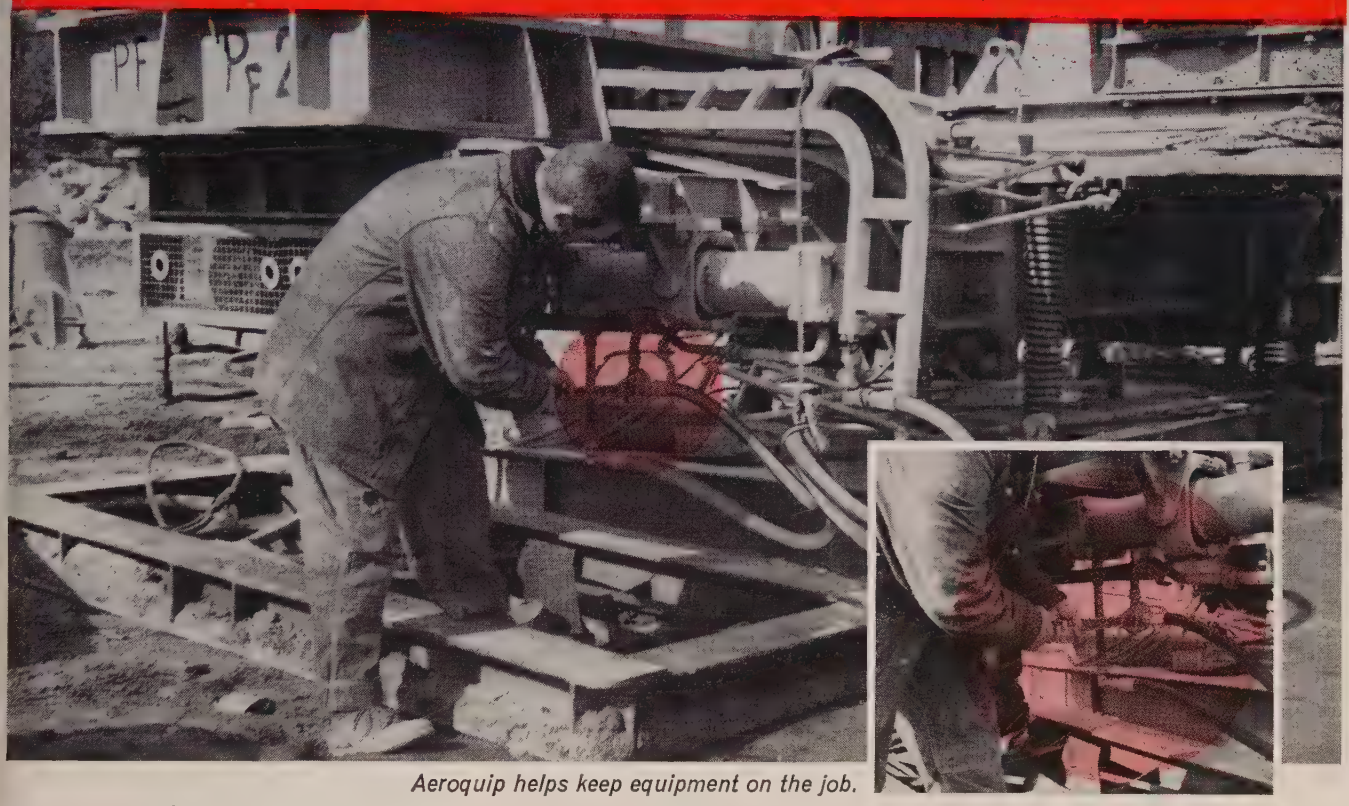
Pioneer roads were pushed through first in order to get the station construction started by mid July. Preliminary site work was supplied by helicopters. This work was principally detailed surveying for construction.

Bulldozers and other heavy earthmoving equiment were used to strip off layers of spongy tundra 2 ft. thick. Deeper road cuts are blasted out of solid rock formations —limestone or dolomite at Hoonah, granite at Duncan Canal.

The permanent road will be gravel-surfaced, one lane, 12 ft. wide with 12-ft. wide turnouts located at 1,000-ft. intervals for vehicle passing. Costs were reduced as much as possible compatible with the needs of national defense by District designers and surveyors. Lengths were kept as short as possible while maintaining an efficient grade. When the stations are in operation the roads will be used on a year-round basis to supply and service the communications stations.

walking pile driver has up to 8000 psi peak hydraulic pressures handled by Aeroquip Very High Pressure Hose

...from job report, Franki Foundation Co., Boston, Mass.



Aeroquip helps keep equipment on the job.

Hydraulic pressure is the key to walking Franki's 70-ton rig onto a foundation job. Frequently, the hydraulic pressure hits 7000 to 8000 psi—only the best hose can take this kind of punishment. Aeroquip 1508 Spiral Wrap Reinforced Hose is meeting this extreme test without break or trace of leak. The pictures show a Franki rig on one of the 140 caissons required for a new department store at the New England Shopping Center, Saugus, Mass. Franki is also using Aeroquip Low Pressure Hose for air lines on his construction equipment.

Our files of job reports like this show you are in good hands when you consult with Aeroquip. You'll find details about the right kind of Aeroquip Hose and Reusable Fittings for your particular applications in Catalog 204. Your Aeroquip distributor, a fluid line specialist, will give you a copy. He'll discuss, without obligation, various applications that might be helpful to you. His number is in the "Yellow Pages" under "Hose."

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Rush to complete stilling basin at Hanson Dam

THE DIVERSION TUNNEL is completed at Hanson Dam near Seattle, Wash. (*Western Construction,* May 1960). Work is now on around-the-clock basis six days a week to rush completion of the stilling basin ahead of seasonal rains and high water, James F. Grafton, resident engineer for the Army Engineers, has reported.

Continental Drilling Co. of Los Angeles, subcontractor to Kaiser-Raymond International, prime contractor for the dam's construction, handled the grouting in the diversion tunnel. This was the final contract work on that feature of the dam. The tunnel is 900 ft. long and 19 ft. in diameter, all concrete lined.

Work on the stilling basin, where the turbulent water will be quieted on the downstream side of the spillway, includes placing of concrete, rock and derrick stone placing, drilling for relief drains, and installing 36-in. by-pass pipe and valve.

Hanson Dam is a Federal flood-control project on the Green River, under jurisdiction of U. S. Army Engineer District, Seattle. Kaiser-Raymond and a subcontractor, R. & P. Contractors, have been "making hay" on the reservoir-area clearing and expect to have that job completed on schedule by late October.

Construction has been started this week on the permanent administration building by Ketner Brothers of Tacoma, a subcontractor. This will be a one-story masonry building 30 by 80 feet.

Rock placement on the right abutment of the dam is moving ahead. This is work on the rock-shell face of the "blanket" on the upstream side. The outlet works' control tower is going up, while drilling for rock excavation in the spillway approach channel is advancing. Both are on the upstream side of the dam.

Clearing has been completed for relocation of approximately 3 mi. of Forest Service road. The contractor is grading and installing culverts. Sub-grade work is under way on the access road between the Tacoma Water Department diversion dam and Hanson Dam. Surfacing of the road will be started next.

Construction will continue at a strong clip until the first of November, unless bad weather causes a slow-down, according to Army Engineers and contractor plans. River diversion will not be accomplished until next spring, then major work of constructing the dam will move full-speed ahead.

The rock-fill structure will be faced on the upstream side with a sand-and-gravel core and rock shell. It will rise 235 ft. above the river bed. Completion is scheduled for the fall of 1962. Partial flood-control storage will become available for the 1961-62 winter season, when the main dam and outlet works are completed in November 1961. However, 100% flood protection will not be provided until installation of spillway gates is completed in 1962.

PG&E asks for bids on 1,400-mi. pipeline

THE 1,400-mile Alberta-California natural gas pipeline system will call for construction bids immediately and break ground this fall, Pacific Gas and Electric Company has revealed. The news followed California Public Utilities Commission authorization to PG&E to build the 300-mi. California section of the big international pipeline. Commission action was the last governmental authorization needed and was the go-ahead signal for the $340,000,000 construction job.

The Alberta-California line will be one of the biggest pipeline projects ever undertaken. It will cross the Canadian Rockies, the Cascade Mountains and 14 major rivers to bring new supplies of natural gas to more than six million people in PG&E's northern and central California service area.

PG&E, in California, and the Bechtel Corporation, the project's engineering managers in the Pacific Northwest and in Canada, already have done much of the preparatory work. Line location work is substantially completed, acquisition of rights-of-way is well along, and the steel pipe is on order.

The route of the line runs southeast and south about 400 miles through Alberta, paralleling the Rockies and gathering gas from several fields; turns west and cuts 100 miles across the southeastern corner of British Columbia, to enter the United States at the top of the Idaho Panhandle; runs southward across southeastern Washington and extends down through central Oregon via Bend and Klamath Falls.

It will enter California in Modoc County, south of Klamath Falls, Oregon, and cross lava beds and the rough Pit River country to reach the Sacramento River near Red Bluff. Then it will continue down the west side of the valley and underneath the Sacramento and San Joaquin Rivers and terminate at Antioch in Contra Costa County.

Four big compressor stations will push the Canadian gas through the line to California.

Gibbons & Reed wins Whiskeytown Dam job

THE Bureau of Reclamation has announced award of the prime contract for construction of the 270-ft.-high Whiskeytown Dam, a major unit of the Trinity River Division of the Central Valley Project, in Shasta County, Calif.

The $6,215,577 contract goes to Gibbons and Reed Company, a Salt Lake City, Utah, construction firm, lowest of 16 bidders. Second low was the offer of $6,823,642 by Grafe-Callahan Construction Company and C. K. F-M, Los Angeles, California, a joint venture. Third low was the $6,991,629 bid of Darkenwald Construction Company and Morrison-Knudson Company, Sacramento, California.

Construction of the earthfill structure on Clear Creek, a tributary of the Sacramento River, about 10 mi. west of Redding, California, must be completed in 975 days. The entire $262 million Trinity Division will be essentially completed in mid-1963, if the currently rapid pace of construction is maintained.

Whiskeytown Dam and adjacent saddle dams will be 4,000 ft. long at the crest, will have a volume of 4,500,000 cu. yd. and will create a reservoir of about 253,200 ac.-ft. in capacity. The reservoir will store and re-regulate release from Trinity Reservoir, now about 85 percent complete.

Three gates, each two feet nine inches wide by three feet nine inches high, in the gate chamber located 264 ft. below the crest of the dam, and two regulating gates of the same dimensions located in the control house downstream will control the outlet works, which will have a capacity of 1,240 cu. ft. per second.

ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

DEVELOPMENT BILL—A $100,000,000 development bank bill which would provide money to finance tourist attractions has been proposed by State Representative Russ Meekins of Anchorage. Meekins proposes that the development bank could be created with capital provided by sale of state bonds. Funds from the bank would be loaned to private enterprise when other capital is not available for construction of modern tourist facilities and recreation centers. The bonds would be long term notes of twenty to thirty years with repayment adjusted to seasonal cycles of business.

BEAR TROUBLE – Construction workers at the Clear Ballistic Missile Early Warning Site have been criticized for bothering bears which each day invade the garbage dump near the jobsite. Joseph Laur, of the Department of Fish and Game, received a complaint from the Army Engineer Office at Clear that some of the workers were molesting bears at the site. A few men who worked in the area were reported roping the bears and dragging them along the ground with vehicles. Others were crippling the bears by shooting them. Laur investigated the complaints and brought a halt to the situation. He said that he counted 14 bears at the garbage dump at one time.

NEW PORT – The Anchorage port, being constructed at a cost of $8,000,000, is scheduled to be in usable condition by the end of November of this year. Henry Roloff, port director, is doing everything possible to put an end to rumors that the port is jeopardized by silting. The nearby Army port has had such a problem, but Rolof has pointed out that the fact that the Army is having difficulties with silting in no way affects the Port of Anchorage.

SCHOOLS IN THE NORTH – Construction of high schools and grade schools for native students in remote areas of Alaska is expected to increase over the next few years. The first school in this program of providing educational facilities in Alaska towns and villages opened early in September. This school was at Unalakleet. This is the first time that native children in isolated areas of the state have not had to leave their homes in order to further their education after grade school. To meet steadily rising enrollment figures the Bureau of Indian Affairs has constructed a three room school at Alakanuk and a two room school at Kotlik. Throughout the state, an additional 14 rooms have been added to school plants at various stations. Most of these construction projects are accompanied by new quarters for teachers.

WHITE ELEPHANTS? – The Army is pulling out of Whittier within the next year, but is concerned with what can be done about its facilities there. These include two large skyscraper buildings and a number of smaller buildings. The Army is ready to lease facilities on the base to acceptable bidders and would give preference to state and federal agencies. There have been suggestions that the Whittier buildings be used for everything from a state capitol to a penitentiary. The Army installation, about the size of the Pentagon in land area, is at the head of a 700-ft. deep fjord. It is almost encircled by mountains up to about 5,000 ft. One of the disadvantages of Whittier for most purposes is its extremely poor weather. During the summer, rain and cloudy weather may persist for weeks at a time. Rain averages 180 in. annually and snow 208 in., making it one of the wettest places on earth. Winds, especially during the winter, blast the area, and gusts as high as 135 mph. have been recorded.

PIONEER ROADS—A program of so-called "pioneer roads"—roads designed for opening up the wilderness to development and settlement—has a high priority in Alaska. Last year's state legislature set aside a million-dollar fund to help build such roads in all sections of the state. The state money can be used for construction, repair or relocation of roads leading into areas rich in natural resources, including mining areas currently inaccessible to truck haulage. The roads, generally, will not be suitable for passenger auto traffic, but will be for heavy trucks. Phil Holdsworth, Natural Resources Commissioner, terms them "essentially low standard, rudimentary truck roads." But they can mean a great deal to the development of Alaska—and to the road construction industry.

'60 HIGHWAY PROGRAM – Although last year's highway construction lagged – mainly because of the transition from the federal Bureau of Public Roads to the State Division of Highways – the 1960 outlook for road construction is excellent. Richard A. Downing, Public Works Commissioner, has predicted that the 1960 program will be "the most comprehensive highway construction program in Alaska's history." Downing reported that construction is now under way on 28 highway projects throughout the state having a total contract value of $11,087,586. Twenty other projects are all set to go. Incidentally, shortage of engineering manpower has been one of the things holding up this year's Alaska's road program.

ROAD REBUILDING—One facet of the 1960 Alaska road program will be emphasis on road rebuilding. The State Division of Highways has reported it plans to go all-out on paving and re-paving of more than 300 mi. of roads throughout Alaska. Reason for placing a high priority on hard-surfacing is that the state will face a staggering annual maintenance bill if the work is not done. Another reason for the decision is that Federal matching funds can be used for rebuilding roads but not for maintenance. T. D. Sherard, Division of Highways chief, said the state hopes to cut annual road maintenance costs from more than $1,500 a mile to about $1,000. This will result in a slash of $5,000,000 off the annual maintenance bill. Sherard revealed that the state is considering a plan to award contracts for road work in the fall of the year so contractors can study the situation and move in equipment during the winter, enabling them to be ready to begin work immediately after the spring breakup. A new state materials testing laboratory is scheduled for construction in Anchorage in connection with the accelerated road program.

B.F.Goodrich helps forge a new route through the redwoods

MORRISON-KNUDSEN EARTH-MOVERS climb 42% grade after delivering 35 tons of fill dirt. Equipment works 18 hours a day, 6 days a week, to speed completion of Redwood Highway bypass near Weott, California. B.F.Goodrich Rock Service tires will help move 3,300,000 cubic yards of earth over rocky, mountainous terrain, have performed so well already that many have been retreaded *twice*.

TWO-LANE U.S. HIGHWAY 101 snakes through California's famous forest of giant redwoods—a tourist's delight but a trap for through traffic. To remedy this, a new 4-lane bypass is under construction, 7.5 miles of it by Morrison-Knudsen Co., Inc. On M-K equipment you'll find B.F.Goodrich Rock Service tires.

This $5-million project calls for the excavation of 3,300,000 cubic yards of dirt. Earth-movers haul as much as 35 tons at a clip over ripped rock, twist up and down grades as steep as 42%. Massive B.F.Goodrich Rock Service cleats get a firm, non-slip grip on the ground, pull in forward or reverse.

For work in razor-sharp, tire-killing rock, B.F.Goodrich builds the Rock Service with new Cut Protected compound. BFG Flex-Rite Nylon cords withstand double the impact of ordinary materials, resist heat blowouts and flex breaks. Result: more retreadable tires. Morrison-Knudsen finds Rock Service tires often can be retreaded *twice*.

FOREMAN SETS GRADE STAKES as BFG Rock Service tires shoulder another 35-ton load of fill dirt. Finished 4-lane highway will be 60 feet wide, surfaced with 4-inch-thick asphalt, will have 4 bridges and 100,000 feet of 2″ horizontal water drain pipe. B.F.Goodrich on-the-job tire service is available on projects such as this.

RETREADED B.F.GOODRICH ROCK SERVICE TIRE in foreground has already given over 2,200 hours of service (some tires on the project have worked over 3,200 hours). BFG builds the Rock Service in 3 compounds — Regular; Cut Protected (CP) for short hauls over jagged rock; and Heat Resistant (HR) for longer runs at higher speeds.

Supplying contractors with longer-wearing BFG tires and providing on-the-spot tire service that saves time and money are everyday jobs for your B.F.Goodrich Smileage dealer. On many projects B.F.Goodrich supplies everything from tires to boots to belts through its new Unified Contractors Program. Whatever *your* need, it will pay you to check first with your BFG dealer. You'll find him listed under Tires in the Yellow Pages. Or write *The B.F.Goodrich Company, Akron 18, Ohio.*

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HAWAII Report

By ALAN GOODFADER, Honolulu

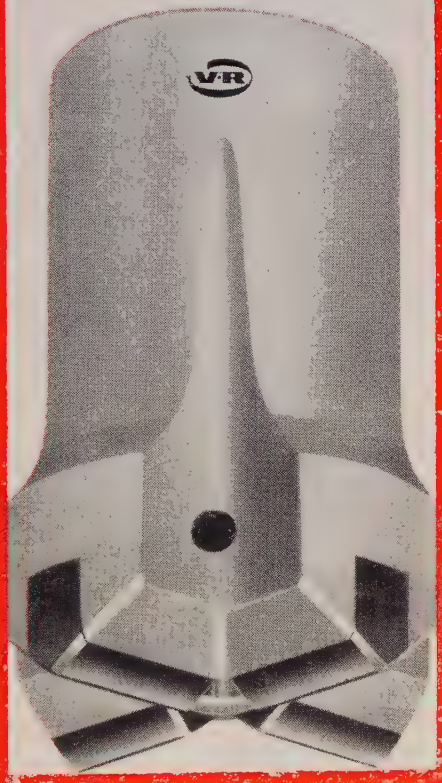
CEMENT AND MORE CEMENT—Hawaii, which has up to now imported all its cement, saw the opening recently of two cement plants which between them have a capacity of 2,700,000 bbl., or more than twice the 1,100,000 bbl. it uses annually. Official opening ceermonies were held on Oahu for the Hawaiian Cement Corp.'s 1,000,000-bbl. capacity plant and the Permanente Cement Co.'s 1,700,000-bbl. plant. Hawaiian Cement's $12,000,000 plant, under construction since mid-1959, and Permanente's $13,500,000 plant will supplant cement bulk shipments previously supplied by Permanente from the West Coast. Permanente also intends to supply cement from here to Guam and other Pacific areas. Meanwhile, the introduction of locally made cement has turned developers' eyes to subsidiary growth.

A new firm, United-Pacific Cement Corp., has announced it will build a $1,000,000 plant to manufacture concrete pipe and prestressed concrete products. It is being formed by Pacific Concrete & Rock Co., Ltd., of Honolulu, and United Concrete Pipe Corp. of Baldwin Park, Calif. Operations are expected to start within six months.

MASTER PLAN REVEALED—Part of the new cement industry's potential might will be used to fulfill a newly revealed master plan for Honolulu's home island of Oahu. The plan, first of its kind here, was announced after study by a number of planning consultants hired by the City of Honolulu. It calls for hundreds of millions of dollars worth of construction over the next 20 years. Public hearings all over the island will hammer out the final master plan to be submitted for approval by the city fathers.

It attempts to provide for an integral pattern of Oahu growth including land use, a transportation system, community facilities and administrative and regulatory provisions that will prevent "economic suicide" as Oahu's present 488,822 population grows to an expected 830,000 by 1980. Among other things, the plan proposes: a $500,000,000 highway system including wider through-traffic routes and two additional tunnel routes through the Koolau Mountains that bisect the island; a multi-million-dollar sewer system to replace the cesspools that are used in most of the island; expansion of Honolulu harbor facilities including widening of channels; construction of 52 elementary, 13 intermediate, nine high and one intermediate-high school; expansion of Oahu's water system that will cost $12,500,000 in the next five years alone; construction of 46 new park sites whose acquisition alone would cost $30,000,000, and construction of three regional and 11 community civic centers outside of metropolitan Honolulu. Along with construction goals, planners are pushing for new zoning ordinances and major urban renewal efforts to prevent or rehabilitate deterioration of older central urban areas on the island.

EAST-WEST CENTER—Closer to realization is the proposed East-West Center of the University of



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Hawaii for which Congress is being asked to supply $10,000,000 this year. The sum would be used to start construction and operation of a $30,000,000 training ground for Asian leaders and for Americans interested in Asian affairs. The university has appointed three firms to plan and build the center. They are the firms of McAuliffe, Young & Associates, I. M. Pei and Associates, and Law & Wilson. Chosen for supplementary work were Wynn Nakamura to engineer electrical utilities; Park Associates to design the first of three 12-story dormitories; Haydn Phillips to design a transient apartment unit; Design Associates, Inc., to design a 3-story dorm and Anderson, Kubala and Associates to design the classroom building. Ground breaking ceremonies will take place this fall.

The univeristy also has submitted to Governor William Quinn a $5,729,800 capital improvements budget for the next fiscal year. Largest item is a $1,650,000 classroom building. Other major items include a $1,000,000 food service building; $1,000,000 women's dorm; $534,000 military science building; $100,000 worth of roads and utilities; $356,000 worth of building and maintenance facilities; a $160,000 dispensary and a $190,000 cafetorium for the university's high school.

OFFICERS INSTALLED — The Hawaii Chinese Building Industry Assn. has installed the following new officers: Alexander K. W. Yuen, president; William Y. P. Wong, vice president; Lee Chang, secretary; David Chang, treasurer; Boy Chee, Wilfred Kon, Wallace Lai, Jonah Ting and Calvin Y. L. Ching, directors.

RECORD BOOM CONTINUES —Despite warnings that Hawaii's construction boom may start to level off soon, records continue to be smashed here. The General Contractors Assn. of Hawaii has announced that July contracts totaled $20,344,304, compared to $11,315,973 in the same month last year. The Bank of Hawaii says construction completed in May totaled $18,700,000, or 38.1% more than in May 1959, and construction bids let during June were valued at $38,100,000, or 41.8% more than in June 1959. The bank cautions, however, that "There are increasing indications of a gradual return from the unprecedented boom in construction to a more normal rate construction to a more normal rate."

Low bids and contract awards

ALASKA

Peter Kiewit Sons' Co., Seattle, Wash. submitted a low bid of $1,239,575 for paving runway and taxiway extensions at the Fairbanks International Airport. **Ghemm Co., Inc.,** Fairbanks, received a $688,200 contract for construction of mess facility at Eielson Air Force Base.

ARIZONA

San Xavier Rock & Sand Co., Tucson, submitted a low bid of $1,487,350 for grading, surfacing, retaining walls, and construction of 4 grade separation structures and one pedestrian underpass in city of Tucson, Pima County. A low bid of $448,425 was submitted by **Fisher Contracting Co.,** Phoenix, for grading, surfacing and one steel arch bridge east of Flagstaff in Coconino County. **Tanner Bros. Contracting Co.,** Phoenix, submitted a low bid of $406,552 for 2.5 mi. of grading and surfacing on the Cordes Junction-Flagstaff highway south of Flagstaff in Coconino County. **Arizona Sand & Rock Co.,** Phoenix, submitted a low bid of $253,387 for grading and surfacing on Camelback Road for 2.3 mi. in Maricopa County. **Copper State Construction Co.,** Mesa, submitted a low bid of $235,156 for grading, surfacing and one bridge near Prescott on the Willow Creek Road in Yavapai County. **Palmer Contracting Co.,** Phoenix, submitted a low bid of $185,385 for 3.3 mi. of grading and surfacing on the Globe-Young highway near Globe in Gila County. A low bid of $162,448 was submitted by **Arrow Construction Co.,** Yuma, for grading, surfacing and construction of one concrete bridge on the San Luis-Yuma highway near San Luis in Yuma County. **Kenneth A. Ethridge Contracting Co., Inc.,** Tucson, submitted a low bid of $125,953 for grading and asphalt seal coating on 4 mi. of the Trico Road northwest of Tucson in Pima County.

CALIFORNIA

Guy F. Atkinson Co. of South San Francisco received three contracts for highway work and powerplant: $16,237,675 for 11.9 mi. of grading, surfacing, construction of 4 undercrossings, one overcrossing and 6 pedestrian undercrossings and related work in city and county of Los Angeles; $3,993,744 contract for grading, surfacing and 14 concrete structures to be constructed on 9.6 mi. of 4-lane divided freeway in Sonoma County; and $1,047,867 for construction of the two-unit Trinity power plant, Central Valley Project near Lewiston. **E-W Construction Co.** of Creswell, Ore., received a $2,712,510 contract for construction of the 2-unit Clear Creek power plant located midway between Lewiston and Redding in Shasta County. **Gibbons & Reed Co.,** Salt Lake City, Utah, submitted a low bid of $6,215,577 for construction of the Whiskeytown Dam, a feature of the Trinity Project, Trinity County. **Peter Kiewit Sons' Co.,** San Francisco, submitted a low bid of $3,806,235 for grading, surfacing, and construction of 9 bridges, portions of substructures for 4 bridges and 11 retaining walls in city of Oakland, Alameda County. A $2,102,369 contract was received by **Morrison-Knudsen Co., Inc., Mercer Fraser Co., Inc.** of Eureka, for construction of 3.7 mi. of 4-lane freeway on U. S. 101, including 3 bridges and 2 box culverts south of Fields Landing in Humboldt County. **Fred S. Macomber,** Fresno, received a $2,511,358 contract for general work in constructing a physical education building and swimming pools at San Fernando Valley State College, Los Angeles County; also a $1,363,252 contract for construction of buildings and remodeling of existing building at Chico State College in Butte County. **B & R Construction Co.,** San Francisco, received a $1,142,180 contract for constructing a Natural Science Building at Humboldt State College, Arcata, Humboldt County. A $702,890 contract was received by **East Bay Excavating Co., Inc.** of San Leandro, for widening a 4-lane divided highway on 4.1 mi. on State Sign Route 9 in city of Hayward, Alameda County. **Hooker Co.** of Sun Valley received a $530,730 contract for grading, surfacing, and widening on U. S. 395 near Kramer and Johannesburg in San Bernardino County.

COLORADO

Northwestern Engineering Co., Denver, received a $1,718,603 contract for grading and paving on 12 mi. of U. S. 40 between Watkins and Strasburg in Adams County. **L. H. Kilgroe Construction Co.,** Denver, received a $914,716 contract for grading, surfacing and construction of 2 bridges on U. S. 87, in and near Denver, Adams County. A low bid of $897,861 was submitted by **Peter Kiewit Sons' Co.,** Denver, for grading, surfacing and structures on 6.9 mi. in Weld County. **Harrison Construction Co.,** Denver, submitted a low bid of $776,774 for grading and structures on 19.1 mi. south of Cortez, in the Four Corners area, Montezuma County. **Nielson's Inc.,** Dolores, received a $606,350 contract for grading, surfacing and structures on State Highway 80, north and south from Dolores and San Miguel in San Miguel and Dolores counties. **Schmidt Construction Co.,** Arvada, received a $565,709 contract for grading, surfacing and structures on 4.9 mi. of U. S. 50, from Kahnah Creek west in Mesa County. **C. L. Hubner Co.,** Denver, received a $464,766 contract for grading and asphalt surfacing on 8.3 mi. on U. S. 36 between Last Chance and Lindon in Washington County. **Domenic Leone Construction Co.,** Trinidad, submitted a low bid of $356,670 for grading, surfacing and related work on portions of State Highways 2, 51 and 14, Sedgwick, Logan and Phillips counties.

IDAHO

Aslett Construction Co. and **Twin Falls Construction Co.** of Twin Falls submitted a low bid of $1,024,667 for construction of 4-lane divided highway, concrete structures, drainage structures and related work in Bingham County. **Karl Woodall** and **Nelson Deppe,** Boise, submitted a low bid of $425,213 for grading and surfacing on the Lewis and Clark Highway in Idaho County. **Kimberly Construction Co.,** Kimberly, received a $270,149 contract for drainage structures, 4 concrete bridges, 3 concrete culverts and surfacing in Camas County. **Carl Carbon, Inc.,** Spokane, Wash., received a $163,176 contract for construction access road at Cottonwood Air Force Station.

MONTANA

Purvis Construction Co., Yardley, Wash., submitted a low bid of $1,034,147 for construction of Prudential Arcade Building in Butte. **Gus M. Albert, Contractor,** Miles City, received a $495,857 contract for 8.6 mi. of grading, structures

and surfacing on the Miles City-Kinsey road in Custer County. A $154,115 contract was received by **Walling Construction Co.,** Lewistown, for grading, structures and surfacing on the Utica-Hobson road in Judith Basin County. A low bid of $387,823 was submitted by **McLaughlin, Inc.** of Great Falls, for grading and surfacing on 5 mi. of the Y. G. B. Line Highway south of Neihart in Cascade County. **Albert LaLonde Co.,** Sidney, received a $470,572 contract for 5.7 mi. of grading, surfacing and draining on the Bozeman-Wilsall road in Gallatin County. A $376,573 contract was received by **Richardson Construction Co.,** Miles City, for 27 mi. of surfacing west of Wolf Point-North Dakota line.

NEVADA

Dodge Construction, Inc., Fallon, received a $427,973 contract for construction of a portion of U. S. Highway 6, east of Warm Springs in Nye County. **Alfred Brown Co.,** Salt Lake City, Utah, submitted a low bid of $927,697 for construction of a general hospital, Lovelock.

NEW MEXICO

Jack Adams Construction Co., Inc., Santa Fe, submitted three low bids for roadwork in Eddy and San Juan counties: $875,394 for 8 mi. of grading and surfacing on U. S. 62, 180 Carlsbad East in Eddy County; $798,094 for 9.1 mi. of grading, surfacing and related work on State Highway 62—180 Carlsbad East in Eddy County, and $411,184 for 4.7 mi. of grading and surfacing on State Highway 371, Farmington-Bisti in San Juan County. **Roberts Construction Co.** and **Western Paving Co.** submitted a low bid of $739,395 for grading and surfacing and related work on 1.8 mi. in city of Albuquerque, Bernalillo County. **Wylie Bros. Contracting Co.,** Albuquerque, submitted three low bids for roadwork in Eddy, Taos and Grant counties: $1,155,000 for structures and related work on State Highway 529 and 8, Arkansas Junction, Loco Hills, Eddy County; $664,566 for 8.1 mi. of grading, surfacing and structures on State 38, Questa - Red River, Taos County; and $498,295 for 6.7 mi. of grading, surfacing and related work near San Lorenzo, Grant County. **Armstrong & Armstrong,** Roswell, submitted a low bid of $658.964 for 5.9 mi. of grading and surfacing north of Anthony.

OREGON

Roy L. Houck Sons' Corp., Salem, received two contracts for roadwork in Multnomah and Lane counties: $1,238,283 for paving, surfacing and signing on the R. H. Baldock Freeway in city of Portland, Multnomah County; and $320,720 for grading, surfacing and 3 structures in the Goshen-Coast Willamette River section of the Pacific Highway in Lane County. **Rogers Construction Co.,** Portland, received a $1,387,905 contract for grading, surfacing and 4 structures on 9.4 mi. of the Deadmans Pass-Meacham section of the Old Oregon Trail Highway, east of Pendleton in Umatilla County. **Keystone Construction Co., Inc.,** Prineville, submitted a low bid of $1,153,851 for grading and paving on the Pleasant Valley-Hill Creek section of the Old Oregon Trail in Baker County. A $1,108,089 contract was received by **Vernie Jarl,** Gresham, for grading, paving and structures on The Dalles-Big Eddy section of the Columbia River Highway in Wasco County. **Earl L. McNutt Co.,** Eugene, received a $786,577 contract for grading, surfacing and related work on 8.6 mi. on the North Unit, Lyle Gap-Madras section of The Dalles-California highway, north of Madras in Jefferson County. **C. M. Corkum Co., Inc.,** Portland, submitted a low bid of $460,322 for construction of the Clackamas River bridge on the Cascade Highway in Clackamas County. A $447,123 contract was received by **Miller & Hutchins Constructors, Inc.,** Roseburg, for 2.2 mi. of grading, surfacing and oiling on the Coos Bay-Roseburg highway east of Myrtle Point in Coos County. **Warren Northwest, Inc.,** Portland, received a $365,402 contract for grading and paving on New Era-Canby section of the Pacific Highway east in Clackamas County.

UTAH

Jack B. Parson Construction Co., Smithfield, submitted two low bids for roadwork in Cache County: $527,737 for 5.3 mi. of grading and surfacing and construction of 2 concrete bridges near Logan, and $237,632 for grading and surfacing on 9.2 mi. from Box Elder — Cache County line to near Wellsville in Cache County. **Waterfall Construction Co.,** Ogden, received a $286,000 contract for 4.7 mi. of grading and surfacing in the Cache National Forest on the Woodruff-Huntsville route in Cache and Weber counties. **W. W. Clyde & Co.,** Springville, received a $254,000 contract for 2.7 mi. of grading and surfacing on the Windows Spur Road in Arches National Monument. A low bid of $293,741 was submitted by **General Contracting Corp.,** Salt Lake City, for constructing 2 concrete overpass structures in Orem, Utah County. A low bid of $213,056 was submitted by **Rosenlof Construction Co.,** Orem, for a steel beam structure on Interstate 15, city of Orem, Utah County.

WASHINGTON

Guy F. Atkinson Co., South San Francisco, Calif. received a $10,969,556 contract for constructing the second Lake Washington Bridge, Unit 1 - floating structure, 1.4 mi. length in King County. A $3,099,996 contract was received by **Puget Sound Bridge & Dry Dock Co.,** Seattle, for constructing the Seattle Freeway, Lakeview Boulevard to Shelby St. in King County. **John P. Hopkins Co., Inc.,** Mercer Island, received a $2,469,773 contract for 3.8 mi. of grading and surfacing, east city limits of Tacoma to King County line in Pierce County. **Roy L. Houck Sons Corp.,** Salem, Oregon, received a $1,743,195 contract for 4.8 mi. of grading, surfacing and related work from Burnt Bridge Creek to PSH No. 1 in Clark County. **Crick & Sons** and **Materne Bros., Inc.,** Yardley, received a $1,047,278 contract for grading and surfacing on 6.4 mi. Smythe Road to Hatch Road in Spokane County. A $663,923 contract was received by **N. Fiorito Co. Inc.,** Seattle, for 2.3 mi. of grading and surfacing in Mayfield vicinity Lewis County.

WYOMING

Big Horn Construction Co., Sheridan, received a $816,194 contract for grading, surfacing and related work on 4-lane divided highway Rock Springs-Rawlins road west of Rawlins in Carbon County. **Knisely-Moore Co.,** Douglas, received two contracts for work in Johnson and Albany counties: $737,945 for grading, surfacing and miscellaneous work on the Buffalo-Gillette road east of Buffalo in Johnson County, and $718,566 for grading, paving and culverts near Laramie in Albany County. **Roth Construction Co.** of Rapid City, S. Dak. received a $561,547 contract for grading, paving and related work on 3.5 mi. southeast of Buffalo in Johnson County.

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ENGINEERS and CONTRACTORS

AS huge concrete buckets place their loads on side of roof of the world's largest concrete hyperbolic paraboloid structure now taking final form at site of the Broadmoor Hotel near Colorado Springs, Colo., four of the men directly involved in the design and construction pose for the camera: Left to right, *R. E. Alderson* of Alderson Construction Co.; *Joe Coachman*, project superintendent; *E. Vernon Konkel* of the engineering firm of Ketchum, Konkel and Hastings; and *Edwin Francis*, architect.

Isbell announces new executive group

ISBELL Construction Co. recently announced executive changes, due to the impending retirement of the four Isbell brothers from active management of the construction firm.

The brothers who have been active in the construction field, and who will retire are:

C. V. Isbell, President, who has been active in the mining field, and resides in Reno.

W. J. Isbell, Vice President, who has been active in the highway and heavy equipment field, and resides in Reno.

Roy S. Isbell, Secretary, who has been in charge of the Arizona operations, and who resides in Phoenix.

Guy V. Isbell, Treasurer, who has been active in the mining operations, and who resides in Ely, Nev.

Edward L. Pine has assumed the duties of president of the corporation and general manager, with headquarters in Reno. Pine is a former state highway engineer of Nevada, has been active in the construction field in Nevada, and numerous civic organizations.

Henry Isbell has assumed the duties of vice president in charge of Nevada construction operations. Mr. Isbell is a graduate civil engineer and has been in charge of major construction projects performed by the firm, such as Boca-Floriston, Interstate Route 80, McCarran Hill, Interstate 80, reconstruction of U. S. 50, Clear Creek, near Carson City, and many other construction projects.

Furman Byars has assumed the duty of vice president in charge of Arizona operations, with headquarters in Phoenix. Mr. Byars has been associated with the firm since 1937 and has had active management of mining operations as well as highway and heavy projects.

John Isbell has assumed duties as vice president in charge of planning and also will organize subsidiary firms to develop the various holdings of the construction firm.

E. F. Duerr has assumed the duties of secretary-treasurer.

George Havas has been appointed vice president and director of engineering of Kaiser Industries Corp., Oakland. Since joining the organization in 1928, Havas has figured prominently in all the various engineering and construction jobs of the Kaiser companies, including Hoover and Bonneville dams, and the Fontana installation. He has served as chief engineer since 1935.

Another announcement concerns the Heavy Construction Division of Henry J. Kaiser Co. This division has been renamed Kaiser Engineers International, division of Henry J. Kaiser Co. **John Hallett** is general manager of the newly named international division.

* * *

Leo K. Berry, Palo Alto, Calif., has been appointed to fill a vacancy as district engineer at Sacramento, for The Asphalt Institute. He succeeds **W. R. Lovering,** recently promoted to division paving engineer. Likewise, **Charles G. Grosvenor, Jr.,** Denver, has been appointed to fill the vacant post of district engineer at Santa Fe, N.M.

* * *

Opening of a civil engineering office at 13912 Ponderosa St., Santa Ana, Calif., is announced by Engineering Service Corp., Los Angeles. **Leonard Gerkin** is general manager of the new facility.

* * *

Col. Helmer A. Holstrom has been assigned to the U. S. Army Engineer Division, South Pacific, according to announcement by **Brig. Gen. Robert G. MacDonnell,** Division Engineer. Holstrom will be assistant division engineer with headquarters at San Francisco.

CALENDAR

Oct. 5-7—Associated Equipment Distributors, Western Regional Meeting, Sun Valley, Idaho.

Oct. 6-8—Structural Engineers Association of California, annual convention, Yosemite Valley, Calif.

Feb. 5-9—Associated Equipment Distributors, annual meeting, Statler Hilton Hotel, Los Angeles.

Feb. 20-23—American Concrete Institute, annual convention, Chase-Park Plaza hotels, St. Louis, Mo.

A grader for CONTRACTORS

Competitive bidding factors on modern construction jobs . . . the pressure of work schedules . . . the exacting specifications—all demand much more from a motor grader now than a few years ago. Thus, greatly increased earth-moving ability, stamina, minimum maintenance, and ease of handling are what contractors want in motor graders to meet their needs today and tomorrow.

Three Galion 160 motor graders on construction of Ohio Highway No. 1 near Conneaut.

Effective Weight and Power

One grader which is meeting all demands with spectacular on-the-job performance is the GALION model 160. Its 30,020 lbs. weight (with scarifier) balanced to the 160 hp direct-starting diesel engine produces tremendous "push power" on the extra-large hydraulic power-shift moldboard.

This efficient pay load combination speeds operations, moves more dirt per pass, reduces the number of passes needed to do the job—gives additional profits or bidding advantage to contractors.

Easy and Safe Control

Any experienced operator who has had the pleasure of putting the GALION 160 through its paces will agree that the 160 is amazingly easy to operate. Features which aid the operator include: combination manual with hydraulic power steering, no "kick back" in the hydraulic control system which is Galion-designed and Galion-built, two-stick shift mechanism for the six-speed constant-mesh transmission, 10 ply 14.00 x 24 tires front and rear, four-wheel hydraulic brakes, complete visibility of blade, and conveniently grouped operating controls.

Simple, Economical Maintenance

The GALION 160 grader is designed for exceptionally long life and for easy servicing. For instance, the positive-acting leaning front wheels have only two grease fittings to service.

The GALION constant-mesh transmission and final drive are engineered to ratios which reduce stresses and wear to a minimum. It is common for these transmissions to log over 10,000 operating hours without need of overhaul. The powerful Cummins diesel engine is renowned for its economical operation, freedom from trouble, and dependable performance at any temperature or altitude.

The special feramic-faced, spring-loaded, heavy-duty clutch is not affected by heat or cold. No cooling system is required on this simple, dry-type clutch; consequently frequent servicing is not necessary. Other features of rugged construction that value-conscious contractors appreciate in the GALION 160 are the heavy front axle assembly, extra large (3⅜" x 2") front wheel spindles, full-floating two-piece drive axles which carry no weight, and the extra strong single member box-type frame.

When the going is rough and tough, you will be glad you have GALION 160 Motor Graders on the job. Write for Bulletin No. 421. The Galion Iron Works & Mfg. Co., Galion, Ohio, U.S.A.

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SUPERVISING the jobs

Ray Beigh, superintendent, **Everett Wentworth,** grading foreman, **Wayne Stoll,** general foreman, and **Clifford Johnson,** mechanic, comprise the chief personnel on another highway award to Thomas Construction Co. Costing $199,587, this work consists of 1.5 mi. to be graded and surfaced with asphalt concrete on cement-treated base, and is located on the Tuolumne-Sonora road in California. For this widening and realignment job, the shot rock is being loaded into Model C Tournapuls with rocker bodies by a Link-Belt shovel. Scraper dirt is being moved by Model S-18 Euclids. M. J. Ruddy & Son is paving subcontractor.

* * *

C. D. Bisordi, project manager, **George Jones,** superintendent, and **Doug Calder,** engineer, head the job personnel for S. S. Mullen, Inc., contractor constructing 3½ mi. of road, building, and tower for Rearward Communications facilities at Sawmill AFB in Alaska. Mullen got the bid on a low figure of $641,099. Under construction since the first of July, work is expected to be finished by Nov. 1.

* * *

Robert E. McKee, Contractor, Inc., is constructing a living unit at the Youth Training School at Chino, Calif. This general work award went to McKee on a low bid of $1,430,700. Engineer here is **W. Talbot.** Office manager is **B. J. Stanford.** In the foreman spot are **E. C. Piper** and **L. E. Davis,** carpenter, and **F. B. Anderson,** labor. Scheduled for completion August next year, construction began last July.

* * *

Charles Wiswell, project manager for Maino Construction Co., Inc., has charge of construction of 4 buildings, 2 on San Nicolas Island, 2 at Point Mugu in California, plus electronic facilities at both sites, a part of the Naval Missile program. Maino Construction's bid was $1,639,891. The project has been under construction since July, with June next year the target.

* * *

Joe Kubich is supervising a recent $1,106,965 award to Stolte, Inc., for 1 mi. of roadway grading and drainage and an 825-ft. long steel girder bridge over the South Fork of the Eel River in Humboldt County, Calif. Pile-butt foremen are **J. D. Cardwell** and **Calvin Dyer.** Job started last July, will probably end June next year.

* * *

Harry Clabertros, Donn Huber and **Roger Shaffer,** project manager, superintendent, and engineer respectively, are the chief supervisors in the installing of tramways at Lisburne and Tin City Air Force stations in Alaska. S. S. Mullen, Inc., is doing the work at a contract price of $1,228,701, started the project Aug. 1 and expects to be finished October next year.

* * *

John Tryon is project manager, and **Lawrence Finger** is superintendent on another recent award to S. S. Mullen. This one covers construction of 2 bridges and 3.1 mi. of grading and surfacing on the Tongass Highway near Ketchikan, Alaska. Work on the $1,038,242 project got under way July 20 and will run till Aug. 20 next year.

* * *

J. E. Feller is project manager, **H. W. Parker** is project engineer, and **C. O. Pierson** is the job superintendent for the Spring Creek power conduit contract which was awarded to Winston Bros. Co., Johnson Drake & Piper, Inc., and Green Construction Co. on a low bid of $11,717,104. Office manager is **H. R. Tucker,** while office engineer is **B. E. Witcher.** Part of the Trinity River Division of the Central Valley Project, Calif., this construction covers Tunnels No. 1 and 2 and the Rock Creek siphon. Last June was the starting date, with completion set for the end of 1962.

* * *

Jake H. Metzger is supervising a $361,575 job for C. A. Reeves Construction Co. in Johnson County, Wyo. Work consists of grading, surfacing and other items on 2.2 mi. of 4-lane divided highway. Other key supervisors here are **Kent V. Reindahl,** mechanic, and **Charles E. Burr,** welder. The job started in June and is expected to be finished in December.

* * *

Ross McWilliams is superintending Allen M. Campbell Co.'s $1,612,000 award to construct a reinforced concrete structure on the campus of Polytechnic College, Pomona, Calif. The 3-story building will be finished about August next year, having been under construction since June.

* * *

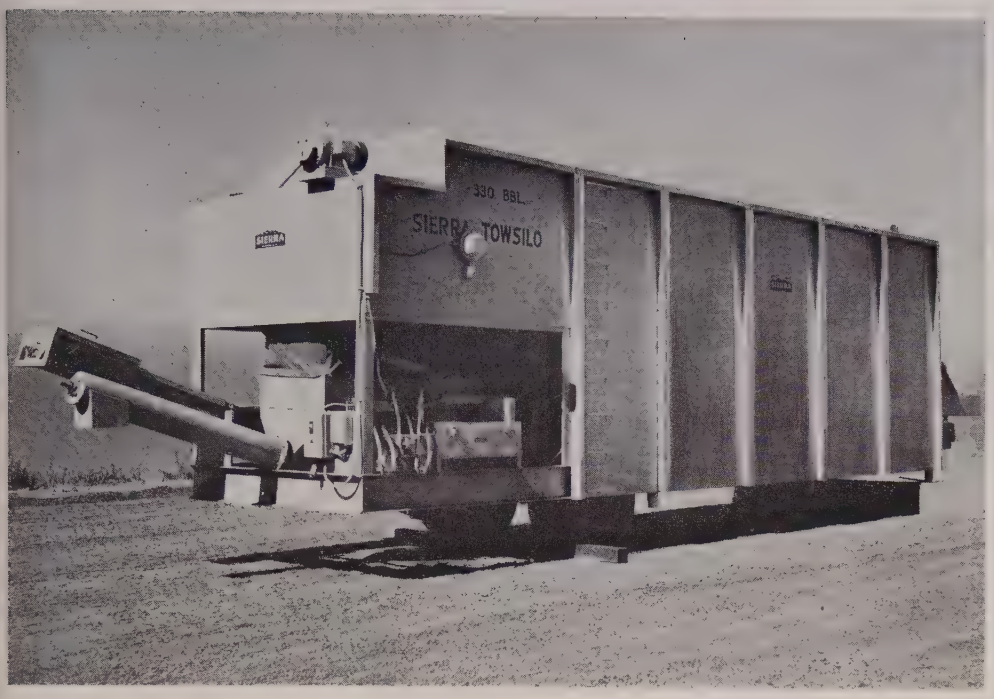
George Victorino, project engineer, and **Tony Bettencourt,** job superintendent, are chief supervisors of a $184,341 contract for grading and surfacing at various locations in Marin, Sonoma, and Napa counties, Calif. Madonna Construction Co. was the successful bidder.

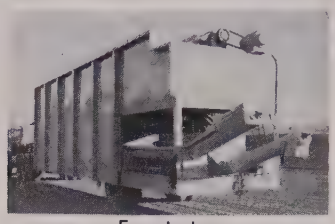
* * *

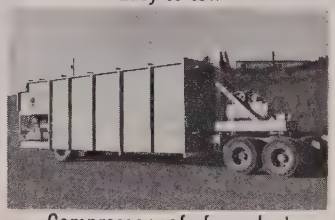
C. H. Hansen, Jr., as general superintendent for Stolte, Inc., is in charge of construction of box girder bridge crossing the Tuolumne River in California, complete with new approach road. Grading superintendent is **Stan Kister.** The winning bid was $383,328. Job started in June, will finish in December.

* * *

E. J. "Lefty" Whitcomb is supervising Isbell Construction Co.'s contract for 2.3 mi. of grading, surfacing and related work on the Globe-Show Low highway in Gila County, Ariz. This work went to Isbell on a low bid of $1,522,959, and involves 1,400,000 cu. yd. unclassified excavation and 2,650 cu. yd. concrete, with one box cul-




Easy to tow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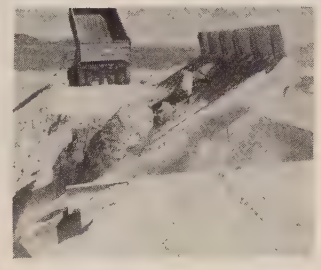

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. . . for more details, write No. 38 on Reader Service Postcard

vert 530 ft. long. Other important personnel on the job are **Keith Turley,** tractor foreman, and **Jim Evans,** timekeeper. Job started in August, and Isbell reports shovel work will begin in November, with final finish date scheduled for September next year.

* * *

John H. Tanner, engineer, **Carl C. Jacobson,** general superintendent, **Lyle Fish,** superintendent, and **Donald J. Norris,** office manager, comprise the top men on job of grading and surfacing on 2.5 mi. of the Cordes Junction-Flagstaff highway in Arizona. This is a $533,469 award which recently went to Tanner Bros. Contracting Co., Inc., which started work in August and expects to have it complete this December.

* * *

T. H. Kelly was named to act as job superintendent on recent freeway interchange award to Peter Kiewit Sons' Co. The $7,676,933 contract covers grading, surfacing and 17 major structures in the city and county of Los Angeles, Calif. Other key contractor men are: **Zelmo Mullican,** structures superintendent; **W. E. Wilson,** excavation superintendent; **J. D. Brown,** HDR general foreman; **J. F. McLaughlin,** job engineer, and **Robert Terryberry,** job office manager. Earmarked for completion in October 1961, job started in August.

* * *

Earl Anderson is superintending a contract for construction of undercrossing and approaches in Pierce County, Wash. Allen R. Anderson was the successful bidder at $248,257 and describes the job as prestressed beams bearing on Armco pile foundations. Foremen working here are **LeRoy McFarland** and **Jake Sipila.** Work is expected to end in March next year, having been under way since August.

* * *

Merrill L. Dubach, project manager for R. A. Westbrook, Inc., and Morrison-Knudsen Co., Inc., has charge of grading and paving job including structures and pipe on 8.9 mi. of U. S. 395 south of Alturas, Calif. Office manager for this $825,419 project is **T. J. Hopper,** while **Dallas Matthews** is master mechanic. Started last July, work will finish about April next year.

O'Neil Jones, project manager, **Earl Fisher,** superintendent, and his assistant, **Forrest Strand,** and **Eldon Ulshafter,** head the job personnel working for Albert LaLande Co. on 9.7 mi. of grading, surfacing and plant mix oiling on the Circle-Sidney and Circle-Northwest road in McCone and Dawson counties, Mont. Earmarked for completion next May, the $351,184 job started Aug. 10.

* * *

Ken Rose is supervising a $229,950 job for Isbell Construction Co., with **Charley Webber** acting as foreman, and **Bill Huie,** timekeeper. Located in the Petrified Forest of Arizona, work consists of 5.7 mi. resurfacing and partial realignment of Painted Desert Rim Drive, including parking areas. Under way since July, Isbell expects to have the job finished in October.

* * *

Robert Immel, project superintendent for R. A. Bianchi and R. A. Bianchi Construction Co., has charge of $674,430 contract for 5.4 mi. of road grading and drainage work in Invo County, Calif. Assisting as foreman is **Hobbert Pond. Al Eads** is mechanic. **R. D. Bottorff** is resident engineer for the project, which is expected to run until March 1961.

* * *

Edgar Billimek, general superintendent, assisted by **Lloyd Severns,** is supervising construction of a communications station at Neklasson Lake, Alaska, for Alcan Pacific Co., which won the award on a low bid of $439,000. **Maurice Martin** is project engineer on this contract which has been under way since June and is expected to finish about November.

* * *

George Ramstad is supervising the $658,807 job recently awarded to Alcan Pacific Co. covering grading, surfacing, and a bridge over Cripple River in Alaska. Assistant superintendents are **John Dahlke** and **Don Mekechnie,** and project engineer is **Joe Keller.** Work here started last July and will run till October next year.

* * *

Jim Harris is in charge of L. M. White Contracting Co.'s $269,955 award for grading and surfacing on 9 mi. of the Benson-Douglas highway near Bisbee, Ariz. Equipment superintendent is **V. A. Steinhart.** Scheduled for finish the end of November, the job started July 25.

* * *

George Pope, superintendent for E. L. Yeager Co., has charge of shoulder widening and resurfacing on 28.7 mi. east of Amboy in California. This is a $444,107 contract which has been under way since July, with work scheduled for October completion.

* * *

Don Grock is supervising grading, graveling, cement stabilization, and hot stuff on 7.5 mi. of county road in Box Elder County, Utah. This is a Thorn Construction Co. project costing $414,591. Other key men here are **J. W. Clark,** grade foreman, assisted by **Louis Thorn** who also acts as structure foreman. Scheduled for November completion, the job has been going since August.

* * *

Fred Pankratz is superintendent on a $428,694 award to B-E-C-K Constructors for construction of rearward communication facility at Tahneta Pass, Alaska, a project scheduled for completion in November.

* * *

Jerome Funk, superintendent, aided by **Wendell Fife,** crusher foreman, is in charge of Fife Construction Co.'s plant-mix bituminous surfacing contract east of Wendover, Utah. This $101,697 job will soon finish.

* * *

Melvin A. Johnson and **N. F. Meyers,** grade superintendents, and **Willard J. Grant** and **Pearl Crable,** crusher superintendents, are key men on 5.5 mi. of clearing, grading, draining, surfacing and paving in Walla Walla County, Wash. Scheduled to be finished in November, the $379,596 award went to Grant Construction Co. and Grant Company, which started work last August.

* * *

Neil Morrison is superintending an $184,803 contract for Haumont Contracting Co. Job consists of grading, draining, and surfacing about 2 mi. of the Payson-Show Low highway in Arizona. Equipment foreman is **Walt Young.** Work will be finished in November.

MASTER MECHANIC®

Torque converter maintenance tips

J. E. BICKNELL, instructor for the Transmission Service School for Allison Div. of General Motors (left), and Jim Miller of Shepherd Machinery (foreground) discuss converter operation with Allison's Los Angeles service representative, Jack Shirley, looking on.

"REMEMBER, the most important steps to the trouble-free operation and maintenance of the torque converter transmission is the use of the right grade of oil, maintaining the oil at the proper level and keeping it clean."

EMSA Los Angeles

Jim Bicknell, instructor for the Transmission Service School for the Allison Division of General Motors Corp. prefaced his discussion of Allison torque converter transmissions before the EMSA group in Los Angeles with this observation on the importance of torque converter oil to the successful use of the Allison equipment. Aided by Jack Shirley, Allison's Los Angeles service representative, Bicknell presented a detailed review of the Allison units' operational and service features for the 58 attending members.

Discussion centered around the Allison transmissions commonly

found in off-highway equipment. He pointed out that the transmissions found in this equipment are usually full power shifting and that the model number, such as CRT-3331 designates the presence of a converter, reversing gears, transmission as well as the foot-pounds of input torque, the range of speeds and the model number.

"The modern torque converter actually multiplies torque at low speeds yet doesn't heat up at high speeds," stated Bicknell. "The curvature of the converter's stator vanes determines the amount of torque multiplication possible."

He pointed out that Allison's engineering department, using engine rpm. and torque peak, designs Allison's torque converter transmissions to satisfy the requirements of individual installations. A universal feature of these installations is that a proper "marriage" between engine and torque converter assures that the engine operates at torque peak under all load conditions.

"The positive displacement charging pump mounted inside the converter and driven by the engine discharges the converter oil into the vanes of the stators at as much as 98 ft. per second. Foreign elements in suspension will quickly wear out these vanes. This is why this oil must be kept absolutely clean."

When trouble-shooting the Allison torque converter transmission, EMSA members were told that a torque converter transmission that overheats under high vehicle speeds indicates the possibility that the stator blades are remaining in the free-wheeling high speed position and don't lock up to provide torque multiplication.

"The locking characteristic of the stators does more than hold torque converter temperatures down," explained Bicknell. "It mechancially connects the turbine to the pump, thereby eliminating slippage and providing better fuel mileage and higher speed."

As a sidelight, Bicknell discussed the method of using the Allison torque converter transmission as a dynamometer for the field testing of both engine efficiency and the efficiency of the torque converter transmission.

As added precautions both Bicknell and Jack Shirley advised that torque converter oil level should always be checked when the oil is at operating temperature. Careful attention should be given the cooler to assure that clogging doesn't develop.

INTERNATIONAL R-LINE six-wheelers (right) save time, reduce bog-down and slow-down problems by providing maximum flotation and traction. Six-cylinder engines up to 501 cu. in. displacement are available with gasoline or LPG power. Gear reduction of over 100-to-1 multiplies engine torque to tandem axle to assure smooth, powerful performance. GVW ratings up to 53,000 lbs.

INTERNATIONAL V-LINE dump trucks (below) are ideal for exacting operations. Powerful gasoline V-8 engines with up to 257 hp. supply the power needed to come out of rough areas with king-size loads plus a high average road speed to cut trip time. Also available with LPG and diesel power supplying 695 lb-ft. of torque. Extra heavy-duty frames, brakes and front end can really stand long term punishment. GCW ratings exceeding 100,000 lbs.

INTERNATIONAL is always ready to serve and solve your transportation needs!

INTERNATIONAL six-wheel dump trucks have "take-any-terrain" ruggedness and maneuver easily in "tight" working conditions – just two reasons why they do their job right and on time. They're built to get in *and* out. Whatever INTERNATIONAL dump truck model you select, you can be assured of maximum power-performance every day of the year. See your INTERNATIONAL Dealer or Branch today for full details.

When schedule demands pinch your operation, and you need a dump truck right away—six-wheeler or single axle—call on your INTERNATIONAL Truck Dealer or Branch. Within 24 hours, dump truck models in popular sizes and specifications are ready for shipment from the INTERNATIONAL Truck Sales Processing center. This "pool" has been made famous by getting complete units in the field when you want them. Through anticipation and knowledge of your emergency needs and equipment demands, INTERNATIONAL is prepared to keep your job on schedule.

Model Series	RF-192	BCF-182	B-184	B-192	B-164
Gross Vehicle Rating	43,000	35,000	24 000	21 000	19,000
Body	8-10 Yd.	8 Yd.	4 Yd.	4 Yd.	4 Yd.
Wheelbase	157 in.	149 in.	141 in.	141 in.	129 in.
Engine	450 cu. in.	345 cu. in.	345 cu. in.	345 cu. in.	304 cu. in.
Transmission	5-speed Direct, 3-speed Auxiliary	5-speed Direct, 3-speed Auxiliary	5-speed Direct	5-speed Direct	4-speed Synchro-mesh
Rear Axle and Capacity	34,000 single-reduction tandem	28,000 single-reduction tandem	18,500 2-speed	16,000 2-speed	15,000 2-speed
Tires	9.00 x 20 10 ply	9.00 x 20 10 ply	10.00 x 20 12 ply	9.00 x 20 10 ply	8.25 x 20 10 ply
Frame Reinforcements	Inverted "L"	Inverted "L"	Inverted "L"	Inverted "L"	Inverted "L"
Heavy Duty Springs			Front & Rear	Front & Rear	Front & Rear

INTERNATIONAL® TRUCKS WORLD'S MOST COMPLETE LINE

INTERNATIONAL HARVESTER CO., CHICAGO • Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

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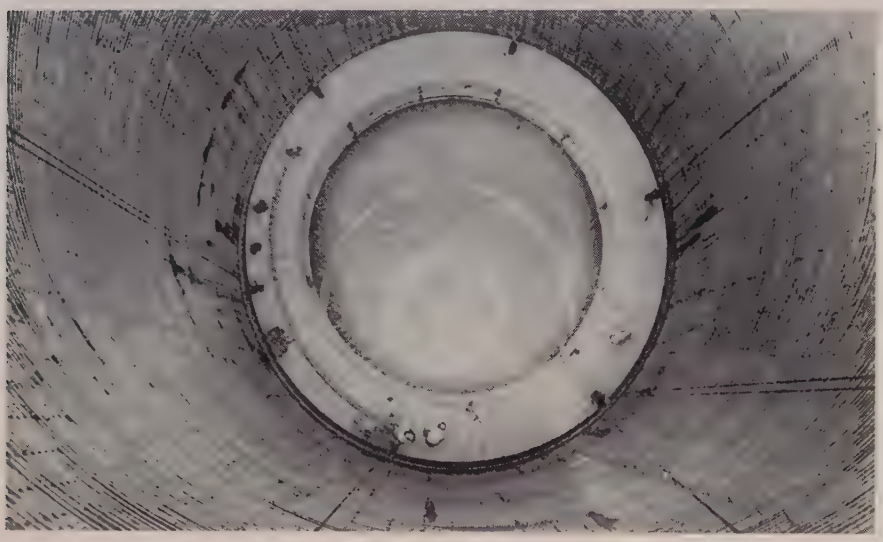
CONSTRUCTION BRIEFS



New way to raise scaffolds

ON SEVERAL important Western projects contractors are using a new technique for raising suspended work platforms inside surge shafts and missile silos. The method involves the use of a Tirfor Griphoist on each of the supporting cables. The Griphoist is a manually-operated lifting unit which climbs a cable without coiling or spooling it.

The upper photograph is looking into the surge shaft of the Clear Creek Tunnel, part of the Trinity Project in Northern California. Subcontractor Steel-Fab of Castroville used six two-part ½-in. lines with pulleys at the top.

The lower view is in the 350-ft. deep surge chamber at Navajo Dam in northern New Mexico, a Kaiser-Morrison-Knudsen-F&S project. The platform is suspended on six single 9/16-in. lines. Arrows show hoisting units. The same equipment and system is being used for setting reinforcing steel and pouring concrete in underground missile silos at Vandenberg and Beale Air Force bases in California.

The manufacturer will send further details on request.

. . . Write No. 154

Chemical film cuts evaporation

A SECOND major cooperative field test of methods which seek to curtail heavy water losses from reservoir evaporation is being conducted in Arizona, by the Department of the Interior.

The tests are performed on Lake Sahuaro above Stewart Mountain Dam on the Salt River where an estimated seven feet of the reservoir's level is lost annually by evaporation. The ultimate objective of this research is to develop practical methods to conserve the tremendous quantities of water lost in this manner for irrigation and other useful purposes.

The test involves use of a harmless chemical film known to have no ill effects on animal or plant life and water quality for domestic use. It does not interfere with recreation uses. Only one molecule thick when applied, it is known as a monomolecular film, or monolayer. The chemical, a mixture of hexadecanol and octadecanol, was first applied to the surface of Lake Sahuaro last December to determine the behavior of small patches of the monolayer in wind and water currents. Similar behavior tests were also conducted last fall on Lake Mead above Hoover Dam on the Colorado River.

Evaporation control would mean a major savings in the Western states where an estimated 25 million acre-feet of water are lost annually.

Approximately 12,000 pounds of chemical are being applied to Lake Sahuaro's surface during the hot summer months when evaporation is greatest. It is hoped that this step in the program will help to develop practical methods to arrest this heavy water loss.

The tests were interrupted for a two-week period in mid-August when Federal, State, and Salt River Project scientists measured the persistence or endurance qualities of the thin protective covering.

The chemical arrives at the reservoir in flake form. It is melted into a liquid and pumped into storage tanks on boats and inshore installations located at strategic points around the shoreline. In actual application, it is sprayed into the air, forming a fine mist which settles on the water surface to form the monolayer.

EATON 2-SPEED TANDEMS

give you all the advantages of BOTH

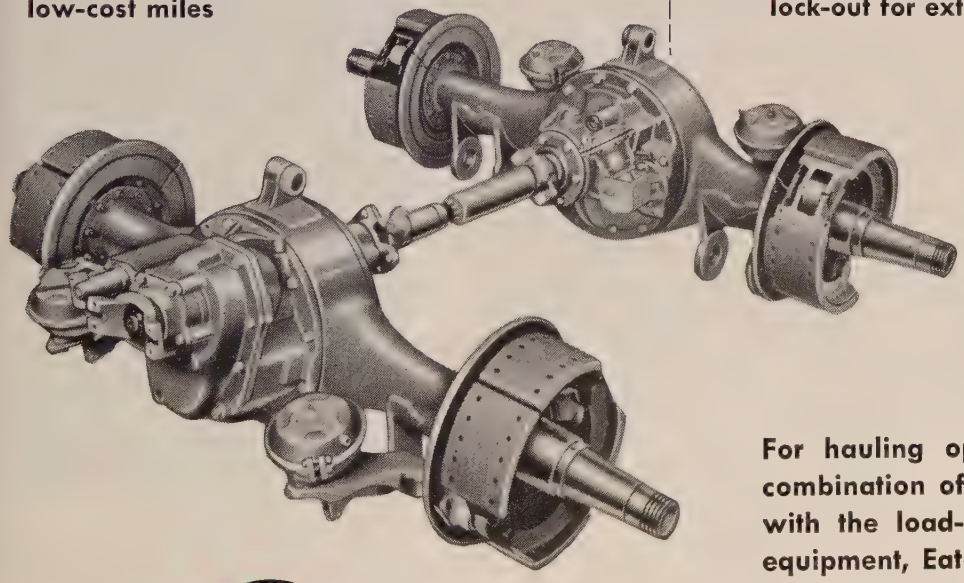
EATON 2-SPEED AXLES

- ★ *Double* the conventional number of available gear ratios
- ★ Power when you need it; speed when you want it
- ★ Engine operation within the most efficient, economical speed range
- ★ Low stress and wear on axle, clutch, transmission, and drive line
- ★ Simple, low-cost maintenance
- ★ Long truck life; thousands of extra low-cost miles

and

EATON TANDEM DRIVES

- ★ Short over-all length; maximum strength with minimum weight
- ★ Simplified design; few parts; easy, low-cost maintenance
- ★ Most parts interchangeable with standard Eaton 2-Speed Axles
- ★ No need to match tires; Eaton's inter-axle differential eliminates wheel-fight
- ★ Power equally transmitted to both axles
- ★ Driver-controlled inter-axle differential lock-out for extra traction when needed



Wide range of capacities. Eaton Tandems are also available in Single and Double Reduction types.

For hauling operations which require a combination of speed and power together with the load-carrying ability of tandem equipment, Eaton 2-Speed Tandems make big savings in hauling costs. Ask your truck dealer to tell you about the many exclusive profit-building features you get only in Eaton 2-Speed Tandems.

EATON

AXLE DIVISION

MANUFACTURING COMPANY

CLEVELAND 10, OHIO

Giant hardware for Sacramento canal lock

TWO WALLS of earth and steel are rising above men and equipment to create a man-made canyon near Sacramento, California. When completed, the canyon will be filled with water, and will become California's first navigational locks. Construction involves some giant hardware.

The locks are part of a barge canal to be included in the new Sacramento River Deep Water Channel project.

The $6,500,000 contract for the current phase of the construction is held by Lock-Bridge Constructors, a joint venture of Rothschild, Raffin and Weirick, Inc., Yuba Consolidated Industries, Inc., and George Pollock Co.

The inside, or face walls of the barge canal, are 580 feet long and

86 feet wide, made of steel sheet piling 60 feet high. The bottom of the canal will be 13 feet below mean tide level.

Behind the face walls are tons of earth fill and a series of steel anchor walls placed at various levels. These anchor walls are connected to the face wall with heavy steel tie-back rods, compressing the earth like a gigantic sandwich.

The rods are threaded on each end, inserted in holes drilled in the anchor wall, and secured with nuts measuring 6⅞ inches from flat to

flat and weighing 29.2 lb. each.

Heavy steel bolts, 2¼ inches in diameter and 1 ft., 9 in. long, hold the waler securely to the face wall. A total of 63,000 lb. of these bolts and 3,800 lb. of nuts will be used in the wall construction. These large fasteners were manufactured at the Los Angeles plant of Bethlehem Steel Co.

Steel tie-rods on this lower anchor wall are 3⅝ inches in diameter, upset to 4½ inches with 4NC2 threads. They are put in place in two sections, one 22 ft. 10 in. long, the other 23 ft. long, connected with a giant turnbuckle.

The turnbuckles have a 9 inch draw and weigh 152 lb. each. The steel tie-rods, turnbuckles and nuts are manufactured by Schmitt Steel Inc. of Portland, Ore., from steel supplied by Bethlehem Steel Co. Each set of rods, turnbuckle and nuts weighs 1,883 lb. A total of 285 tons of rod are used in the canal and locks.

Sector gate locks will be installed in the canal upon its completion. The locks will operate entirely by gravity, with no pumping required. Maximum rise and fall of the water level will be 21.1 feet.

The barge canal and navigation lock, together with a bascule bridge and mooring basin, are scheduled for completion in 1961. The U. S. Army Corps of Engineers designed the project facilities and are supervising all of the construction.

New screw thread gage

ALL TEXT books and standards publications recommend the fundamentally sound 3-wire method for a true measurement of pitch diameter as a single element.

The O-VEE made by Sherr-Timco gage together with any standard hand micrometer enables the user to determine the actual size of a screw thread and whether it is within tolerance, without any reference to table or calculations.

This new measuring gage consists of a coil spring mounted on a data plate. Inserting the gage on the thread is done by depressing the lever thus expanding the coil. Measurements are taken with an ordinary micrometer over the coils and then checked with limits printed on data plate. No calculations or tables are required. The O-VEE gages come either in single units or in sets.

They are available in standard sizes from No. 5 to 1 in., all series, all classes of fit.

For brochure write Scherr-Tumico, 200 Lafayette St., New York 12, N.Y.

Cord on screed aids fast paving job

IN the Dominquez area of California, the J. A. Thompson Construction Co. of Inglewood had to finish a concrete flood control channel which has been under water most of the year. With time for completion of the job drawing near it meant they would have to rush in and place concrete as soon as the weather dried out the earth.

Jim King, superintendent, decided to use a Stow 30-ft. screed with 2 Power Paks and an adjustable crown assembly in order to strike off fast the 4-in.-slump, 6-in.-thick slab. Although the concrete was poured in 90° heat with a dry wind, some "soup" was raised to the surface by the vibrating action of the screed. This was overcome by attaching a cord to both ends of the screed so that it dragged behind, as shown, picking up the excess soup resulting in a perfect job.

Two Stow G 46B Roto Trowels were used behind the screed which gave the floor of the channel a power-trowel finish.

With the Stow screed Thompson was able to screed the 2,600 ft. at a rate of 110 linear feet per hour cutting his costs from an estimated 11 cents a square foot to 3 cents a square foot. Strict inspectors on this flood control job had nothing but praise for the job.

Neoprene is used for expansion joints

A NEW TYPE of expanion joint constructed of neoprene synthetic rubber and steel, which can absorb the movement of concrete during extreme temperature changes without any bulge, dip, or gap in the top surface, and at all times keep a tight seal against water and dirt, is now being used on highways, bridges and airfield runways.

Developed by B. F. Goodrich, the joint is designed so the movement of concrete pushes together the ne-

oprene cells or pulls them back to their original position like an accordian. Steel truss rods looping out from both sides anchor it securely to the end of each of the concrete panels. And because it is anchored in this manner, the surface stays flush with the top of the concrete.

Before installation, the joint is precompressed to the correct width by tightening the through bolts

placed across the face of the joint. As soon as the concrete has sufficiently hardened, the precompression holding pin is removed releasing the pressure of the through bolt and allowing the unit freedom to contract or expand as it rides between the concrete panels. A neoprene plug is inserted to seal the hole left by removal of the through bolt. Ends of each joint are sealed, at the factory, with flexible neoprene diaphragms.

Break hard ground with rigid dozer

If you're jockying a rigid frame dozer (one not designed to angle or tilt) and you can't get your mount to dig into the hardpan or frozen ground, maneuver a log, rock or block into place under one track near the rear of the tractor. The object must be spotted near the rear to nullify the oscillating effect of the track frame.

A corner of the blade now should be low enough to break through the tough material. Once the first cut is made, it's usually a simple matter to open up the rest of the job.

NEW LITERATURE

Motor grader catalog

Brief descriptions of new components and operating features of the Caterpillar No. 12E grader are contained in a 12-page booklet released by **Caterpillar Tractor Co.** Beginning with a new compact engine which powers the 12E, the publication works through the various components to point up many advanced features which are incorporated in the machine. The booklet covers oil clutch, constant mesh transmission, final drive, main frame and blade circle, controls, blade positioning and offset and auxiliary equipment, as well as providing condensed specifications for the machine. . . . *Write No. 156*

Joist hanger design data

A 4-page booklet presenting design and use data on Teco-U-Grip joist and beam hangers is now

available from **Timber Engineering Co.** (TECO). The booklet provides recommended safe working values and illustrates applications where the hangers can be used for economical wood frame construction. A single formula for determining maximum joist spans for various hangers is given. Utilizing special nails in shear, the hangers give more efficient framing than is possible with old style joist and strap hangers and yet cost half as much to use. . . . *Write No. 157*

Comprehensive form hardware catalog

A multitude of form hardware and accessories is described in a new 60-page catalog issued by **Superior Concrete Accessories, Inc.** covering its entire line. The two-color illustrated book describes forming materials for ordinary foundations, overpasses, dams, bridge superstructures, stadiums, engineering structures, heavy-duty forming, tilt-up work, and others. The catalog pictures each type of accessory and shows its application. Numerous charts, specifications, and weight capacities and other reference material are included, together with a three page fold-out chart showing spacing data for form lumber and form ties.

. . . *Write No. 158*

Bulletin covers 60-ton truck crane

Complete data on the recently introduced 60-ton Lorain Moto-Crane is contained in a new 12-page catalog issued by **Thew-Lorain Shovel Co.** Features discussed in the 3-color booklet include Lorain's exclusive "Power-Set" outriggers. They are designed with special curved beams with attached self-adjusting floats that move out and down simultaneously. Each beam is hydraulically powered and individually controlled, from the carrier cab. Also discussed is a 10-year warranted "Shear-Ball" connection, Lorain's huge ball-bearing design which connects the turntable to the carrier. Other items are the lighter, stronger square-tubular-chord boom, removable counterweight, fast highway travel and others. The booklet pictures component assemblies, and shows photos of the cranes in action.

. . . *Write No. 159*

Vibrating feeder folder

A 6-page folder describing the new Straightline vibrating feeders for heavy abrasive bulk materials has been issued by **Link-Belt Co.** The publication describes the new Synchromatic vibrator which produces high-intensity feeding motion by two unbalanced shafts driven in opposite directions by

Drill hard rock faster with your rotary rig and the

GARDNER-DENVER "MOLE-DRIL"®

Now—add new versatility to your rotary drilling rig with the Gardner-Denver "MOLE-DRIL"* in three sizes: AM4 (4″ dia.), AM5 (5″ dia.) and AM6 (6″ dia.).

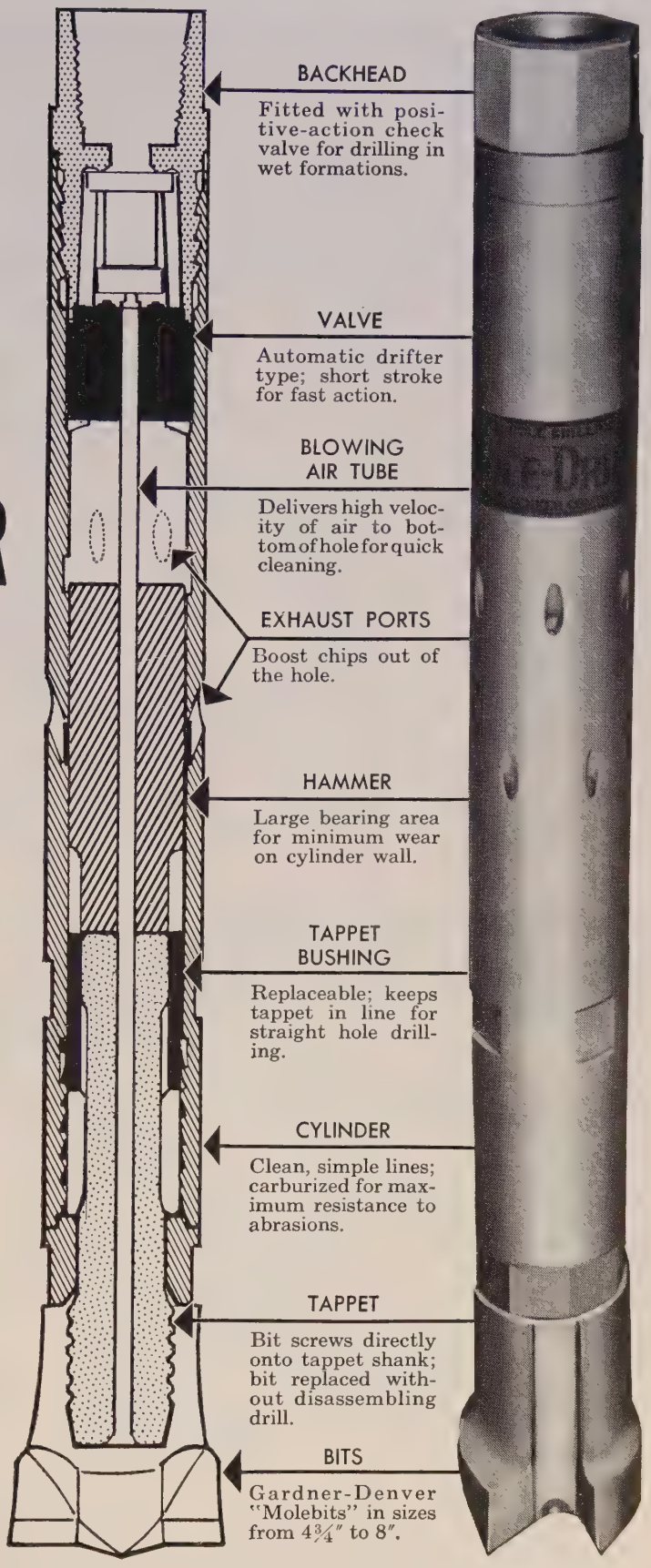
Add new power for fast hard-rock drilling with the heavy-duty, percussion-type "MOLE-DRIL." It screws directly onto your drill pipe . . . works at the bottom of the hole right at the rock face. There's no power-draining rod between the hammer and the bit.

ONLY 3 MOVING PARTS

Rugged construction cuts down time. Simple design reduces wear and trouble. Only three moving parts: valve, hammer and tappet. Compare these Gardner-Denver "MOLE-DRIL" features right down the line:

FOR FULL DETAILS,
WRITE FOR BULLETINS.

**Trade-Mark*



EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

. . . for more details, write No. 48 on Reader Service Postcard

individual pancake motors. The combination of speed, stroke intensity and straightline action of the vibrator results in effective feeding. Two models, either cable-suspended or floor-mounted, are available in 30 sizes with capacities up to 1,350 tph. are covered in the booklet. Selection and application data based on feeder size and total vibrating weight also are given.
. . . Write No. 160

Industrial tractor brochure

Ford industrial tractors with backhoe loader and other attachments are featured in huge 4-color action photos in a construction brochure issued by the **Ford Motor Co.** The booklet depicts several models of Ford wheel tractors on construction jobs doing light and heavy excavation and loading as well as scraping, leveling, and grading with bulldozer and scraper attachments.

The versatile wheel tractors also are shown doing a great variety of construction utility jobs using both special and standard attachments. The backhoe can be used to place pipe as well as dig the trench while the loader bucket can be used as a crane with addition of a chain sling as well as for high lift of masonry blocks and similar items. Numerous special attachments are shown including a compressor, boom trencher, fork lift mast, and fork attachment which mounts on loader arms. *. . . Write No. 161*

Miniature radios

A transistorized line of portable radio equipment including a miniature receiver and a pocket transmitter is described in a new catalog and series of data sheets issued by **Motorola Communications & Electronics, Inc.** The "Handie-Talkie" line includes standard size battery-operated units with either microphone-speaker combinations or hand-set models. The units employ transistors and printed circuits for low power consumption, improved performance, and light weight. Literature covers three conventional portable units plus the miniaturized receiver and pocket transmitter, as well as numerous accessories.
. . . Write No. 162

Earthmover catalog

Component construction and operating features of the S-18 2-axle scraper are described in the 16-page, 3-color booklet issued by **Euclid Division of General Motors.** Material includes the 336-hp. diesel engine and power train including 4-speed torqmatic drive and planetary drive axle, action of the loading and dumping cycle featuring a roll-out ejector and combination hydraulic and cable controls, and a description of the hydraulic steering and operating features. Booklet also describes servicing features of the machine. Specifications and dimensions of the 21-yd. 2-axle unit also are included. *. . . Write No. 163*

Wire rope catalog

A 156-page illustrated catalog, "Wire Rope for Construction and Industrial Equipment," has been issued by **Bethlehem Steel Co.** It contains specific recommendations for use of wire ropes on various types of construction equipment, such as power shovels, dredges, scrapers, dozers, derricks, hoists, pile drivers, pavers, traveling cranes, conveyors and winches. Rope reeving diagrams show typical line arrangements. The catalog also includes basic wire rope information, and discusses special rope features, grades, constructions, lays and cores. Detailed data on all

standard Bethlehem ropes, as well as fittings, are included in separate sections. *. . . Write No. 164*

4½-ton capacity loader

A 9,000-lb. capacity front-end loader with 4-wheel drive and rear-wheel steering is described in detail in a 16-page catalog now available from the **J. I. Case Co.** A convenient index permits quick reference to outstanding features, including improved balance and stability; heavier construction; power operation; economical diesel engine; interchangeable buckets, with 1⅝ and 2½ (std.) and 3 1/3 cu. yd. capacities. Other loader models in the line are shown and described along with optional equipment such as winter cab, snow plow, brush rakes, and other attachments. *. . . Write No. 165*

Eimco crawler specification

A comprehensive 32-page book describing its 100-hp. diesel crawler tractor line, the Eimco 103, has been issued by **Eimco Corp.** The profusely illustrated booklet covers the Eimco power train, featuring its "Unidrive," "Quadra-Torque" with 4-speeds forward and reverse, and dual final drives; the Eimco unitized stress flow construction; self-cleaning air cleaner; hydraulic track take-up; increased ground clearance and full track oscillation; up-front operator seating and numerous other features. Booklet includes full specifications on the tractor, bulldozers, front-end loaders and other units in this series, together with schematic drawings and coded listing of performance features. *. . . Write No. 166*

Line of steel concrete forms

A complete line of curb, curb and gutter, sidewalk and flexible steel forms is described in a 20-page bulletin published by **Chain Belt Co.** Detailed information on Rex forms is given, stressing such features as electro-welded stake pockets; workable face forms available in three styles; sliding dowel connections on face forms which assure close-butting joints for seam-free surfaces; and division plate spacing every foot on back curb and front gutter forms for simple adaptability to any job requirement. In addi-

tion, the bulletin carries suggested specifications for curb and gutter and sidewalk forms and information on road and airport forms.

. . . Write No. 167

"65" Payhauler catalog

A three-color, 16-page catalog detailing the features of the 19-ton **International Harvester Company's** Model 65 Payhauler is available from the Company's **Construction Equipment Division.** Advantages of the 250-hp. diesel, such as five filters, unrestricted exhaust and heavy-duty crankshaft, are discussed and illustrated. A two-page diagram gives the speed of the Model 65, both loaded and unloaded going up grades of 1.28% at 30.47 mph.

. . . Write No. 168

Excavator bulletin

The Eimco Corp. has announced the publication of Bulletin L-1091 outlining the use of their 105 Excavator on three recent major jobs around the U. S. Facts and figures are given on the Glen Canyon Dam Tunnels; the Fort Pitt Tunnels in Pittsburgh; and the Mammoth Pool Diversion Tunnel, all of which utilized the 105 Excavator. Contained are illustrations of these units in use as well as English and metric specifications.

. . . Write No. 169

Automatic batch plant

Erection operation and design of a complete push-button batch plant serving truck mixers is featured in a 4-page bulletin issued by **Blaw-Knox.** The brochure contains photographs of the "Uni-Rect" plant in operation. Data emphasizes high-speed quality production with low operating costs, operational

simplicity of the electric control system, auxiliary material handling controls, basic components, and optional features. The three-step erection process for the plant which is pre-tested prior to shipment is also presented in photographs.

. . . Write No. 170

Back-up warning brochure

Features of the "Dynalarm" back-up warning system are contained in a 4-page brochure published by **Atkinson Dynamics Co.** The electrically powered system described consists of an automatic switch mounted on transmission speedometer drive and an electric horn unit tuned to produce a sound which can easily be heard above normal construction noises. The illustrated booklet lists features of the system, describes how the horn sound was developed, and provides specifications for the system.

. . . Write No. 171

Floor cranes and winches

Complete specifications and drawings of cranes from 500 to 4,000-lb. capacities for truck and shop floor use are described in a 4-page brochure published by the **H. S. Watson Co.** A line of hand-operated winches, with capacities from 500 to 2,000 lb. is also shown. Hand winch specifications and limitations ranges are shown, so that decisions can be made for job applicability.

. . . Write No. 172

An industrial equipment line

The entire new industrial equipment line of **Massey-Ferguson** is described in a 24-page 4-color catalog-type brochure. Action photographs, cutaway drawings, operating information and specifications on the many items in the line are covered.

. . . Write No. 173

NEW EQUIPMENT

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

Cat adds second wheeled Traxcavator

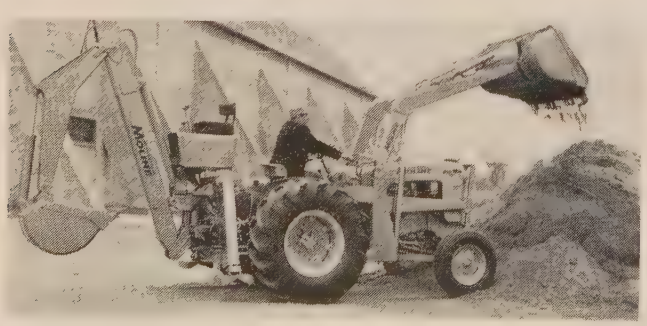
Second in its new line of wheeled front-end loaders, **Caterpillar Tractor Co.** has announced the Caterpillar 966 Traxcavator. The unit is similar in design and general features to the previously announced 944.

The new unit is a 140-hp. model, with a 2¾-yd. bucket as standard equipment. A particular design feature is the open cockpit which permits accessibility from either side, and the location of all loading mechanism in front of the operator.

The 966 has a maximum lift of 154 in. with maximum reach of 35½ in. at that height. The machine has a breakout force of 24,000 lb., and a turning radius at the outside rear wheel of 20 ft. 9 in. It has four operating speeds and can be worked in all phases of the production cycle with its "one finger" forward-reverse shifting. *. . . Write No. 174*

Minneapolis-Moline announces "Big Mo"

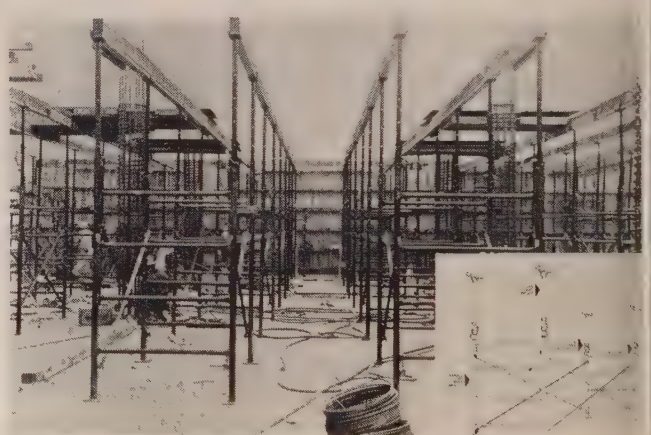
Designed to be fast and rugged for general highway and construction jobs, a new series of wheeled tractors named the "Big Mo" has just been announced by **Minneapolis-Moline.** Powered by 206-cu. in. Moline-built engine, "Big Mo" 500 has 56 hp. on gasoline and 50 hp. on diesel fuel. "Big Mo" 600 has 60 hp.



on gasoline at 2,000 rpm. Both units have heavy-duty axles and frame to handle all construction attachments, including dozers, crane hooks, mowers, backhoes, loaders, and several types of buckets. Instant shifting and reverse speeds accelerate loading work by about 50%. Five forward speeds provide range from 2.63 to 14.57 mph. Hydraulic power steering is standard on both models. When using these backhoe attachments, the operator's seat pivots with the boom and is offset to provide complete view of the 190-deg. swinging boom and the work area. *. . . Write No. 175*

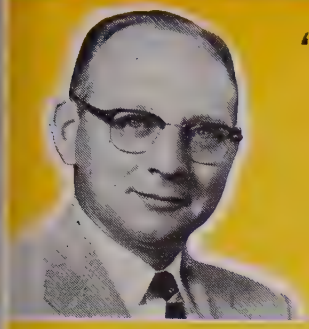
Shoring loads of 20,000 lb. per panel

Referred to as "Hi-Load Shoring," **Tubular Structures Corp. of America** has designed this supporting system to carry loads up to 20,000 lb. per panel. The "Hi-Load" has been engineered to provide a load capacity of double that of conventional steel scaffolding, and yet can be erected with all the speed of the latter. Because of this speed, substantial savings can be realized in erection, stripping, forming, etc. The picture shows an installation for a county office building in San Jose, Calif. The contractor stated that the use of the "Hi-Load" shoring cut his costs of shoring erection time by more than 25%. *. . . Write No. 176*



Stabilization plant of 600-tph. size

A twin-shaft Thoro-Mix stabilization plant with capacities in excess of 600 tph. is announced by **Universal Engineering Corp.** The plant offers twin-shaft mixing in a 9-ft. self-lining tub. Extended shafts with agitating arms eliminate segregation of material as it drops into the 5-yd. hopper located at the end of the mixing tub. The surge hopper is equipped with hydraulic clam type discharge gate. Heavy-duty paddle tips on the twin shafts are reversible to retard movement of material through the mixing area for more thorough agitation when specifications require this. Each spray bar is equipped with a calibrated control valve which can be set and locked when proper moisture percentages have been determined. Overall control of water is maintained with a quick action level valve. The entire pugmill is mounted on heavy struc



"With our big 8000-lb. MADSEN ASPHALT PLANT we get

350 TONS PER HOUR

...2800 tons in an 8-hour day"

WALLACE W. AHEARN
Vice President, General Manager
NORWALK *Asphaltic Concrete, Inc.*
SANTA FE SPRINGS, CALIFORNIA

GENERAL
ENGINEERING
CONTRACTORS

"We're engineering contractors and we recognize superior engineering in a piece of equipment. We own and operate two MADSEN Model 481 Asphalt Plants . . . a 4000-lb. plant and an 8000-lb. plant and we sincerely believe MADSEN Plants are the finest-engineered plants in the industry.

"It takes a big plant to turn out 350 tons of asphaltic mix per hour and MADSEN Plants have "more beef" than other plants. We've experienced only 7 hours downtime in 4 years of operating our 4000-lb. plant . . . a tribute to our own preventative maintenance program and to the fact that MADSEN Plants are built to last.

"We like the externally removable segment-liner feature of the MADSEN Pug Mill Mixer. It's a cinch to service and the mixer liners are interchangeable which means longer mixer life.

"MADSEN Asphalt Plants are CLEAN OPERATING. Actual tests show that they emit not over 10 lbs. per hour of solids to the atmosphere . . ."

Inset photo shows the 104" x 32' MADSEN Dryer used with the 8000-lb. MADSEN Plant. Dryer is equipped with forged steel floating tires. Other plant components include: a Hauck 14" burner, a 50-ton capacity hot bin, oversize hot elevator, Symons 60" x 16' double deck with split deck screen, MADSEN Model 7812 Triple Wet Tube Dust Washer, and Ray bin level indicators (showing high and low positions).

• *For high, money-making production and low-cost operation . . . there's no equal to the MADSEN Model 481 Asphalt Plant. Call your MADSEN Distributor for the complete story on this outstanding plant. Built in 4000-lb., 5000-lb., 6000-lb. and 8000-lb. batch capacities.*

HELPING TO BUILD LIMA MADSEN THE HIGHWAYS OF THE WORLD

LIMA MADSEN Asphalt Plants • Base Stabilizer Plants

BALDWIN-LIMA-HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

BALDWIN BLH LIMA-HAMILTON

Sales Offices: 14120 E. ROSECRANS AVE., LA MIRADA, CALIFORNIA and BOX L, LIMA, OHIO

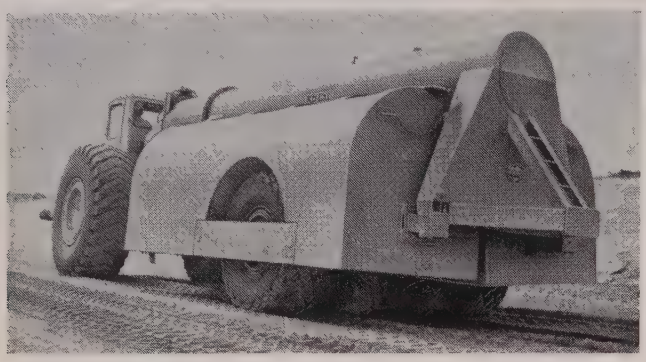
Complete Parts-Service Departments in La Mirada (Los Angeles), California and Lima, Ohio

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

tural fabricated steel base that extends its full length. The unit is available with or without wheels. Optional equipment include metering devices to mount on the feeding conveyors for metering additives, such as calcium chloride or cement, steel bins of various sizes and feeding conveyors of all types.

Heavy pneumatic compactor

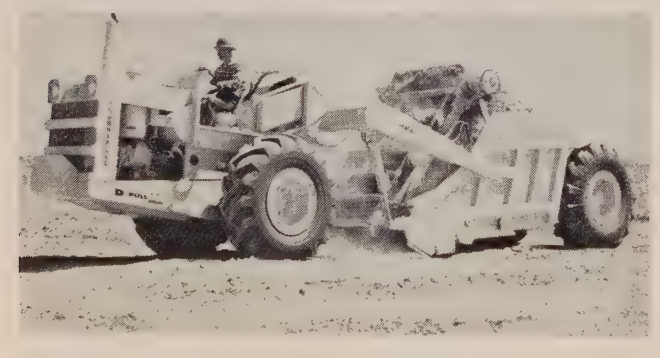
The Ko-Cal "Konsolidator," a tractor-drawn roller employing earth-mover type wheels, is announced by **Koehring Company of California.** The giant unit



weighs 37,000 lb. empty, 115,000 lb. fully loaded. Body has 700 cu. ft. of space for sand ballast and towing frame has 130 cu. ft. for water ballast. The roller is about 29 ft. long, 12 ft. wide and 10 ft. high, and has 18.00 x 25-20 ply tires. . . . *Write No. 177*

Elevating scraper is self-loading

A large-capacity, self-loading, tractor-scraper combination is being introduced by **LeTourneau-Westinghouse Co.,** and **Hancock Manufacturing Co.** The unit is built essentially for those jobs where self-loading is mandatory and the 10-cu. yd. Model 10E2 will load in a surprisingly short time under moderately difficult conditions. It has an exclusive chopping action on the slat-type elevator, which is driven by LeTourneau-Westinghouse motors. This action chops and pulverizes the material and lifts it high into the bowl. This is the action which provides the high-capacity and the pulverizing action makes for easy and uniform spreading. The well-known Model "D" Tournapull is a powerful machine, perfectly teamed for the Model 10E2 scraper. The pulling unit is powered with a 143-hp. engine making it capable of road haul at speeds up to 30 mph. . . . *Write No. 178*

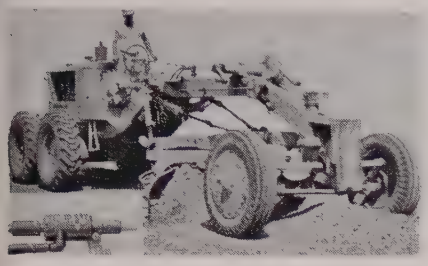


Many features for Prime Mover power truck

Announcing the Model M-30A Power Truck, **Prime-Mover Co.** indicates that new features include a Borg-Warner torque converter drive, improved steering and braking, a lower center of gravity, and convenient controls for the operator. These features have been introduced to provide higher production on construction jobs by eliminating clutching and shifting and to insure quicker acceleration. The new model is powered with a Wisconsin 18-hp. air-cooled engine and a 12-volt starting system is standard. The unit can be equipped with an 18-cu. ft. dump body or a 42 x 42-in. flatbed. Control of the endgate and angle of dumping permits varying the rate of load discharge. . . . *Write No. 179*

Hydraulic steering booster for motor graders

A small torque steering booster which in effect provides power steering is now available for several models of Adams and Allis-Chalmers motor graders. The unit



is manufactured by **Rivinius, Inc.** and is available only through Caterpillar distributors. The company which manufactures these units for all Caterpillar motor graders now produces steering boosters to fit Adams graders Models 312, 414, 512, and 550 and Allis-Chalmers graders Models Ad-3 and Ad-4. The booster has all advantages of full time power steering, reducing operator fatigue and increasing work accuracy. Wheels turn with ease whether the machine is moving or not. *. . . Write No. 180*

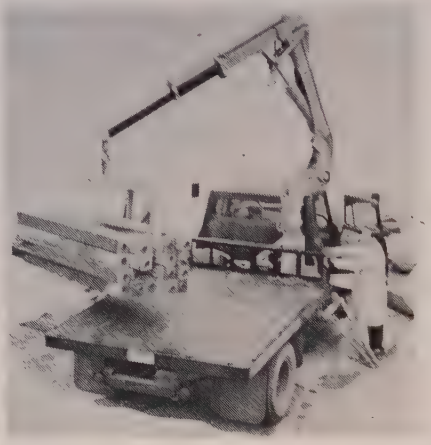
Hand tamper offers 3 sizes of shoes

A hand operated vibratory compactor featuring three sizes of tamping pads is being introduced

by **Muller Machinery Co., Inc.** The machine is self-propelled and is designed for one-man operation. It is powered by a heavy-duty engine with Stellite valve and its large eccentric weighted rotor delivers a compacting force equal to a 10-ton roller. It travels at speeds of 50 to 75 ft. per minute. Tamping shoes available include widths of 12, 18, and 24 in. *. . . Wrtie No. 181*

Hydraulic crane for attaching to trucks

An all-hydraulic jib-boom crane which attached to a truck enables the driver alone to load and unload materials of up to 3.3 tons is



announced by the **Focowil Corp.** The new unit eliminates gears, running cables, pullies, and similar components. Crane pillar is side mounted for maximum reach. Boom folds and telescopes into a 15-in. space athwart truck channels for travel. Two hydraulic support legs reduce frame stress and prevent tipping during operation. The crane is standard with dual controls, double acting cylinders and hard chromed rods. Maximum lifting height is 24 ft., maximum depression 4 ft. 5 in. below ground level. Maximum reach from center of truck 17 ft. and swing angle is 280 deg. Installed weight 1,900 lb. and lifting capacity 2,200 lb. at maximum reach. . . . *Write No. 182*

Small vibrator for stiff mixes

A 2½-in. 10V concrete vibrator has been developed by **Ingersoll-Rand Co.** for use with stiffer mixes in building construction and foundation work. The air-powered unit will handle sections up to 30 in. with concrete of 2½-in. slump, and in thinner sections will handle lower slump material. The vibrating head measures 17¾ in. long, 2¼ in diameter, and weighs 16¼ lb. Weight of a standard 5-ft. hose assembly is 25½ lb. Other 10, 15, and 20 ft. hose assemblies are available as optional equipment. The 10V delivers 15,000 vibrations per minute at no load and 9,000 vibrations per minute at full load. A ½-in. pipe tap hose connection is provided, and use of ½-in. hose is recommended. . . . *Write No. 183*

Choice of attachments for tractor shovel

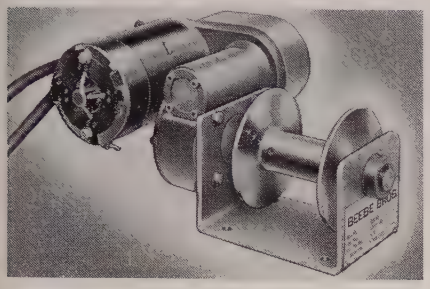
Three new attachments as well as a wide variety of bucket sizes and a choice of three different engines are now offered for the Michigan Model 85A tractor shovel by

Clark Equipment Co. Attachments include a rotary snow plow, capable of handling up to 1,200 tons of snow per hour, a compact street sweeper mounted in place of the bucket, and a hydraulic snap-mount back-hoe attaching to the rear of the machine without use of tools. Optional bucket sizes range in capacity from 1-2½ yd. and are

available in place of the standard 1¾-yd. excavating bucket. The machine now can be powered with a choice of three engines including a 107-hp. General Motors diesel, as well as the 96-hp. Waukesha gasoline engine or the 91-hp. Waukesha diesel power plants currently offered. *. . . Write No. 184*

Battery operated hoist

A ¾-ton portable hoist operated on power furnished by 6, 12, or 24-volt batteries is announced by



Beebe Bros. Manufacturing Co. The lightweight hoist has parts cast of aluminum alloy and steel. Over-all dimensions are only 17x11x8 in. The hoist can be run in either direction and is automatically self-locking, due to its worm-gear drive. It is used wherever electric power is not available.
. . . Write No. 185

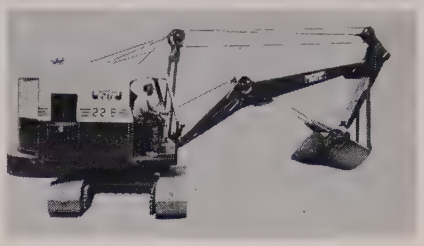
Small rubber tired dozer

A 49-hp. all wheel drive dozer is announced by **Detroit Tractor, Ltd.** The unit, Model 44-35, features planetary steering, controlled

traction and maximum maneuverability. Of all welded construction, it has 20 in. of clearance and a low center of gravity. Dozer is mounted on inside push arms and hydraulically controlled with positive down pressure. *. . . Write No. 186*

25-ton crane has variety of mountings

A new Model 22-B Series 2 crane-excavator available as a crawler, carrier or wagon mounted machine is announced by **Bucyrus-Erie Co.** Improved features of the machine include adjustable hook rollers, splined horizontal propel shaft, alloy bronze bearings for propel machinery, splined clutch or quick shift swing-propel, and improved



crawler frame construction with shielded rollers and bearings. On the transit machine, new features include steel booms up to 110 ft. long with bolt or pin connections, 12-part suspension and choice of 6x4, 6x6, or 8x4 carriers with gas or diesel power. *. . . Write No. 187*

Push plate for TD-25

A direct-mounted push plate measuring 48 x 42 in., which distributes push loads to 4 separate areas of the tractor main frame is announced by **International Harvester** for its Model TD-25 crawler tractor. The plate is 2 in. thick and is mounted top and bottom by a rugged bracket-pin-strut arrangement. Offset and corner loadings are easily withstood and the tractor can push on any part.
. . . Write No. 188

BuRec studies protection of iron and steel structures

INVESTIGATIONS on the problems of protective coatings, by the Bureau of Reclamation, for metalwork exposed to the corrosive forces of water, air, and soil are producing dividends to Western water users, according to Assistant Commissioner and Chief Engineer Grant Bloodgood.

"These exposures of iron and steel facilities to fresh water, the atmosphere, and soil are not severely corrosive as compared with many in industry," he explained. "However, because the Bureau builds structures to last a century or more on its water conservation projects throughout the 17 Western states, the effectiveness and durability of the protective coatings we use, after thorough laboratory and field investigation, are highly important to the beneficiaries of the projects, who repay the cost of construction and who operate and maintain the completed works."

The Bureau's foremost advances in protective coatings research have been made in the protection of iron and steel structures that are continuously and completely submerged in fresh water. In this category are the interior surfaces of steel water pipes, high-pressure gates of dams, and trashracks. Studies in the Denver engineering laboratories provided the basis for setting new specifications limits for certain critical properties of coal-tar enamel and control tests for adhesion. The tests led to wide and effective Bureau use of this material for steel pipes and tunnel liners.

Similarly, substantial savings are being realized on projects through the adoption of a single solution-type vinyl resin paint. Laboratory and field studies demonstrated this type of paint to be much superior to formerly used coatings in corrosion protection for water tanks, gates and other metalwork.

Current progress in protective coating research had initial impetus in field tests begun in 1949 at Shasta powerplant. Twenty different coatings were applied under the direction of Bureau engineers to sections of the interior of one of the five 15-ft. penstocks leading to the powerplant.

For more than 10 years the coatings have been exposed to the full force and corrosivity of water flowing through the penstock. At yearly intervals engineers have entered the penstock, photographed the coatings, and evaluated their performance. The Shasta test indicated that the coatings, aside from coal-tar enamel, which best withstood the rushing water, were two different types of vinyl paints and three types of phenolic paints.

Laboratory research pointed the way to the use of a cold-applied coal-tar paint, designated by the Bureau as CA-50, for use on metalwork associated with penstocks, such as butterfly valves and wicket gates. For trashrack metalwork at the head of penstocks, coal-tar pitch applied by dipping was found to be economical and effective. For radial gates, parts of which are sub-

merged or alternately submerged and exposed to the atmosphere, a 6-coat vinyl-resin paint was found to provide excellent protection against corrosion as well as resistance to abrasion and sunlight. Small gates, such as those on canal structures, can be best protected by galvanizing or painting with phenolic red-lead primer and phenolic aluminum topcoats.

Reclamation research in protection of metal structures exposed seasonally to either air or water is exemplified in the so-called Shadow Mountain test. In 1950, research engineers of the Bureau applied 16 coatings to the interiors of several 30-in. diameter experimental steel pipe sections which were then transported to the Shadow Mountain Reservoir on the Colorado-Big Thompson Project in Colorado.

For 6 years the coated pipe sections were exposed to the frigid air of the Rocky Mountain winters, when temperatures may drop as low as 40 below zero, and to submergence in the reservoir during the summer months. The first results of the test, which is now continuing in Denver, showed that the following interior pipe linings were in excellent condition after the prolonged extremes of exposure: cold-applied asphalt paint, neoprene, cement mortar, coal-tar paint, and vinyl-resin paint.

The behavior of selected coatings in a buried soil environment was studied in the laboratories for several years. The laboratory specimens, consisting of steel pipe sections covered with protective coatings, underwent repeated wetting and drying cycles during the test period. The severe shrinkage forces damaged many of the coatings, but several materials were found to resist the soil stresses. Coatings of coal-tar enamel having a reinforcement of spun glass and asbestos felt wrapping were particularly effective, and cement mortar was virtually unaffected. A hot-applied coal-tar enamel tape, reinforced with woven fiber-glass, was best adapted to molding around the irregular surfaces of fittings and advantageously employed in field work for joints and short piping sections. Polyethylene and polyvinyl chloride tape wraps also adequately resisted the powerful soil stresses.

An extensive test of a variety of interior protective linings for steel pipe is now under way at the Southside Canal on the Bureau's Collbran Project in western Colorado.

News of DISTRIBUTORS

Portland distributor appointed

In Portland, Balzer Machinery Co.'s newest line is Sierra Engineering Co., Inc., manufacturer of TowBatcher portable concrete plants.

New branch manager at Billings

L. R. McKinney was recently appointed branch manager of Miller Machinery Co., Billings, Mont., replacing Richard W. Lewis, Sr. McKinney has been sales representative for Miller at Great Falls for the past two years.

Alaska firm changes address

With larger facilities at 101 E. Northern Lights Blvd., Spenard, Alaska, Bailey's Rent-All is in a better position to serve more customers more efficiently, according to Fred J. Bailey, manager. Bailey said the move was made without interruption of service.

Montana Hy-Hoe distributor

Montana Powder & Equipment Co., Helena, has been appointed distributor in Montana for the Hydraulic Machinery Co. line, including the Hy-Hoe 380 truck-mounted backhoe, the smaller Hy-Hoe 250, and a 2,500-lb. capacity jib-crane attachment for the 380.

Wiggans handles Jaeger line

Jaeger Machine Co. announces the appointment of Neal Wiggans Co., Albuquerque, as distributor for northern New Mexico. The Wiggans plant at 2520 First St., N. W., will provide warehouse stocks, repair parts and shop service for Jaeger air compressors, pumps, truck mixers, concrete mixers and paving spreaders and finishers, and Speed King concrete and plaster mixers.

Machinery Supply breaks ground

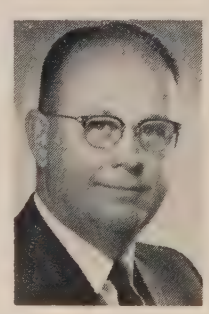
Development of a 23-ac. industrial park for Machinery Supply, Inc., by the parent company, The H. C. Shaw Co., is announced by R. M. Lewis, executive vice president and general manager. Located on U. S. 99 between Highway 88 and Fremont St., Stockton, the site will be known as Shaw Industrial Park. Initial development will encompass 7 ac. and include 34,000 sq. ft. of new offices, warehouses, loading docks and paved area. Complete relocation of the firm's present facilities at 240 So. Aurora St. is anticipated for early 1961.

Saber Tooth distributors

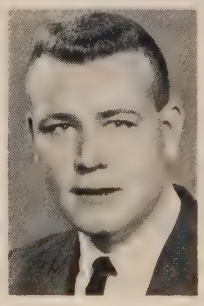
Saber Tooth Co., Oakland, has appointed two new distributors of its line of rippers and ripper components. They are Peterson Tractor Co., San Leandro, Redding, and Chico, Calif.; and N. C. Machinery Co., Seattle, Wash.

Two department managers named

Western Equipment Co., Caterpillar dealer for southern Idaho, announces the appointment of Robert F. White, Spokane, Wash., as general parts manager, and Don



White



Rayborn

R. Rayborn as promotion manager. White, formerly Northwest parts sales representative for Caterpillar, will direct Western's parts sales and distribution activities. Rayborn, who joined the company from Caterpillar's offices in Peoria, will handle sales promotion, training programs and personnel. Both new managers will reside in Boise, Idaho.

Rounds out 50 years of selling

Samuel P. Morse recently rounded out fifty years of selling construction equipment in the Los Angeles area for Smith Booth Usher Co. To celebrate this outstanding record, and as a prelude to going right on working, a party was held in his honor at which more than a hundred company officials, employees and their wives attended.

Morse joined the Southern California firm in 1910 as a salesman. The company was then handling machine tools, pumps, engines, and kindred supplies. After ten years "on the road" he became sales manager, a position he held until 1926 when a construction equipment department was added. This prompted Morse to go back into the field, and he's been selling ever since. Now located in the City of Industry, Smith Booth Usher handles a complete line of contractor equipment, including cranes, shovels, graders, pavers, etc.

Cummins delivers first V-8 Turbodiesel

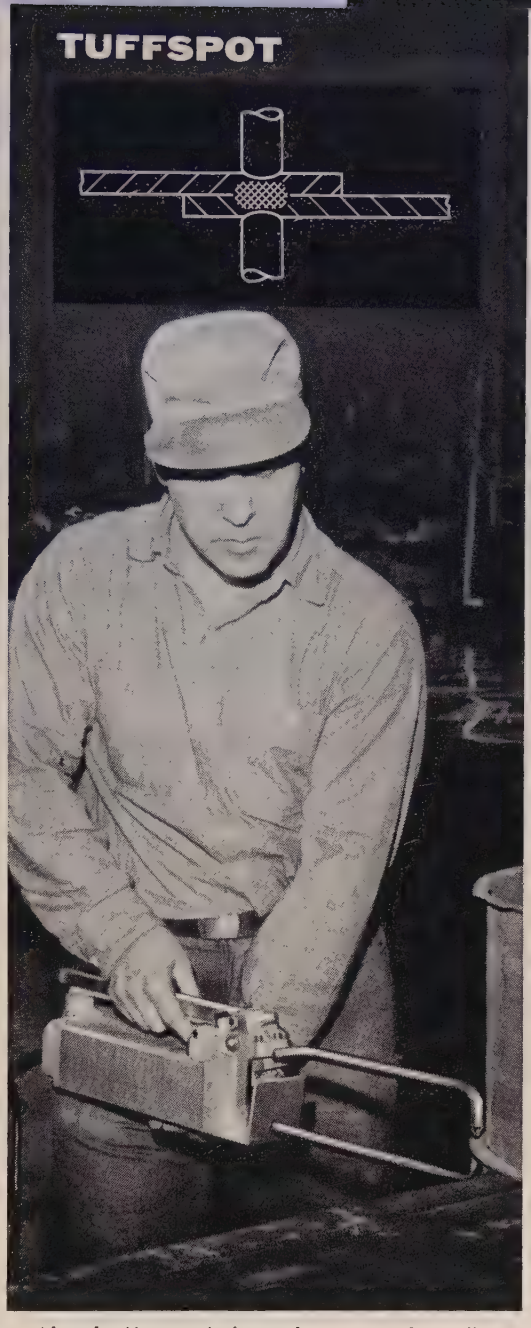
Cummins Colorado Inc., locally owned Colorado distributor organization for Cummins engines, recently delivered the first V-8 Turbodiesel Cummins engine for high altitude construction application. William M. Thompson, sales manager at Denver, announced the purchase by and delivery to H. E. Loudermilk Co. Thompson said he had no doubt that the contracting company will find the power and rugged-dependability of this unit to their advantage for altitudes and extreme variations in weather in the Rocky Mountain area.

Maxon appoints Western Machinery Co., Denver

Western Machinery Co., Denver, has been appointed exclusive distributor for the Manufacturing Division of Maxon Construction Co., Dayton, Ohio. Western Machinery will distribute the Dumpcrete nonagitated concrete hauling bodies, and concrete spreaders, throughout Colorado.

New Yale representative

Pacific Lift Truck Co. has been appointed exclusive Yale representative in Southern California, according to joint announcement by Horace H. Fritz, III, president of Pacific Lift Truck, and Louis W. Jander, general sales manager of Yale Materials Handling Division. As franchised representative, the West Coast company will assume management of the former Los Angeles branch of Yale & Towne at 5711 East Olympic Blvd.



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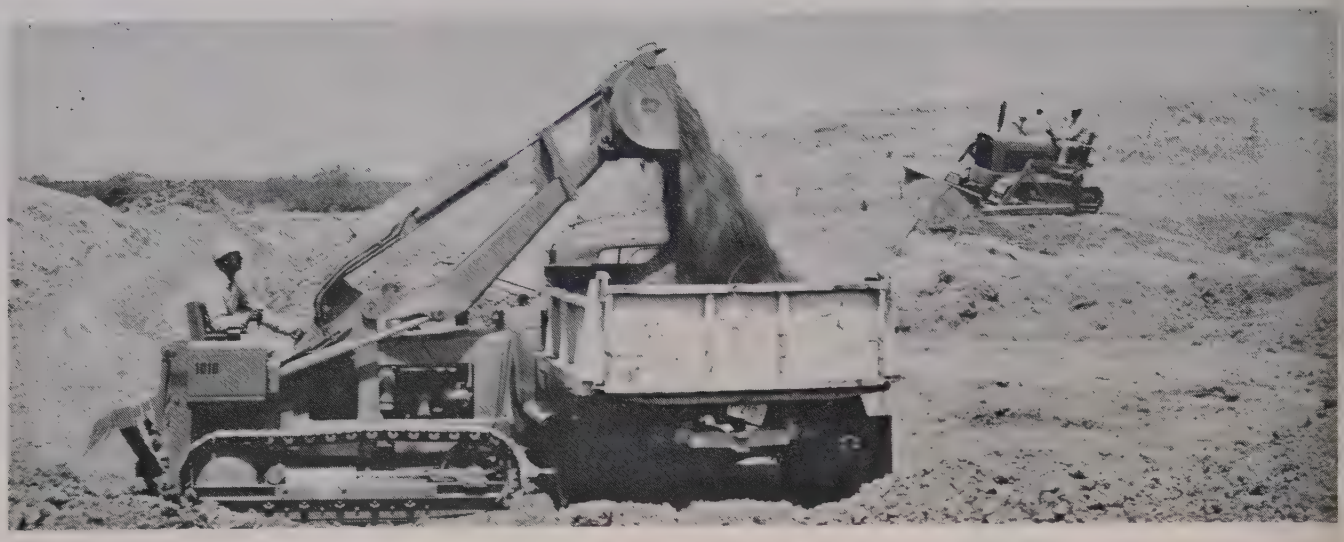

Deere shows new tractors at dealer meeting in Dallas

TO INTRODUCE its new line of industrial tractors—proclaimed "A New Generation of Power"—Deere and Company air-lifted its dealers, company men and representatives of the construction press to Dallas, Texas, on August 30. This gathering, totaling about 6,000, were shown two new crawler tractors and four new wheel tractors in the new line, complete with accessories designed for the construction market.

The machines represent the result of several years of design and testing to develop completely new and modern tractors for the 1960's. Starting with the design of new engines — now available for gasoline, diesel, and L-P gas — the design continued into improvements in all other details of the tractors, ending in such modern features as power steering and power brakes. This same re-design extended into the accessories.

For example, the Model 2010 crawler (pictured at bottom of page) mounts a 90-in. dozer blade with a three piece cutting edge. The blade angles 25 deg. right or left, cuts 12 in. below track level and lifts as high as 48 in. Flexibility provided by the hydraulic power system provides for tilting, angle or cut on the go with one control, for the inside mounted 80-in. blade. This crawler also mounts the Model 50 or 51 backhoe which is designed to take advantage of the new engine power and the hydraulic system. An efficient two-lever control of boom, dipper stick and bucket, a previous John Deere feature, is continued in the new line. Hand motion is reduced to a minimum. The Model 51 backhoe digs flush either left or right against walls or buildings. The rotary boom cylinder slides to any of four off-center positions and moves by the unit's own hydraulic power. This operation can be carried on by one man on the job in a matter of minutes.

Increase in power and flexibility were the object of engine re-design. They are variable-speed, 4 and 6-cylinder engines with new multi-speed syncro-range transmission. Engines are capable of operating efficiently at any speed within the working range. In the two larger tractor sizes, the hydraulic pump, tailored to tractor use, goes off-stroke when there is no power demand. It provides up to 18 gal. of pressure oil immediately upon demand.

The Model 1010 crawler-loader (picture at top of page) is designed as a versatile unit in the 40-hp. class. Its 66-in. bucket has a roll-back of 40 deg., 8,500 lb. of breakout force, full-height lifting capacity of 3,500 lb. and a dumping clearance of 8 ft. 1 in. The unit is equipped with a ¾-yd. bucket and is available with either a gasoline or diesel engine. The larger, Model 2010 of 50 hp., is equipped with a 1-yd. bucket.

The large size wheel tractor (Model 3010) shown at bottom of the page carries a ⅝-yd. bucket with a 4,800-lb. breakout force and a full lift height with 2,000 lb. and dumping clearance of 102 in. A single lever control is provided.

The industrial wheel tractors will have a power range of 40, 50, 60, and 85 hp. in the four sizes. Engines will operate at speeds up to 2,500 rpm.

MANUFACTURERS

C. A. Budnik joins American

C. A. Budnik, formerly assistant manager of industrial construction for Kaiser Engineers of Oakland, Calif., has been appointed general manager of the Titan Installation and Activation Division of American Machine & Foundry Co.'s Government Products Group in Greenwich, Conn.

Gar Wood appoints Glen Hicks

Appointment of W. Glen Hicks as sales manager, trailers, is announced by D. J. Davis, director of sales, Gar Wood Industries, Inc., Wayne, Mich. Hicks joined the company in 1952. As a project engineer, Richmond, California Division, he was responsible for the design of the Mono-Shell hopper trailers and directed the marketing of these new trailers to contractors in the West. In his new position Hicks will be responsible for the national marketing of all Gar Wood hopper and end-dump trailers, making his headquarters in Wayne.

Hague named district manager

G. N. Hague has been appointed district manager for Northern California, American Bitumels & Asphalt Co., as announced by C. W. Turner, president. Hague began his career in 1933 as a member of marketing department of Standard Oil Co. of California, the parent company. Immediately prior to his present appointment, Hague was a sales engineer for ABACO in Portland, Ore. He succeeds E. L. Morgan, who has gone into private business under the name of Colorado Bitumels Co., with headquarters in Denver.

C.I.T. makes two appointments

C.I.T. Corporation, Seattle, announces the addition of two men to its sales staff. Tom Biallas will handle the eastern Washington area, headquartering in Spokane; and Owen Sproat will headquarter in Tacoma and handle that area south to Cowlitz County.

108-year old firm relocating

H. G. Warrington, president of Vulcan Iron Works, Inc., announces that after operating in Chicago since the firm's founding in 1852 it will move its entire manufacturing facilities and offices to Chattanooga, Tenn., effective Nov. 1, 1960. The move is made for economic factors and for better proximity to major suppliers.

U. S. Rubber Western appointment

Announcement is made by E. G. Morrill, district sales manager, of the appointment of Carl D. Meyer as assistant district sales manager, Los Angeles district mechanical division, United States Rubber. Meyer started with the firm in 1953 as a salesman at the Denver branch.

Yale & Towne chooses president

Gordon Patterson, Detroit, has been elected president and a director of The Yale & Towne Mfg. Co. Patterson previously served as president of Square D Co. He succeeds Gilbert W. Chapman, who retired after eleven years as president of the firm.

BFG plans Salt Lake expansion

Office and warehouse facilities of The B. F. Goodrich Co. will soon move to a new and larger building in Salt Lake City, as an-

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Completely rebuilt. Like new condition. Guaranteed. D13000 Power Unit. See to appreciate.

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FOR SALE — 48" belt conveyor. Complete with like-new belting, drives, motors, plus oscillating hopper. Has had very little use. 180 ft. long, in 30 ft. sections. Anthony Machine & Engineering Service Inc., 107 - 109 El Camino, Millbrae, Calif. Phone OXford 7-4456.

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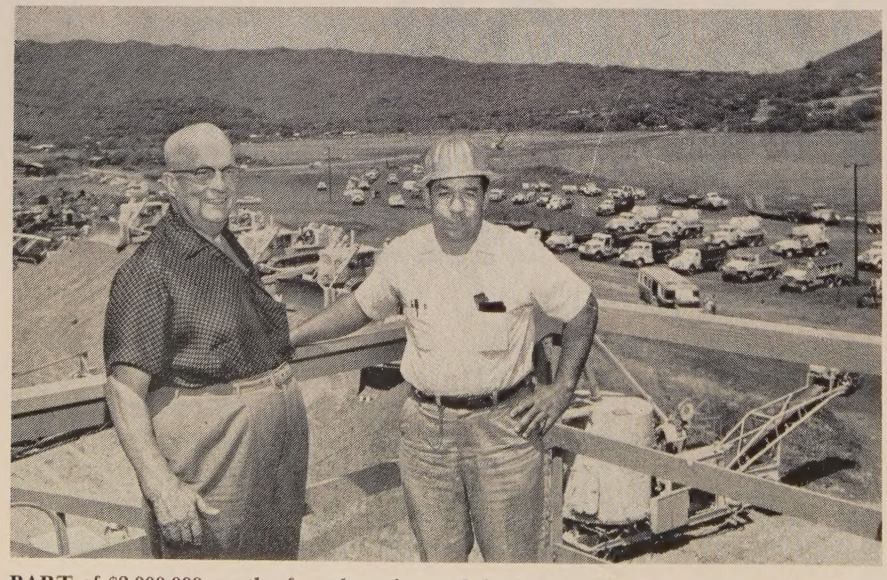
nounced by J. W. Martin, Salt Lake zone manager of the BFG Tire Co. The new facility is under construction on a 2-ac. tract at 450 West 17th South and will initially comprise 27,149 sq. ft.

Dangler succeeds Monroe

Election of Alfred Dangler, Jr., as president of Hercules Galion Products, Inc., is announced. He succeeds E. Paul Monroe, who is retiring following 53 years of service. Dangler has been executive vice president and general manager of the corporation since 1952.

Quick-Way promotes Robert Larsen

Robert G. Larsen, formerly Northeastern district representative for Quick-Way Truck Shovel Co., has been promoted to Western district representative to supervise distribution in seven of the Western states. With headquarters at 659 Southgate Ave., Daly City, Calif., Larsen will handle Quick-Way distribution in Washington, Oregon, California, Idaho, Nevada, Arizona, and Utah.



PART of $2,000,000 worth of earthmoving and dredging equipment serves as a backdrop in this picture of *Henry J. Kaiser* and his construction chief, *Roger James*, the men directing development of the latest in the many Kaiser enterprises in Hawaii: construction of a resort city on Oahu, where a marina, scenic residential areas, hotel, business and civic center and allied facilities will provide for a population of 75,000.

Every piece of equipment you see in the picture is painted pink. According to *A. G. Hanson*, district manager, and *Richard Young*, sales promotion manager of Theo. H. Davies & Co., Ltd., Tractor & Implement Department, Caterpillar distributor in Honolulu, all machinery purchased by Kaiser gets a new coat of paint. Caterpillar's famous Yellow is being replaced by Kaiser Pink on the numerous large projects under construction in Hawaii by this renowned Western industrialist.

R. C. Clark becomes Noble vice president and sales manager

Appointment of Robert C. Clark as vice president and general sales manager of Noble Company, Oakland, Calif., is announced. Joining the company in 1950, Clark established Noble's Northwest sales office at Seattle three years later and served as regional manager here until 1955 when he opened the Eastern sales division in Cleveland. In 1957 he returned to headquarters at Oakland to become sales promotion manager.

Pecco opens Western headquarters

American Pecco Corp. of White Plains, N. Y., announces the opening of a new Western headquarters at 439 South Canal St., South San Francisco, Calif., which will provide complete engineering facilities. For servicing the Southern California area, the firm has also opened a sales office and equipment yard at 11410 South Patton Road, Downey, Calif. A dealer network in the thirteen Western states, including Alaska and Hawaii, facilitates distribution of Pecco tower cranes and horizontal shoring.

Completion of plant to step up production in Arizona

Ray R. Adams, president of Phoenix Cement Co., announces plans to complete its plant at Clarkdale, Ariz., with new construction starting this fall. Directors of the parent company, American Cement Corp., in Detroit, approved installation of an additional rotary kiln to bring the capacity up from 1,800,000 bbls. annually to approximately 2,600,000. The plant at Clarkdale started operations in 1959.

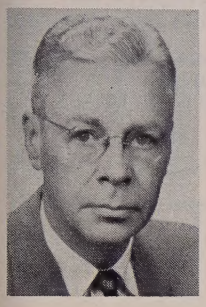
Technical center opens

One of the nation's most modern and complete concrete research laboratories is now located in Cleveland, Ohio, where Master Builders Co. operates a fully equipped 16,000-sq. ft. facility devoted to research and development for the improvement of concrete and other

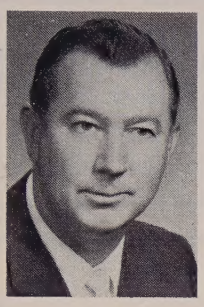
masonry products. The lab is under the direction of Thomas M. Kelly, vice president—research, and Herbert K. Cook, vice president—engineering, and occupies the lower level of the new Master headquarters.

Manufacturing company formed

Thunderbird Engineering, Inc., is a new manufacturing company located at 2811 Dawson Rd., Tulsa, Okla. Heading the organization



Berner



Lowder

are two men of long experience in the construction equipment field. President is Robert B. Berner, who served in various capacities for 28 years with Hetherington & Berner, and was its vice president in charge of sales. Robert W. Lowder, Thunderbird's vice president, was a district sales manager with H&B for several years, later operating his own construction company. Richard R. Berner, son of the president, is chief engineer as well as company treasurer.

With an extensive background in the construction equipment business, the principals of the new company expect to develop the varied roller units inherited from the Welded Products Co. of Oklahoma City into an up-to-date and highly competitive contractor line.

Joy has new Northwest manager

Joy Manufacturing Co. announces appointment of Clair C. Ballard as district manager at Seattle, Wash. Ballard has been affiliated with Joy since 1939 when he joined the Franklin, Pa., plant.

Colorado representative named

The appointment of Ward R. Kelley as earthmoving representative in Colorado and portions of surrounding territory is announced by Caterpillar Tractor Co. Kelley has been with Caterpillar since 1956.

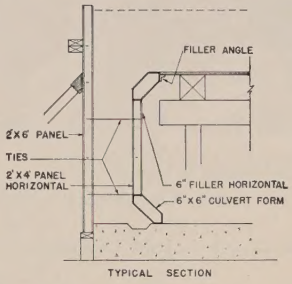
492 Ft. Culvert

Symons Prefab Forms and Engineering Service

. . . Reduced by About ½ Material Needed for Job

How to extend an existing culvert 492 feet to allow Mercer Slough to pass under the new Seattle by-pass of U.S. Highway 99. Also, how to finish it before rains swell the slough, or creek, to over-flowing. That was the problem faced by A. R. Anderson Construction Company, Seattle.

Anderson used Symons Culvert Forms with Symons Steel-Ply Panels. Symons engineering and their Seattle man, Hal Caffee, designed a form lay-



TYPICAL SECTION

out, so that inside wall and fillet forms could be stripped out without disturbing the shoring for the slab roof. This not only saved time but reduced by almost one-half, the material needed for the job.

The pay-off! It is estimated that it took under 200 man hours to set up and pour the job and under 60 man hours to strip the forms.

For the complete story on the *Seattle Culvert Job*, send in request on your company letterhead. Symons Steel-Ply Forms rented with purchase option.

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